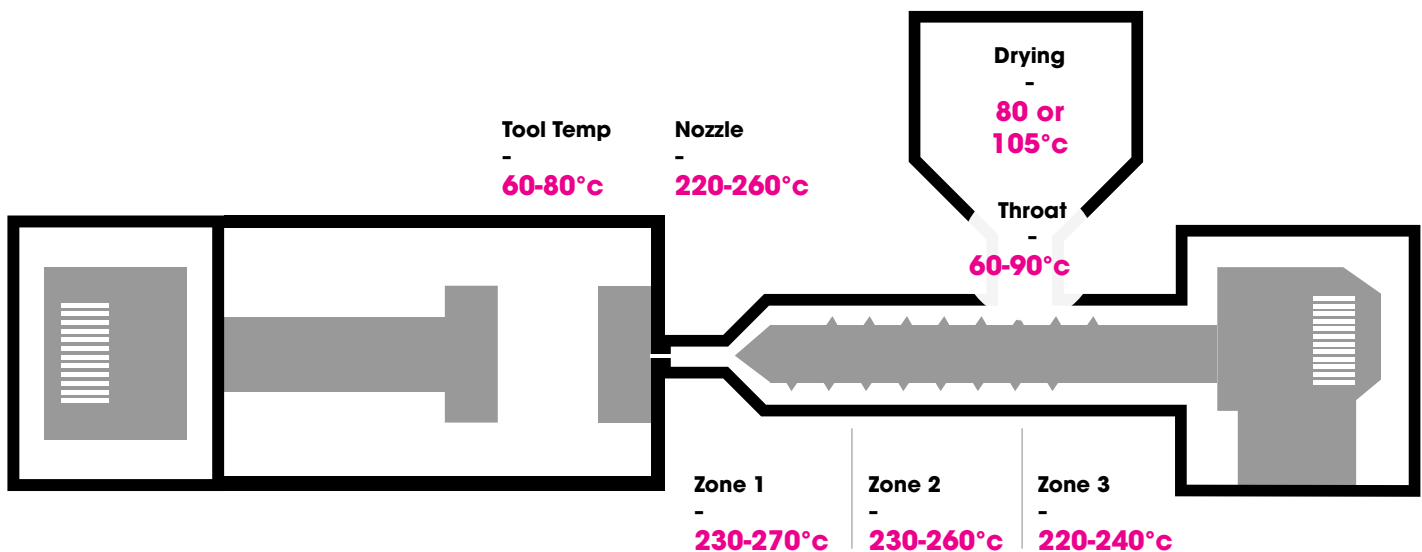# Nylon (PA6)

General Description

Nylon is possibly the most well-known engineering material. Nylon has a high level of crystallinity it has a good mix of toughness, stiffness and heat resistance allowing it to be used in a wide variety of applications. Varying from cable ties and cable jacketing to under bonnet applications where glass filled grades are often used.

Pre-Production

Nylon will be suitable for moulding as supplied. However as soon as the material bag is open Nylon will start to quickly absorb moisture. If the Nylon has become very wet (exposed to air for more than 8 hours) desiccant drying will be required 12 hours at 105°c. Any moisture levels above 0.2% will have a detrimental effect on the processing and final properties of the part low levels of moisture can be dried with 16 hours in a ventilated hot air oven at 80°c.

Processing Guidelines (Temps, speeds, pressures added to the diagram).

Drying - **80 or 105°c**

Throat - **60-90°c**

Tool Temp - **60-80°c**

Nozzle - **220-260°c**

Zone 1 - **230-270°c**

Zone 2 - **230-260°c**

Zone 3 - **220-240°c**

Processing notes

- Injection speed is normally as quick as possible, however for a smooth matt finish on a reinforced grade it is best to slow the injection speed.

- PA6 has a very low melt viscosity and as such back pressure should be kept as low as possible, nominal value 5 bar.

- Residence time should not exceed 4 to 5 minutes at 280°c.
  At 310°c the residence time should not exceed 1-2 minutes.

- Screw surface speed should not exceed 0.5m/sfor standard grades.
  Flame retardant grades should not exceed a screw surface speed of 0.2m/s.

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Tool requirements

- Nylon shrinkage is normally around 1-1.5%.

- Glass filled nylons can have very non uniform shrinkage with as low as 0.3% in the flow direction and as high as 1% across the flow. This can cause warpage issues.

- Good venting is necessary to facilitate the recommended high injection speeds.

- When processing flame retardant nylon stainless steel tooling should be used to help prevent wear caused by corrosive gases released when the material overheats.

Post Production

- PA6 can be purged fairly easily using a more viscous polymer. HDPE or PP is often used. Make sure to purge using slow injection speeds as the low viscosity as PA6 can splash or splay. Make sure that appropriate protection in the form of a nozzle guard and personal protective equipment is used when purging.

- Nylons will both undergo post mould shrinkage and absorb moisture after moulding. The moisture absorption will negate the shrinkage to a certain extent. This dual possibility of shrinkage and expansion can lead to part dimensional issues. If a part is going to be in use at elevated temperatures annealing may be required.

Nylon (PA6) Portfolio

Supplier	Material	Brand Name
polyram	PA6	Plustek
RADICI GROUP	PA6 Industrial	Heramid B
	PA6 Industrial	Heramid S
	PA6 Prime FR	Radiflam S
	PA6 Prime	Radilon B
	PA6	Radilon S
	PA6 Prime	Radilon S

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