

DESMOPAN[®] IT 70AU

Thermoplastic Polyurethane

Technical Data Sheet

Special Polyester-Based Grade

Description

Desmopan IT 70AU resin is an aromatic polyester-based thermoplastic polyurethane with a shore hardness of approximately 71A. It can be processed by injection molding, extrusion processes are not recommended. In addition to excellent mechanical property, Desmopan IT 70AU offers good UV stabilizer and wide processing window. Applications include electronic accessories and injection molding engineering parts.

Package & Storage

DesmopanTPU resins are supplied in pellet form packed in 25Kgs multi-layer paper Al bag for loading in the PE film. All Desmopan TPU resins have been dried before packaging. The water content of the original TPU pellets is below 200ppm (0.02 wt. %).

DesmopanTPU resins should remain in their sealed containers and be stored under ventilated, cool and dry conditions until used. Storage temperature should not exceed 30°C. Under these conditions Desmopan TPU resins will have an indefinite shelf life.

Dried, hot pellets should not be left to cool down in the open air. They must be stored in dry containers that can be re-sealed.

Drying

TPU resins have a strong tendency to absorb atmospheric moisture. The extent and rate of absorption depends on the raw material type, hardness and climate. If the pellets are too moist, blisters or streaks can occur on the surface of the finished components. The extrudate is no longer smooth and glossy but foamy and gassy.

To ensure trouble-free processing and avoid any loss of quality, we strongly recommend that Desmopan TPU resins should be dried before processing. To achieve the recommended moisture content $\leq 200\text{ppm}$ (0.02 wt. %), the recommended drying conditions are 95°C, 3-5 hours. Such levels can be reliably reached in conventional circulating-air ovens. Better drying can be achieved in a shorter time with vacuum drying cabinets or dehumidifier.

Injection Molding

General-purpose single-screw 3-section injection machine is suitable for Desmopan TPU resins injection. The recommended screw length-to-diameter (L/D) ratio is 16-20:1 with a compression ratio of 2.0–2.5:1. Comparing to other plastics, it tends to produce high shear stress in the screw barrel owing to the high viscosity during melting so as to damage the properties of Desmopan TPU resins. Screws with a compression ratio greater than 4:1 should be avoided.

Normally, it is recommended to hold the mold temperature between 25°C and 45°C. For some special purposes, e.g. processing the transparent grades, the cold water can be flowed through the pipeline inside the mold to keep the mold temperature at around 10°C so as to achieve transparency and reduce cycle time.

Typical Injection Molding Conditions

Injection Temperature:	
Nozzle.....	175°C
Metering Zone.....	170°C
Compression Zone.....	165°C
Feeding Zone.....	160°C
Mold Temperature.....	15–45°C
Injection Pressure.....	20–110MPa
Holding Pressure.....	50–80% of Injection Pressure
Back pressure.....	0.3–4MPa
Screw Speed.....	20–80rpm
Injection Cycle Time:	
Injection Time.....	5–10 sec
Holding Time.....	10–20 sec
Cool Time.....	30–40 sec

Coloring

Apart from a few exceptions, DesmopanTPU resins are supplied solely in their natural color. The final color of Desmopan TPU resins can vary from virtually transparent through translucent to opaque, depending on the grade in question.

Desmopan TPU resins can be colored by blending in the pigment master batch or by dry-blending the pigment directly into the pellets.

The resin must be dry before blending any colorants into it. Particular care should be taken to ensure that the colorants employed are dry. If a pigment master batch is to be used, it must be dried in the same manner as the resin. Even the addition of just 1% moist pigment master batch can affect the surface and impair demolding behavior. Many inorganic pigments contain water which must be eliminated.

Using the pigment master batch with DesmopanTPU resin as the carrier material is a simple and reliable means. Other pigment master batch based on polystyrene or SAN (styrene-acrylonitrile) resin is suitable to a limited extent, while master batch based on polyethylene, polypropylene or PVC is not at all suitable.

The standard quantities employed (depending on wall thickness and color density):

Pigment master batch	1.0 -4.0 %
Pigments	0.2 - 0.5 %

Additives

Various additives, e.g., anti-blocking agents, release agents, antioxidant and UV stabilizers can be used to enhance the properties of DesmopanTPU resins. Generally, most additives supplied as master batches based on TPU resins are available. Since not all additives are compatible with Desmopan TPU resins, it is strongly recommended to inquire of your suppliers or our technical service representative about suitability before compounding.

Post Treatment

Desmopan TPU resins can attain full mechanical properties through post treatment. For some high-performance finished products and the test sample that needs to know properties immediately, to achieve optimal and stable mechanical properties in a shorter period, annealing is necessary. This heat treatment can be undertaken in a circulating-air oven. Recommended post treatment conditions:

Temperature	100°C
Time	20hours

Extrusion products are annealed only in special cases. By exposing the injection or extrusion finished products at room temperature for about 4~5 weeks, the mechanical properties that obtained are very close to that obtained from the post treatment.

Recycling

For Desmopan TPU resins, up to 30wt. % regrind may be used with virgin material, depending on the end-use requirements of the molded part and provided that the material is kept free of contamination and is properly dried (see section on Drying). Sprue and runner waste and other clean waste can be granulated and re-processed. All regrind used must be clean, uncontaminated, and thoroughly blended with virgin resin prior to drying and processing. Under no circumstances should degraded, discolored, or contaminated material be used for regrind. Materials of this type should be discarded (see section on Waste Disposal).

Improperly mixed and/or dried resin may diminish the desired properties of Desmopan TPU resin. The quantity of regrind added to virgin material should always be selected on the basis of the requirement profile specified for the parts. This will also show whether it is possible to use 100% regrind. Unless the injection moldings are being used for inferior-quality applications, they must be tested to check that they meet the specified requirements. Regulatory or testing organizations (e.g., UL) may have specific requirements limiting the allowable amount of regrind. Because third party regrind generally does not have a traceable heat history, nor offer any assurance including proper temperatures, conditions, when materials were used in processing, extreme caution must be exercised in buying and using regrind from third parties.

The use of regrind material should be avoided entirely in those applications where resin properties equivalent to virgin material are required, including but not limited to color quality, impact strength, resin purity, and/or load-bearing performance.

Air Extraction

DesmopanTPU resins can be processed over a wide temperature range. As all natural and synthetic organic materials, it tends to decompose above a certain temperature. For full dried pellets, the development of smoke signifies that decomposition is taking place. Normally, slow decomposition commences at approximately 230°C, depending on the grade in question.

We recommend efficient air ventilation and discharge equipment in all cases. This is particularly important for extrusion and welding, since, in the latter case in particular, it is impossible to achieve a controlled temperature profile.

Waste Disposal

Providing that it is not contaminated with other substances, DesmopanTPU resins can essentially be dumped on municipal landfills. It does not constitute a hazard to water. If the material can no longer be recycled, then it is feasible and, indeed makes sense, for it to be incinerated in a waste incineration plant on account of its high calorific value. Undoubtedly, local environmental protection regulations must be observed.

Health and Safety Information

Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling Desmopan TPU resins. Before working with these products, you must read and become familiar with the available information on its hazards, proper use and handling. This cannot be overemphasized. Information is available in several forms, e.g., material safety data sheets (MSDS) and product labels. Additional information, contact our sales representative or technical service representative.

Desmopan IT 70AU Standard Properties

Properties	Test Standard	SI Unit	Value ¹
Physical properties			
Density	DIN 53479	g/cm ³	1.14
Hardness	DIN 53505	Shore A	71
Color	-	-	Natural
Mechanical properties			
Tensile Strength	DIN 53504	Kg/cm ²	150
Elongation at Break	DIN 53504	%	550
100% Modulus of Elasticity	DIN 53504	Kg/cm ²	35
Tear Strength	DIN 53515	N/mm	50
Abrasion Loss	DIN 53516	mm ³	120

¹ Typical values, not to be construed as specifications. Users should confirm results by their own tests.

Note: Condition the test specimens at 23 ± 2°C and 50 ± 5% relative humidity for not less than 40 hours prior to test in accordance. Conduct the test at 23 ± 2°C and 50 ± 5% relative humidity. Unless otherwise specified by contract or the relevant material specification. Reference pre-test conditioning and testing conditioning, to settle disagreement, shall apply tolerances of ± 1°C and 2% relative humidity.

Standard Disclaimer

The conditions of your use and application of our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations, are beyond our control. Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis at least must include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by Bayer Corporation. All information is given without warranty or guarantee. It is expressly understood and agreed that customer assumes and hereby expressly releases Bayer from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance, and information. Any statement or recommendation not contained herein is unauthorized and shall not bind Bayer. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any patent.

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