

## Extruder

### Green-Tec.

A BioDegradable Plastic, and compostable. (Biodegradable plastics based on lignin compounds)

Manufacturers Recommended Settings		Personal preferred Settings
Nozzle temperature	170 - 230 °C	205 °C
Bed Temperature	0 – 60 °C	50°C
Speed (mm/s)	-120 mm/s	50-65 mm/s
Cooling Fan Speed	%	30 %
Max Flow Rate		8 mm <sup>3</sup> /s at 210°C
Retraction		4.5mm @25mm/s
<b>Other specifications</b>		
Density	1.2 g/cm <sup>3</sup>	
Diameter & Tolerance	2.85 ± 0.05mm	
Shore Hardness (A)		Glass Transition Temp °C
Bed Adhesive	None required	Hair spray

1cm<sup>3</sup> test piece, 9.93 x 10.02 x 9.90 (mm) (XYZ) weight 1.22g. Density = 1.2g/cm<sup>3</sup>

**Temperature:** Tested between 210-190°C, and printed well across this range no real noticeable difference, just seemed to look a little better at 205°C, not enough material to test the full range.

**Speed:** The material flowed nicely but lack of enough sample restricted tests from the volumetric flow test then it should print well at 50 – 70 mm/s.

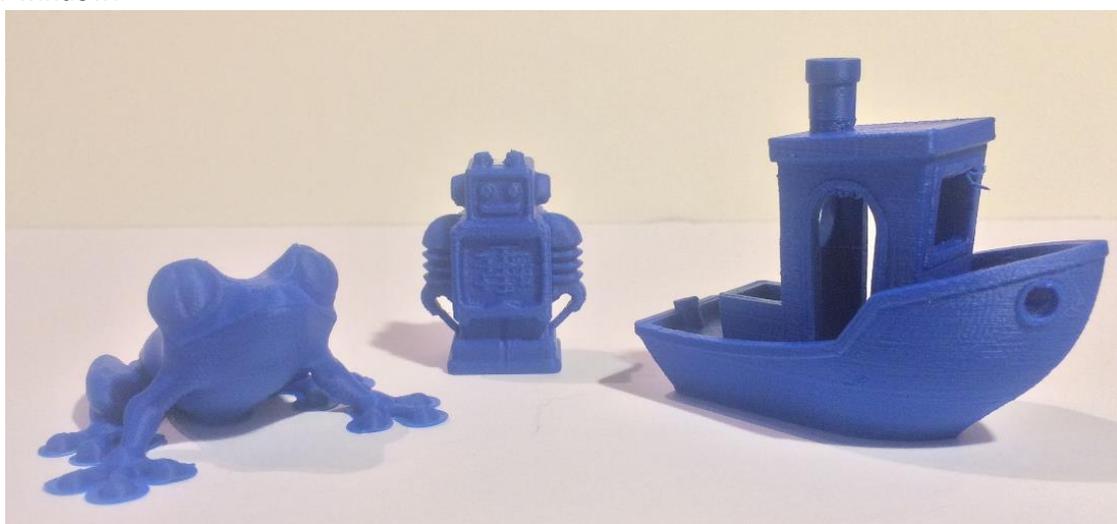
**Volumetric Flow:** Printed up to 9mm<sup>3</sup>/s and good layer adhesion at all levels, although quality of print did start to deteriorate at 8mm<sup>3</sup>/s.

**Preferred settings:** Nozzle temperature 205 °C, Bed temperature 50°C and 50mm/s print speed, moderate fan speed for the part and for detailed areas, and hairspray for bed adhesion.

**Ultimaker Robot:** A nice print, the blue colour is very nice and it coped with the overhangs and bridging well, good detail to the ears although perhaps slightly cooler or more fan speed for the antenna.

**Tree Frog:** A very nice print, giving a very nice smooth build of the belly overhang, no stringing on the build of the front legs so temperature and retractions just right for this print. Great definition all over the print.

**3DBenchy:** Another very nice print, no stringing at all at my referred setting, just a little problem on the initial bridging across the top of the square front window and the top of the arch on the doors and rear window.



### Shrinkage

	Length		Width		Height*	
Dimension	60mm		31mm		32.5mm	
Measurement and % difference	59.75	0.42%	30.87	0.42%	32.48	+0.06%

\*As the vertical height can be effected by the distance of the bed-levelling to the nozzle the height of the "Top of the Chimney to the top of the box" should be more accurate for the comparisons.

**Conclusion:** This was a very nice material to print with, the top surfaces were nice and smooth, and the test pieces printed well, they needed no finishing and looked good, the blue is almost semi metallic. They stuck very well to the print bed just using hairspray and were a little difficult to remove. The 'bdp' range are 'BioDegradable plastic' and as well as being 'biodegradable' they are also 'compostable', although only having one small sample to test I hope the other colours in the range would be similar in their printability and excellent results.

This bdp is a nice filament and one I would like to test further across its print temperature range, although the settings I used were giving great results, I would test further the fine details on the robot head and antenna, also to compare some of the other colours in the range.

Along with the other properties of the material that **Extrudr** quote, that is food-safe, heat resistant up to 110 – 120°C, has higher mechanical resistance, they also report very good properties regards shrinking and warping. The Biodegradability and Composability (apparently PLA although biodegradable does not return nutrients to the soil) of the filament would certainly attract some users. Perhaps the only down side is the cost, at the time of this review it is €56 for 1kg reel so nearly twice that of PLA.

Colours available; 10 Colours are in the range at this point and include, Spruce (wood). Flax, Antrazit (a dark Grey), Black, Blue, Natural, Red, Silver, White, Pearl,

<http://extrudr.eu/collections/bdp>

*Testing performed on an **Ultimaker<sup>2</sup>**, With a **BondTec** Feeder, an **Olsson Block** running a 35W heater and using a 0.4mm nozzle*

(October 2016).

(November 2016) Shrinkage Added.

(December 2016) Printer Spec Added

