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POSTPRO3D
ADVANCED OPERATIONS GUIDE
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ADVANCED OPERATIONS GUIDE

When using the PostPro3D it is important the correct process parameters are chosen and the parts are processed in optimum conditions to achieve the best results. These process parameters vary depending on what material and printer technology has been used to produce the parts. This guide outlines best practice for processing parts and provides recommended process parameter settings for processing different materials.

BATCH GROUPING OF PARTS

Different materials and part geometries require different processing parameters. The first step when preparing a process run is to batch group parts of similar materials and geometries together, to do this follow the steps below:

- Group parts made of similar materials together (i.e. SLS Nylon, MJF PA-12, ABS, PLA, etc.).

- Subdivide the material groups into groups of parts with similar wall thicknesses:

- Wall thicknesses of 3mm and below
    B. Wall thicknesses of 3.1mm – 10mm on average
    C. Wall thicknesses of 10.1mm – 20mm on average
    D. Wall thicknesses of 20.1mm – 40mm on average
    E. Wall thicknesses of 40mm and above

- Exceptions must be made when a part has features from two subgroups that are two or more letters apart (i.e. parts with subgroup C. and subgroup A. features). Follow parameters of the larger thickness subgroup (i.e. subgroup C) and tweak for best results.

HANGING PARTS ON THE PROCESS RACK

With the parts subdivided into batches the following step is to hang the parts on the process racks. The following points should be considered:

- Parts with thin features should be suspended by the strongest point/feature.
- Keep parts a minimum of 25mm away from chamber walls and 10mm from each other.
- Place the hanging tool, hook or clip in a hidden location on the part to lower the chance of blemishes from contact points being noticeable after processing.
- Utilize a polypropylene mesh screen to place parts on, when processing small parts (20-30mm bounding box or less).
- Cupping features should be positioned facing down to avoid potential solvent pooling.
- Part temperatures should be in the range of 17 – 19 °C prior to processing.

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PARAMETER OPERATING RANGES AND EXPLANATION

This section outlines each variable parameter and the recommended standard operating ranges. Please note that there can always be exceptions and in certain instances the selected processing parameters may lie outside the ranges described below to achieve the desired results.

Process Chamber Temperature: 38 – 39 °C
- Process chamber temperature controls the temperature difference between the parts and chamber. The greater the difference, the more consumable will condense on the parts.
- As the pressure is increased, the process chamber temperature should also be increased.

Process Chamber Pressure: 300 – 500 mbar
- Viewed as processing aggression.
- A higher pressure pushes solvent to the part surface with more force resulting in more condensation on the parts.
- Very thick parts (subgroup E) should start with a process chamber pressure of 300mbar. Very thin parts should be processed at a higher pressure to ensure there is enough consumable condensation.

Consumable Volume: 100 – 250 ml
- The amount of solvent introduced into the processing chamber.
- Controls the amount of particle flow on the surface of the part. With more consumable, the particles on the part's surface will move faster and further.
- Directly related to surface area and volume of parts in the chamber. A higher surface area requires more consumable.

Processing Time: 100 – 250 seconds
- Processing time controls the exposure of consumable on the part.
- As the surface area or quantity of parts being processed increases the processing time should also be increased to ensure there is enough time for the consumable to condensate on all areas of the parts.
- Part geometry impacts this value too. Thinner parts need a longer time to process as they have a low thermal mass and heat up in the chamber quickly reducing the amount of consumable condensation on the thin walled surface. Whereas thicker walled parts require less processing time because they hold temperature difference better due to their greater thermal mass.

Curing Time: 300 – 900 seconds
- During the curing phase the 'reaction' stops inside the chamber and creates the smooth outer layer of the parts.
- A longer curing time allows for more efficient extraction recyclability.
- The curing time should be increased when drying parts at a lower temperature.

Drying Process Chamber Temperature: 45 – 75 °C
- The drying cycle is used to extract the remaining consumable out of the parts and the chamber. The warmer temperatures re-vaporize the consumable for efficient extraction.
- Lower the temperature when processing soft and sensitive materials – primarily filament materials.

Drying Time: 5200 – 7000 seconds
- The length of time for complete consumable extraction and drying of parts, resulting in no trace of con sumable on the surface of the part.
- A longer drying time should be used when processing greater numbers of parts and/or using high con sumable amounts.
- If customer desires to shorten the drying time below this range, it is imperative that they finish drying the parts in a secondary stage for safety – for example using an extracted oven. This is not condoned by AMT as this prevents a full dry cycle inside machine.

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MATERIAL SPECIFIC PROCESS PARAMETERS

Below are suggested processing parameters for specific materials. The parameters shown below are suggested for parts classified into subgroup B and assumed a full chamber of parts is to be processed.

The values stated below are to be taken as a guide only and results may vary depending on specific pro-cessing and part conditions. These given parameter ranges are always subject to change if the parts being processed are regularly different in size, density and material. This process is designed around a production environment which allows for these parameters to be tuned to the product's ideal finish. The below information has been created to start the tuning process within an ideal range.

SLS Nylon 12 (Including Glass Filled, Alumide, and other Nylon derivatives)

- Process Chamber Temperature: 38 °C
- IC/Hot Plate temperature: 100 °C
- Process Chamber Pressure: 350 mbar (Thinner parts in group B can processed at 400 mbar)
- Consumable Volume: 160 – 190 ml (Depending on surface area & part volume)
- Process time: 180 – 220 sec (Thinner parts in group B should process longer)
- Curing time: 600 sec
- Drying temperature: 70 °C
- Drying time: 5200 sec (Higher solvent & part quantity need longer dry time)

MJF PA-12 (Including Glass Filled Variants)

- Process Chamber Temperature: 38 °C
- IC/Hot Plate temperature: 100 °C
- Process Chamber Pressure: 300 mbar (Thinner parts in group B can be processed at 350 mbar)
- Consumable: 160 – 180 ml (Depending on surface area & part volume)
- Process time: 150 – 200 sec (Thinner parts in group B should process longer)
- Curing time: 600 sec
- Drying temperature: 70 °C
- Drying time: 5200 sec (Higher solvent & part quantity need longer dry time)

Powder TPU/TPA

- Process Chamber Temperature: 39 °C
- IC/Hot Plate temperature: 100 °C
- Process Chamber Pressure: 400 mbar (Thinner parts will be processed at 450 mbar)
- Consumable: 150 – 200 ml (Depending on surface area & part volume)
- Process time: 160 – 220 sec (Thinner parts in group B should process longer)
- Curing time: 800 sec
- Drying temperature: 75 °C
- Drying time: 6000 sec (Higher solvent & part quantity need longer dry time)

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Soft-Bond Filament Materials (ABS, ASA, PLA and other soft filaments)

- Process Chamber temperature: 36 °C
- IC/Hot Plate temperature: 100 °C
- Process Chamber Pressure: 315 mbar (Thinner parts will be processed at 350 mbar)
- Consumable: 160 – 180 ml (Depending on surface area & part volume)
- Process time: 185 – 225 sec (Thinner parts in group B should process longer)
- Curing time: 900 sec
- Drying temperature: 45 °C
- Drying time: 4000 sec (Higher solvent & part quantity need longer dry time)

Strong-Bond Filament Materials (Nylon, PC, Infiltrated filaments and other strong materials)

- Process Chamber temperature: 36 °C
- IC/Hot Plate temperature: 100 °C
- Process Chamber Pressure: 325 mbar (Thinner parts will be processed at 360 mbar)
- Consumable: 160 – 180 ml (Depending on surface area & part volume)
- Process time: 190 – 235 sec (Thinner parts in group B should process longer)
- Curing time: 900 sec
- Drying temperature: 50 °C
- Drying time: 4000 sec (Higher solvent & part quantity need longer dry time)

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