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PROCESS GUIDE FOR PK 5000

KEY PROCESS PARAMETERS

- Part Bed Temperature: 178°C
- Feed Temperature: 135°C
- Piston/Cylinder Temperature: 165°C
- Layer Thickness: 0.1mm
- Energy Density: 0.21 J/mm3

PRINTING

- The SLS machine must maintain an inert environment during the printing process (<1% oxygen) to prevent oxidation and material degradation.
- Machine must recoat material effectively, ensuring powder flowability while limiting clumping. Reducing feed temperature and amount of material fed can improve flowability if issues arise.
- Machine changeover from certain PA materials can be aided by thorough cleaning of the roller, including a light media blasting or sanding with 240 grit sandpaper to ensure no residual residue remains.
- Material is sensitive to machine leaks, both for oxidation as well as associated cold spots resulting in orange peel. Ensure all machine seals are kept in good condition.
- Material is not curl-prone, so curl phenomena of parts within the part bed is typically indicative of
  - Very low part bed temperature.
  - Excess melt energy causing clumping and sticking of powder around melt pool perimeters.
- Material tends to loosely stick and clump when exposed to elevated temperatures for long times. This may include clumps forming on build plate areas around part bed. These clumps seldom result in print defects unless temperature is excessive.

BURN HAZARD. If exposed to oxygen immediately after printing, the part bed center can become very hot. Read and follow all instructions for proper cooling.

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POST PRINT

- Keep part cake in machine under inert atmosphere until part bed surface temperature cools to 60°C, then transfer to an inert environment to continue cooling until cake center has reached 60°C. This typically takes two to four times as long as the build time, depending on packing density and volume of part cake.
- Exposing semi-molten parts within a cooling part cake to oxygen has the chance to trigger an exothermic reaction, resulting in temperatures in excess of 280°C in the part bed center and emission of odorous vapor. Care should be taken to ensure that the part cake is cooled under an inert environment. If such a reaction does begin to occur, it can be mitigated and controlled by placing the cake in an inert environment until cool.
- Part cake, overflow, and remaining feed material should be sieved at 140 mesh (106µm) for reuse.
- Material should be refreshed at 40% virgin content for repeatable, steady-state processing. Reduced virgin content can be processed at the expense of material lifespan and mechanical performance.
- Material that has experienced significant degradation due to oxidation will turn brown/amber color and produce odor. This material should be discarded.

QUESTIONS? VISIT LUMASPOLYMERS.COM FOR THE LATEST PRINT PROFILES.

POST PROCESSING: VAPOR SMOOTHING

AMT Post Pro/PK 5000: 2-4mm thick wall (Assuming full chamber)

Processing	Process Chamber Pressure	350	mBar
	Hot Plate Temp.	100	C
	Process Chamber Temp.	38	C
	Processing Time	220	Sec
	Consumable Volume	225	mL
	Impeller Time On	30	Sec
	Impeller Time Off	30	Sec
Curing	Vacuum Pump Frequency	50	Hz
	Curing Time	900	Sec
	Vacuum Pump Frequency	10	Hz
Drying	Drying Time	3600	Sec
	Process Chamber Temp.	50	C
	Vacuum Pump Frequency	50	Hz
Cooling	Cooling Off Temp.	40	C

Note: Consider these base values as a general starting place. Please contact Lumas Polymers if you application has very specific surface finish or mechanical performance requirements.