

# Printing Process Guide

## FUNMAT PRO 310 APOLLO

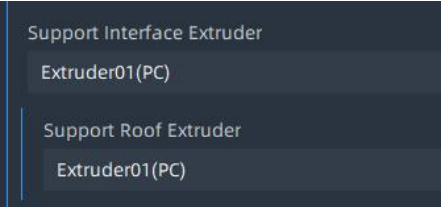
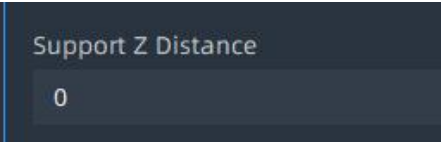
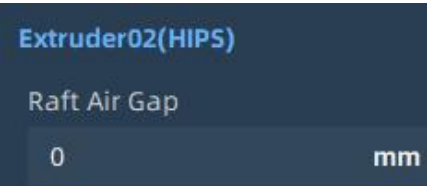
|                        | PEEK                                   | PEEK-CF                                | PEEK-GF                                | AM200                                  | PEKK                                   | PAEK                                   | PLA                          | PLA-HS                       | TPU95A                       | PETG                         | PET-CF                       | PET-GF                       | ABS-HS                       | ABS+                         | ABS-HT                       | ABS-GF                       | ABS-ESD                      |
|------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| Nozzle Temp.(°C)       | 440                                    | 440                                    | 440                                    | 400                                    | 380                                    | 400                                    | 230                          | 230                          | 220                          | 240                          | 300                          | 300                          | 255                          | 280                          | 280                          | 260                          | 260                          |
| Buildplate Temp. (°C)  | 120                                    | 120                                    | 120                                    | 120                                    | 120                                    | 120                                    | 55                           | 55                           | 55                           | 65                           | 60                           | 60                           | 100                          | 90                           | 110                          | 100                          | 110                          |
| Chamber Temp. (°C)     | 100                                    | 100                                    | 100                                    | 100                                    | 100                                    | 100                                    | 0                            | 0                            | 0                            | 60                           | 60                           | 60                           | 80                           | 90                           | 80                           | 80                           | 80                           |
| Build Plate            | Magnetic thickened hardened buildplate | Magnetic thickened hardened buildplate | Magnetic thickened hardened buildplate | Magnetic thickened hardened buildplate | Magnetic thickened hardened buildplate | Magnetic thickened hardened buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate |
| Filament Dry Condition | 100°C/12h                              | 100°C/12h                              | 100°C/12h                              | 100°C/12h                              | 100°C/12h                              | 100°C/12h                              | 50°C/8h                      | 50°C/8h                      | 80°C/12h                     | 80°C/8h                      | 100°C/8h                     | 100°C/8h                     | 80°C/8h                      | 80°C/8h                      | 80°C/8h                      | 80°C/8h                      | 80°C/8h                      |
| Support Materials      | PEEK/ SP5080                           | PEEK-CF/ SP5080                        | PEEK-GF/ SP5080                        | SP5000                                 | SP5000/SP5080                          | SP5080                                 | SP3030                       | SP3030                       | SP3030                       | HIPS                         | HIPS                         | HIPS                         | HIPS                         | SP3030                       | HIPS                         | HIPS                         | HIPS                         |
|                        | ASA                                    | PC                                     | PC-FR                                  | PC-FR-HT                               | PC/ABS                                 | PC-PBT                                 | PA6/66                       | PA6-CF                       | PA12-CF                      | PA-CF-LM                     | PPA-CF                       | PPA-GF                       | PPS                          | PPS-CF                       | PPS-GF                       | HIPS                         | PVA                          |
| Nozzle Temp.(°C)       | 260                                    | 270                                    | 270                                    | 300                                    | 280                                    | 255                                    | 250                          | 270                          | 290                          | 280                          | 310                          | 310                          | 310                          | 320                          | 320                          | 250                          | 250                          |
| Buildplate Temp. (°C)  | 90                                     | 100                                    | 100                                    | 120                                    | 100                                    | 90                                     | 90                           | 75                           | 100                          | 100                          | 90                           | 90                           | 90                           | 100                          | 100                          | 80                           | 60                           |
| Chamber Temp. (°C)     | 90                                     | 100                                    | 100                                    | 100                                    | 100                                    | 100                                    | 90                           | 70                           | 60                           | 60                           | 70                           | 70                           | 100                          | 80                           | 80                           | 80                           | 0                            |
| Build Plate            | Magnetic flexible buildplate           | Magnetic flexible buildplate           | Magnetic flexible buildplate           | Magnetic flexible buildplate           | Magnetic flexible buildplate           | Magnetic flexible buildplate           | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate | Magnetic flexible buildplate |
| Filament Dry Condition | 80°C/8h                                | 80°C/8h                                | 80°C/8h                                | 80°C/8h                                | 80°C/8h                                | 80°C/8h                                | 80°C/12h                     | 80°C/12h                     | 100°C/12h                    | 100°C/12h                    | 100°C/12h                    | 100°C/12h                    | 100°C/12h                    | 100°C/12h                    | 100°C/12h                    | 50°C/8h                      | 80°C/12h                     |
| Support Materials      | HIPS                                   | HIPS                                   | HIPS                                   | HIPS                                   | HIPS                                   | HIPS                                   | SP3030                       | SP3030                       | SP3052                       | SP3054                       | SP5010                       | SP5010                       | SP5010                       | SP5010                       | SP5010                       | /                            | /                            |
|                        | SP3030                                 | SP3052                                 | SP3054                                 | SP5010                                 | SP5000                                 | SP5080                                 |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |
| Nozzle Temp.(°C)       | 250                                    | 260                                    | 280                                    | 290                                    | 280                                    | 400                                    |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |
| Buildplate Temp. (°C)  | 50                                     | 90                                     | 90                                     | 90                                     | 130                                    | 120                                    |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |
| Chamber Temp. (°C)     | 50                                     | 70                                     | 70                                     | 70                                     | 100                                    | 100                                    |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |
| Build Plate            | Magnetic flexible buildplate           | Magnetic flexible buildplate           | Magnetic flexible buildplate           | Magnetic flexible buildplate           | Magnetic thickened hardened buildplate | Magnetic thickened hardened buildplate |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |
| Filament Dry           | 80°C/12h                               | 80°C/8h                                | 80°C/8h                                | 100°C/12h                              | 80°C/12h                               | 100°C/12h                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |                              |

|                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|--|--|--|--|--|--|--|--|--|--|
| Condition                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |
| 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.<br>There are two methods of bed leveling: Manual Leveling and Auto Leveling.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |
| Build plate adhesion type                                       | Raft is recommended to get better first layer adhesion.<br>Magnetic thickened hardened buildplate and Magnetic flexible buildplate can be both used for printing and the thickened hardened buildplate requires the application of PVP glue to enhance adhesion between the model and buildplate.<br>Before applying the PVP glue, ensure that the print bed is clean. If there is noticeable yellowing from leftover adhesive on the bed surface, it must be cleaned thoroughly with water, dried, and then re-coated with PVP glue. Detailed adhesive application procedures refer to the FUNMAT PRO 310 Apollo Buildplate Adhesive Application Guide.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |
| Brush Confirmation                                              | Before printing, check the position and condition of the brush. The steel sheet should just lightly touch the tip of the nozzle, and the brush should have no visible damage. Note that the brush adjustment screws need to be coated with Loctite 243.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |
| Print part remove                                               | Once your printing process is completed, it is recommended to remove the printed model after cooling.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |
| Nozzle choose                                                   | All materials should be printed using the INTAMSYS FUNMAT PRO 310 APOLLO dedicated hardened steel nozzle.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |
| Hotend choose                                                   | For high-temperature materials (PEEK, PEEK-CF, PEEK-GF, AM200, PEKK), please use the INTAMSYS FUNMAT PRO 310 APOLLO dedicated high-temperature hotend for printing.<br>For the remaining materials, please use the INTAMSYS FUNMAT PRO 310 APOLLO dedicated normal-temperature hotend for printing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |
| Filament usage instructions                                     | 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.<br>Please dry the filaments according to the recommended temperature and time, and avoid drying the filaments for an excessively long time.<br>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.<br>It is strongly recommended to use the INTAM Box-3KG sealed drying consumable box and use molecular sieve desiccant to assist drying to ensure that the filament is dry during the printing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |
| INTAM Box - 3KG sealed drying consumable box usage instructions | The INTAM Box-3KG sealed drying consumable box must be used in conjunction with molecular sieve desiccant. The usage method can be found in the INTAM Box-3KG sealed drying consumable box user guide.<br>The heating drying function of the INTAM Box-3KG sealed drying consumable box needs to be manually activated by the user and operated according to the printer screen prompts.<br>There is a manual switch for dehumidification on the rear side of the INTAM Box-3KG sealed drying consumable box. Please ensure to close the dehumidification port when the consumable box is not in heating mode to maintain stable humidity inside the box.<br>When the humidity inside the INTAM Box-3KG sealed drying consumable box cannot be reduced to below 10%, the molecular sieve desiccant needs to be replaced and the heating drying function needs to be activated.<br>The INTAM Box-3KG sealed drying consumable box supports maximum 65°C drying while printing PAEK materials (PEEK, PEEK-CF, PEEK-GF, AM200, PEKK). For other materials, it supports maximum 50°C drying while printing. In the heating state, the dehumidification port needs to be manually opened. |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |
| Support material solution                                       | Please refer to Annex 1 for the supporting material solution.<br>Please refer to Annex 2 for instructions on the use of water-soluble support.<br>When two support materials are available, the first material is recommended.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |
| Others                                                          | Please wear high temperature protective gloves when taking out the printing plate from high temperature chamber.<br>All printing process instructions above are for use on FUNMAT PRO 310 APOLLO printers using INTAMSYS filament only.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |   |   |   |   |   |  |  |  |  |  |  |  |  |  |  |

## Annex 1

## Support Material Solution

## 1. Support &amp; Raft Settings In Slicing Software

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

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

## 2. Support Material Treatment (after printing)

| Support Material | Type                  | For model material                                          | Treatment process and others                                                                                                                                                |
|------------------|-----------------------|-------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SP3030           | Water soluble support | TPU95A,PLA,ABS+,PA6/66,PA6-CF                               | Immerse the print part in tap water until all support dissolved.<br>It is highly recommended to store the filament in the resealable bag because its strong hygroscopicity. |
| HIPS             | Breakaway support     | PETG,PET-CF/GF,ABS-HS, ABS-GF, ASA,PC, P C-FR,PC/ABS,PC-PBT | Manually breakaway.                                                                                                                                                         |
| SP3052           | Breakaway support     | PA12-CF                                                     | Manually breakaway.                                                                                                                                                         |
| SP3054           | Breakaway support     | PA-CF-LM                                                    | Manually breakaway.                                                                                                                                                         |
| SP5010           | Breakaway support     | PPA-CF/GF,PPS, PPS-CF/GF                                    | Manually breakaway.                                                                                                                                                         |
| SP5000           | Breakaway support     | AM200, PEKK                                                 | Manually breakaway.                                                                                                                                                         |
| SP5080           | Breakaway support     | PEEK, PEEK-CF/GF, PEKK,PAEK                                 | Manually breakaway.                                                                                                                                                         |

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

# 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.