Instruction S3 – 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_tensioner	y-axis	PCCF	1	PCCF-general
y-axis_tensioner	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_tensioner	x-axis	PCCF	1	PCCF-general
x-axis_tensioner	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 abbrasive 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.

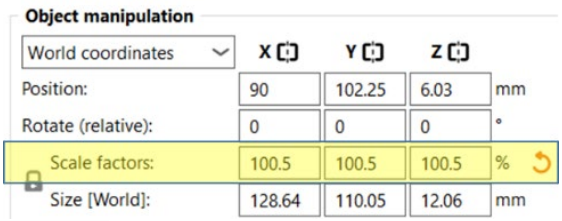
Printer settings

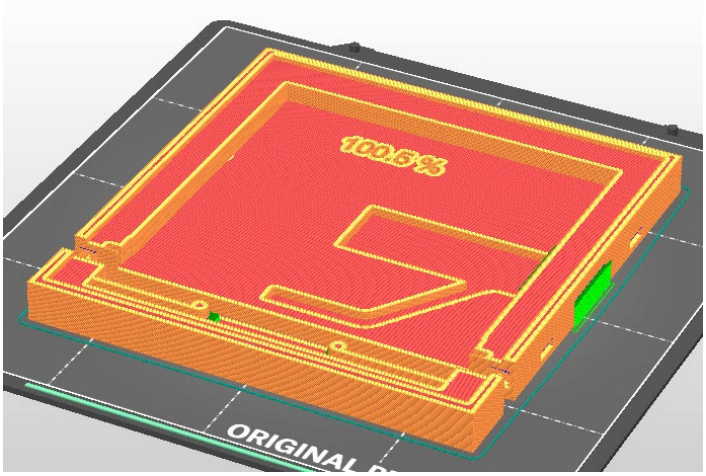
PCCF-general:
Layer height: 0.20mm
Perimeters: 4
Infill: 25% (grid)
Solid layers: 6 top and bottom
Support material:
- First layer density 30 %
- Top interface layers 3
- Bottom interface layers 0
- XY Separation: 150%

Multi functional plateholder

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

Supports everywhere!

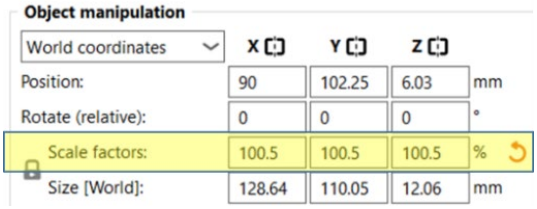


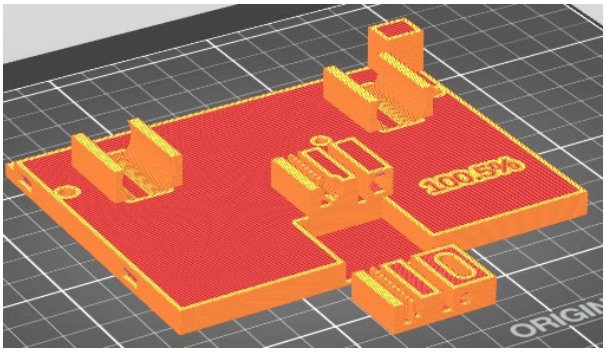


Y-axis_cart_tensioner

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

No support material.

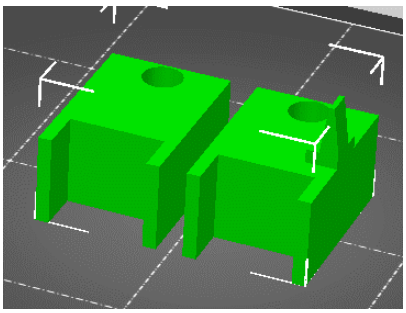


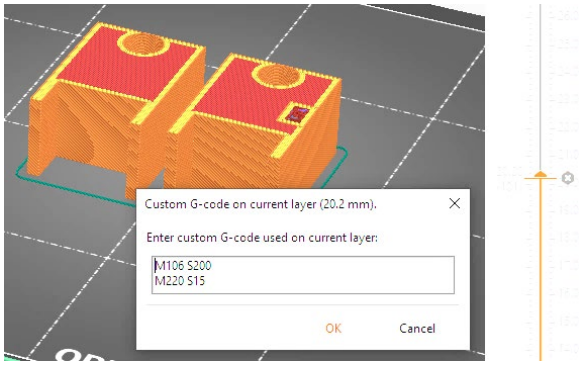


☞After printing and cleaning, heat both the plateholder parts and the y_cart in an oven at 140 °C for two hours, resulting in heat stability.

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!]

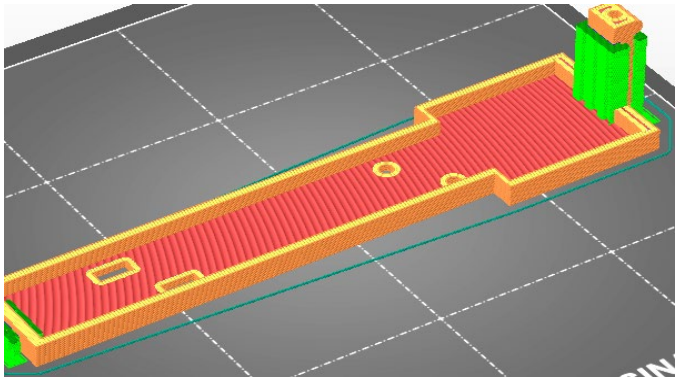




No supports!

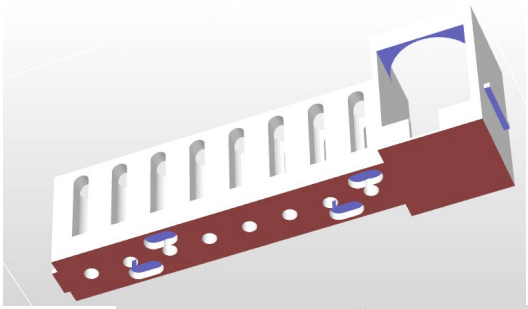
Vial-rack holder

Supports everywhere!

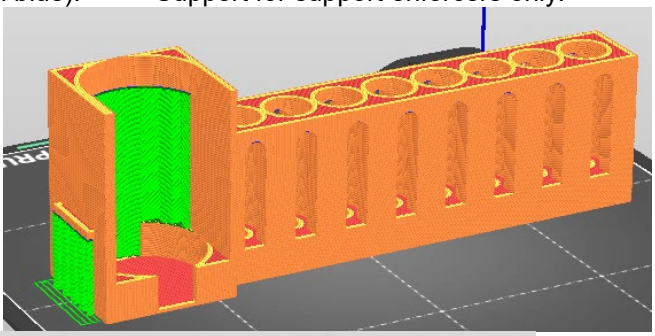


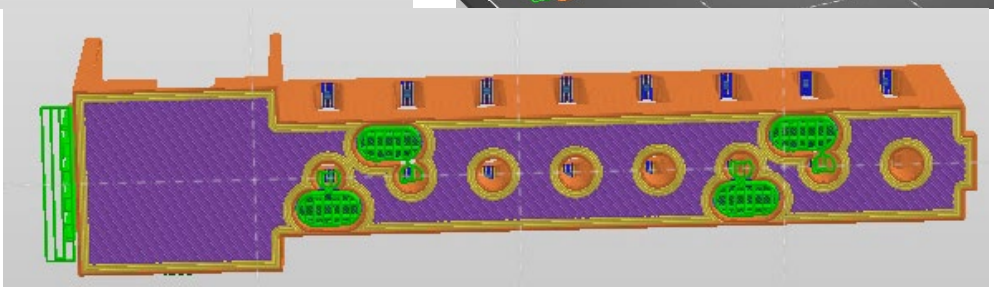
Vial-rack

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

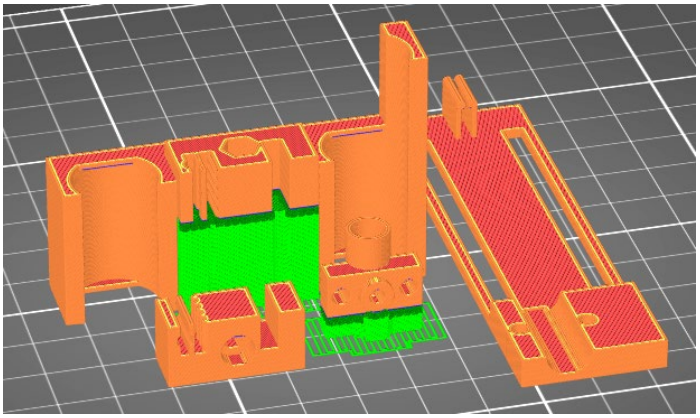


Support for support enforcers only!





x-Axis (PCCF parts)

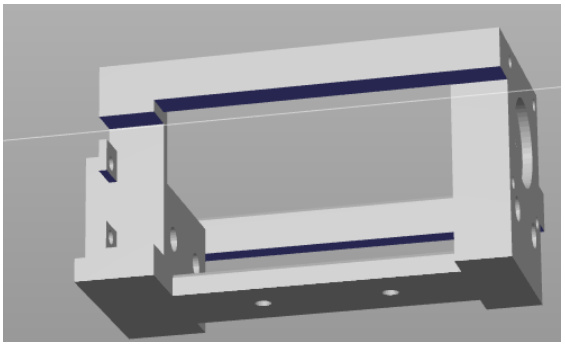


x-axis_cart_tensioner
x-axis_tensioner
x-axis_valve_holder
x-axis_valve_holder_mount

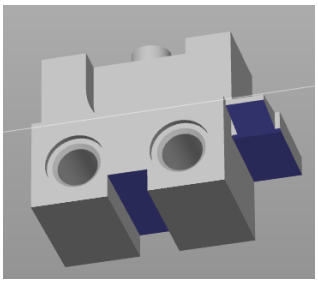
Supports on build plate only!

Syringe pump

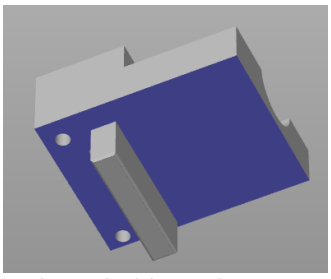
Paint-on supports with Smart fill (here marked in blue).



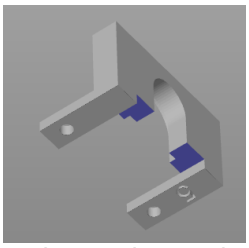
body



pusher

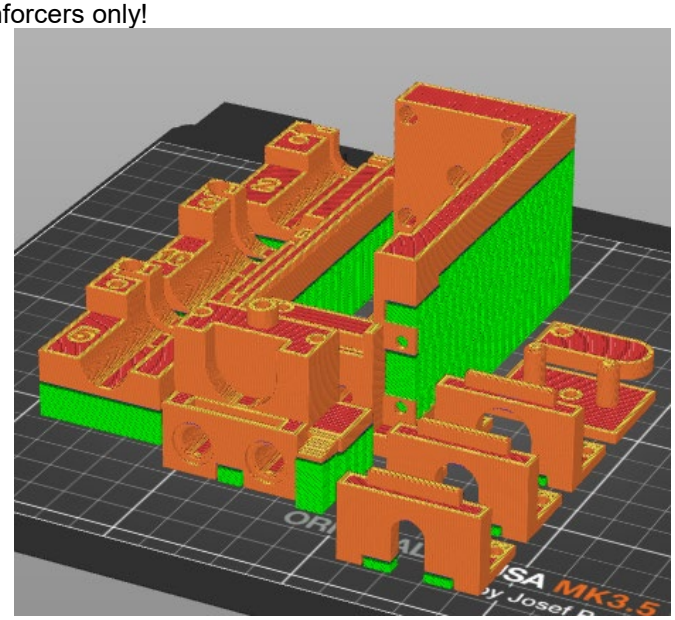


syringe_holder_adapter



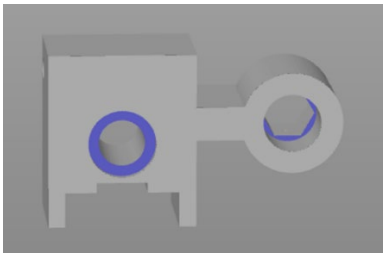
pusher_syringe_adapter

Support for support enforcers only!

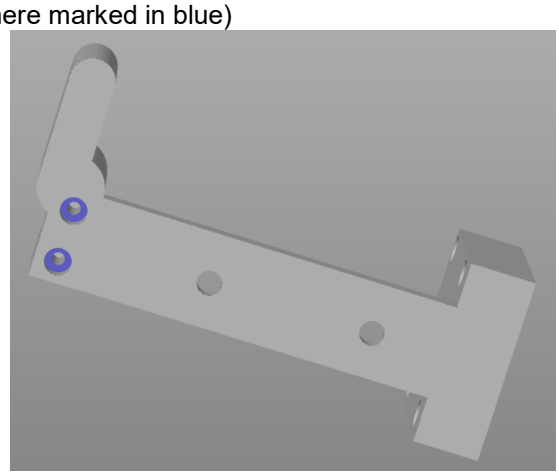


e-axis (PCCF parts)

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

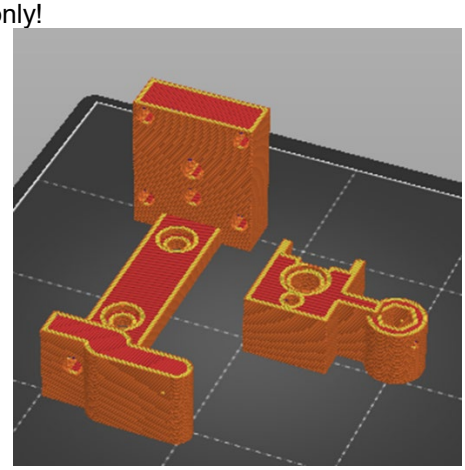


needle_pusher

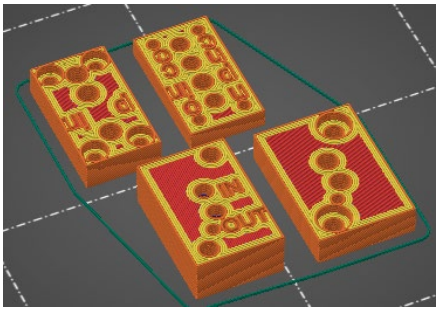


motor_holder

Support for support enforcers only!



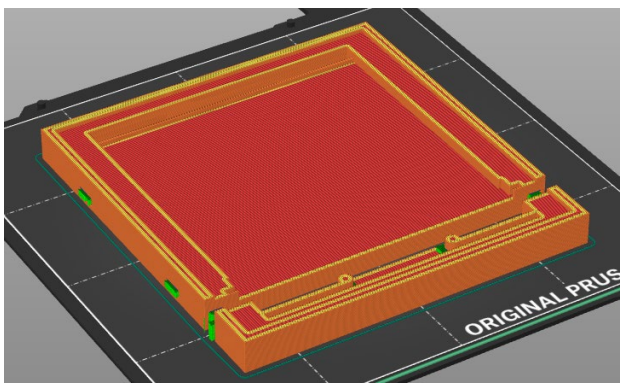
Manifolds for Lee micropump and 3-way valve



No supports!

Plate holder simple

Supports everywhere!

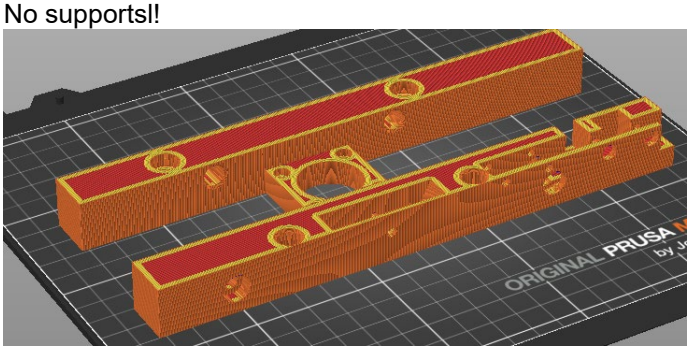


PLA

PLA-strong:
Layer height: 0.20mm
Perimeters: 6
Infill: 70% (grid)
Solid layers: 6 top and bottom

y-axis

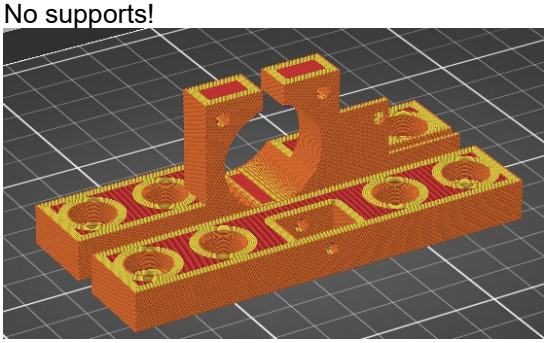
No supportsl!



y_back and y_front

x-axis

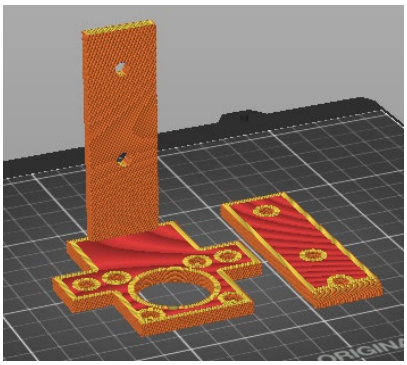
No supports!



x_right and x_left

Autosampler (PLA parts)

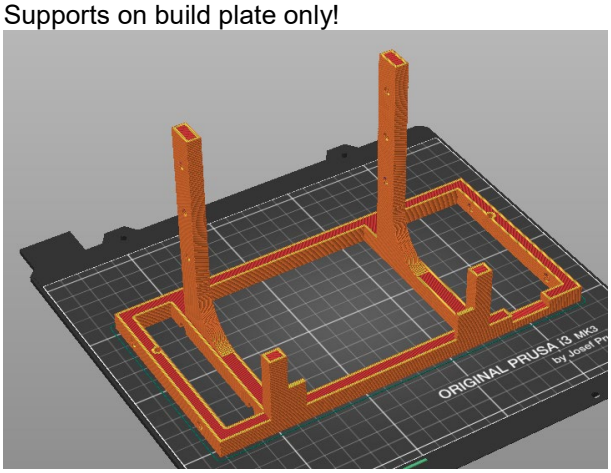
No supports!



motor_holder, mounting_profile

Camera cabinet holder

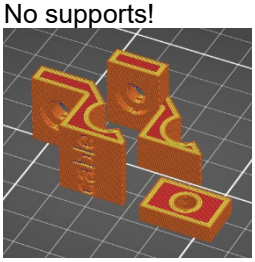
Supports on build plate only!



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

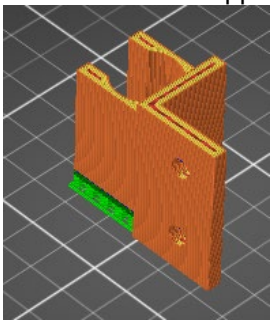
No supports!



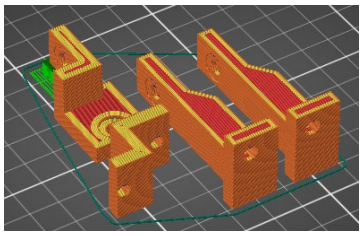
x-axis_distance_check_left, x-axis_cable_guide_top_left, x-axis_cable_guide_top_right

e-axis

Support on build plate only!

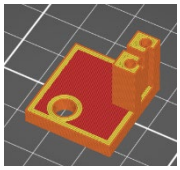


micropump_holder



connectors

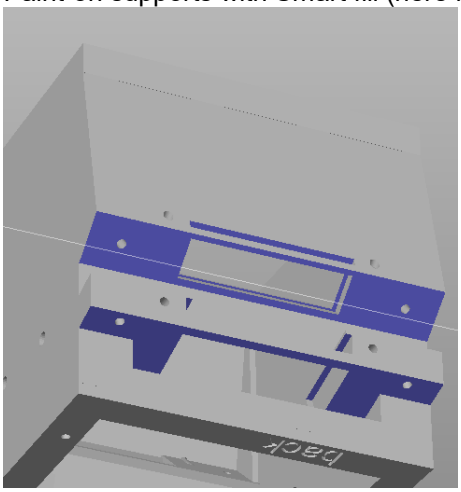
No support!

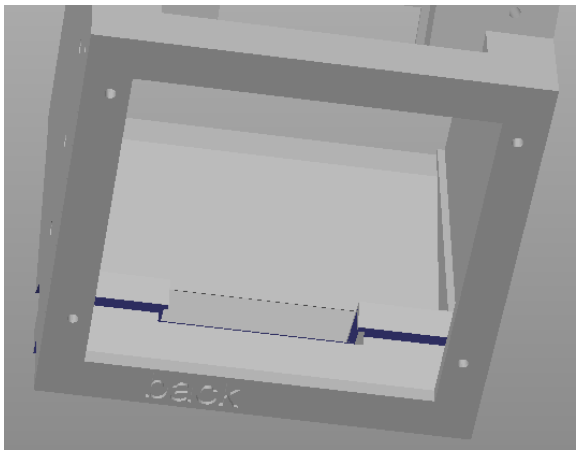


3way-valve_holder

Camera cabinet

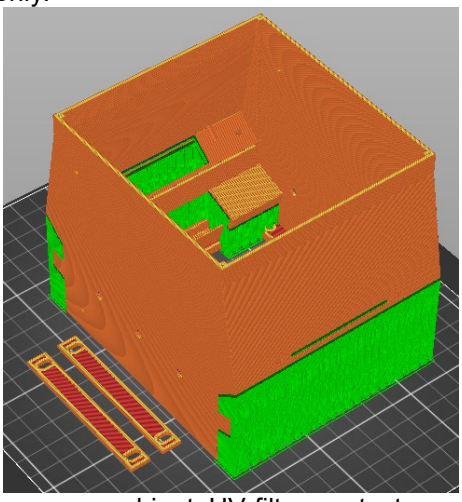
Paint-on supports with Smart fill (here marked in blue)



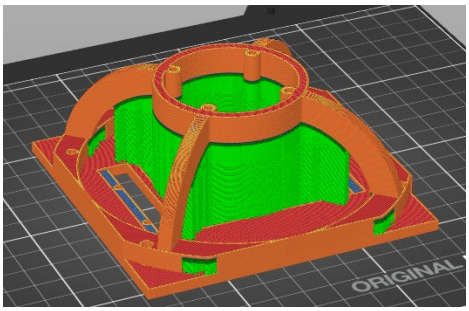


Camera cabinet

Supports for support enforcers only!

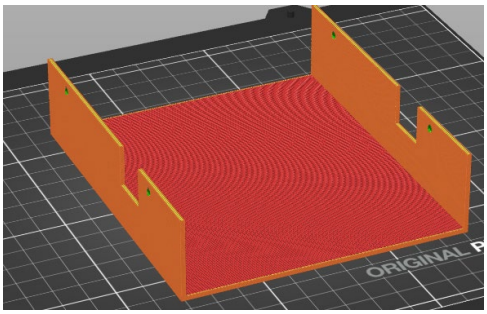


camera_cabinet, UV-filter_protect



Supports everywhere!

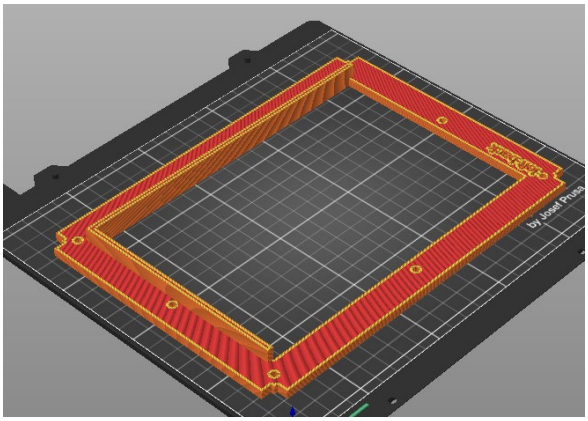
Camera_top



No supports!

Camera_facing

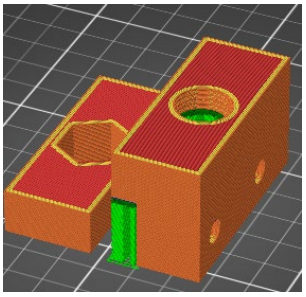
Frames



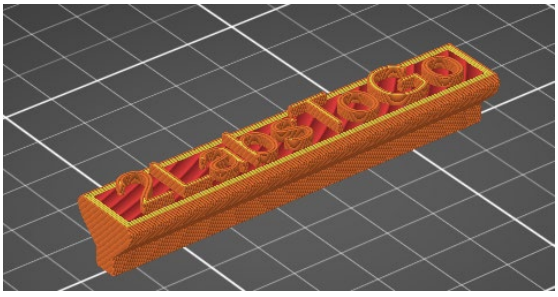
Exemplarily shown for frame_left_back.

Frame_front and frame_back_bottom need supports on build plate only!

DC-power-jacket_housing


Supports on build plate only!

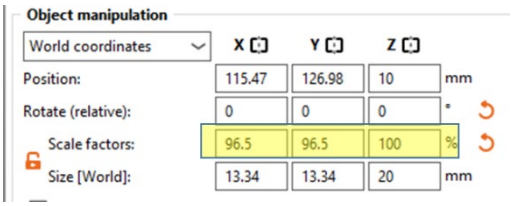
Front holder


No supports!

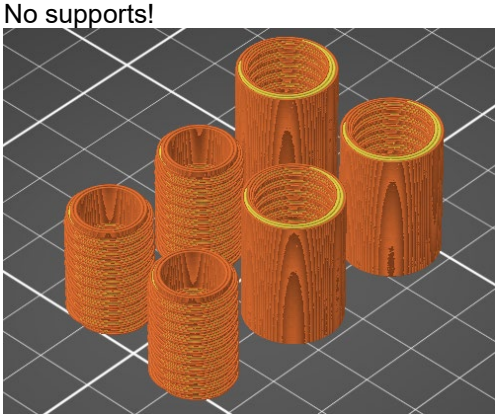
Feet

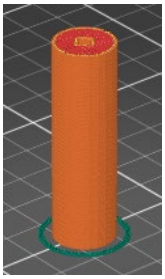
PLA-general but infill concentric

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



No supports!

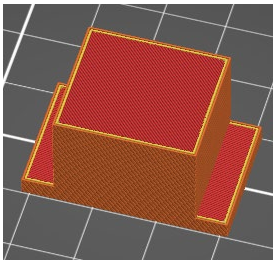


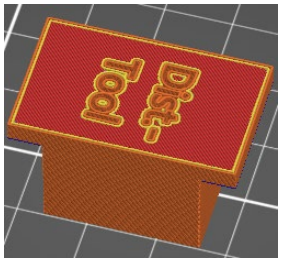


Handle for thread taps and allen keys

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%

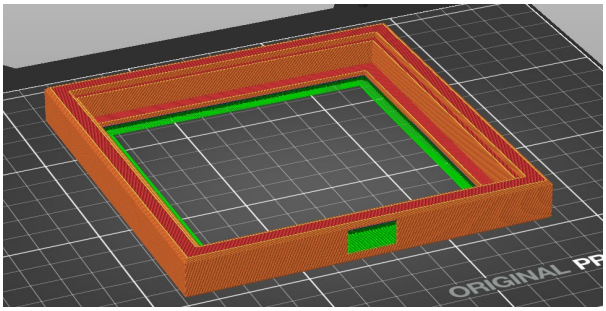
Autosampler distance_tool

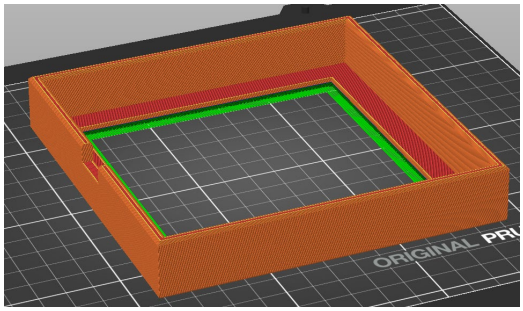


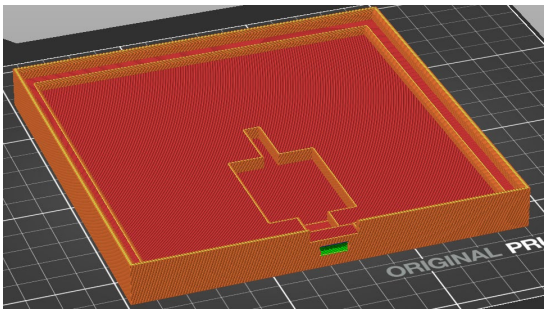


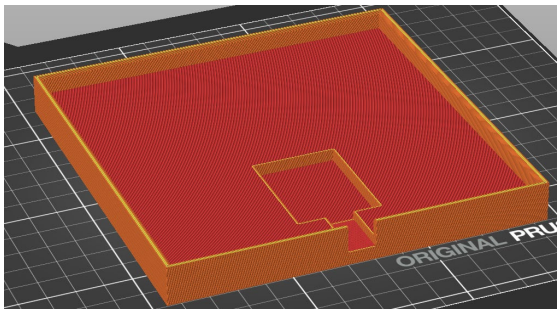
No supports!

Mini-Incubator

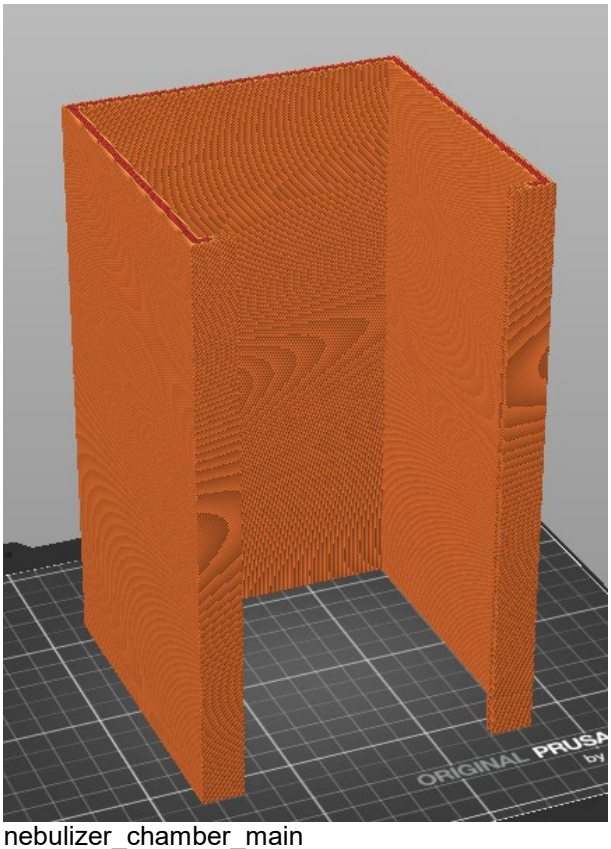

inner_bottom (support everywhere)

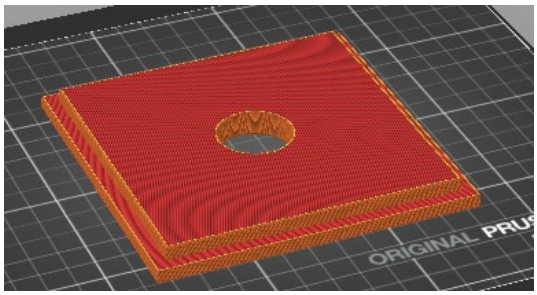

inner_lid (support on build plate only)

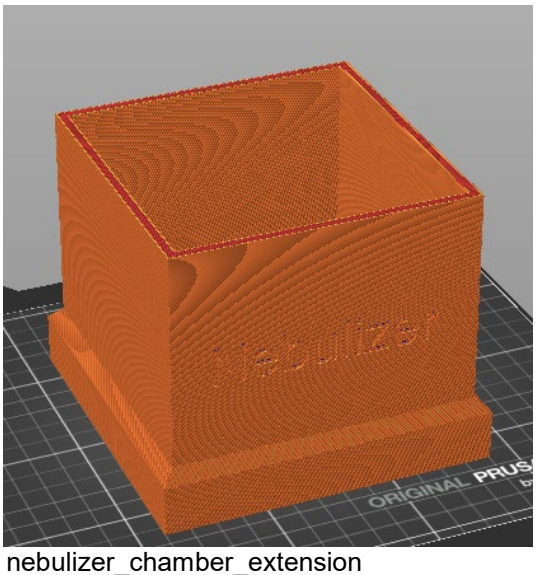

outer_bottom (support everywhere)


outer_lid (no support needed)

Nebulizer
No support needed for any part!

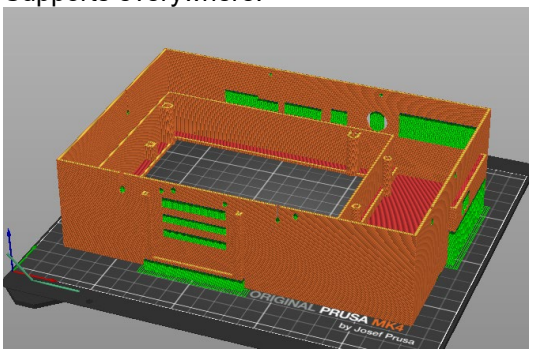

nebulizer_chamber_main


nebulizer_chamber_lid

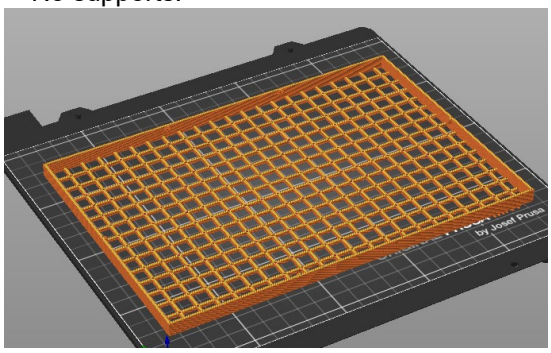

nebulizer_chamber_extension

Electronic box

Supports everywhere!

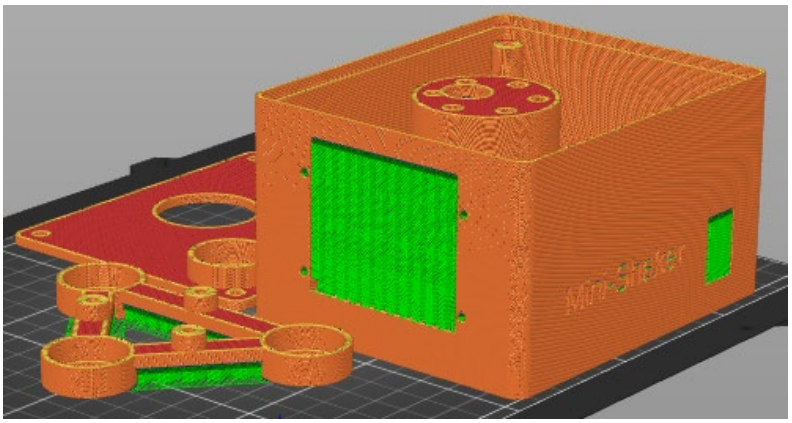


No supports!



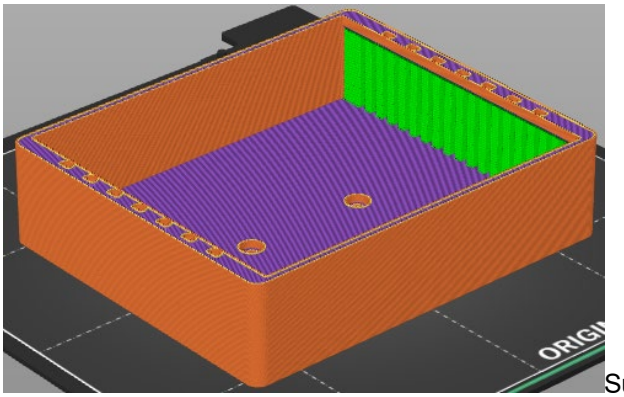
Mini-Shaker

PLA-general



Supports everywhere!

case, case_cover; platform_support

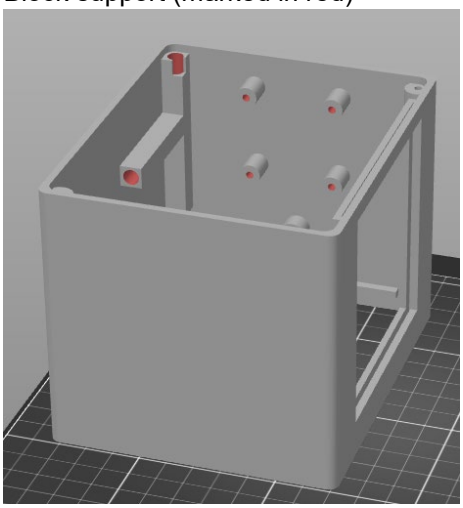


Supports everywhere!

platform

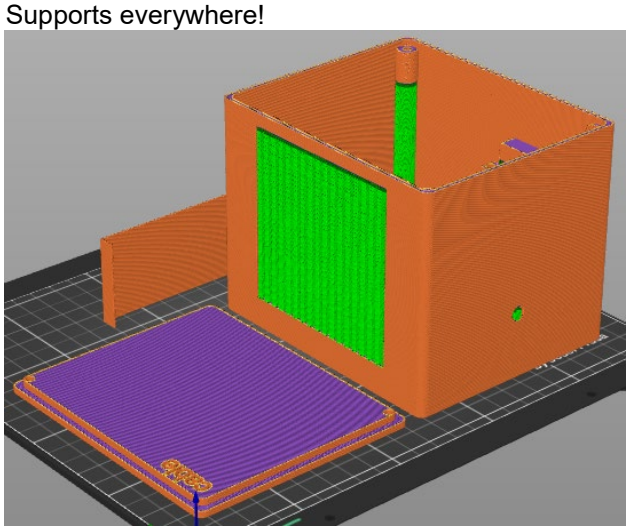
PLA-standard

Block support (marked in red)



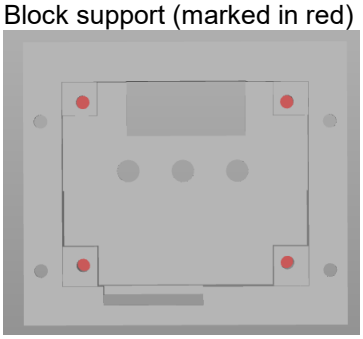
hood

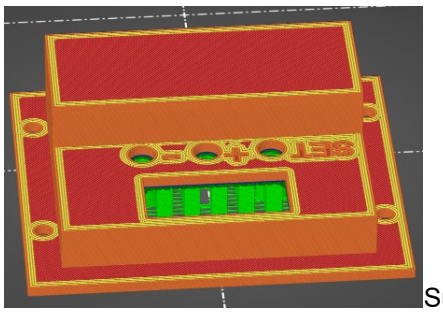
Supports everywhere!



hood, hood_cover, cable_support

Block support (marked in red)

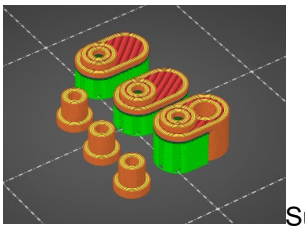




Support on build plate only!

board-housing

PCCF-general



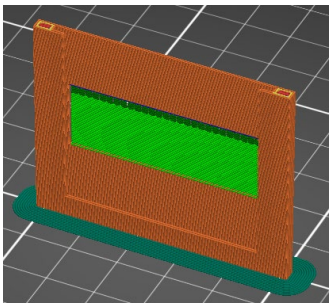
Supports on build plate only!

excenters, burlings, motor_adapter

PLA white

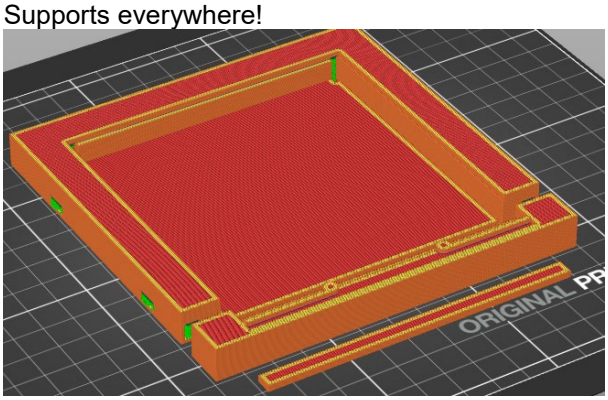
Layer height: 0.20mm
Perimeters: 4
Infill: 25% (grid)
Solid layers: 6 top and bottom
Support material:
First layer density 40 %
Top interface layers 3
Bottom interface layers 0
XY Separation: 0.2 mm

Electronic box – Label frame


Support matrial everywhere! Brim!

Backlight-plate holder

Supports everywhere!



Polyamide (PA12)

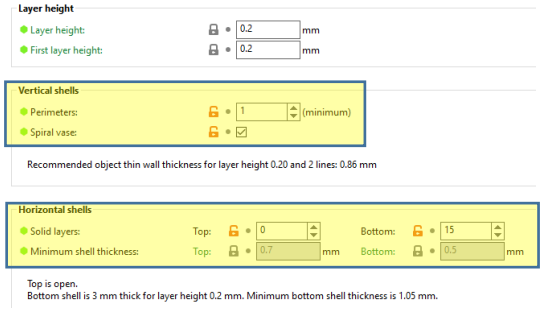
Remarks:
Polyamide filaments are hygroscopic and must kept dry! Otherwise water evaporizes in the hotend, preventing sticking onto the build plate.

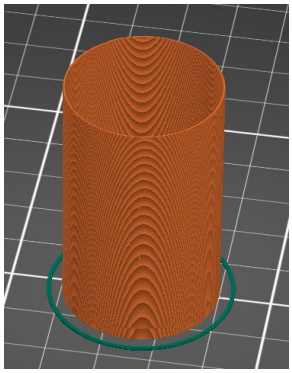
The best build plate is the PA Nylon Powder-coated Steel Sheet (Prusa).
Alternatively, the textured sheet can be used, together with a glue stick.

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)

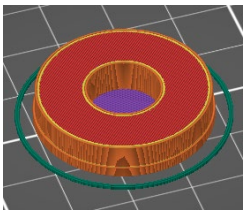
Rinsing vial, waste vial

Spiral vase!





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!