

Instruction S-2 – 3D-printing guide

STL-name	Folder	Filament	No	Slicer setting
frame_left_back	frames	PLA ¹⁾	1	PLA-general
frame_left_front	frames	PLA	1	PLA-general
frame_right_back	frames	PLA	1	PLA-general
frame_right_front	frames	PLA	1	PLA-general
frame_front	frames	PLA	1	PLA-general
frame_back	frames	PLA	1	PLA-general
frame_top_front	frames	PLA	1	PLA-general
frame_top_back	frames	PLA	1	PLA-general
cable_clip1	frames	PLA	15	PLA-standard
cable_clip2	frames	PLA	4	PLA-standard
cable_clip3	frames	PLA	2	PLA-standard
cable_clip_alu	frames	PLA	20	PLA-standard
cable_support_electronic_box	frames	PLA	1	PLA-general
cable-label_X	electronic box	PLA white	2	PLA-standard
cable-label_Y	electronic box	PLA white	2	PLA-standard
cable-label_Z1	electronic box	PLA white	2	PLA-standard
cable-label_E0	electronic box	PLA white	1	PLA-standard
foot_inside	panels	PLA	3	PLA-general
foot_outside	panels	PLA	3	PLA-general
front_holder	panels	PLA	1	PLA-standard
cover_y_motor	panels	PLA	1	PLA-standard
cover_autosampler_mounting_profile	panels	PLA	1	PLA-standard
cover_autosampler_motor_holder	panels	PLA	1	PLA-standard
cover_z1_motor	panels	PLA	1	PLA-standard
waste_bottle_holder	panels	PFFC ²⁾	1	PCCF-general
y-axis_back	y-axis	PLA	1	PLA-strong
y-axis_front	y-axis	PLA	1	PLA-strong
y-axis_cart	y-axis	PCCF	1	PCCF-general
y-axis_cork	y-axis	PLA	1	PLA-general
x-axis_left	x-axis	PLA	1	PLA-strong
x-axis_right	x-axis	PLA	1	PLA-strong
x-axis_valve_holder_mount	x-axis	PCCF	1	PCCF-general
x-axis_valve_holder	x-axis	PCCF	1	PCCF-general
x-axis_cart	x-axis	PCCF	1	PCCF-general
x-axis_distance_check_left	x-axis	PLA	2	PLA-general
x-axis_cable_guide_top_left	x-axis	PLA	1	PLA-general
x-axis_cable_guide_top_right	x-axis	PLA	1	PLA-general
e-axis_motor_holder	e-axis	PCCF	1	PCCF-general
e-axis_needle_pusher	e-axis	PCCF	1	PCCF-general
e-axis_pump_holder	e-axis	PLA	1	PLA-general
e-axis_connector_long	e-axis	PLA	2	PLA-strong
e-axis_connector_bottom	e-axis	PLA	1	PLA-strong
e-axis_connector_top	e-axis	PLA	1	PLA-strong
e-axis_3way-valve_holder	e-axis	PLA	1	PLA-general
3way-valve_manifold	e-axis	PCCF	1	PCCF-general
micropump_manifold	e-axis	PCCF	1	PCCF-general
3way-valve_manifold_drill-aid	e-axis	PCCF	1	PCCF-general
micropump_manifold_drill-aid	e-axis	PCCF	1	PCCF-general
cutting_aid_Prusa_PTFE_tube	e-axis	PLA	1	PLA-general
autosampler_vial_rack	autosampler	PCCF	1	PCCF-general
autosampler_vial_rack_holder	autosampler	PCCF	1	PCCF-general
autosampler_slider	autosampler	PCCF	1	PCCF-slider-tip
autosampler_slider_tip	autosampler	PCCF	1	PCCF-slider-tip
autosampler_motor_holder	autosampler	PLA	1	PLA-strong
autosampler_mounting_profile	autosampler	PLA	1	PLA-strong
autosampler_distance-tool	autosampler	PLA	1	PLA-standard
rinsing_waste_bottle	autosampler	PA12 ⁴⁾	2	PA-spiral-vase
rinsing_bottle_cap	autosampler	PA12	1	PA-standard
syringe-pump_body	syringe pump	PCCF	1	PCCF-general
syringe-pump_clip	syringe pump	PCCF	1	PCCF-general
syringe-pump_syringe_holder_adapter_2mL	syringe pump	PCCF	1	PCCF-general

syringe-pump syringe holder adapter 5mL	syringe pump	PCCF	1	PCCF-general
syringe-pump syringe holder adapter 10mL	syringe pump	PCCF	1	PCCF-general
syringe-pump pusher base	syringe pump	PCCF	1	PCCF-general
syringe-pump pusher syringe adapter 2mL	syringe pump	PCCF	1	PCCF-general
syringe-pump pusher syringe adapter 5mL	syringe pump	PCCF	1	PCCF-general
syringe-pump pusher syringe adapter 10mL	syringe pump	PCCF	1	PCCF-general
syringe-pump plug steel rods	syringe pump	PCCF		PCCF-general
multifunctional plate-holder front	plate holder	PCCF	1	PCCF-general
multifunctional plate-holder back	plate holder	PCCF	1	PCCF-general
multifunctional plate-holder plug	plate holder	PCCF	1	PCCF-general
multifunctional plate-holder cover development	plate holder	PCCF	1	PCCF-general
plate-holder simple front	plate holder	PLA	1	PLA-general
plate-holder simple back	plate holder	PLA	1	PLA-general
plate-holder backlight front	plate holder	PLA white	1	PLA-general
plate-holder backlight back	plate holder	PLA white	1	PLA-general
plate-holder backlight plug	plate holder	PLA white	1	PLA-general
cutting-aid plexi-glass	plate holder	PLA	1	PLA-general
camera-cabinet body	camera	PLA matte ³⁾	1	PLA-general
camera-cabinet facing	camera	PLA	1	PLA-general
camera-cabinet holder	camera	PLA	1	PLA-strong
camera-cabinet top	camera	PLA matte	1	PLA-general
camera-cabinet UV-filter protect	camera	PLA	2	PLA-general
camera-cabinet module3-adapter, option	camera	PLA	1	PLA-general
electronic-box body	electronic box	PLA	1	PLA-general
electronic-box spindle-cover	electronic box	PLA	1	PLA-general
electronic-box cover	electronic box	PLA	1	PLA-general
electronic-box frame-led-label	electronic box	PLA white	1	PLA-standard
DC-power-jacket housing	electronic box	PLA	1	PLA-general
DC-power-jacket housing cover	electronic box	PLA	1	PLA-general
nebulizer chamber main	nebulizer	PLA	1	PLA-standard
nebulizer chamber extension	nebulizer	PLA	1	PLA-standard
nebulizer chamber lid	nebulizer	PLA	1	PLA-standard
nebulizer atomizer part-1	nebulizer	PA12	1	PA-standard
nebulizer atomizer part-2	nebulizer	PA12	1	PA-standard
nebulizer atomizer lid	nebulizer	PLA	1	PLA-standard
mini-incubator inner bottom	mini-incubator	PLA	1	PLA-standard
mini-incubator outer bottom	mini-incubator	PLA	1	PLA-standard
mini-incubator inner lid	mini-incubator	PLA	1	PLA-standard
mini-incubator outer lid	mini-incubator	PLA	1	PLA-standard
mini-shaker burling	mini shaker	PCCF	3	PCCF-general
mini-shaker excenter	mini shaker	PCCF	2	PCCF-general
mini-shaker motor adapter	mini shaker	PCCF	1	PCCF-general
mini-shaker base	mini shaker	PLA	1	PLA-general
mini-shaker platform	mini shaker	PLA	1	PLA-general
mini-shaker platform support	mini shaker	PLA	1	PLA-general
mini-shaker base cover	mini shaker	PLA	1	PLA-general
mini-shaker board holder	mini shaker	PLA	1	PLA-standard
mini-shaker heated hood	mini shaker	PLA	1	PLA-standrad
mini-shaker heated hood cover	mini shaker	PLA	1	PLA-standard
mini-shaker heated hood cable support	mini shaker	PLA	1	PLA-standard
mini-shaker washer	mini shaker	PLA	2	PLA-standard
handle allen-key 1.5mm	tools	PLA	1	PLA-concentric
handle allen-key 2mm	tools	PLA	1	PLA-concentric
handle for thread tap M2-M2.5	tools	PLA	1	PLA-concentric
handle for thread tap M3	tools	PLA	1	PLA-concentric
handle for thread tap M4	tools	PLA	1	PLA-concentric
handle for thread tap M5	tools	PLA	1	PLA-concentric
handle for thread tap UNF-6x40	tools	PLA	1	PLA-concentric
needle-wrench	tools	PLA	1	PLA-general
tool miniature ball bearings	tools	PLA	1	PLA-standard

Preliminary remarks

The exact printing of the 3D parts depends on various parameters, the 3D printer, the printer settings and the filament supplier.

Therefore, check e.g. with the plate-holder_simple_front (PLA), if the layers are printed well and smooth surfaces are obtained. Additionally, compare the external and internal dimensions with those in the slicer. In the worst case, the objects have to be modified in the CAD software.

PC Blend Carbon Fiber (PCCF)

PCCF can be printed with a standard brass nozzle for a while, but the nozzle will be damaged with time by the abrasive filament. Therefore, a hardened steel nozzle is suggested. A ruby nozzle is the best, but is rather expensive.

As PCCF is rather soft as compared to PLA, it is not easy to remove support materials from freshly printed parts. Therefore, let the 3D-printed parts thoroughly cool down and partly crystallize, at least 12 hours. Then the support material is well separated and quite easy to remove without residues.

Printer settings

PCCF-general:

Layer height: 0.20mm

Perimeters: 4

Infill: 25% (grid)

Solid layers: 6 top and bottom

Support material:

First layer density 30 %

Top interface layers 3

Bottom interface layers 0

XY Separation: 150%

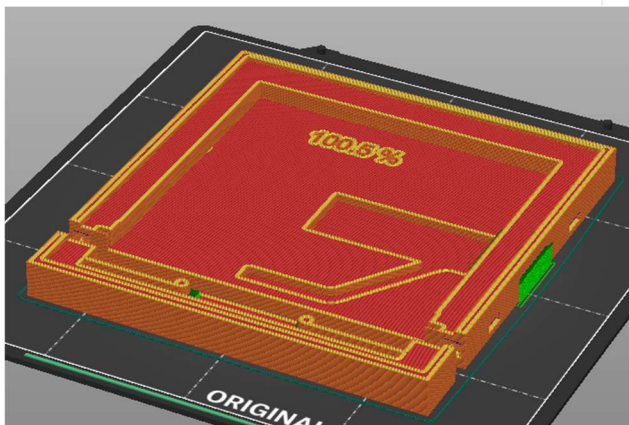
Multi functional plateholder

In the slicer, scale both parts to 100.5%!!

The parts will shrink during annealing at 140 °C.

Supports everywhere!

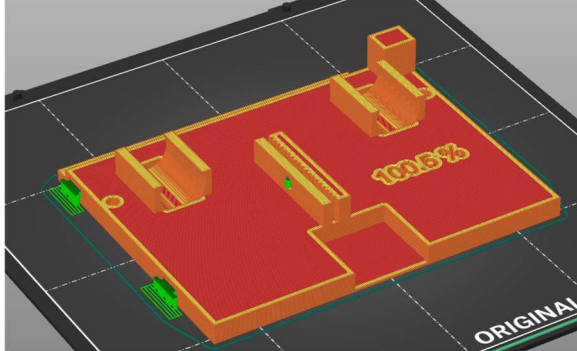
Object manipulation				
World coordinates	X	Y	Z	
Position:	90	102.25	6.03	mm
Rotate (relative):	0	0	0	°
Scale factors:	100.5	100.5	100.5	% ↻
Size [World]:	128.64	110.05	12.06	mm



Y-Cart

In the slicer, scale the part to 100.5 %!
The part will shrink during annealing at 140 °C.

Supports everywhere.

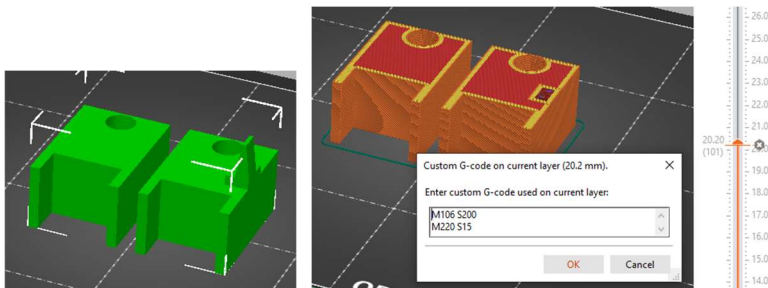


Object manipulation				
World coordinates	X	Y	Z	
Position:	90	102.25	6.03	mm
Rotate (relative):	0	0	0	°
Scale factors:	100.5	100.5	100.5	% ↻
Size [World]:	128.64	110.05	12.06	mm

☞ After printing and cleaning, heat both the plateholder parts and the y_cart in an oven at 140 °C for two hours, resulting in heat stability.

Autosampler sliders

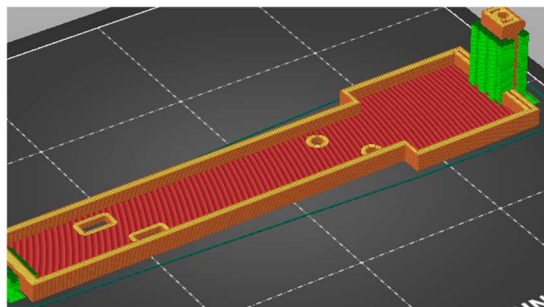
After slicing, move the slider to a height of 20.2 mm and add the custom G-codes M106 S200 (fan speed) and M220 S15 (print very slowly). Slice again.
[After printing, reset the printer. Otherwise the next print will start slowly!]



No supports!

Vial-rack holder

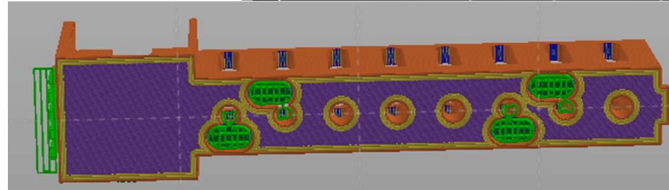
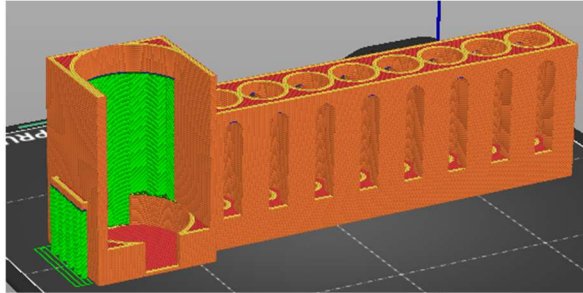
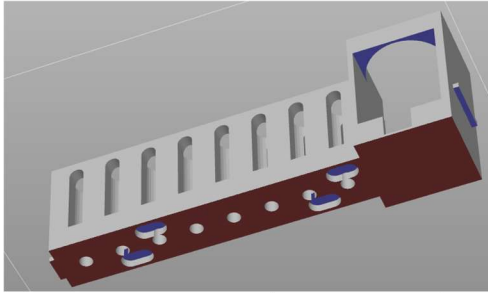
Supports everywhere!



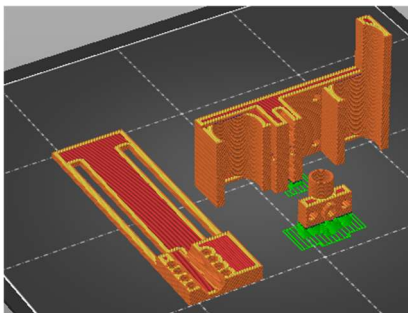
Vial-rack

Paint-on supports with Smart fill (here marked in blue).

Support for support enforcers only!



x-axis (PCCF parts)

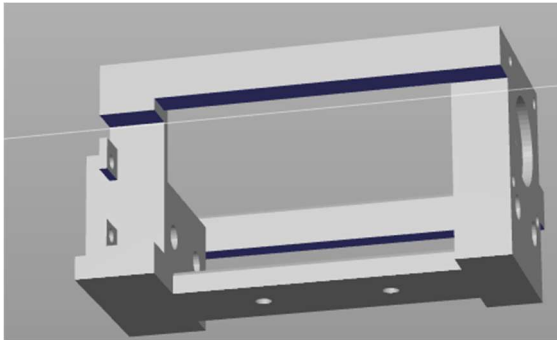


x-axis_cart
x-axis_valve_holder
x-axis_valve_holder_mount

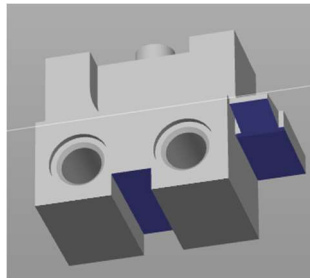
Supports on build plate only!

Syringe pump

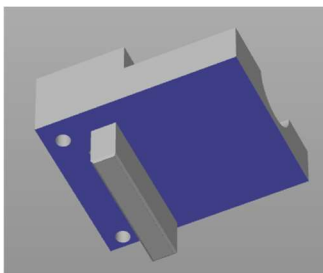
Paint-on supports with Smart fill (here marked in blue).



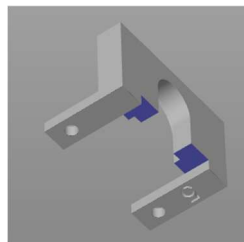
body



pusher

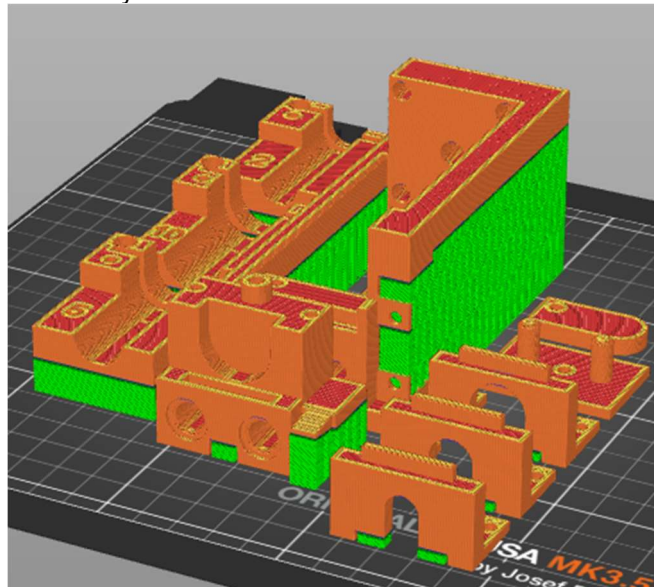


syringe_holder_adapter



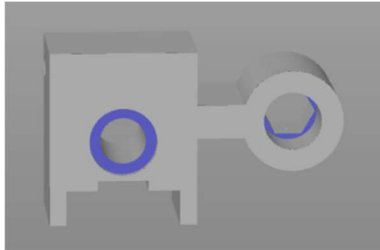
pusher_syringe_adapter

Support for support enforcers only!

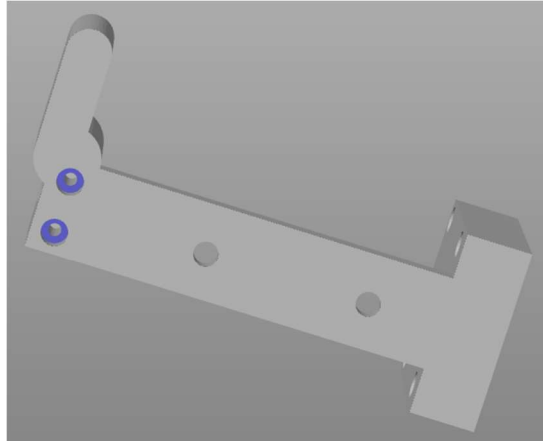


e-axis (PCCF parts)

Paint on support with smart fill (here marked in blue)

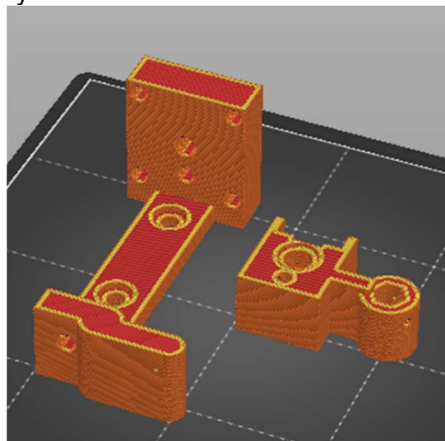


needle_pusher

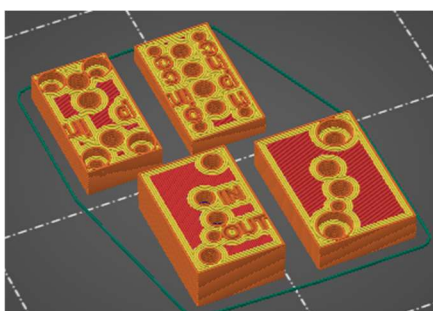


motor_holder

Support for support enforcers only!



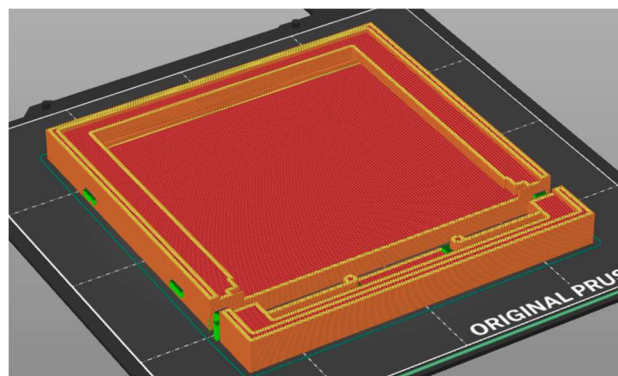
Manifolds for Lee micropump and 3-way valve



No supports!

Plate holder simple

Supports everywhere!



PLA

PLA-strong:

Layer height: 0.20mm

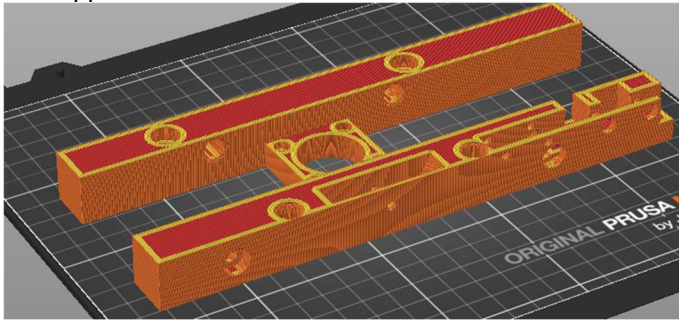
Perimeters: 6

Infill: 70% (grid)

Solid layers: 6 top and bottom

y-axis

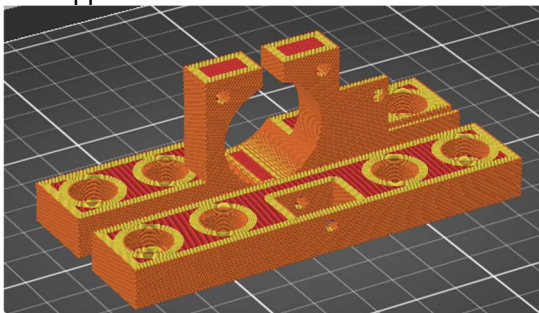
No supports!!



y_back and y_front

x-axis

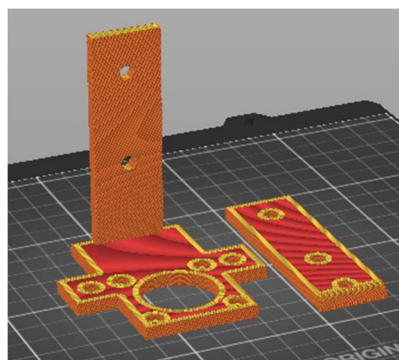
No supports!



x_right and x_left

Autosampler (PLA parts)

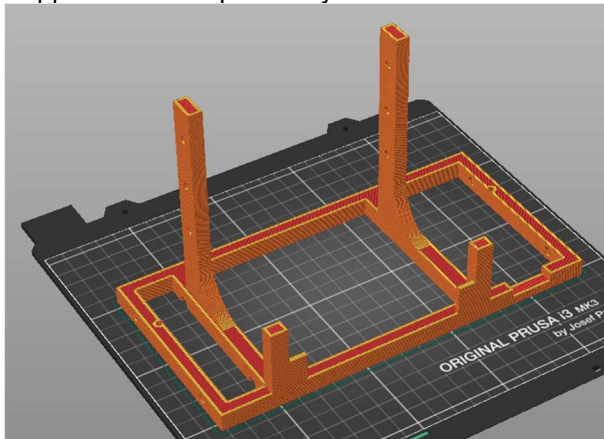
No supports!



motor_holder, mounting_profile

Camera cabinet holder

Supports on build plate only!



PLA-general:

Layer height: 0.20mm

Perimeters: 4

Infill: 25% (grid)

Solid layers: 6 top and bottom

Support material:

First layer density 40 %

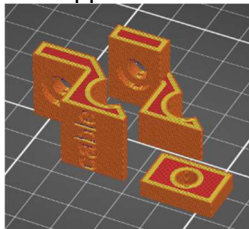
Top interface layers 3

Bottom interface layers 0

XY Separation: 150%

x-axis

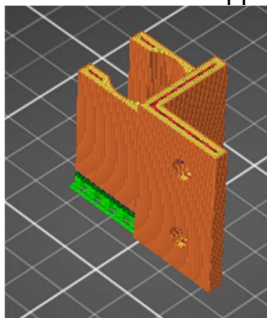
No supports!



x-axis_distance_check_left, x-axis_cable_guide_top_left, x-axis_cable_guide_top_right

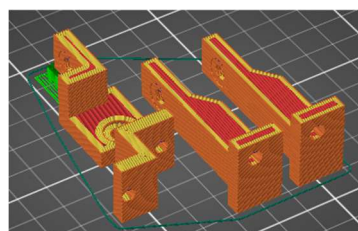
e-axis

Support on build plate only!

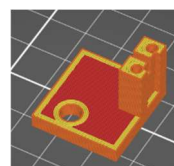


micropump_holder

No support!



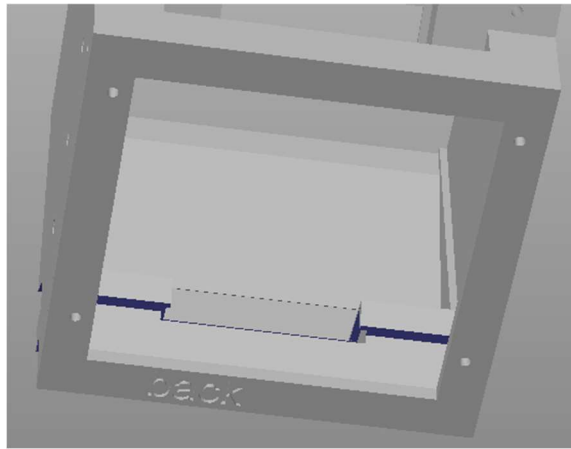
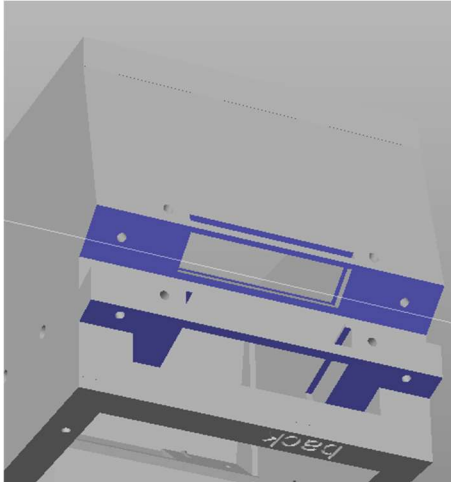
connectors



3way-valve_holder

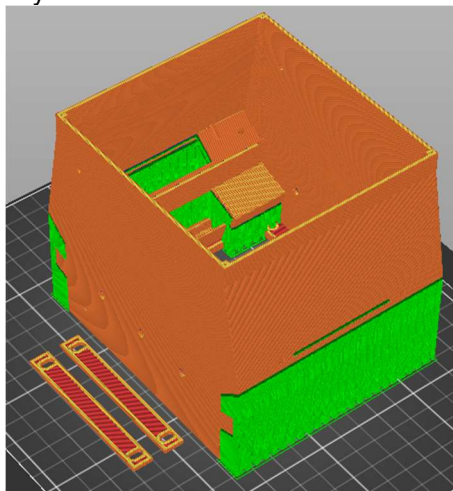
Camera cabinet

Paint-on supports with Smart fill (here marked in blue)

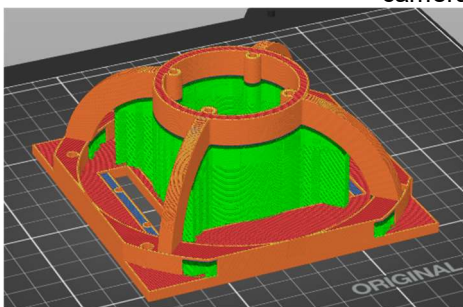


Camera cabinet

Supports for support enforcers only!

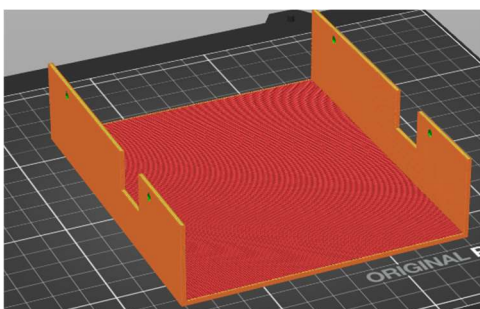


camera_cabinet, UV-filter_protect



Camera_top

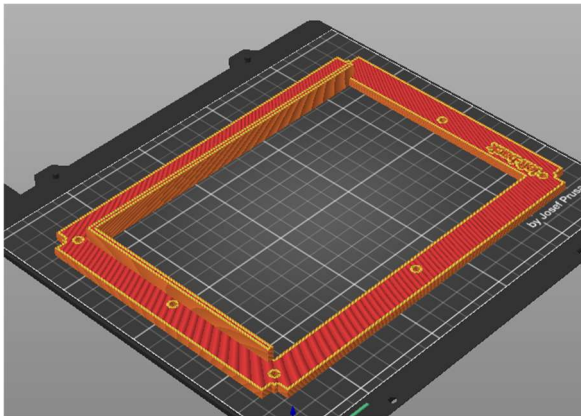
Supports everywhere!



Camera_facing

No supports!

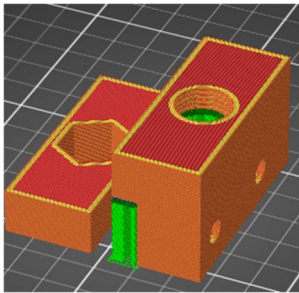
Frames



Exemplarily shown for frame_left_back.

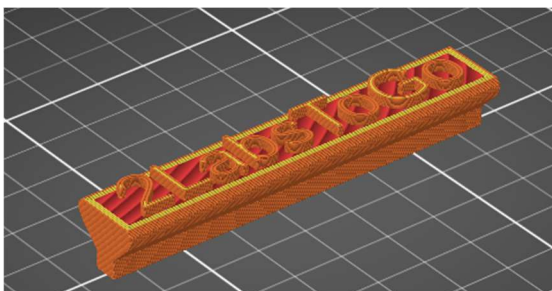
Frame_front and frame_back_bottom need supports on build plate only!

DC-power-jacket_housing



Supports on build plate only!

Front holder



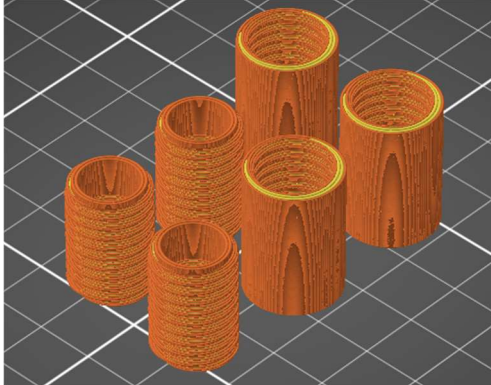
No supports!

Feet

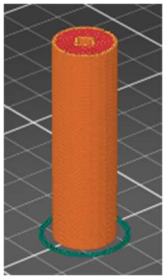
PLA-general but infill concentric

Reduce the size of the parts with the external thread to 96.5% both in x- and y-direction

No supports!



Object manipulation				
World coordinates	X	Y	Z	
Position:	115.47	126.98	10	mm
Rotate (relative):	0	0	0	°
Scale factors:	96.5	96.5	100	%
Size [World]:	13.34	13.34	20	mm



Handle for thread taps and allen keys

PLA-standard:

Layer height: 0.20mm

Perimeters: 2

Infill: 15% (grid)

Solid layers: 4 top and bottom

Support material:

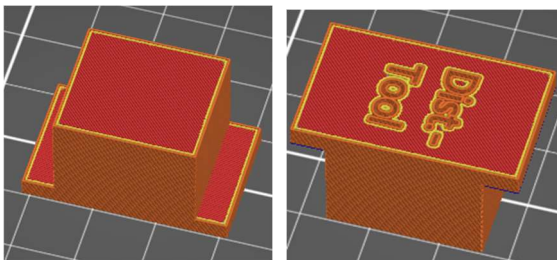
First layer density 40 %

Top interface layers 3

Bottom interface layers 0

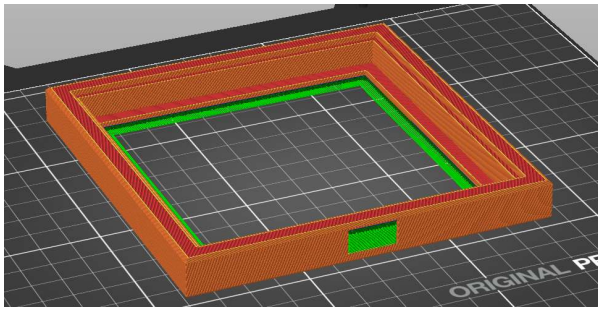
XY Separation: 150%

Autosampler distance_tool

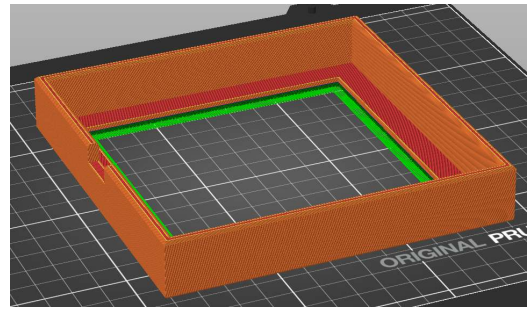


No supports!

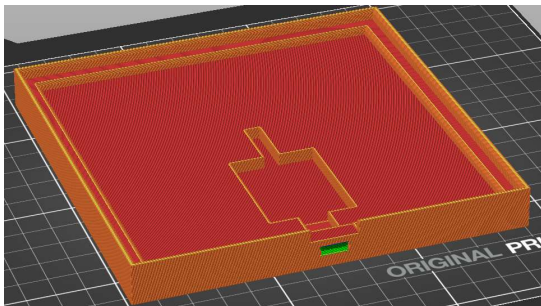
Mini-Incubator



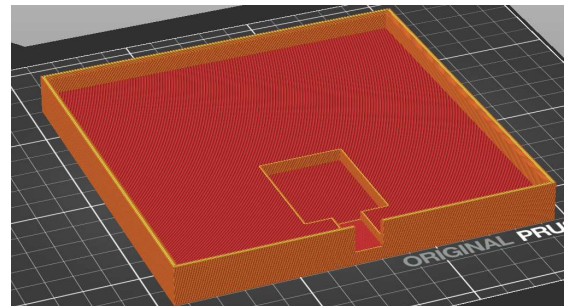
inner_bottom (support everywhere)



inner_lid (support on build plate only)



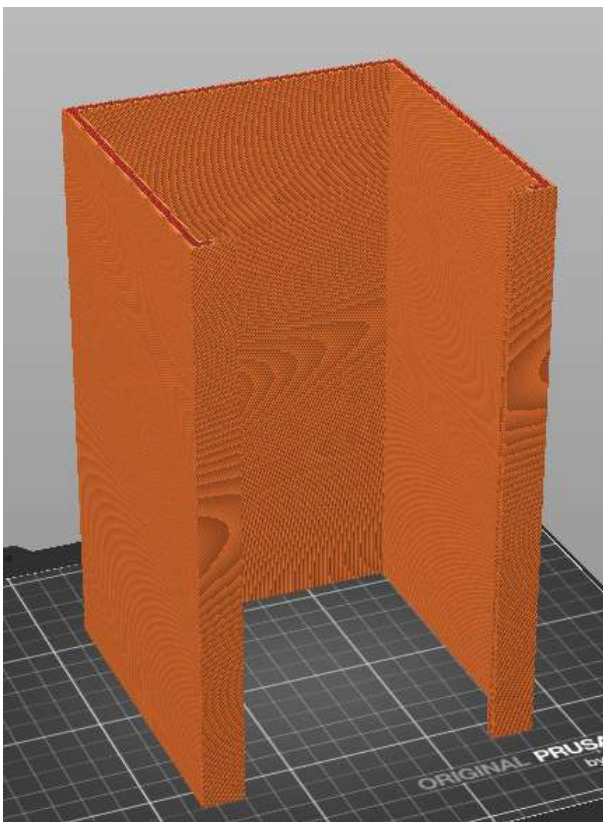
outer_bottom (support everywhere)



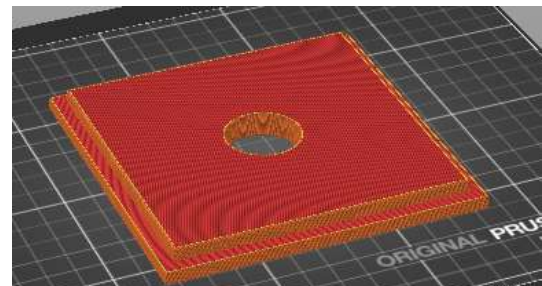
outer_lid (no support needed)

Nebulizer

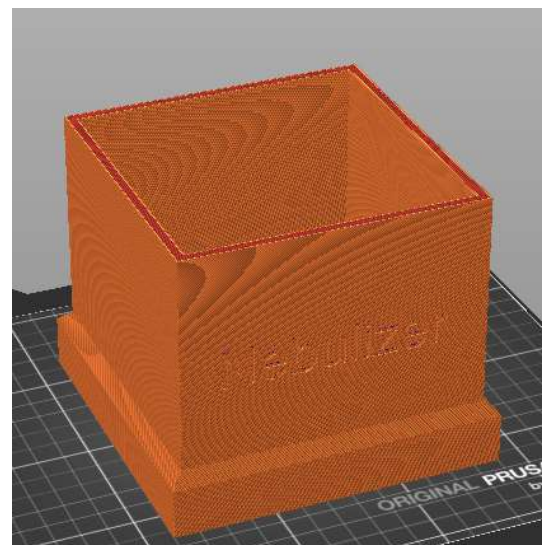
No support needed for any part!



nebulizer_chamber_main



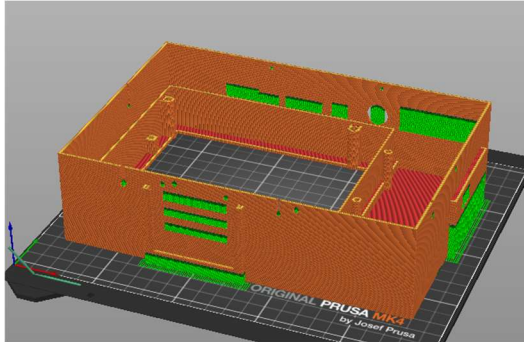
nebulizer_chamber_lid



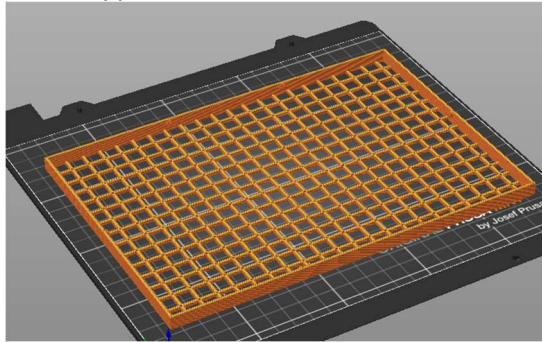
nebulizer_chamber_extension

Electronic box

Supports everywhere!

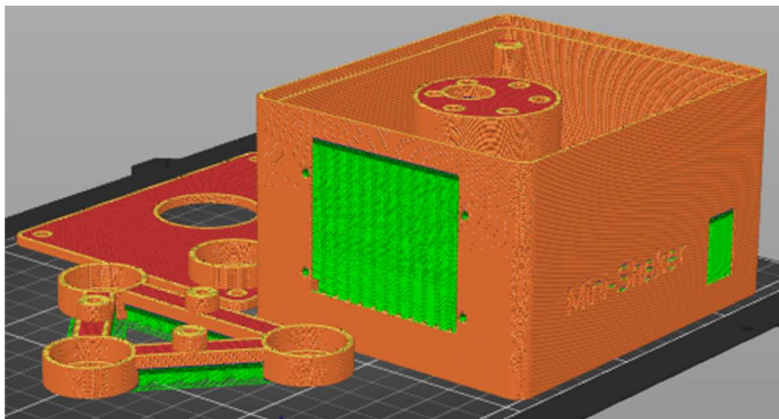


No supports!



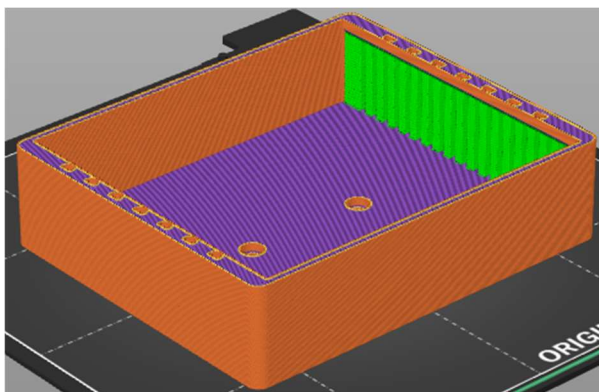
Mini-Shaker

PLA-general



Supports everywhere!

case, case_cover; platform_support

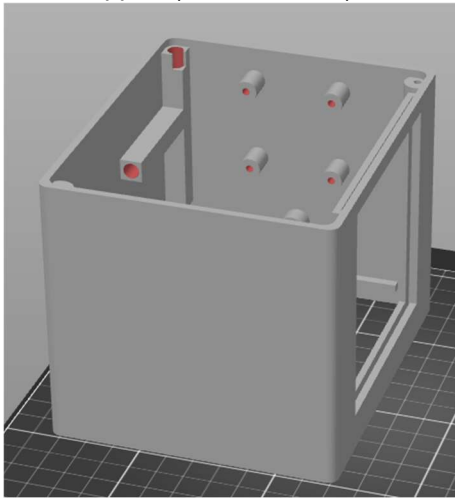


Supports everywhere!

platform

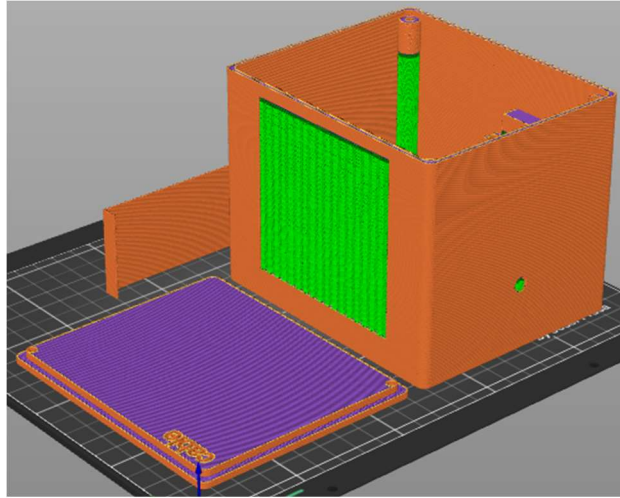
PLA-standard

Block support (marked in red)



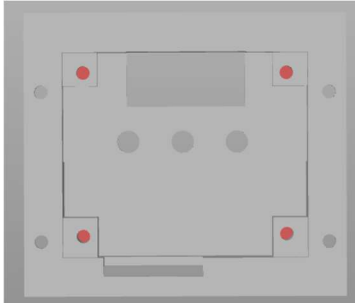
hood

Supports everywhere!



hood, hood_cover, cable_support

Block support (marked in red)

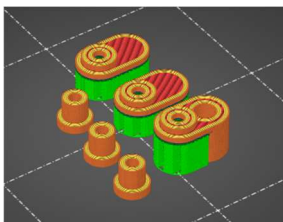


board-housing



Support on build plate only!

PCCF-general



Supports on build plate only!

excenters, burlings, motor_adapter

PLA white

Layer height: 0.20mm

Perimeters: 4

Infill: 25% (grid)

Solid layers: 6 top and bottom

Support material:

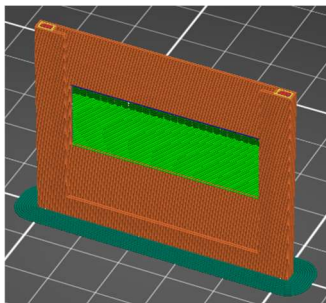
First layer density 40 %

Top interface layers 3

Bottom interface layers 0

XY Separation: 0.2 mm

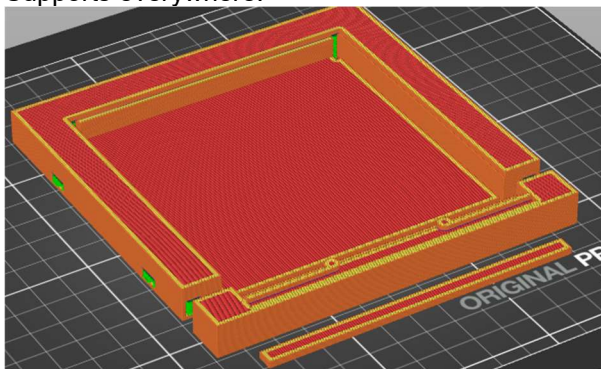
Electronic box – Label frame



Support material everywhere! Brim!

Backlight-plate holder

Supports everywhere!



Polyamide (PA12)

Remarks:

Polyamide filaments are hygroscopic and must be kept dry! Otherwise water evaporizes in the hotend, preventing sticking onto the build plate.

The best build plate is the PA Nylon Powder-coated Steel Sheet (Prusa).
Alternatively, the textured sheet can be used, together with a glue stick.

PA-general:

Print settings: 0.20mm

Filament settings: PA12 (nozzle 255 °C, bed 105 °C)

Perimeters: 4

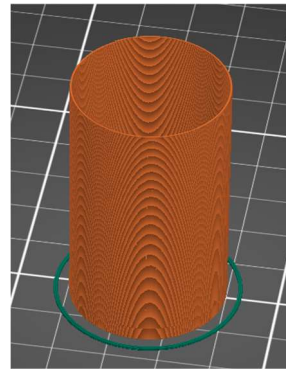
Solid layers: 6 top and bottom

Infill: 25 % (concentric)

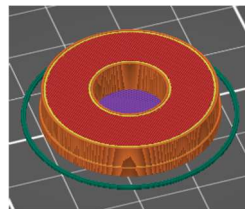
Rinsing vial, waste vial

Spiral vase!

Layer height	
Layer height:	<input type="text" value="0.2"/> mm
First layer height:	<input type="text" value="0.2"/> mm
Vertical shells	
Perimeters:	<input type="text" value="1"/> (minimum)
Spiral vase:	<input checked="" type="checkbox"/>
Recommended object thin wall thickness for layer height 0.20 and 2 lines: 0.86 mm	
Horizontal shells	
Solid layers:	Top: <input type="text" value="0"/> Bottom: <input type="text" value="15"/>
Minimum shell thickness:	Top: <input type="text" value="0.7"/> mm Bottom: <input type="text" value="0.5"/> mm
Top is open. Bottom shell is 3 mm thick for layer height 0.2 mm. Minimum bottom shell thickness is 1.05 mm.	



Rinsing vial cap



Spiral vase deactivated!

PA-standard

Print settings: 0.20mm

Filament settings: PA12 (nozzle 250 °C, bed 100 °C)

Perimeters: 2

Solid layers: 6 top, 4 bottom

Infill: 15 % (gyroid)

Nebulizer Atomizer

No supports!

