



# THERMOPLASTIC POLYURETHANE

## ISOTHANE® 8102-B

High Performance Engineering Resins

Biocompatible Grade

Technical Data Sheet

### Description

ISOTHANE® 8102-B is a clear USP Class VI engineering thermoplastic polyurethane resin. It exhibits excellent bio-compatibility, hydrolytic resistance, fungus resistance, tensile and flexural strength, toughness, solvent resistance, abrasive resistance, good fatigue resistance, and maintenance of good physical properties under UV exposure. The product can be injection molded and extruded.

### Supply and Storage

ISOTHANE® TPU resins are supplied in pellet form packed in 25kg moisture proof bags. All TPU resins have been dried before packing. ISOTHANE® TPU resins should be stored in cool and dry environment in their original containers until be used. Storage temperature should not exceed 30°C. If only a portion of TPU resins was used from a bag, the remainder of TPU resins should be tightly closed.

### Drying

TPU resins are hygroscopic and pre-drying of TPU resins is always a necessary step before processing. Depend on the climate, the granule exposed to the atmosphere will absorb moisture very quickly. The moisture might bring about partial degradation of polymers and the formation of bubbles or streaks in the molded and extruded parts. In order to ensure the efficient and successful processing into quality parts, the moisture content in TPU resins is recommended less than 0.02%.

A desiccant-bed-type hopper dryer is recommended for drying ISOTHANE® 8102-B. The recommended drying conditions are 90°C (194°F) for 8-12 hours. The dew point of the inlet air should be below -40°C.

### Processing— Extrusion

- Barrel and Motor

- ◆ High torque drive capacity at low speed
- ◆ Vented or standard barrels acceptable
- Screw
  - ◆ Compression ratios between 2:1 and 3:1
  - ◆ Minimum L/D of 30/1
- Feed Throat
  - ◆ Vertical and tangential
  - ◆ Water cooling is recommended
- Screen Pack
  - ◆ Streamlined breaker plates with screen packing is recommended
  - ◆ Typical 40/80/80/40 mesh screens
- Die
  - ◆ Streamline with good temperature control
  - ◆ Land Length is generally 10 to 15 times the part thickness
  - ◆ Coat-hanger manifold-type dies are recommended for extruding film and sheet
  - ◆ Crosshead dies are recommended for wire, cable and hose jacketing
  - ◆ Side-fed rotating dies are recommended for blown film
- Extrusion Temperatures

| Feeding Zone | Compression Zone | Metering Zone | Die       |
|--------------|------------------|---------------|-----------|
| 195-210°C    | 215-230°C        | 215-230°C     | 215-230°C |

### Processing— Injection Molding

- Barrel and Motor
  - ◆ High torque drive capacity at low speed
  - ◆ Vented or standard barrels acceptable
- Screw
  - ◆ Compression ratios between 2:1 and 3:1
  - ◆ Metering screw with gradual transition zone
- Injection Pressure
  - ◆ Typical 6,000 to 15,000 psi
  - ◆ Hold pressure 60 – 70% of forward time
- Injection speed

- ♦ Slow to moderate
- ♦ Depends on gating, wall section and flow length

➤ Injection Molding Temperatures

| Feeding Zone | Compression Zone | Metering Zone | Nozzle    |
|--------------|------------------|---------------|-----------|
| 195-210°C    | 215-230°C        | 215-230°C     | 220-230°C |

### Coloring

Generally, ISOTHANE® TPU resins are supplied in their natural color. They can be colored by blending with pigment or pigment master batch. Using master batch based on TPU is recommended. Other master batch based on polyethylene or polystyrene is suitable to a limited extent. All colorants employed in TPU resins must be pre-dried before processing.

The normal addition of pigment or pigment master batch is 0.2%-0.5% or 1-3%.

### Additives

Various additives can be used to enhanced the properties of ISOTHANE® TPU resins, e.g. anti-blocking agents, antioxidant, UV stabilizers or release agents. Most additives supplied as master batches are available. But not all additives are compatible with ISOTHANE® TPU resins. It is recommended to inquire of your suppliers or our technical service before compounding.

### Post-treatment

In order to obtain optimal functional properties of ISOTHANE® TPU resins, annealing of the finished products is necessary. The heat treatment can be undertaken in a circulating-air oven. The recommended annealing conditions are 80°C (176°F) for 12-16 hours. The finished products without annealing may require several weeks storage at room temperature to obtain full mechanical properties. Extrusion products are annealed only in special cases.

### Recycling

For ISOTHANE® TPU resins, up to 20% of regrind may be recycled with virgin material depending on finished parts requirements. The regrind material

has to be kept free of contamination, diced and dried before re-using. The material which has been contaminated, discolored or degraded is not suitable for recycling. TPU resins may decrease desired properties, e.g. hardness and mechanical properties, due to improperly mixing with regrind.

Regulatory or testing organizations (e.g., UL) may have specific requirements limiting the allowance amount of regrind. Certain quality requirements laid down in specifications may exclude the use of regrind material.

### Healthy and Safety Information

Before working with these products, it is essential that all operators are aware of the healthy and safety precautions. ISOTHANE® TPU resins can be processed or machined over a wide range of temperature. There can be some smoke formation during processing. The smoke that contains some decomposition substances of TPU or additives may cause irritation to human body. Generally, the temperature does not exceed 230°C that can reduce decomposition formation. An effective extraction system, especially in the melt outlet zone, is necessary. The detail information concerning healthy and safety can be available in safety data sheets (SDS) or contact our technical service.

### Disposal

ISOTHANE® TPU resins present no hazard to the environment or water. They can be dumped on municipal landfill or in a waste incineration plant. The official regulations on waste disposal should be observed.

## ISOTHANE® 8102-B Properties:

| Items  | Units                 | ASTM        | 8102-B           |
|--|-----------------------|-------------|------------------|
| Specific Gravity                                   |                       | D-792       | 1.19             |
| Hardness   | Shore D               | D-2240      | 77D              |
| Tensile Strength                                   | MPa<br>psi            | D-638       | 70<br>10,200     |
| Tensile Modulus                                    | MPa<br>psi            | D-638       | 1,570<br>227,000 |
| Elongation @ break                                 | %                     | D-638       | 170              |
| Flexural Strength                                  | MPa<br>psi            | D-790       | 75<br>10,900     |
| Flexural Modulus                                   | MPa<br>psi            | D-790       | 1,760<br>256,000 |
| Izod Impact Strength<br>Notched 1/4 in., 23°C      | J/m<br>ft-lb/in       | D-256       | 1,200<br>22      |
| Heat Deflection<br>Temperature<br>HDT/B (0.46 MPa) | °C<br>°F              | D-648       | 90<br>194        |
| Melt Flow Rate                                     | g/10min<br>224°C, 5kg | ASTM D-1238 | 1-8              |

While the above information is presented in good faith and believed to be accurate, GRECO does not guarantee satisfactory results from reliance upon such information and disclaims all liability for any loss or damage arising out of its use.

Updated in 08/2020

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