

# **PROCESSING DATA SHEET ABS HEAT RESISTANT**

## **PRODUCT LIST**

SICOFLEX 99 MEDIUM HEAT RESISTANT GRADE  
SICOFLEX 100A HEAT RESISTANT GRADE  
SICOFLEX 100/O LOW GLOSS GRADE  
SICOFLEX S460 S460F HEAT RESISTANT GRADE  
SICOFLEX S471 HIGH HEAT RESISTANT GRADE

## **MATERIAL DESCRIPTION**

SICOFLEX™ HH SERIE are ABS resins designed for injection molding of parts for automotive applications. Depending on the different composition between the three components (Acrylonitrile, Butadiene and Styrene) it is possible to obtain different properties balancing (stiffness, heat resistance) depending on the application needs.

To satisfy specific application requirements it is also available one specific grades like :

- SICOFLEX 100/O where a low gloss value is required

## **DRYING**

ABS 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.

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

Therefore, it is recommended that resin moisture content be limited to 0.1% when processing SICOFLEX™ HH SERIE.

## **DRYING EQUIPMENT AND CONDITIONS**

Hopper dryers that incorporate dehumidifying units are recommended for drying ABS resin granules. It is recommended 2-3 hours at 80°-90°C as minimum-drying conditions for ABS 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 90°-100°C for at least 4 to 5 hours, depending on the granule size.

## **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 30 and 70 percent of the total capacity. An optimum shot size is between 40 and 60 percent of the machine capacity.

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

1. A minimum of 15:1 length-to diameter ratio.
2. A compression ratio between 1.5:1 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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## MELT TEMPERATURE

The molding machine should be set up to deliver a melt temperature between 220 to 250°C, with an aim of 240°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 ABS materials is 40 to 60°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. SICOFLEX™AUTOMOTIVE SERIE 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) 215-225°C ; Intermediate 230-240°C ; Front 240-250°C ; Nozzle 240-245°C

**Mold Temperature :** 40-60°C

### **Pressure :**

Back Pressure 3.0-15 Bar

Injection Pressure Adjust to control part weight & dimensions

Hold/Pack Pressure 30-60 Bar

Cushion 3.0-6.0 mm

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

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## **Plasticizing Conditions :**

A moderate screw speed of 40-70 RPM is recommended for SICOFLEX™HH SERIE

**Injection Conditions :** the appropriate injection speed for SICOFLEX™HH SERIE resins is determined largely by gate design. ABS 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 SICOFLEX™HH SERIE 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**

Where exposure time at a high temperature will, or has been excessive it may be necessary to purge the barrel and nozzle. Purging will also be necessary for color or polymer changes.

There are many purging compounds available on the market.

Purge at the low end of the melt processing range being careful not to exceed the screw torque limit.

Alternatively a low melt flow rate GPPS or PMMA resin may be used.

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