Technical Data Sheet

Isothane® Thermoplastic Urethane — 8000 Series

Great Eastern Resins Industrial Co. Ltd.

Isothane 8000 grades are engineering polyether based thermoplastic polyurethanes that offer mechanical properties and resistance to solvents and ultra violet light exposure. These grades can be processed using conventional injection molding equipment.

Property	ASTM Test Method	Conditions	Units	8101-B	8102-B
Biomedical*	USP	-	Class	VI	VI
Specific Gravity	D-792	-	g/cm^3	1.20	1.19
Hardness	D-2240	-	Shore	81D	77D
Tensile Strength	D-638	-	MPa	65	70
			psi	9,500	10,200
Tensile Modulus	D-638	-	MPa	2,090	1,570
			psi	304,300	227,000
Tensile Elongation	D-638	@ break	%	125	170
Flexural Strength	D-790	-	MPa	75	75
			psi	10,900	10,900
Flexural Modulus	D-790	-	MPa	2,260	1,760
			psi	298,000	256,600
Izod Impact Strength	D-256	notched, ¼ in, 23°C	J/m	117	1,200
			ft-lb/in	2.2	22
Heat Deflection Temperature	D-648	HDT/B 0.46 MPa	°C	93	90
			°F	199	194
Melt Flow Rate	D-1238	224°C, 1.2kg	g/10min	2-14	1-8

**USP tested grades are designated with the suffix '-B' (i.e. 8101-B)*

Note:Values are shown as typical values and should not be used as specifications

Great Eastern Resins Industrial Co. Ltd. (GRECO) is a leading Taiwanese producer of thermoplastic urethanes, coatings, films and specialty chemicals. Isothane is a registered trademark of GRECO.

Foster Polymer Distribution, a business unit of Foster Corporation, is a specialized supplier of performance polymers for medical device applications. Specialty services included product development, material sampling, lot selection, custom batches, regulatory support and logistics.

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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. Depending 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 Engineering Series. The recommended drying conditions are 85°C (185°F) for 3-4 hours. The dew point of the inlet air should be in the range of -30 to -40°C.

Injection Processing

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
Barrel Temperature – Rear 200~205°C (390~400°F); Middle 210~220°C (410~430°F); Front 210~220°C (410~430°F)
Nozzle Temperature - 220~230°C (430~450°F)
Melt Temperature - 220~240°C (430~465°F)
Mold Temperature - 65~85°C (150~185°F)

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 enhance 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 of 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 health 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 material safety data sheets (MSDS) 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.

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