

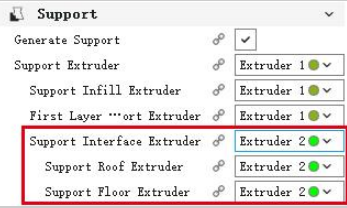
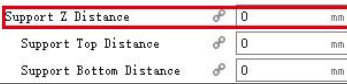
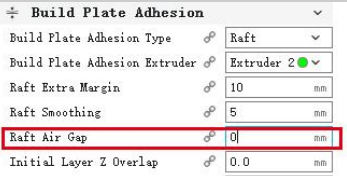
Printing Process Guide For Funmat PRO 410

	PLA	ABS+	ABS	ASA	PC	PC/ABS	PC-FR	PC-PBT	PA6/66	PA6-CF	PA12-CF	PPA-CF	PPA-GF	PPS	PEEK	PEEK-CF	PEEK-GF	PEKK
Nozzle temp.(℃)	210	260	270	255	265	260	260	270	265	270	280	310	310	330	440	440	440	380
Build plate temp. (℃)	40	90	90	90	100	100	100	100	40	40	40	70	70	90	130	130	130	110
Chamber temp.(℃)	0	80	80	80	90	90	90	90	40	40	40	70	70	75	90	90	90	90
Cooling fan speed	25%	0	0	25%	0	0	25	0	25%	0	0	0	0	100%	100%	100%	100%	0
Filament dry condition	50℃/8h	80℃/8h	80℃/8h	80℃/8h	80℃/8h	80℃/8h	80℃/8h	80℃/12h	80℃/12h	80℃/12h	100℃/12h	100℃/12h	100℃/12h	100℃/12h	100℃/12h	100℃/12h	100℃/12h	100℃/12h
Max filament chamber temp	40℃	50℃	50℃	50℃	60℃	70℃	70℃	70℃	70℃	70℃	70℃	70℃	70℃	70℃	70℃	70℃	70℃	70℃
Support Materials	SP3030 PVA	HIPS SP3030	HIPS	HIPS	HIPS	HIPS	HIPS	HIPS	SP3030P VA	SP3030 PVA	SP3050	SP5010	SP5010	HIPS SP5000	SP5000	SP5000	SP5000	SP5000
	PVA	HIPS	SP5000	SP3030	SP3050	SP5010												
Nozzle temp.(℃)	220	250	300	230	280	270												
Build plate temp. (℃)	40	90	130	F90	40	70												
Chamber temp.(℃)	0	80	90	80	40	70												
Cooling fan speed	25%	25%	0	25%	50%	0												
Filament dry condition	60℃/12h	50℃/8h	80℃/12h	60℃ /12h	100℃/8h	100℃/12h												
Max filament chamber temp	35℃	70℃	70℃	40℃	70℃	70℃												
Support Materials	--	--	--	--	--	--												
Layer thickness (mm)	0.25~0.75*nozzle diameter (0.1~0.3mm layer height for 0.4mm nozzle, 0.15~0.2mm is recommended).																	
Build plate leveling	Build plate leveling is very important. After completed leveling, user may proceed with printing. There are two methods of bed leveling: Manual Leveling and Auto Leveling. Only need to choose one method to do the leveling once. Manual Leveling is much recommended because of higher precision.																	
Build plate treatment	Glass plate + PVP glue, Apply no less than 4 layers of glue when glass plate is cold; OR Glass plate + Magigoo Adhesive from Thought 3D (https://magigoo.com), please follow the instructions.																	
Build plate adhesion type	Raft is recommended to get better first layer adhesion.																	
Print part remove	Once your 3D print is completed, it must be removed from the build plate when its temperature is still high. Removing a print after it is cooled may cause the glass plate to break.																	
Nozzle separately use	Use separately nozzle for high and normal temp material and use CuCrZr nozzle for PEEK PEEK-CF PEEK-GF. Because residual high material cannot melt when printing normal materials, which may clog the nozzle. Please use the original INTAMSYS Funmat PRO 410 HT nozzle set to print.																	
Filament care	A convection or vacuum oven should be used to dry filaments before printing. If the filament is not sufficiently dry, the extrudate will be foamy with bubbles. Please dry the filaments according to the recommended temperature and time, and avoid drying the filaments for too long. Thread the filament into the small holes in the side of the spool after removing from the printer to avoid twisting. And ensure the filament is not twisted before printing. It is strongly recommended that filaments should be stored in a sealed container and with desiccant.																	
Others	Wear gloves when move the glass plate with high temperature.																	
Support material solution	Please refer to Annex 1.																	
High temp materials print	Please refer to Annex 2.																	
Guide																		
PVA Print Guide	Please refer to Annex 3.																	

Annex 1

Support Material Solution

1. Support & Raft Settings In Slicing Software

	Single-nozzle print	Dual-nozzle print
Support Interface Extruder 		Support material
Support Z Distance 	0.1mm/one layer height	0
Raft Air Gap 	0~Initial Layer Height	0

The Support Pattern “Zig Zag” is recommended because it is more easily to remove.

2. Support Material Treatment

Support Material	Type	For model material	Treatment process and others
PVA/SP3030	Water soluble support	PLA, PA6/66, PA6-CF	Immerse the print part in tap water until all support dissolved. It is highly recommended to store the filament in the resealable bag because its strong hygroscopicity.
SP3050	Breakaway support	PA12-CF	Manually breakaway.
SP5010	Breakaway support	PPA-CF, PPA-GF	Manually breakaway.
HIPS	Breakaway support	ABS, ASA, PC, PC/ABS, PC-FR, PC-PBT, PPS	Manually breakaway.
SP5000	Breakaway support	PEEK, PEEK-CF, PEEK-GF, PPS	Immerse the print part in Ethyl Acetate Solvent for more than 24h. After that the support material will become soften. Then manually remove the soften support.

Notice: Always wear safety glasses and safety gloves when removing support material by hand and operating chemical solvent; Inaccurate “Z calibration” and “XY calibration” may cause the two materials to embed each other or poor bonding, which results in model printing defects or even printing failures, please check it and redo the calibrations of the printer.

Annex 2

High Temperature Materials

(PPS, PEEK/PEEK-CF/PEEK-GF and PEKK) Print Guide

1. Filament Drying

PPS, PEEK/PEEK-CF/PEEK-GF and PEKK are moisture-sensitive materials. It is vital to keep the filaments away from moisture before and during printing.

Prior to printing, it is necessary to keep residual moisture of filaments to below 0.02% to prevent foamy extrudate due to high vapor pressure caused by trace of moisture at high printing temperature. If the filament is sufficiently dry, the extrudate should be transparent and without bubbles. An air circulating oven can be used to dry filaments before printing.

Please ensure several bags of desiccant are placed inside the filament chamber when printing.

2. Build Plate Treatment

For PPS, PEEK/PEEK-CF/PEEK-GF and PEKK printings, PVP glue is desired for glass plate gluing. Correct way of gluing is important to ensure good adhesion of your print to the glass plate. The following steps are recommended for gluing:

- (1) Cleaning. Clean the glass surface with water, and wipe to dry;
- (2) Gluing. Evenly apply no less than 4 layers of glue on the glass.
- (3) The treated glass plate is now ready for printing;
- (4) After printing, remove the print and clean the glass plate with water.

Other glue products, like NANO POLYMER ADHENSIVE from VISIONMINER (<https://visionminer.com>), Magigoo Adhesive from Thought3D (<https://magigoo.com>), are also recommended. Please follow the instructions when using.

3. Removing A Print After Completion

Once your 3D print is completed, it must be removed from the build plate when its temperature is still high. Removing a print after it is cooled may cause the glass plate to break because the print may shrink more rapidly than the glass plate.

4. Annealing After Completion

- (1) Place the print in the oven, set the oven temperature (PPS/150°C, PEEK/PEEK-CF/PEEK-GF /150°C, PEKK/130°C) and hold for an hour.
- (2) Increase the temperature (PPS/220°C, PEEK/PEEK-CF/PEEK-GF 200°C, PEKK/150°C) and leave it for 2 hours.
- (3) Lower the temperature (PPS/150°C, PEEK/PEEK-CF/PEEK-GF /150°C, PEKK/130°C) and leave it for 30 minutes.
- (4) Finally, turn off the oven and leave it to cool down to room temperature before removing the print.

Annex 3

Water soluble support Print Guide

1. Filament Drying

Water soluble support materials is vital to keep the filaments away from moisture before and during printing.

Prior to printing, We recommend that the filament should be fully dried in accordance with the recommended drying method before use to prevent foamy extrudate. An air circulating oven can be used to dry filaments before printing.

Please ensure several bags of desiccant are placed inside the filament chamber when printing.

2. Separation between model and support

The printing part should be kept in water (35-40°C warm water would be better) for 4-10 hours, then the model and support could be easily separated.

Annex 4

Material Change Procedure — Always Use the Higher Loading Temperature

When switching to a new material, first compare the loading/extrusion temperature of the previous material with the new material. Always perform the loading/unloading procedure using the higher temperature of the two materials.

This ensures complete melting and purging of the previous material before the new filament is introduced, preventing nozzle clogs caused by residual material solidifying at a temperature that is too low.

Example:

Previous material: PC (loading temperature: 265°C)

New material: PLA (loading temperature: 220°C)

Action: Run the material change using the PC loading program (265°C) to fully purge the nozzle. Once the filament change is complete and the new PLA material is flowing cleanly, then adjust the temperature down to the PLA printing profile.