Elastollan® TPU Technical Data Sheet

BASF
The Chemical Company

Elastollan® 1180A

Polyether-based Grade

Elastollan® 1180A is specifically formulated for extruded profile, sheet and film applications. Elastollan® 1180A exhibits excellent abrasion resistance, toughness, transparency, very good low temperature flexibility, hydrolytic stability and fungus resistance. It has excellent damping characteristics and outstanding resistance to tear propagation. Elastollan® 1180A is rated UL-94 HB in vertical flame test for wall thickness of 0.83 mm. Elastollan® 1180A also conforms to the FDA food contact section, book 21, section 177.2600. Elastollan® 1180A also has NSF Standard 61 "Water Contact Material" certification. Elastollan® 1180A is supplied uncolored in diced or pelletized form.

Typical Properties of Elastollan®	ASTM Test Method	Units	Typical Values
All the physical properties reported here are measured on injection molded samples. Properties of sheet or film samples of this product are also available upon request.			
Specific Gravity	ASTM D 792	g/cm^3	1.11
Shore Hardness	ASTM D 2240	Shore A or D	80A
Taber Abrasion	ASTM D 1044	mg loss	25
DIN Abrasion	DIN 53516	mm^3 loss	25
E-Modulus	ASTM D 412	psi	1800
Flexural Modulus	ASTM D 790	psi	2500
Tensile Strength	ASTM D 412	psi	4900
Tensile Stress at 100% Elongation	ASTM D 412	psi	900
Tensile Stress at 300% Elongation	ASTM D 412	psi	2100
Ultimate Elongation	ASTM D 412	%	590
Tear Strength	ASTM D 624, Die C	lb/in	550
Compression Set **22h at 70ºC** **22h at 23 ºC**	ASTM D 395 "B"	% of original deflection	 45 25
Glass Transition temperature*	BASF Analytical Method	°C	-40
Vicat Softening Temperature	ASTM D 1525	°C	90
DMA Softening Temperature	BASF Analytical Method	°C	53

*Measured with Dynamic Mechanical Analysis (DMA). DMA profile is available upon request.
Above values are shown as typical values and should not be used as specifications.

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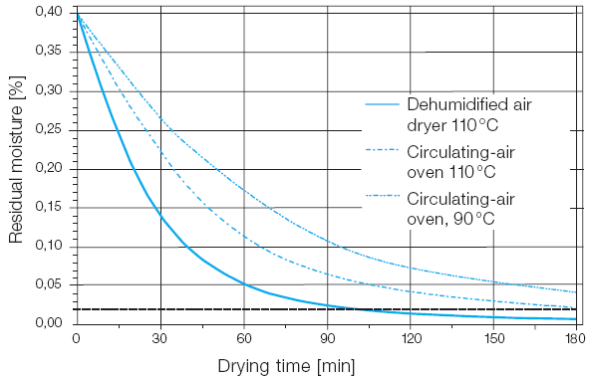
MELT FLOW INDEX (MFI): Elastollan® 1180A is available in various MFI ranges. Depending on the process and application, different melt flow index can be used. Physical properties of all the materials are same. "ASTM D 1238, B" MFI test method is used for generation of data.

Elastollan® Name	MFI Conditions	MFI, g/10min
1180A10	190 °C, 8.7 kg	10-20
	190 °C, 21.6 kg	20-50
1180A50	190 °C, 8.7 kg	15-30
	190 °C, 21.6 kg	30-60

DRYING: Elastollan® materials are hydroscopic, i.e. dry Elastollan® will rapidly absorb moisture when exposed to atmosphere. Polyether-based Elastollan® grades absorb moisture more rapidly than polyester-based Elastollan® grades. As with all TPU products, Elastollan® 1180A must be dried before processing. The drying step is required to maintain a low moisture content until the product enters the processing equipment. The water content must be less than 0.03% before and during processing.

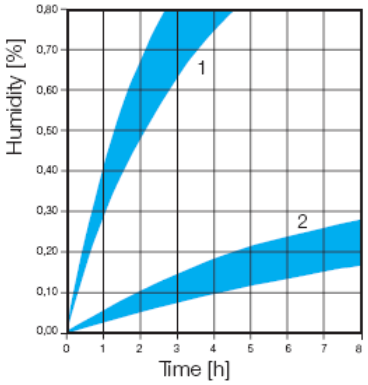
Drying diagram for Elastollan



Elastollan® Hardness	Drying Time	Drying Temperature	
		Circulating air	Dehumidified Air
78A to 90A	2 to 3 h	100 to 110 ºC	80 to 90 ºC
> 90A	2 to 3 h	110 to 120 ºC	90 to 120 ºC

STORAGE: Elastollan® 1180A can be stored for up to one year in its original container. Containers should be stored in a cool and dry area. Containers should be tightly closed after use. Granulates should be exposed to the surrounding air only for as long as absolutely essential; it is therefore important to cover the feed hopper of the processing machine. Drying is recommended if the container has been opened several times. In order to prevent condensation, materials stored in cool conditions should be brought to room temperature before opening the container.

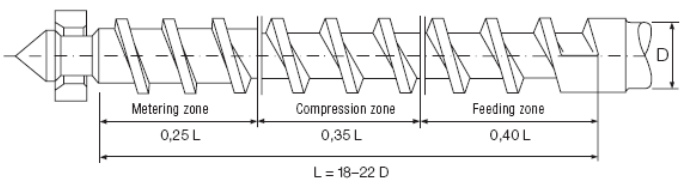
Moisture absorption
Polyether-TPU
Hardness 80 Shore A – 64 Shore D



1 – Standard atmosphere 40 °C/92% rel. hum.
2 – Standard atmosphere 23 °C/50% rel. hum.

PROCESSING RECOMENDATIONS: Single screw extruder with a compression ratio of 1:2 to 1:3, preferably 1: 2.5, are recommended for processing Elastollan®. BASF experience shows that three section screws with an L/D ratio of 25 to 30 are most suitable. Three section screws should have continued constant pitch of 1D. The radial clearance between screw and barrel should be 0.1 to 0.2 mm. For processing Elastollan®, multizone screws, e.g. barrier screws, have also proven suitable. Short screws with high compression ratio are unsuitable for Elastollan®. Use of breaker plates and screen packs is recommended. Depending on the screw diameter and type of die, breaker plates should have holes of 1.5 to 5 mm in diameter. Since thermoplastic polyurethanes are shear sensitive, excessively high screw speeds may lead to reduction in product properties.

Screw configuration (diagrammatic view)



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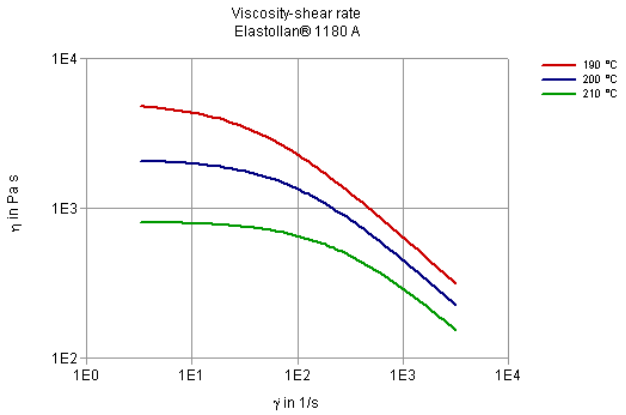
TYPICAL PROCESSING CONDITIONS: Elastollan® 1180A can be used for injection molding or extrusion conditions. Typical processing conditions are listed in the table below. We recommend you to call our technical service helpdesk for more information or troubleshooting.

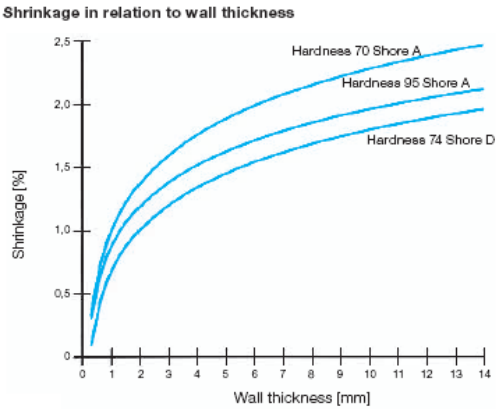
INJECTION MOLDING		
Recommended barrel temperatures in °C		
Elastollan® Hardness	Barrel Temperature	Nozzle
60A- 80A	170-210	200-210
85A- 95A	190-220	210-225
98A-74D	210-230	220-240

EXTRUSION				
Recommended barrel temperatures in °C				
Elastollan® Hardness	Cylinder	Adapter	Die Head	Nozzle
60A to 70A	140-175	160-175	165-170	160-165
75A to 85A	160-200	175-200	175-205	170-205
90A to 98A	170-210	200-220	195-215	190-210

VISCOSITY CURVE:



SHRINKAGE: This graph can be used for estimated shrinkage values of Elastollan® products in relation to the wall thickness. Please remember that depending on the molding conditions and part design these values can change. We recommend you to call technical service group for further information.



CHALLENGE US: Please contact us for more information on Elastollan® products.

You can reach our technical team at 1-800-892-3111 or tpu_helpdesk@basf.com. You can find more information at www.basf.com/elastollan. Our mailing address is BASF Corporation, 1609 Biddle Avenue, Wyandotte, Michigan 48192

For Further information, the following detailed brochures are available upon request:

- Elastollan® Material Properties
- Elastollan® Product Range
- Elastollan® Processing Recommendations
- Elastollan® Electrical Properties
- Elastollan® Chemical Resistance

DISPOSAL: Elastollan® materials are fully reacted and present no hazard to the environment. Waste can therefore be disposed at public waste disposal sites. The official regulations on waste disposal should be observed. For further information, please see BASF material safety data sheets.

CAUTION: Contact with product dusts from regrinding operations may cause temporary irritation of the eyes and the respiratory tract. Use with local exhaust. Under hot melt processing conditions (170-230°C), wear personal protective equipment to prevent thermal burns.

FIRST AID: Eyes-Flush eyes with flowing water at least 15 minutes. If irritation develops, consult a physician. *Skin*-Skin contact with hot melt may cause thermal burns. Call a physician immediately. *Inhalation*-If vapors generated from the hot melt process are inhaled, move to fresh air. Aid in breathing. If breathing difficulties develop, see a physician immediately.
In case of fire: Use water fog, foam, CO_2, or dry chemical extinguishing media. Firefighters should be equipped with self-contained breathing apparatus and turnout gear.