

DuPont™ Hytrel® 5553FG NC010

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® 5553FG NC010 is a high performance thermoplastic polyester elastomer developed for applications in contact with food.

FOOD CONTACT

This product is manufactured according to Good Manufacturing Practice (GMP) principles and generally accepted in food contact applications in Europe and the USA when meeting applicable use conditions. For details, individual compliance statements are available from your DuPont representative.

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	7	cm ³ /10min	ISO 1133
Temperature	220	°C	ISO 1133
Load	2.16	kg	ISO 1133
Melt mass-flow rate	8	g/10min	ISO 1133
Melt mass-flow rate, Temperature	220	°C	ISO 1133
Melt mass-flow rate, Load	2.16	kg	ISO 1133
Moulding shrinkage, parallel	1.4	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.4	%	ISO 294-4, 2577
Mechanical properties (TPE)	Value	Unit	Test Standard
Yield stress	14	MPa	ISO 527-1/-2
Yield strain	40	%	ISO 527-1/-2
Stress at 5% strain	6.6	MPa	ISO 527-1/-2
Stress at 10% strain	10.2	MPa	ISO 527-1/-2
Stress at 100% strain	15	MPa	ISO 527-1/-2
Stress at break	40	MPa	ISO 527-1/-2
Strain at break	>300	%	ISO 527-1/-2
Nominal strain at break	600	%	ISO 527-1/-2
Shore D hardness, max	56	-	ISO 7619-1
Shore D hardness, 15s	51	-	ISO 7619-1
Mechanical properties	Value	Unit	Test Standard
Tensile Modulus	170	MPa	ISO 527-1/-2
Charpy impact strength			ISO 179/1eU
23°C	N	kJ/m ²	
-30°C	N	kJ/m ²	
Charpy notched impact strength			ISO 179/1eA
23°C	N	kJ/m ²	
-40°C	145 ^[P]	kJ/m ²	

P: Partial Break

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Thermal properties	Value	Unit	Test Standard	
Melting temperature, 10°C/min	201	°C	ISO 11357-1/-3	
Glass transition temperature, 10°C/min	-20	°C	ISO 11357-1/-2	
Temp. of deflection under load			ISO 75-1/-2	
1.8 MPa	45	°C		
0.45 MPa	70	°C		
Vicat softening temperature			ISO 306	
50°C/h, 50N	75	°C		
50°C/h, 10N	180	°C		DS
Eff. thermal diffusivity	5.44E-8	m ² /s	-	DS
DS: Derived from similar grade				
Flammability	Value	Unit	Test Standard	
Burning Behav. at 1.5mm nom. thickn.	HB	class	IEC 60695-11-10	
Thickness tested	1.5	mm	IEC 60695-11-10	
Oxygen index	20	%	ISO 4589-1/-2	DS
FMVSS Class	SE	-	ISO 3795 (FMVSS 302)	
DS: Derived from similar grade				
Electrical properties	Value	Unit	Test Standard	
Relative permittivity			IEC 60250	
100Hz	4.8	-		DS
1MHz	4.4	-		DS
Dissipation factor			IEC 60250	
100Hz	90	E-4		DS
1MHz	375	E-4		DS
Volume resistivity	4E11	Ohm*m	IEC 60093	DS
Surface resistivity	>1E15	Ohm	IEC 60093	DS
Electric strength	19	kV/mm	IEC 60243-1	DS
Comparative tracking index	600	-	IEC 60112	DS
DS: Derived from similar grade				
Other properties	Value	Unit	Test Standard	
Humidity absorption, 2mm	0.2	%	Sim. to ISO 62	
Water absorption, 2mm	0.6	%	Sim. to ISO 62	
Density	1200	kg/m ³	ISO 1183	
Density of melt	1030	kg/m ³	-	DS
Water Absorption, Immersion 24h	0.6	%	Sim. to ISO 62	
DS: Derived from similar grade				
VDA Properties	Value	Unit	Test Standard	
Emission of organic compounds	8.5	µgC/g	VDA 277	
Odour	5	class	VDA 270	
Fogging, G-value (condensate)	0.1	mg	ISO 6452	
Injection	Value	Unit	Test Standard	
Drying Recommended	yes	-	-	
Drying Temperature	100	°C	-	
Drying Time, Dehumidified Dryer	2 - 3	h	-	
Processing Moisture Content	≤0.08	%	-	
Melt Temperature Optimum	230	°C	-	
Min. melt temperature	220	°C	-	
Max. melt temperature	250	°C	-	
Mold Temperature Optimum	45	°C	-	
Min. mould temperature	45	°C	-	
Max. mould temperature	55	°C	-	
Extrusion	Value	Unit	Test Standard	
Drying Temperature	90 - 110	°C	-	
Drying Time, Dehumidified Dryer	2 - 3	h	-	
Processing Moisture Content	≤0.06	%	-	

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Melt Temperature Optimum	225 °C	-
Melt Temperature Range	220 - 235 °C	-

Characteristics			
Processing	<ul style="list-style-type: none"> • Injection Moulding • Film Extrusion • Profile Extrusion 	<ul style="list-style-type: none"> • Sheet Extrusion • Other Extrusion • Coatable 	<ul style="list-style-type: none"> • Casting • Thermoforming
Delivery form	<ul style="list-style-type: none"> • Pellets 		
Regional Availability	<ul style="list-style-type: none"> • North America • Europe 	<ul style="list-style-type: none"> • Asia Pacific • South and Central America 	<ul style="list-style-type: none"> • Near East/Africa • Global

Processing Texts

Injection molding

PREPROCESSING

Drying recommended = Yes
 Drying temperature = 100°C
 Drying time, dehumidified dryer = 2-3 h
 Processing moisture content = <0.08 %

PROCESSING

Melt temperature optimum = 230°C
 Melt temperature range = 220-250°C
 Mold temperature optimum = 45°C
 Mold temperature range = 45-55°C

Profile extrusion

PREPROCESSING

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

PROCESSING

Melt temperature optimum = 225°C
 Melt temperature range = 215-235°C

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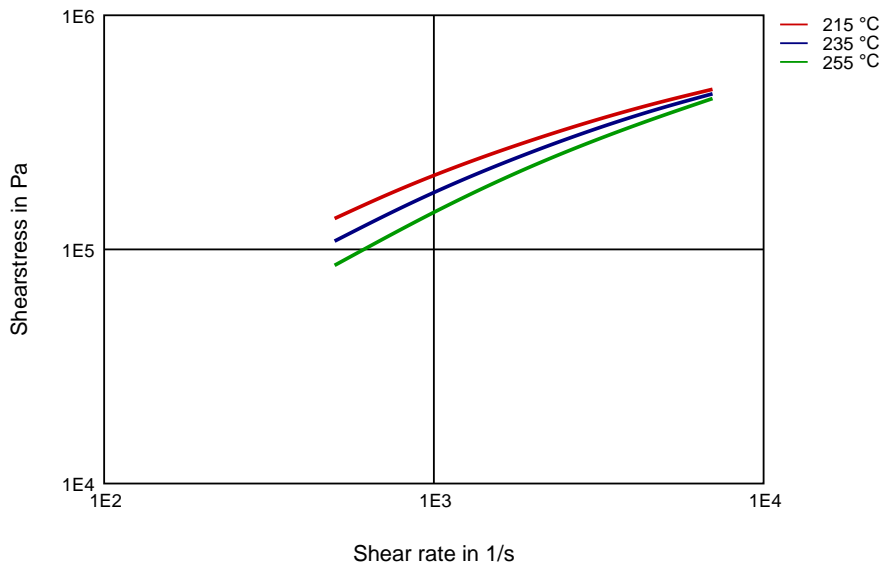


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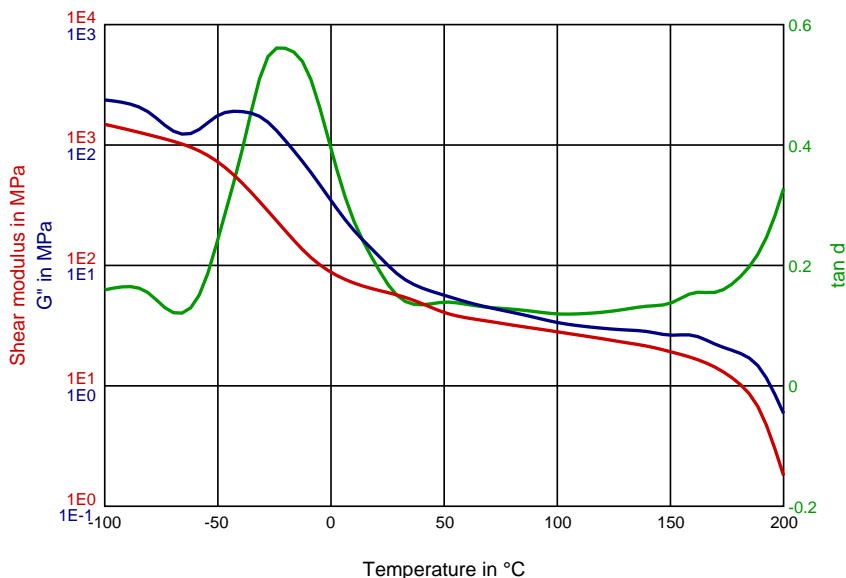
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Diagrams

Shearstress-shear rate



Dynamic Shear modulus-temperature



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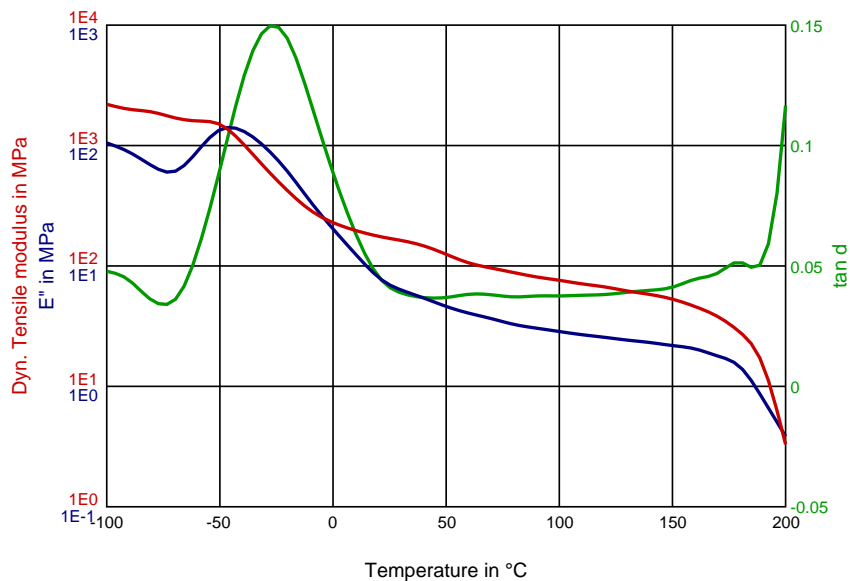


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THERMOPLASTIC POLYESTER ELASTOMER

Dynamic Tensile modulus-temperature (measured on Hytrel® 5556)



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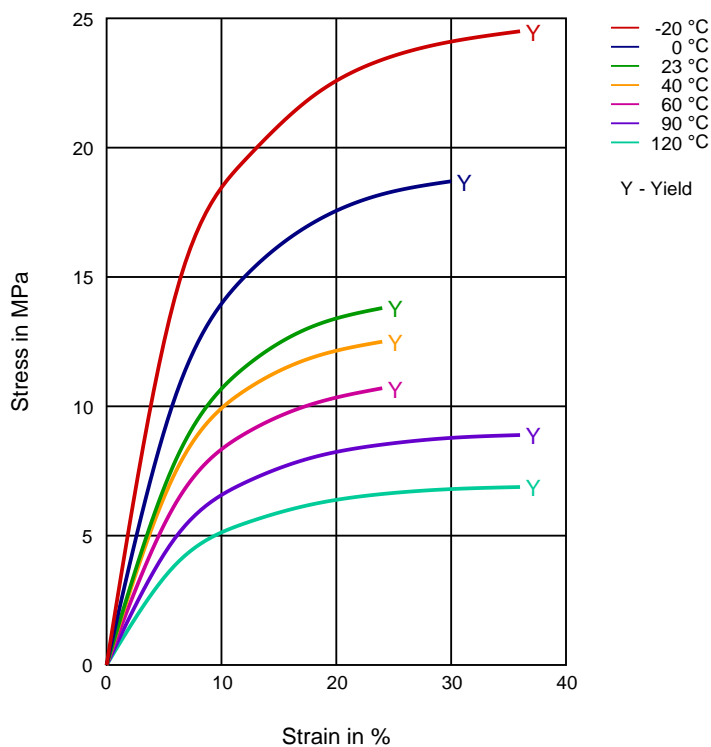


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THERMOPLASTIC POLYESTER ELASTOMER

Stress-strain (measured on Hytrel® 5556)



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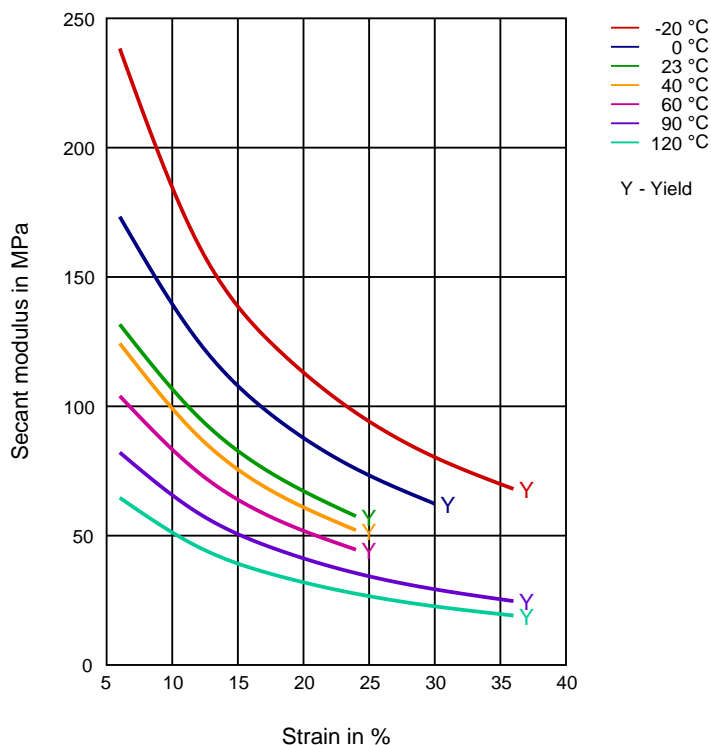
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THERMOPLASTIC POLYESTER ELASTOMER

Secant modulus-strain (measured on Hytrel® 5556)



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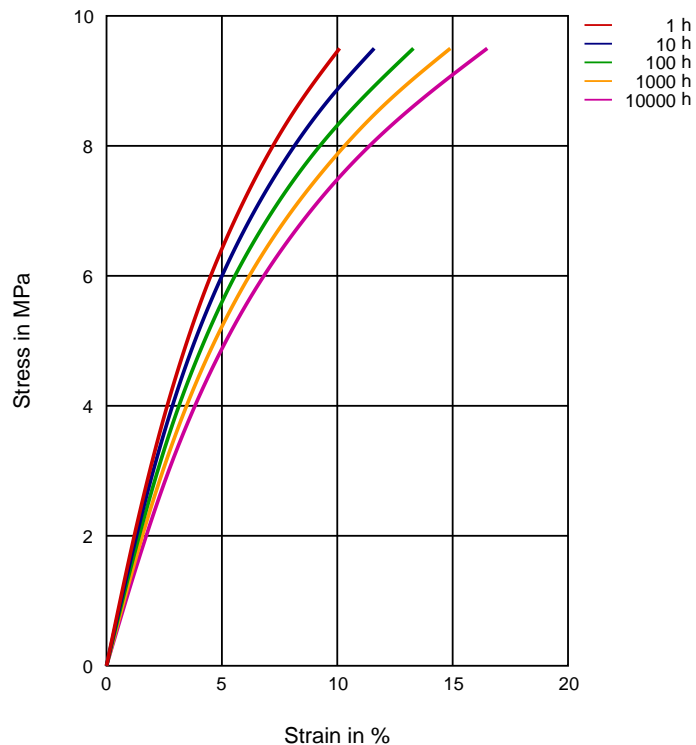
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THERMOPLASTIC POLYESTER ELASTOMER

Stress-strain (isochronous) 23°C



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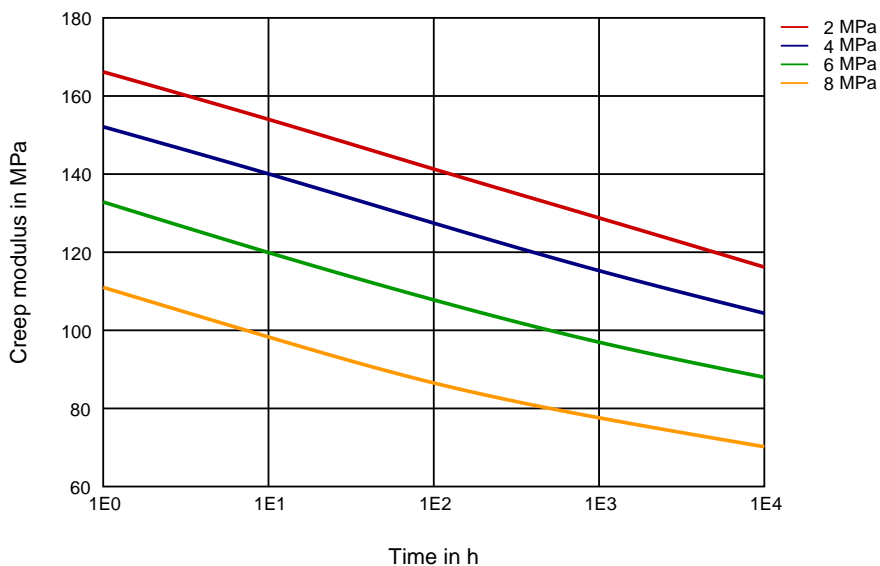
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THERMOPLASTIC POLYESTER ELASTOMER

Creep modulus-time 23 °C



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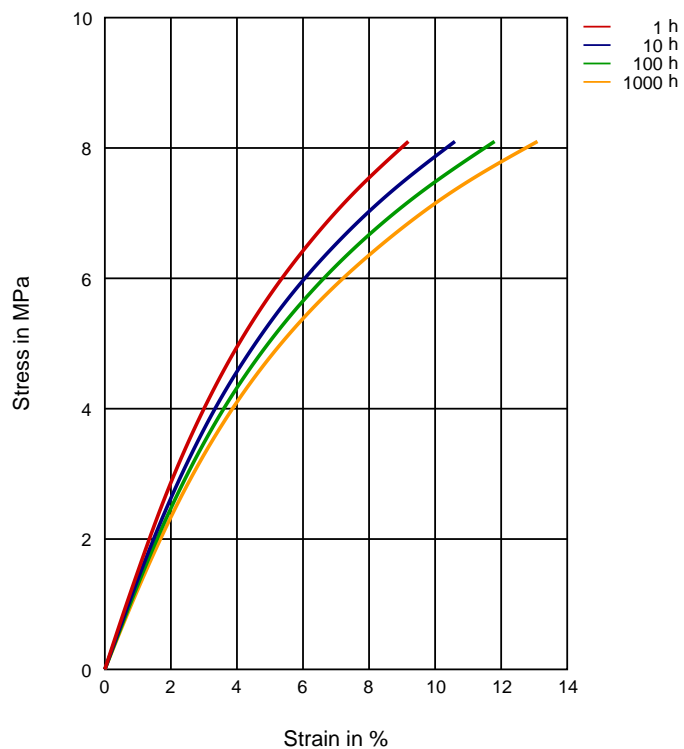
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THERMOPLASTIC POLYESTER ELASTOMER

Stress-strain (isochronous) 40 °C



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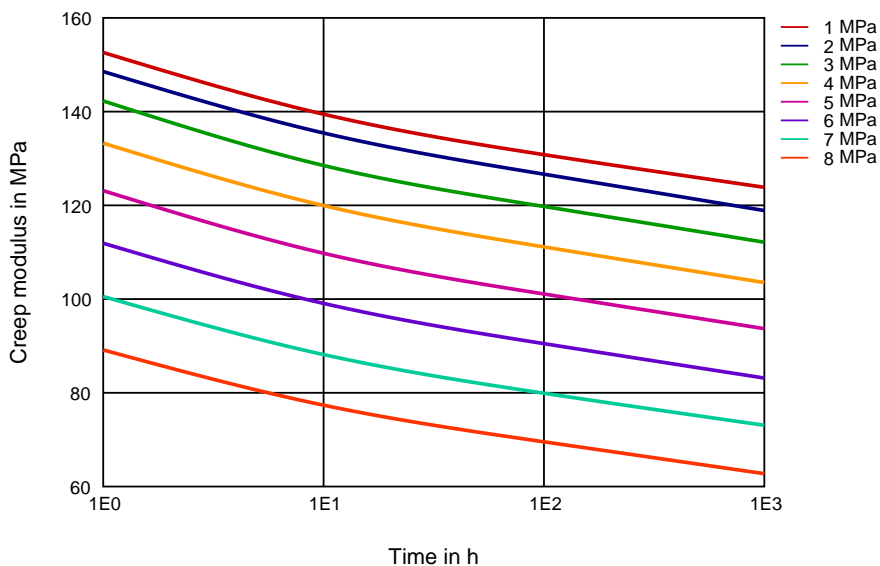
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THERMOPLASTIC POLYESTER ELASTOMER

Creep modulus-time 40 °C



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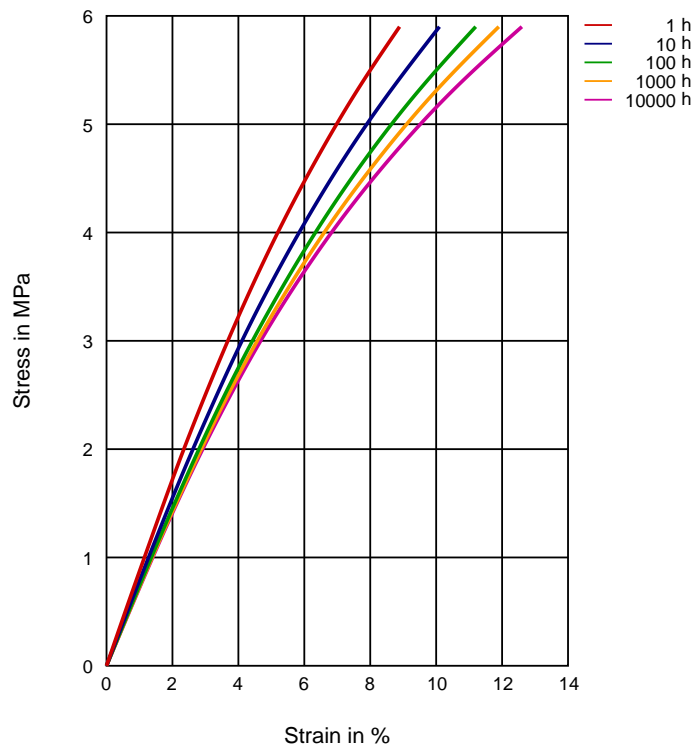
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THERMOPLASTIC POLYESTER ELASTOMER

Stress-strain (isochronous) 80 °C



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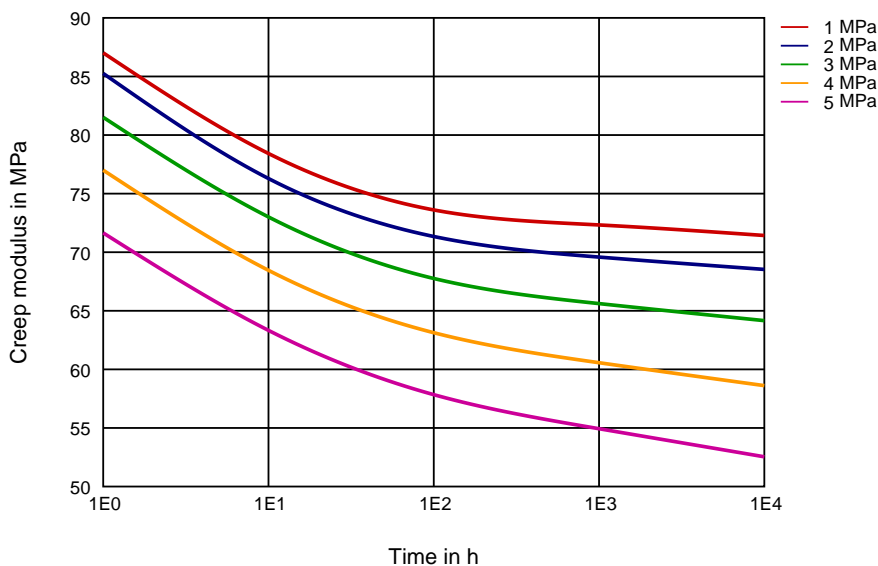
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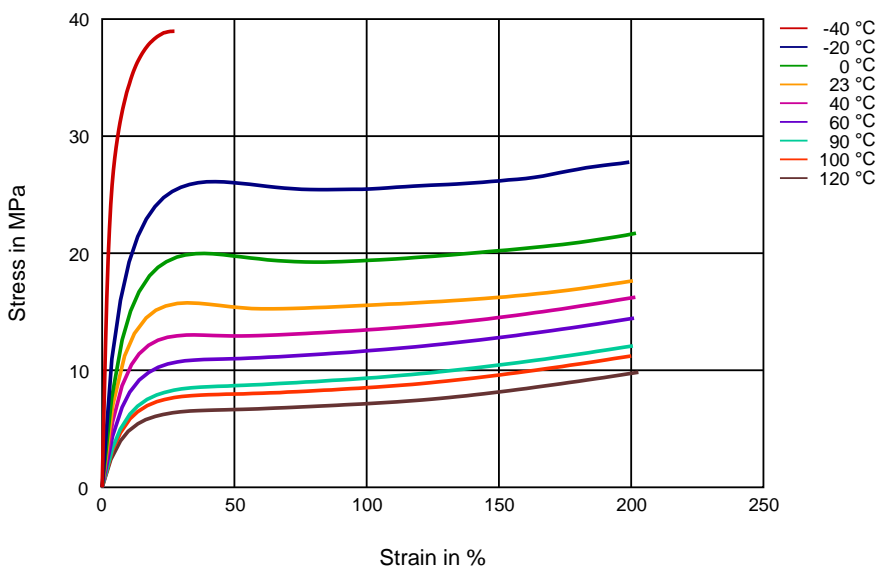
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THERMOPLASTIC POLYESTER ELASTOMER

Creep modulus-time 80 °C



Stress-Strain (TPE) (measured on Hytrel® 5556)



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THERMOPLASTIC POLYESTER ELASTOMER

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)
- ✓ 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 4mm (Hytrel® measured at 2 mm), IEC Electrical properties measured at 2mm, all ASTM properties measured at 3.2mm, and test temperatures are 23°C unless otherwise stated.

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