

# **PROCESSING DATA SHEET POLYCARBONATE**

## **Recycled GRADES**



### **PRODUCT LIST**

SICOKLAR Eco UG SERIES STANDARD GRADES

### **MATERIAL DESCRIPTION**

SICOKLAR ECO UG is a REPROCESSED POLYCARBONATE available with Melt Flow Index from **15 to 35** designed for injection molding applications. Thanks to its properties balancing like, impact resistance, heat resistance, dimensional stability, SICOKLAR ECO UG series can be easily used in a broad range of markets like lighting, automotive, electrical and electronics, office equipment.

### **DRYING**

PC resins are hygroscopic; they absorb water from direct immersion and from humid air. The amount of water absorbed normally depends on the exposure time, the air temperature and the relative humidity; the maximum moisture level absorbed is normally 0.3%

At the temperatures used to mold PC, moisture levels can cause visual flaws and also brittleness of the molded part.

Therefore, it is recommended that resin moisture content be limited to 0.03% when processing SICOKLAR™ resins.

### **DRYING EQUIPMENT AND CONDITIONS**

Hopper dryers that incorporate dehumidifying units are recommended for drying PC resin granules. It is recommended 3-4 hours at 120°C as minimum-drying conditions for PC resins dried in dehumidifying dryers. Closed hot-air systems are not recommended for use. If tray dryers are used, the depth of the granules should not exceed 25 mm, and the granules should be heated at 120°C for at least 6 to 8 hours, depending on the granule size.

Because dried granules of PC resin can quickly pick up moisture from the air, it is good practice to use them as soon as possible after drying.

### **MACHINE SELECTION**

The size of the machine to be used is determined by the volume of plastic required to fill the mold cavity. It is

good practice to keep the shot size of the machine between 40 and 90 percent of the total capacity. An optimum shot size is between 50 and 80 percent of the machine capacity.

There are three general guidelines for selection of the screw for an injection molding machine to be used with PC resins:

1. A minimum of 18:1 22:1 length-to diameter ratio.
2. A compression ratio between 2,0:1 and 3,0:1.
3. Use of a slip-ring type non-return valve with clearances of at least 3.2 mm.

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4. Standard steel nozzles can be used ; its is recommended to use the nozzle as shorter as possible, so to avoid the risks of degradation and black specks generation in long production runs.



### **MELT TEMPERATURE**

The molding machine should be set up to deliver a melt temperature between 270 to 290°C, with an aim of 280°C. The optimum temperature profile depends on many variables such as the ratio of machine capacity to shot size, screw design, mold and part design, and cycle time. Reverse temperature profiles are used occasionally to compensate for improper screw design, to reduce machine amperage or torque requirements, and to compensate for machines with short L/D ratios.

Keeping a uniform melt temperature within recommended range is essential to ensure part performance and color matching to mating component parts. Melt temperatures in the upper end of the recommended range may be necessary when processing thin wall parts, difficult-to-fill parts, parts with very small gates, and parts with long flow lengths. Excessive melt temperatures may result in thermal degradation and a loss of performance, properties and aesthetics. Lower processing temperatures reduce the risk of thermal degradation and shorten the necessary cooling time. However, excessively low melt temperatures may result in high residual molded-in stress.

### **MOLD TEMPERATURE**

The mold temperature range recommended for PC materials is 70 to 90°C. Cooling time is important for part performance and cycle time optimization. Using a mold temperature controller will minimize temperature variations. Higher mold temperatures in the upper recommended range generally provide better surface finish, less molded-in stress because of slower cooling, and easier filling of thin wall parts and parts with long flow lengths. Lower mold temperatures allow the molten polymer to set up faster to reduce the overall cycle time. SICOKLAR™UG resins with different melt flow rates have different processing windows. In general, resins having higher melt flow rates allow the use of lower mold and melt temperatures. The higher melt flow rates are easier to process and their lower molding temperatures allow for shorter cycle times.

### **PARAMETER VALUE**

#### **Barrel Temperatures :**

Rear (Hopper) 250-260°C ; Intermediate 260-270°C ; Front 280-290°C ; Nozzle 280-285°C

**Mold Temperature :** 70-90°C

#### **Pressure :**

Back Pressure 4-8 Bar

Injection Pressure Adjust to control part weight & dimensions

Hold/Pack Pressure 60-80 Bar

Cushion 3.0-6.0 mm

**Rate :** Injection Speed Adjust to control appearance

#### **Plasticizing Conditions :**

A moderate screw speed of 50-80 RPM is recommended for SICOKLAR Eco UG resins.

**Injection Conditions :** the appropriate injection speed for SICOKLAR Eco UG resins is determined largely by gate design. PC resins are susceptible to formation of gate blush. For parts gated into a visible surface it may be necessary to run the machine at as slow an injection speed as possible.

During the packing phase, the material in the cavity is shrinking; to compensate for this shrinkage, additional material must be supplied to the cavity until gates freeze-off. A small melt cushion provides a ready source of additional melt to use during packing.

If the screw is allowed to "bottomout," the packing pressure cannot be transferred through the polymer to pack out the cavity. This will result in poor part consistency due to short shots, poor dimensional stability, excessive sink marks or poor aesthetics.

It is generally recommended that a small cushion size be employed to minimize heat history on the polymer, reducing the potential for polymer degradation.

### **REGRIND**

Regrind can be used with SICOKLAR Eco UG resins if care is taken to avoid cross contamination and moisture pick-up; like virgin resin, regrind must be dried. Large particle sizes of regrind may require longer drying times. However, parts that were rejected because they were molded with wet resin or degraded parts cannot be regrind and reused.

### **PURGING**

Cleaning accurately the barrel and nozzle equipment is essential; due to high processing temperature of the Polycarbonate resin (over 280°C), residual of the resins processed before can degrade generating black specks and color deviation. GPPS or SAN resin can be easily used.

### **SHUTDOWN PROCEDURE**

to shutdown properly the injection molding machinery is important to avoid problems on the new re-start; **typical problems related to improper shutdown are black specks and brown stripes generation.**

for short-term shutdown (4-6 hours) following procedure is recommended :

- 1- close the hopper feeding
- 2- empty the barrel until no material remains into the machinery
- 3- forward the screw
- 4- setting the barrel temperature at 150°C

for long-term shutdown (over 1 day)

- 1- close the hopper feeding
- 2- purge the barrel with GPPS to clean a remove PC residual
- 3- forward the screw
- 4- turn off heat zones

Emission July 2020