Texin® 260D

Characterization	Texin 260D resin is an aromatic polyester-based thermoplastic polyurethane with a Shore hardness of approximately 60D*. It can be processed by injection molding; extrusion processes are not recommended.
Properties / Applications	Texin 260D resin offers outstanding abrasion resistance, impact strength, toughness, and flexibility. It also exhibits excellent fuel and oil resistance. Texin 260D natural color resin complies with FDA food-contact regulations 21 CFR 177.1680 (Polyurethane Resins) and 177.2600 (Rubber Articles Intended for Repeated Use), subject to the limitations of these and any other applicable regulations. Typical applications include toplifts, casters, grommets, and seals. As with any product, use of Texin 260D resin in a given application must be tested (including field testing, etc.) in advance by the user to determine suitability.
Storage	Texin thermoplastic polyurethane resins are hygroscopic and will absorb ambient moisture. The presence of moisture can adversely affect processing characteristics and the quality of parts. Therefore, the resins should remain in their sealed containers and be stored under cool and dry conditions until used. Storage temperature should not exceed 86°F (30°C). Unused resin from opened containers, or reground material that is not to be used immediately, should be stored in sealed containers.
Drying	Prior to processing, Texin 260D resin must be thoroughly dried in a desiccant dehumidifying hopper dryer. Hopper inlet air temperature should be 200° –230°F (93° –110°C). To achieve the recommended moisture content of less than 0.03%, the inlet air dew point should be -20°F (-29°C) or lower. The hopper capacity should be sufficient to provide a minimum residence time of 4 hours. Additional information on drying procedures is available in the brochure - General Drying Guide.

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Injection Molding

General-purpose screws are satisfactory for use with Texin 260D resin. The recommended screw length-to-diameter (L/D) ratio is 20:1 with a compression ratio of 2.5 –3:1. Screws with a compression ratio greater than 4:1 should be avoided. Recommended shot weight is 40-80 % of rated barrel capacity. Typical starting conditions are noted below. Actual processing conditions will depend on machine size, mold design, material residence time, etc.

Typical Injection Molding Conditions

Barrel Temperature: Rear	400°–420°F (204°–216°C)
Barrel Temperature: Middle	405°–430°F (207°–221°C)
Barrel Temperature: Front	405°–430°F (207°–220°C)
Barrel Temperature: Nozzle	410°–435°F (210°–224°C)
Melt Temperature	410°–430°F (210°–220°C)
Mold Temperature	80°–120°F (27°–49°C)
Injection Pressure	10,000 - 15,000 psi
Hold Pressure	60 - 80% of Injection Pressure
Back Pressure	800 psi max.
Screw Speed	40 - 80 rpm
Injection Speed	Slow to Moderate
Cushion	1/8 in max
Clamp	3 - 5 ton/in^2
Timers (per 0.125-in cross section)	
Boost	5 -10 sec
2nd Stage	10- 20 sec
Cool	15 - 20 sec

Mold Shrinkage

Typical values for mold shrinkage are given below. For treatments such as postcuring, an additional 1 to 1.5 mil per inch should be added.

Cross Section	Mold Shrinkage*
Less than 1/8 inch	7 - 10 mils per inch
1/8 to 1/4 inch	10 - 15 mils per inch
Over 1/4 inch	15 - 20 mils per inch

Additional Injection Molding Information

Additional information on injection molding may be obtained by consulting the publication - Texin and Desmopan Thermoplastic Polyurethanes — A Processing Guide for Injection Molding and by contacting a Covestro technical service representative.

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Regrind Usage

Where end-use requirements permit, up to 20% Texin resin regrind may be used with virgin material, provided that the material is kept free of contamination and is properly dried (see section on Drying). Any regrind used must be generated from properly molded/extruded parts, sprues, runners, trimmings, and/or films. 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 properly discarded.

Improperly mixed and/or dried regrind may diminish the desired properties of Texin resin. It is critical that you test finished parts produced with any amount of regrind to ensure that your end-use performance requirements are fully met. Regulatory or testing organizations (e.g., Underwriter's Laboratories) may have specific requirements limiting the allowable amount of regrind. Because third party regrind generally does not have a traceable heat history or offer any assurance that proper temperatures, conditions, and/or 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.

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Typical Properties* for Natural Resin

Property	ASTM Test Method (Other)	Texin 260D Resin U.S. Units	Texin 260D Resin S.I. Units
General			
Specific Gravity	D 792 (ISO 1183)	1.22	1.22
Shore Hardness	D 2240 (ISO 868)	60D	60D
Taber Abrasion: H-18, 1,000-g Load, 1,000 Cycles	D 3489 (ISO 4649)	50 mg Loss	50 mg Loss
Bayshore Resilience	D 2632	35%	35%
Mold Shrinkage, 100-mil thickness	D 955 (ISO 2577)		
Flow Direction		0.008 in/in (mm/mm)	0.008 in/in (mm/mm)
Cross-Flow Direction		0.008 in/in (mm/mm)	0.008 in/in (mm/mm)
Mechanical			
Tensile Strength	D 412 (ISO 37)	8,700 lb/in^2	60.0 MPa
Tensile Stress at 50% Elongation	D 412 (ISO 37)	2,900 lb/in^2	20.0 MPa
Tensile Stress at 100% Elongation	D 412 (ISO 37)	3,200 lb/in^2	22.1 MPa
Tensile Stress at 300% Elongation	D 412 (ISO 37)	5,800 lb/in^2	40.0 MPa
Ultimate Elongation	D 412 (ISO 37)	420%	420%
Tear Strength, Die C	D 624 (ISO 34)	1,000 lbf/in	175 kN/m
Flexural Modulus 73°F (23°C)	D 790 (ISO 178)	43,000 psi	296 MPa
Compression Set:	D 395-B (ISO 815)		
As molded [postcured]**		55 [35]	55 [35]
22 Hours at 158°F (70°C)		27 [21]	27 [21]
22 Hours at 73°F (23°C)			

Document contains important information and must be read in its entirety.

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Texin® 260D

Typical Properties* for Natural Resin (CONT'D.)

Property	ASTM Test Method (Other)	Texin 260D Resin U.S. Units	Texin 260D Resin S.I. Units
Mechanical			
Compressive Load:	D 575		
2% Deflection		50 lb/in^2	0.34 MPa
5% Deflection		525 lb/in^2	3.6 MPa
10% Deflection		1,370 lb/in^2	9.4 MPa
15% Deflection		1,950 lb/in^2	13.4 MPa
20% Deflection		2,520 lb/in^2	17.4 MPa
25% Deflection		3,150 lb/in^2	21.7 MPa
50% Deflection		7,785 lb/in^2	53.7 MPa
Thermal			
Deflection Temperature Under Load 66 psi (0.16 MPa)	D648 (ISO 75)	140°F	60°C
Coefficient of Linear Thermal Expansion	D 696	7.0 E-05 in/in°F	12.6 E-05 mm/mm°C
Low Temperature Brittle Point	D 746 (ISO 974)	< -90°F	< -68°C
Glass Transition Temperature (Tg)	(DMA)[a]	5°F	-15°C
Vicat Softening Temperature Rate A	D 1525 (ISO 306)	374°F	190°C

**These items are provided as general information only. They are approximate values and are not part of the product specifications.*

*** Postcured for 16 hours at 230°F (110°C).*

a DMA — Dynamic Mechanical Analysis.

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Property Changes after Aging Texin 260D Resin

Property	ASTM Test Method (Other)	70 Hours	7 Days	14 Days	21 Days
Hot Air at 212°F (100°C)	D 573 (ISO 216)				
Tensile Strength		+7%	+1%	+9%	+13%
Tensile Stress at 100% Elongation		+13%	-1%	+2%	+5%
Tensile Stress at 300% Elongation		+8%	-1%	-3%	-4%
Ultimate Elongation		+1%	+8%	+17%	+24%
Hardness, Shore D		0	-2	-3	-3
Hot Air at 275°F (125°C)	D 573 (ISO 216)				
Tensile Strength		+16%	+21%	+6%	-2%
Tensile Stress at 100% Elongation		-2%	+8%	-7%	-8%
Tensile Stress at 300% Elongation		-18%	-12%	-24%	-26%
Ultimate Elongation		+51%	+51%	+52%	+44%
Hardness, Shore D		-2	-3	-4	-3
ASTM Oil #3 at 212°F (100°C)	D 471 (ISO 175)				
Tensile Strength		+12%	+22%	+20%	+17%
Tensile Stress at 100% Elongation		+8%	+16%	+7%	+4%
Tensile Stress at 300% Elongation		+5%	+2%	-16%	-14%
Ultimate Elongation		+11%	+29%	+36%	+47%
Hardness, Shore D		0	-2	+2	0
Volume		0%	0%	0%	-1%

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Property Changes after Aging Texin 260D Resin (CONT'D.)

Property	ASTM Test Method (Other)	70 Hours	7 Days	14 Days	21 Days
ASTM Oil #3 at 212°F (100°C)	D 471				
Tensile Strength		+13%	--	--	+28%
Tensile Stress at 100% Elongation		+7%	--	--	-2%
Tensile Stress at 300% Elongation		+5%	--	--	-14%
Ultimate Elongation		+11%	--	--	+47%
Hardness, Shore D		-1	--	--	-3
Volume		+2%	+3%	+2%	+3%
Fuel A at 73°F (23°C)	D 471 (ISO 175)				
Tensile Strength		-4%	-2%	+1%	-1%
Tensile Stress at 100% Elongation		-4%	-1%	+2%	-5%
Tensile Stress at 300% Elongation		-1%	+2%	+2%	+2%
Ultimate Elongation		-5%	-4%	-1%	-4%
Hardness, Shore D		-1	0	-3	-2
Volume		0%	0%	0%	0%
Fuel C at 73°F (23°C)	D 471 (ISO 175)				
Tensile Strength		-1%	-7%	-9%	-19%
Tensile Stress at 100% Elongation		-15%	-17%	-24%	-33%
Tensile Stress at 300% Elongation		+11%	+4%	+1%	-10%
Ultimate Elongation		+5%	+3%	+6%	+3%
Hardness, Shore D		-1	-1	-6	-7
Volume		+4%	+5%	+8%	+10%

** This table shows property changes for Texin 260D resin after exposure to hot air, oil, and fuel. As is the case with any compatibility test, the results are dependent on variables, such as concentration, time, temperature, part design, and residual stresses, and should serve only as a guideline. It is imperative that production parts be evaluated under actual application conditions prior to commercial use.*

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Health and Safety Information	Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling this product. Before working with this product, you must read and become familiar with the available information on its risks, proper use, and handling. This cannot be overemphasized. Information is available in several forms, e.g., safety data sheets and product labels. For further information contact your Covestro LLC representative or the Product Safety and Regulatory Affairs Department in Pittsburgh, PA.
Note	***The purchaser/user agrees that Covestro LLC reserves the right to discontinue this product without prior notice.***

The manner in which you use and the purpose to which you put and utilize 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 utilize our products, technical assistance and information to determine to your own satisfaction whether our products, technical assistance and information are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale which are available upon request. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us 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 us. Nothing herein shall be construed as a recommendation to use any product in conflict with any claim of any patent relative to any material or its use. No license is implied or in fact granted under the claims of any patent.

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