

# Arnite® AM8527 (G)

## PET-GF

### INTRODUCTION

Fused granulate printing of Arnite® AM8527 (G) pellets is possible with a conventional 3-zone screw with a compression ratio between 2.5 and 3.3. A barrier screw in combination with a grooved barrel results in an optimal stable process.

### MATERIAL HANDLING

#### Pre-drying

Pre-drying of Arnite® AM8527 (G) pellets is essential for consistent and high-quality printing application. Therefore it is recommended to dry at conditions stated in the table below this paragraph. A desiccant dryer with a dew-point of  $\leq -30^{\circ}\text{C}$  ( $-22^{\circ}\text{F}$ ) should be used (airflow rate 2.5-3.0 m<sup>3</sup>/kg h) in order to reach the required moisture content level below 0.01wt% or 100 ppm. A drying hopper should be applied to the printer extruder.

Moisture content	Drying time	Drying temperature	
		$^{\circ}\text{C}$	$^{\circ}\text{F}$
<i>wt%</i>	<i>h</i>		
< 0.02 (as-delivered)	3-6	100-120	212-248
> 0.02	6-12	100-120	212-248

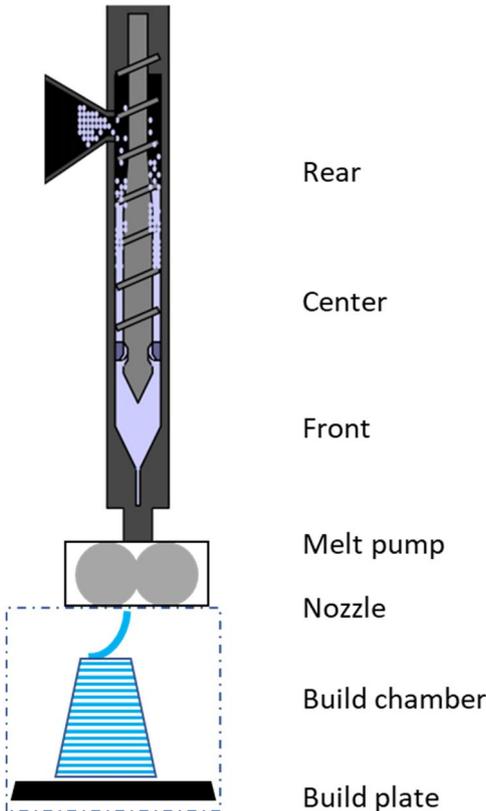
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# Arnite® AM8527 (G)

## TEMPERATURE SETTINGS

Arnite® AM8527 (G) pellets should run at melt temperatures as recommended in the table below. The machine parameters can be changed in order to meet the required stability and melt temperature.



Zone	Setting	
	°C	°F
Hopper	25	77
Rear	200 - 240	392 - 464
Center	270 - 295	518 - 554
Front	270 - 295	518 - 554
Melt pump	270 - 295	518 - 554
Nozzle	265 - 285	509 - 545
Melt	265 - 285	509 - 545
Build chamber	100	212
Build plate	100 - 120	212 - 284

### Build plate adhesion

Several options are available to improve adhesion between the printed part and build plate. DSM advises always to print an additional brim to the print to ease up fixation of the part. Typically, mechanical clamping of the part works well.

Note: prior to removing the printed part, the build plate temperature should be lowered to ambient temperature to facilitate separation and thus avoiding severe deformation of the printed part upon removing.

# Recommendations for 3D printing Arnite<sup>®</sup> AM8527 (G)

## GENERAL PROCESS SETTINGS

### Print speed

Print speeds depend on the maximal layer time required to ensure enough layer adhesion throughout the printed part. Print speeds up to 7500 mm/min should be possible.

### Print nozzle

Nozzle diameters within the range of 2-12 mm can be used for printing. Printer throughput should always be changed according to the selected nozzle diameter. The abrasive nature of filled grades requires wear-resistant nozzle material, e.g. hardened steel.

### Safety

During practical operation we advise to wear personal safety precautions for hand, eye and body applicable to working with high temperature molten plastics.

### Start-up & Shut down

Production has to be started and stopped with a clean machine. Cleaning can be done with cleaning agents or HDPE.

### Optimal melt residence time

Excessive thermal degradation will lead to low quality printed parts. Thermal degradation is caused by too high melt residence times. Average melt residence time should be kept below 6 minutes at all times, leading to a total melt residence time of shorter than 20 minutes. The average melt residence time can be estimated with following equation.

$$t_{res\_average} = \frac{V_{total}}{Q_{vol\_printer}} = \frac{V_{extruder} + V_{melt\ pump/adapter}}{\frac{\dot{m}_{printer}}{\rho_{melt}}}$$

$$V_{extruder} = \frac{L_{extruder}}{2} * \frac{D_{extruder}^2 \pi}{4}$$

### Printing breaks

During printing breaks longer than a few minutes, we advise to empty the barrel of the extruder. When the nozzle, or even the screw is blocked, be aware that under these conditions a sudden outburst of molten material can take place.

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