

Akulon® K240-HP

PA6-I

Heat Stabilized, Impact Modified, Extrusion Blow Molding

Print date: 2024-03-05

Grade coding

Akulon® PA6 unreinforced blow molding grade.

MATERIAL HANDLING

Storage

In order to prevent moisture pick up and contamination, supplied packaging should be kept closed and undamaged. For the same reason, partial bags should be sealed before re-storage. Advisable is storage at room temperature.

Packaging

Akulon® grades are supplied in airtight, moisture-proof packaging.

Moisture content as delivered

Akulon® grades are packaged at a moisture level $\leq 0,15$ w%.

Conditioning before molding

To prevent moisture condensing on granules, bring cold granules up to ambient temperature in the molding shop while keeping the packaging closed.

Moisture content before blow molding

Since Akulon® is delivered at blow molding moisture specification (≤ 0.15 w%), the resin can be blow molded without pre-drying. However, to overcome the fluctuation from package to package we advise to pre-dry / condition (see drying section below). Furthermore, pre-drying is required in case the material is exposed to moisture before blow molding (package damaged or open for longer period of time).

Moisture content can be checked by water evaporation methods or manometric methods (ISO 15512). e.g Karl Fisher.

Drying

Akulon® grades are hygroscopic and absorb moisture from the air relatively quickly.

Preferred driers are de-humidified driers with dew points maintained between -30 and -40°C (-22 and -40°F)

Vacuum driers with N₂purge can also be used. Hot air ovens or hopper driers are not suitable for pre-drying Akulon® grades; the use of such driers may result in non-optimum performance.

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Drying conditions

Moisture content	Time*	Temperature	
		[°C]	[°F]
0.1 – 0.2 and as delivered	2 - 4	80	176
0.2 – 0.5	4 – 8	80	176

Regrind

In the blow molding process regrind is generated. Regrind can be used taking into account that this regrind must be clean/low dust content/not thermally degraded/dry, of same composition and similar particle size as the original material. The acceptable level of regrind depends on the application requirements eg. 30 – 50% is acceptable. The Akulon® regrind is most of the time generated at elevated temperature. The moisture up take is quicker at elevated temperature and higher humidity level. The regrind should be stored preferably in a closed bin and dried according above mentioned conditions.

MACHINERY

Akulon® grades can be processed on general blow molding machines.

Die Swell

In the blow molding process die swell is observed as the plastic parison expands because of plastic memory. For the Akulon® grade the die swell will be around 2.3 to 3 depending on die design.

Screw geometry

It is recommended to use gradual compression screw; L/D length/ diameter ratio 24 -25 designs with volumetric compression ratios of approximately 2.5 (depth feed zone / depth metering zone) works fine. A shorter screw may result in inhomogeneous mixing, while an improper compression ration may result in air entrapment or overheating and degradation of the melt.

Steel type

Abrasive resistant tool steels which are normally used for glass and/or mineral reinforced materials are also to be used for Akulon® polymers in, dies and screws.

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TEMPERATURE SETTINGS

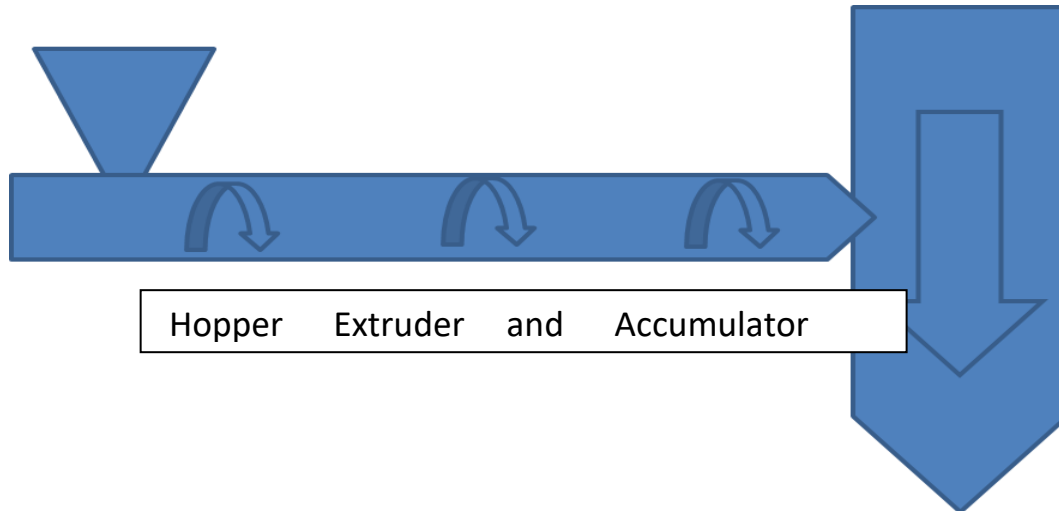
Mold temperature

Akulon® can be used with a wide range of tool temperatures (15 - 60°C / 60 - 140°F). However, to avoid the parison to cool down due to mold contact and to achieve optimal wall thickness distribution and good surface appearance, it is recommended to apply a tooling temperature at the higher side (60°C / 140°F).

Barrel temperature

Optimal settings are governed by barrel size and residence time. Due to the high viscosity of the material and melting point of Akulon® the temperature should be set high enough at the entrance to provide a homogeneous melt. A rising temperature profile is recommended.

	Extrusion Zones			Accumulator	Resin	Mold
	Feed	Compression	Metering	Storage	Melt	Temperature
°C	180 – 200	210 – 230	220 - 240	240 - 260	240 - 260	15 – 60
°F	356 - 392	410 – 446	428 - 464	464 - 500	464 - 500	60 - 140



Barrel entrance extruder: To get good transport of the material a grooved zone is preferred.

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GENERAL PROCESSING SETTINGS

Screw rotation speed

To realize a good and homogeneous melt, and to avoid high shear on the screw, it is advised to set a screw rotation speed resulting in a plasticizing time that is just within the cooling time. The rotational speed of the screw should not exceed 3000/D RPM (where D is the screw diameter in mm).

Injection speed

Moderate to high injection speeds are required in order to prevent premature crystallization in the mold during injection phase and to obtain a good wall thickness distribution and a good surface finish.

Blow up pressure

To get optimal part it is preferred to blow up quick, with minimal 8 bar air pressure, via big hole. 10 bar is even better to have the best copy of the mold print /profiles.

Cooling Time

Actual cooling time will depend on part geometry and dimensional quality requirements as well as the tool design.

RESIDENCE TIME

Melt residence time (MRT) for Akulon® in general should not exceed 6 minutes with preferably at least 50% of the maximal shot volume used. A formula to estimate this MRT is described below.

$$MRT = \frac{\pi D^3 \rho}{m} * \frac{t}{60}$$

Whereas:

MRT	= Melt Residence Time [minutes]
D	= Screw Diameter [cm]
ρ	= Melt Density [g/cm ³] use 1.2
m	= Shot Weight [g]
t	= Cycle Time [s]

Optimal melt residence time for Akulon® is \pm 4 minutes.

Remark:

According to the head design, most of the heads work according the principle first in first out, but cushion should remain as small as possible.

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SAFETY

For the safety properties of the material, we refer to our MSDS which can be ordered at our sales offices. During practical operation we advise to wear personal safety protections for hand/eye/body.

STARTUP/SHUT DOWN/CLEANING

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

PRODUCTION BREAKS

During production breaks longer than a few minutes, we advise emptying the barrel and accumulator. The temperature of the barrel should be reduced to a level far enough below the melting point of the material in order to stop decomposition of the material.

When the screw is blocked, be aware that under these conditions a sudden outburst of molten material can take place. Always wear personal safety protections for hand/eye/body.

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