

Purpose of the document

Developing Simplify3D printing profile for MANU Easy 1.0 for **Add North Koltron G1**¹ filament.

Compatibility with MANU Easy 1.0

1. Koltron specifications state that it needs high extrusion temperatures.
2. MANU E1 hasn't been tested with those before but review of electronics and heaters suggest it won't be a problem.
3. Build plate reaction with Koltron has not been tested before.
4. No information about Acrylic plate and Koltron.

Change log

1. v1.0 - Aug 9, 2021 Petri Heino Started the document and Manabi Poudel Update the document about print settings²

¹ More information can be found here <https://addnorth.fi/product/Koltron%20G1/>

² Reference document [MNE1-39 Internal tests - Koltron G1 Add North -E1](#)

TABLE OF CONTENTS

Purpose of the document	1
Compatibility with MANU Easy 1.0	1
Change log	1
Koltron G1 - Add North's Materials information	3
Print settings recommendation from Add North	3
Guidelines on how to print Koltron G1 on MANU Easy 1.0	4
Build Plate	4
Changes required to print Koltron G1	4
Development of print profile	5
Minimum extrusion temperature	5
1st layer printing temperature	5
Printing temperature	6
At 280 °C with the fan on.	6
At 290 °C with fan off.	7
Further Improvement	7
Microscope image of prints.	8
Final profile name:	8
Other observation	9
Open questions / More testing is required:	9
Download Simplify3d profile from here	9
Dropbox Shared Folder	9

Koltron G1 - Add North's Materials information

- Electrically and thermally conductive filament
- Filament with the highest flame-retardant rating
- Chemical resistantAdd North's Koltron G1 is a very electrically and thermally conductive filament. It's resistant to a range of chemicals, UV light and high continuous working temperatures, with the highest flame-retardant rating. The versatility is unmatched in polymer additive manufacturing.

The application areas for Koltron G1 are vast, ranging from EMI and RFI (electromagnetic and radio frequency interference) shielding to capacitive sensors, wearable and printed electronics as well as the cooling of electronics. The incorporation of Graphmatech's unique AROS Graphene also gives the printed parts excellent self-lubricating properties.

Print settings recommendation from Add North

Temperature	First Layer 280°C, Print Temperature 290°C
Fan speed	- (zero)
Print speed	15 mm/sec

Guidelines on how to print Koltron G1 on MANU Easy 1.0

Build Plate

Acrylic plate A010702³

Changes required to print Koltron G1

- The double fan update is needed
 - Better arm cooling (no problems of raised temperature)
 - The print tests were performed with print cooling fan 0%, and fan speed affects Koltron Layer adhesion drastically.
- Raising the maximum allowed temperature
 - [M143 Command](#)
 - It is set in `config.g`
 - Change the S value to 300 to support 300 °C.

```
M143 H1 S300 ;set temperature limit for heater 1 to 300C
```

³ A010702 -

Development of print profile

Minimum extrusion temperature

Material was tried to extrude at

Temperature °C	Description
1. 210 °C	<i>Koltron G1 was extruded upto 60mm and then it got stuck. Others observation: Gear has grinded the filament.</i>
2. 235 °C	
3. 275 °C	Good material flow was observed at 275°C.

1st layer printing temperature

Temperature °C	Description
1. 268 °C	<i>The printed part was successfully removed from the bed, but part leaves some colour mark at the plate.</i>
2. 270 °C	<i>The printed part comes out from the bed but a small layer is broken from the bed.</i>
3. 272 °C	<i>Printed part was hard to remove with 275 °C and 272 °C. Material stuck too much to the bed.</i>
4. 275°C	

Manabi Poudel decided not to lower the temperature more than 265 °C because the material can lose strength.

MNEI-39 Koltron G1 Add North S3D -E1

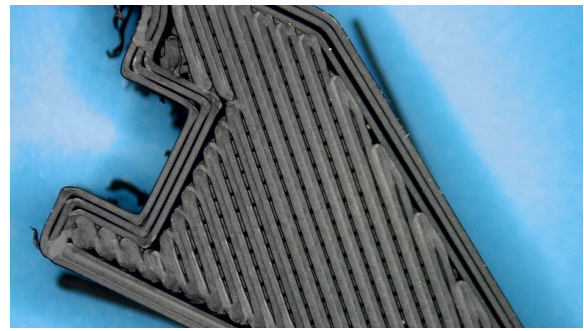
Printing temperature

Part was printed at 280 °C, 290 °C and 295 °C

At 280 °C with the fan on.



Koltron_test_low temperature_with_fan_2
(bottom view)

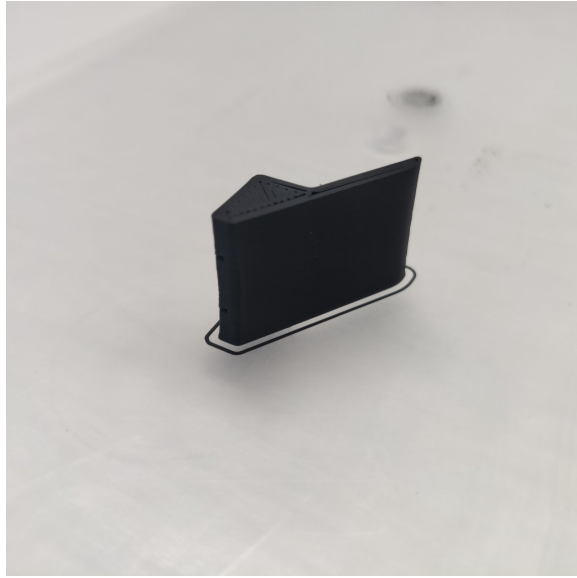


Koltron_test_low temperature_with_fan_1
(top view)



At 280 °C with a fan 100% part was very weak and breaking apart.

At 290 °C with fan off.



At 290 °C part with fan off print was much better and stronger.

Further Improvement

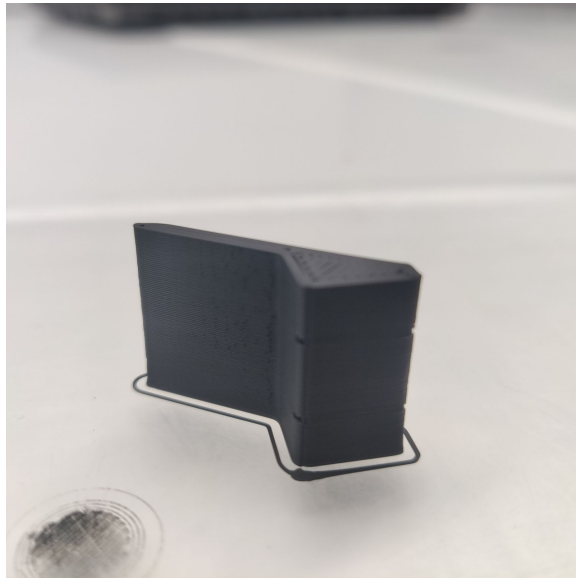
Theory is that gradual increase in temperature would make for better layer adhesion.

Temperature set as

Layer	Temperature
1st Layer	268°C ⁴
2nd Layer	280°C
3rd Layer	290°C
4th Layer	295°C

⁴ [1st layer printing temperature](#) The printed part was successfully removed from the bed, but part leaves some colour mark at the plate.

Microscope image of prints.

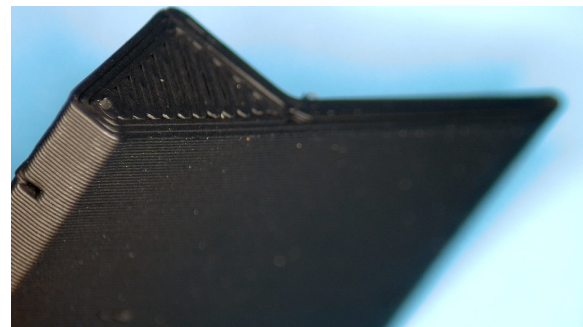


Koltron_g1_3 (bottom view)

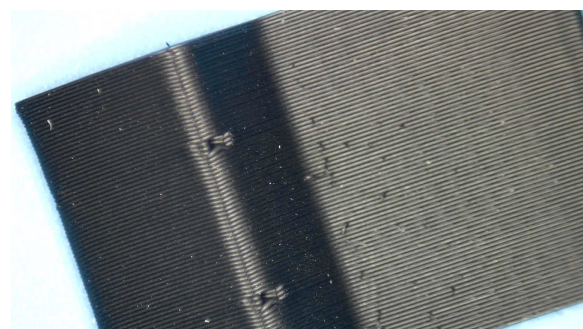
For more strong adhesive infill overlap increased to 20% and print temperature 295 °C

Final profile name:

ANKG1 1.0.0 E1 S3D.fff



Koltron_g1_2 (top view)



Koltron_g1_1 (side view)

Other observation

Tested 1st layer print with PC plate at 280 °C, Kaltron makes no connection with the PC plate at 280, but makes a good chemical connection to Acrylic.

Open questions / More testing is required:

1. Support test
2. Big part printing test
3. Thermistor insulation specification sheet recommends that time used in 300 degrees is max 4 hours. Long term usage at near 300deg should be tested more.
4. To maintain the temperature of the hotend, a new hotend shield may be needed. New hotend shield is in the production process.

Download Simplify3d profile from here

Dropbox Shared Folder

Addnorth Koltron G1 e1 -p

<https://www.dropbox.com/sh/psvb11fj6qi11oo/AABAEyeM-WMc8BTiqMrHCJb-a?dl=0>

— Thank you! —