DuPont™ Hytrel® 4069

THERMOPLASTIC POLYESTER ELASTOMER

Product Information

Common features of Hytrel® thermoplastic polyester elastomer include mechanical and physical properties such as exceptional toughness and resilience, high resistance to creep, impact and flex fatigue, flexibility at low temperatures and good retention of properties at elevated temperatures. In addition, it resists many industrial chemicals, oils and solvents. Special grades include heat stabilised, flame retardant, food contact compliant, blow molding and extrusion grades. Concentrates offered include black pigments, UV protection additives, heat stabilisers, and flame retardants.

Hytrel® thermoplastic polyester elastomer is plasticiser free.

The good melt stability of Hytrel® thermoplastic polyester elastomer normally enables the recycling of properly handled production waste. If recycling is not possible, DuPont recommends, as the preferred option, incineration with energy recovery (-24 kJ/g of base polymer) in appropriately equipped installations.

For disposal, local regulations have to be observed.

Hytrel® thermoplastic polyester elastomer typically is used in demanding applications in the automotive, fluid power, electrical/electronic, consumer goods, appliance and power tool, sporting goods, furniture, industrial and off-road transportation/equipment industry.

Hytrel® 4069 is a low modulus grade with nominal hardness of 40D. It contains non-discoloring stabilizer. It can be processed by many conventional thermoplastic processing techniques like injection molding and extrusion.

General information	Value	Unit	Test Standard
Resin Identification	TPC-ET	-	ISO 1043
Part Marking Code	TPC-ET	-	ISO 11469
Rheological properties	**Value**	**Unit**	**Test Standard**
Melt volume-flow rate	8.8	cm³/10min	ISO 1133
Temperature	220	°C	ISO 1133
Load	2.16	kg	ISO 1133
Melt mass-flow rate	8.5	g/10min	ISO 1133
Melt mass-flow rate, Temperature	220	°C	ISO 1133
Melt mass-flow rate, Load	2.16	kg	ISO 1133
Molding shrinkage, parallel	1.0	%	ISO 294-4, 2577
Molding shrinkage, normal	0.9	%	ISO 294-4, 2577
Mechanical properties (TPE)	**Value**	**Unit**	**Test Standard**
Tensile Modulus	45	MPa	ISO 527-1/-2
Stress at 10% strain	3.2	MPa	ISO 527-1/-2
Stress at 50% strain	6.7	MPa	ISO 527-1/-2
Stress at break	29	MPa	ISO 527-1/-2
Strain at break	>300	%	ISO 527-1/-2
Nominal strain at break	800	%	ISO 527-1/-2
Tear strength, parallel	100	kN/m	ISO 34-1
Tear strength, normal	100	kN/m	ISO 34-1
Shore D hardness, max	37	-	ISO 7619-1
Shore D hardness, 15s	33	-	ISO 7619-1
Mechanical properties	**Value**	**Unit**	**Test Standard**
Flexural Modulus	45	MPa	ISO 178
Charpy impact strength			ISO 179/1eU
73°F	N	kJ/m²	
-22°F	N	kJ/m²	
Charpy notched impact strength			ISO 179/1eA
73°F	N	kJ/m²	
-22°F	N	kJ/m²	
-40°F	N	kJ/m²	
Brittleness temperature	-96	°C	ISO 974
Izod notched impact strength			ISO 180/1A
73°F	N	kJ/m²	
-40°F	N	kJ/m²	

To find out more, visit DuPont Performance Polymers or contact nearest DuPont location.

North America **Asia Pacific** **Europe/Middle East/Africa**

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Thermal properties	Value	Unit	Test Standard
Melting temperature, 18°F/min	193	°C	ISO 11357-1/-3
Glass transition temperature, 18°F/min	-50	°C	ISO 11357-1/-2
Temp. of deflection under load, 65 psi	49	°C	ISO 75-1/-2
Vicat softening temperature, 90°F, 2 lbf	130	°C	ISO 306
Coeff. of linear therm. expansion, parallel	220	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion			ISO 11359-1/-2
normal	200	E-6/K	
Normal, -40-23°C	280	E-6/K	
Parallel, -40-23°C	280	E-6/K	
RTI, electrical			UL 746B
60mil	50	°C	
120mil	50	°C	
RTI, impact			UL 746B
60mil	50	°C	
120mil	50	°C	
RTI, strength			UL 746B
60mil	50	°C	
120mil	50	°C	
Flammability	**Value**	**Unit**	**Test Standard**
Burning Behav. at 60mil nom. thickn.	HB	class	IEC 60695-11-10
Thickness tested	1.5	mm	IEC 60695-11-10
UL recognition	yes	-	UL 94
Burning Behav. at thickness h	HB	class	IEC 60695-11-10
Thickness tested	3	mm	IEC 60695-11-10
UL recognition	yes	-	UL 94
Oxygen index	20	%	ISO 4589-1/-2
Flammability, 3.0mm	HB	-	IEC 60695-11-10
FMVSS Class	B	-	ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	<100	mm/min	ISO 3795 (FMVSS 302)
Electrical properties	**Value**	**Unit**	**Test Standard**
Relative permittivity			IEC 62631-2-1
100Hz	4.8	-	
1MHz	4.7	-	
Dissipation factor			IEC 62631-2-1
100Hz	130	E-4	
1MHz	200	E-4	
Volume resistivity	4E10	Ohm*m	IEC 62631-3-1
Surface resistivity	3E14	Ohm	IEC 62631-3-2
Electric strength	18	kV/mm	IEC 60243-1
Comparative tracking index	600	-	IEC 60112
Other properties	**Value**	**Unit**	**Test Standard**
Humidity absorption, 80mil	0.3	%	Sim. to ISO 62
Water absorption, 80mil	0.7	%	Sim. to ISO 62
Density	1110	kg/m³	ISO 1183
Density of melt	1100	kg/m³	-
Water Absorption, Immersion 24h	0.7	%	Sim. to ISO 62
Film Properties	**Value**	**Unit**	**Test Standard**
WVTR, 23°C/85%r.h.	900	g/(m²*d)	DIS 15106-1/-2
Thickness of specimen	0.025	mm	-
VDA Properties	**Value**	**Unit**	**Test Standard**
Emission of organic compounds	10	µgC/g	VDA 277
Odor test	4	class	VDA 270
Injection	**Value**	**Unit**	**Test Standard**
Drying Recommended	yes	-	-
Drying Temperature	≥100	°C	-

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Drying Time, Dehumidified Dryer	2 - 3	h	-
Processing Moisture Content	≤0.08	%	-
Melt Temperature Optimum	225	°C	-
Min. melt temperature	220	°C	-
Max. melt temperature	250	°C	-
Mold Temperature Optimum	40	°C	-
Min. mold temperature	30	°C	-
Max. mold temperature	40	°C	-

Extrusion	Value	Unit	Test Standard
Drying Temperature	90 - 110	°C	-
Drying Time, Dehumidified Dryer	2 - 3	h	-
Processing Moisture Content	≤0.06	%	-
Melt Temperature Optimum	215	°C	-
Melt Temperature Range	210 - 225	°C	-

Characteristics

Processing	• Injection Molding • Film Extrusion • Profile Extrusion	• Sheet Extrusion • Other Extrusion • Coating	• Casting • Thermoforming
Delivery form	• Pellets		
Special characteristics	• Light stabilized or stable to light		
Regional Availability	• North America • Europe	• Asia Pacific • South and Central America	• Near East/Africa • Global

Processing Texts

Profile extrusion

PREPROCESSING

Drying temperature = 100°C
Drying time, dehumidified dryer = 2-3 h
Processing moisture content = <0.06 %

PROCESSING

Melt termperature range = 205-230°C
Melt temperature optimum = 215°C

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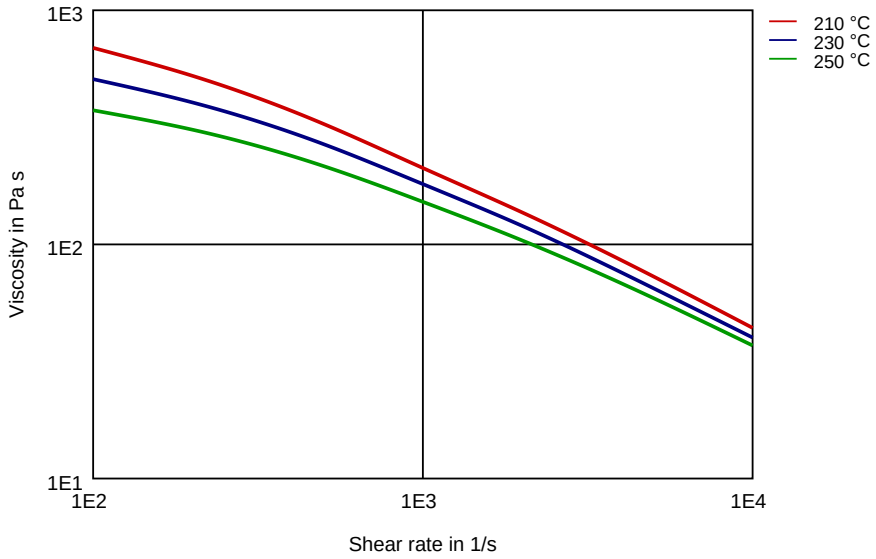
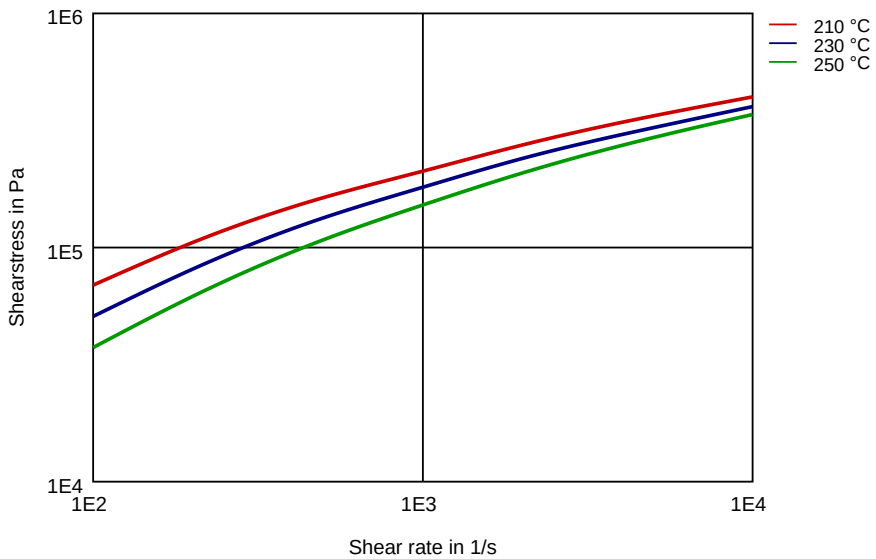
Diagrams

Viscosity-shear rate



Shearstress-shear rate



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Chemical Media Resistance

Acids

- ✓ Acetic Acid (5% by mass) (23°C)
- ✓ Citric Acid solution (10% by mass) (23°C)
- ✓ Lactic Acid (10% by mass) (23°C)
- ✗ Hydrochloric Acid (36% by mass) (23°C)
- ✗ Nitric Acid (40% by mass) (23°C)
- ✗ Sulfuric Acid (38% by mass) (23°C)
- ✓ Sulfuric Acid (5% by mass) (23°C)
- ✗ Chromic Acid solution (40% by mass) (23°C)

Bases

- ✓ Sodium Hydroxide solution (35% by mass) (23°C)
- ✓ Sodium Hydroxide solution (1% by mass) (23°C)
- ✓ Ammonium Hydroxide solution (10% by mass) (23°C)

Alcohols

- ✓ Isopropyl alcohol (23°C)
- ✓ Methanol (23°C)
- ✓ Ethanol (23°C)

Hydrocarbons

- ✓ n-Hexane (23°C)
- ✓ Toluene (23°C)
- ✓ iso-Octane (23°C)

Ketones

- ✗ Acetone (23°C)

Ethers

- ✗ Diethyl ether (23°C)

Mineral oils

- ✓ SAE 10W40 multigrade motor oil (23°C)
- ✗ SAE 10W40 multigrade motor oil (130°C)
- ✗ SAE 80/90 hypoid-gear oil (130°C)
- ✓ Insulating Oil (23°C)

Standard Fuels

- ✗ ISO 1817 Liquid 1 - E5 (60°C)
- ✗ ISO 1817 Liquid 2 - M15E4 (60°C)
- ✗ ISO 1817 Liquid 3 - M3E7 (60°C)
- ✗ ISO 1817 Liquid 4 - M15 (60°C)
- ✓ Standard fuel without alcohol (pref. ISO 1817 Liquid C) (23°C)
- ✓ Standard fuel with alcohol (pref. ISO 1817 Liquid 4) (23°C)

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✓	Diesel fuel (pref. ISO 1817 Liquid F) (23°C)
✓	Diesel fuel (pref. ISO 1817 Liquid F) (90°C)
✗	Diesel fuel (pref. ISO 1817 Liquid F) (>90°C)

Salt solutions

✓	Sodium Chloride solution (10% by mass) (23°C)
✗	Sodium Hypochlorite solution (10% by mass) (23°C)
✓	Sodium Carbonate solution (20% by mass) (23°C)
✓	Sodium Carbonate solution (2% by mass) (23°C)
✓	Zinc Chloride solution (50% by mass) (23°C)

Other

✓	Ethyl Acetate (23°C)
✗	Hydrogen peroxide (23°C)
✗	DOT No. 4 Brake fluid (130°C)
✗	Ethylene Glycol (50% by mass) in water (108°C)
✓	1% nonylphenoxy-polyethyleneoxy ethanol in water (23°C)
✓	50% Oleic acid + 50% Olive Oil (23°C)
✓	Water (23°C)
✓	Water (90°C)
✓	Phenol solution (5% by mass) (23°C)

Symbols used:

✓ possibly resistant

Defined as: Supplier has sufficient indication that contact with chemical can be potentially accepted under the intended use conditions and expected service life. Criteria for assessment have to be indicated (e.g. surface aspect, volume change, property change).

✗ not recommended - see explanation

Defined as: Not recommended for general use. However, short-term exposure under certain restricted conditions could be acceptable (e.g. fast cleaning with thorough rinsing, spills, wiping, vapor exposure).

Contact DuPont for Material Safety Data Sheet, general guides and/or additional information about ventilation, handling, purging, drying, etc. ISO Mechanical properties measured at 160 mil (Hytrel® measured at 80 mil), IEC Electrical properties measured at 80 mil, all ASTM properties measured at 120 mil, and test temperatures are 73°F unless otherwise stated.

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