Celanese
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Hytrel® 5553FG NC010

THERMOPLASTIC POLYESTER ELASTOMER

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, we recommend, 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 our representative.

Product information

Resin Identification	TPC-ET		ISO 1043
Part Marking Code	>TPC-ET<		ISO 11469

Rheological properties

Melt volume-flow rate	7	cm^3/10min	ISO 1133
Temperature	220	°C	
Load	2.16	kg	
Melt mass-flow rate	8	g/10min	ISO 1133
Melt mass-flow rate, Temperature	220	°C	
Melt mass-flow rate, Load	2.16	kg	
Moulding shrinkage, parallel	1.4	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.4	%	ISO 294-4, 2577

Typical mechanical properties

Tensile modulus	170	MPa	ISO 527-1/-2
Tensile stress at yield	14	MPa	ISO 527-1/-2
Tensile strain at yield	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
Tensile stress at 100% strain	15	MPa	ISO 527-1/-2
Tensile stress at break	40	MPa	ISO 527-1/-2
Nominal strain at break	600	%	ISO 527-1/-2
Tensile strain at break	>300	%	ISO 527-1/-2
Charpy impact strength, 23°C	N	kJ/m^2	ISO 179/1eU
Charpy impact strength, -30°C	N	kJ/m^2	ISO 179/1eU

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Charpy notched impact strength, 23°C	N	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -40°C	145	kJ/m²	ISO 179/1eA
Poisson's ratio	0.49		
Shore D hardness, 15s	51		ISO 48-4 / ISO 868
Shore D hardness, max	56		ISO 868

Thermal properties

Melting temperature, 10°C/min	201	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	-25	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	45	°C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	70	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h 50N	75	°C	ISO 306
Vicat softening temperature, 50°C/h 10N	180	°C	ISO 306
Effective thermal diffusivity, flow	5.44E-8[DS]	m²/s	ISO 22007-4

[DS]: Derived from similar grade

Flammability

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[DS]	%	ISO 4589-1/-2
FMVSS Class	SE		ISO 3795 (FMVSS 302)

[DS]: Derived from similar grade

Electrical properties

Relative permittivity, 100Hz	4.8[DS]		IEC 62631-2-1
Relative permittivity, 1MHz	4.4[DS]		IEC 62631-2-1
Dissipation factor, 100Hz	90[DS]	E-4	IEC 62631-2-1
Dissipation factor, 1MHz	375[DS]	E-4	IEC 62631-2-1
Volume resistivity	4E11[DS]	Ohm.m	IEC 62631-3-1
Surface resistivity	>1E15[DS]	Ohm	IEC 62631-3-2
Electric strength	19[DS]	kV/mm	IEC 60243-1
Comparative tracking index	600[DS]		IEC 60112

[DS]: Derived from similar grade

Physical/Other properties

Humidity absorption, 2mm	0.2	%	Sim. to ISO 62
Water absorption, 2mm	0.6	%	Sim. to ISO 62
Water absorption, Immersion 24h	0.6	%	Sim. to ISO 62
Density	1200	kg/m³	ISO 1183
Density of melt	1030[DS]	kg/m³	

[DS]: Derived from similar grade

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VDA Properties

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

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

Drying Temperature	90 - 110	°C
Drying Time, Dehumidified Dryer	2 - 3	h
Processing Moisture Content	≤0.06	%
Melt Temperature Optimum	225	°C
Melt Temperature Range	220 - 235	°C

Characteristics

Processing	Injection Moulding, Film Extrusion, Extrusion, Sheet Extrusion, Other Extrusion, Coatable, Casting, Thermoforming
Delivery form	Pellets

Additional information

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

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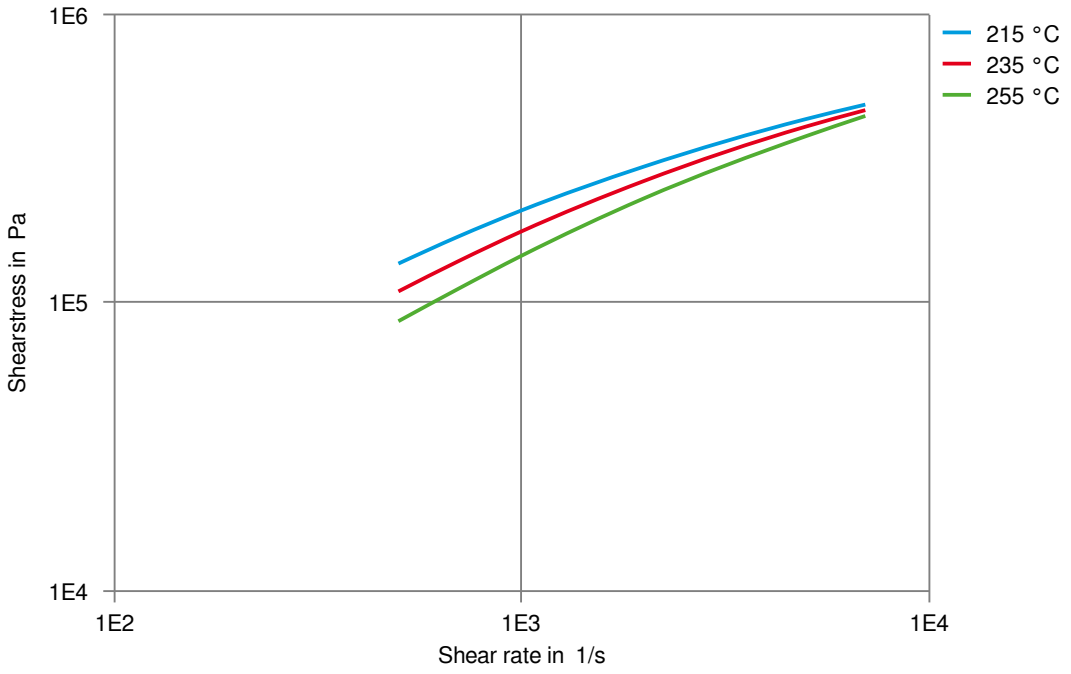
Drying time, dehumidified dryer = 2-3 h
Processing moisture content = <0.06 %

PROCESSING

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

Shearstress-shear rate



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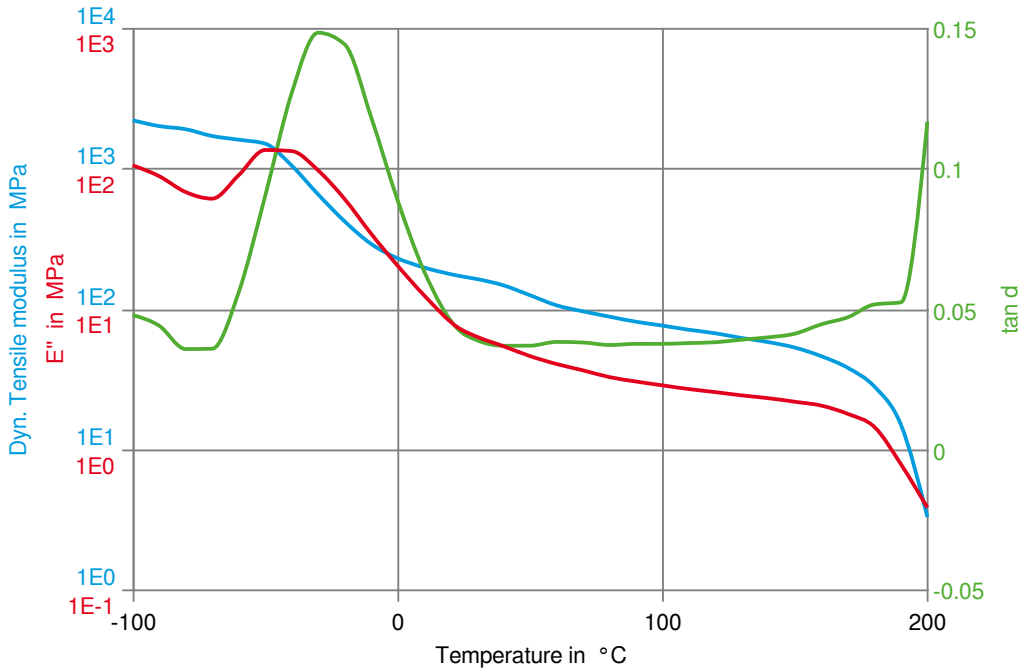
THERMOPLASTIC POLYESTER ELASTOMER

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



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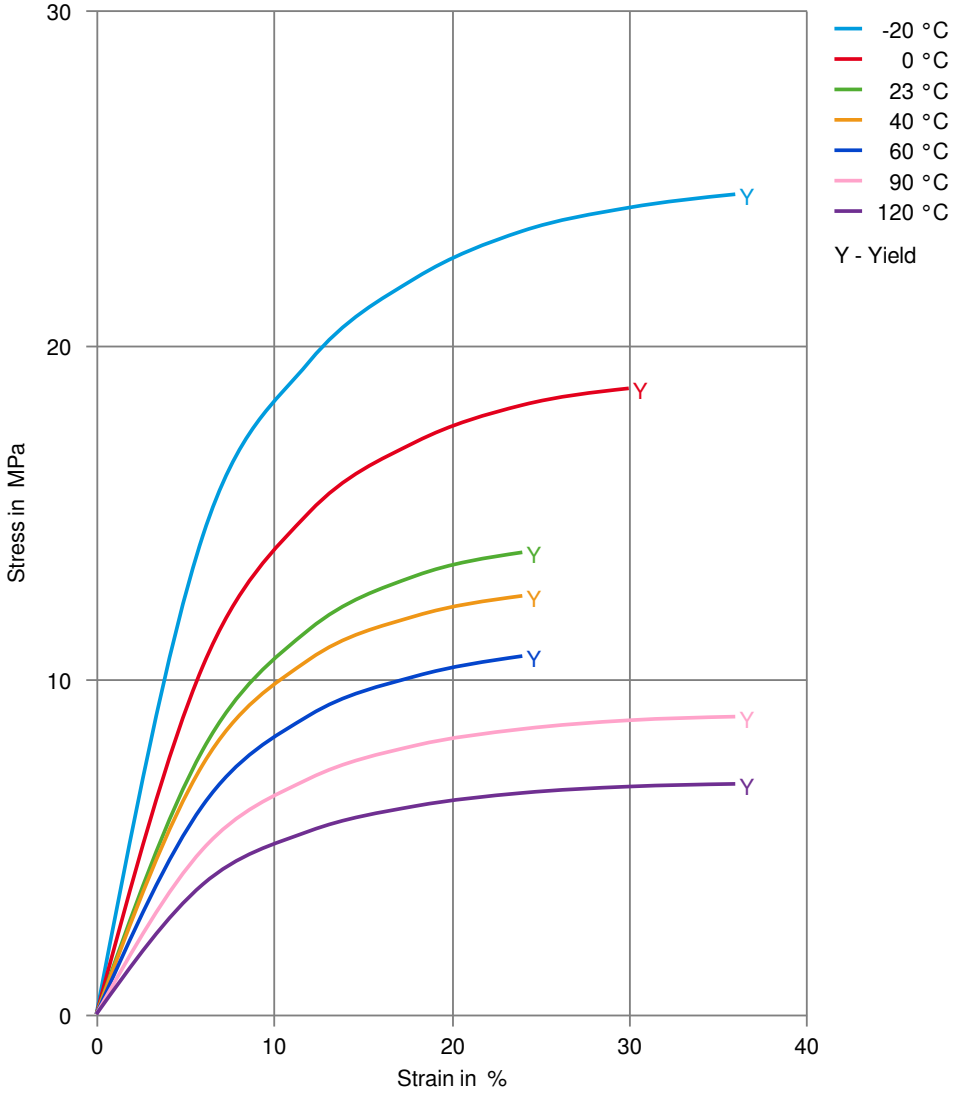
THERMOPLASTIC POLYESTER ELASTOMER

Stress-strain
(measured on Hytrel® 5556)



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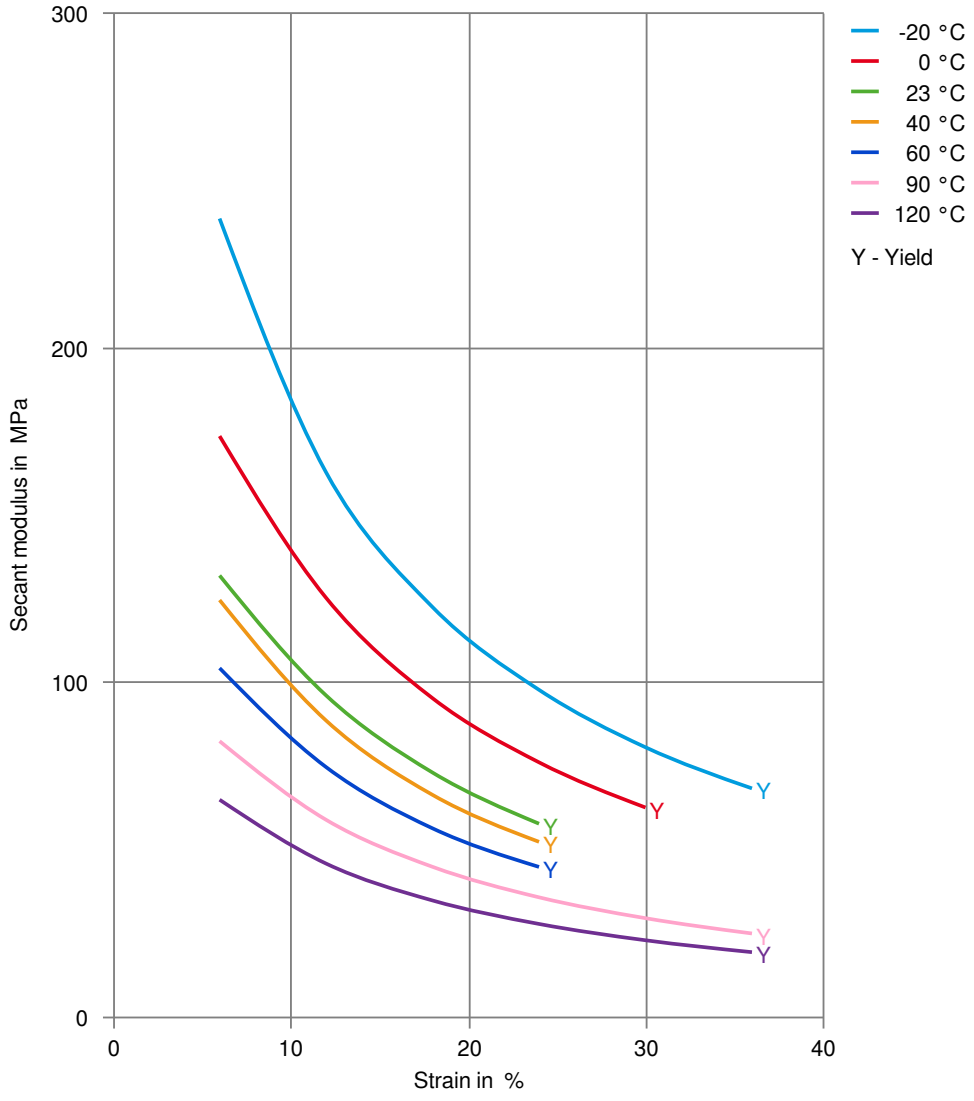
THERMOPLASTIC POLYESTER ELASTOMER

Secant modulus-strain
(measured on Hytrel® 5556)



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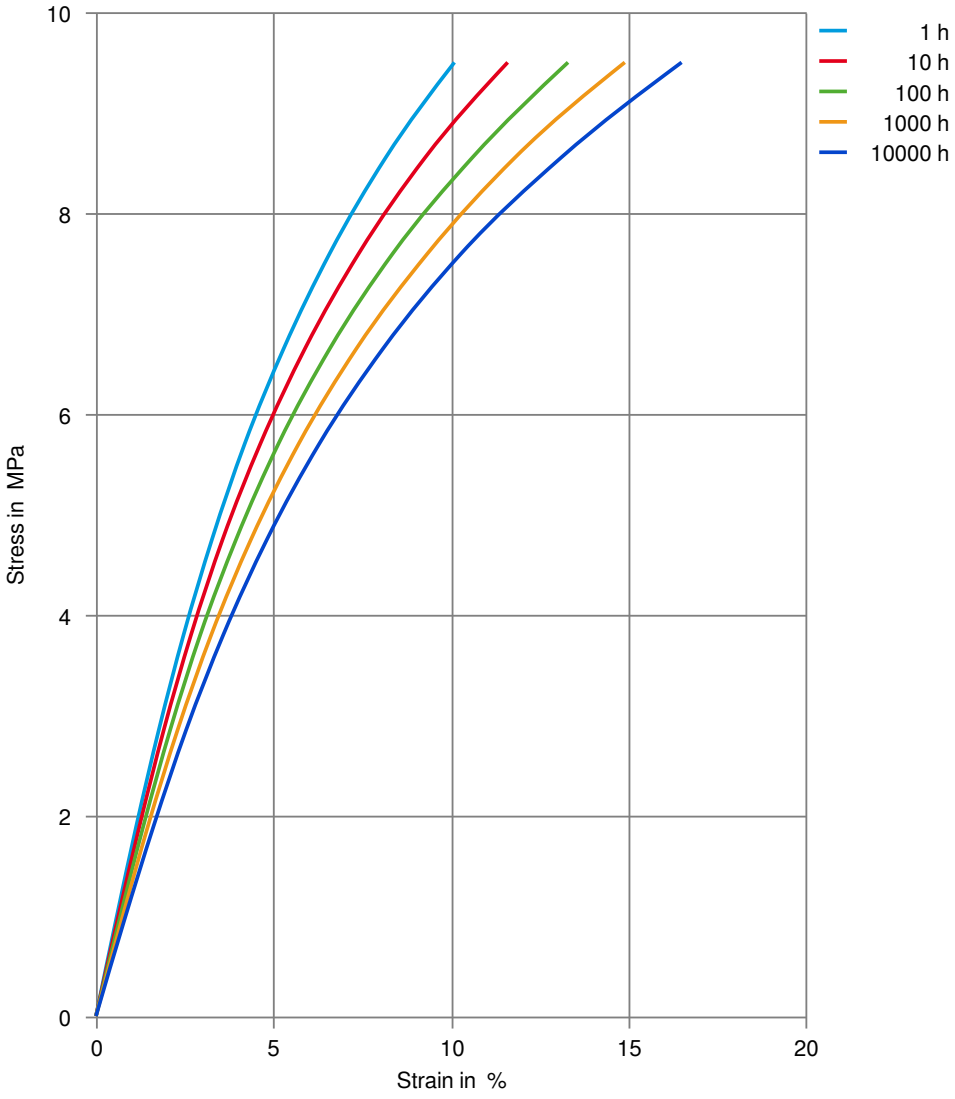
THERMOPLASTIC POLYESTER ELASTOMER

Stress-strain (isochronous) 23 °C



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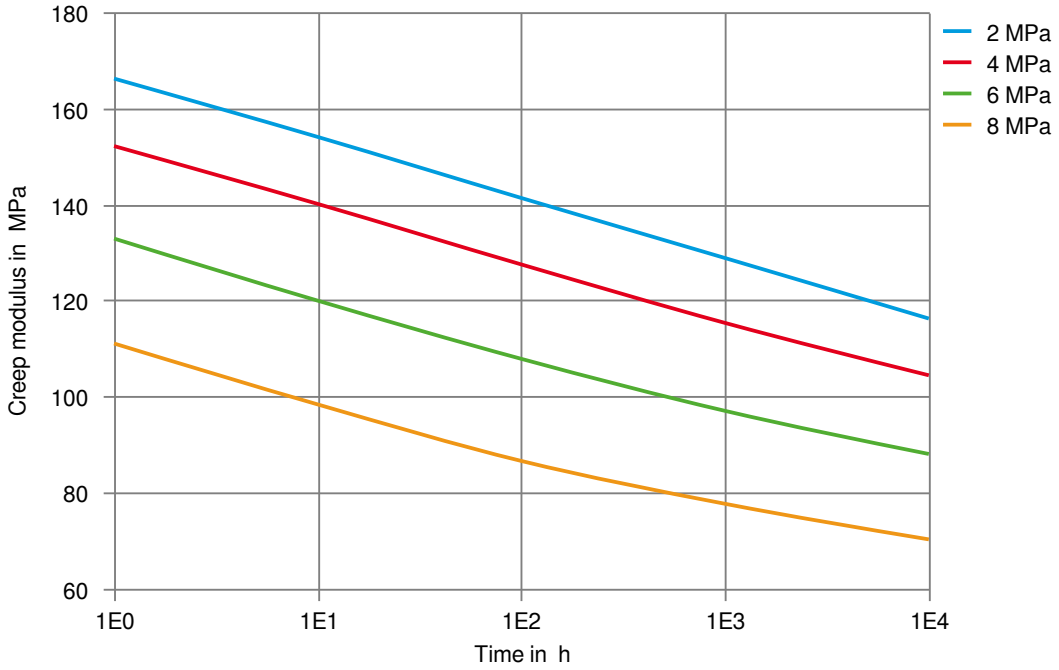
THERMOPLASTIC POLYESTER ELASTOMER

Creep modulus-time 23 °C



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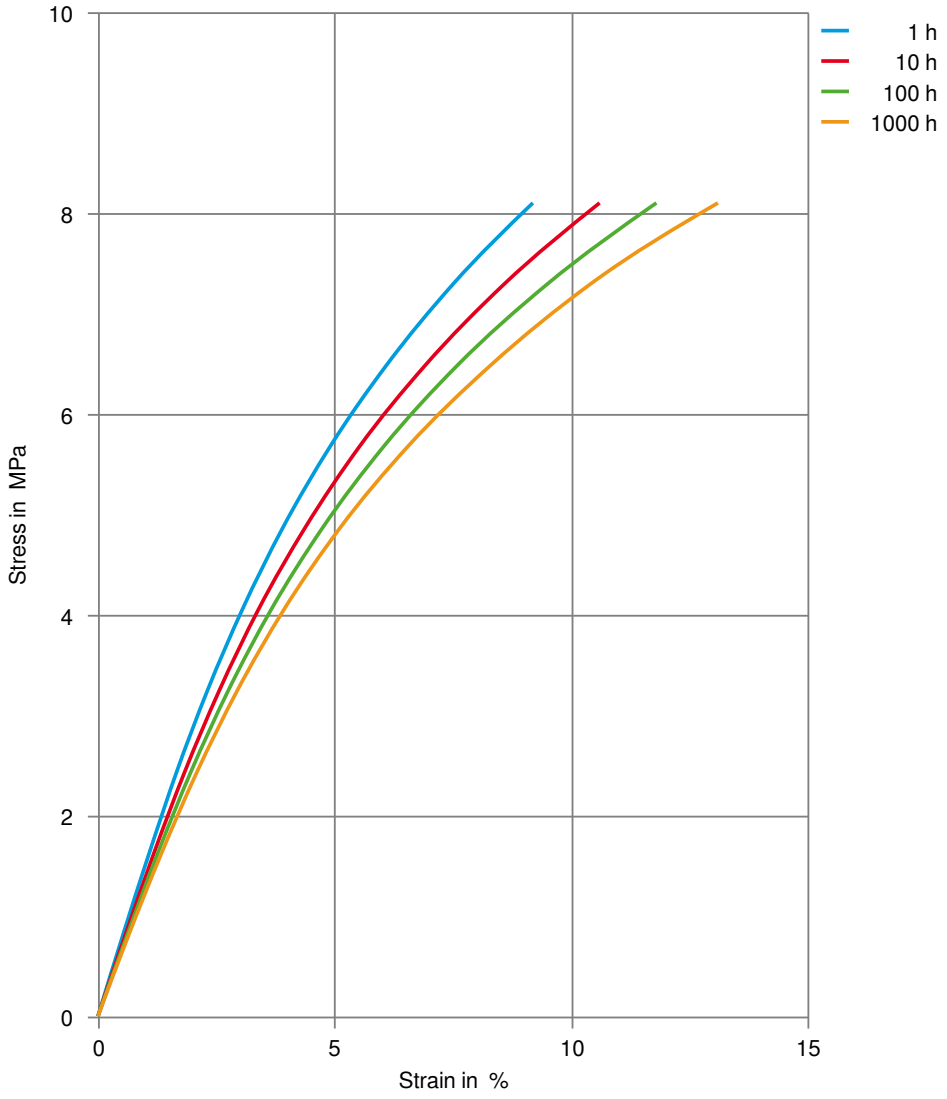
THERMOPLASTIC POLYESTER ELASTOMER

Stress-strain (isochronous) 40 °C



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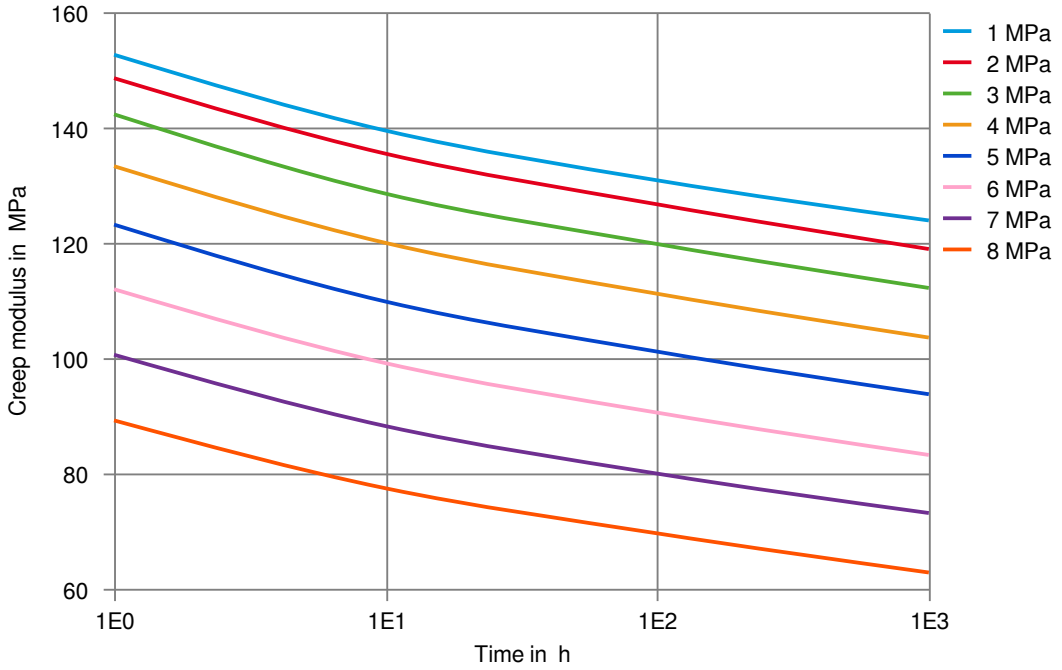
THERMOPLASTIC POLYESTER ELASTOMER

Creep modulus-time 40 °C



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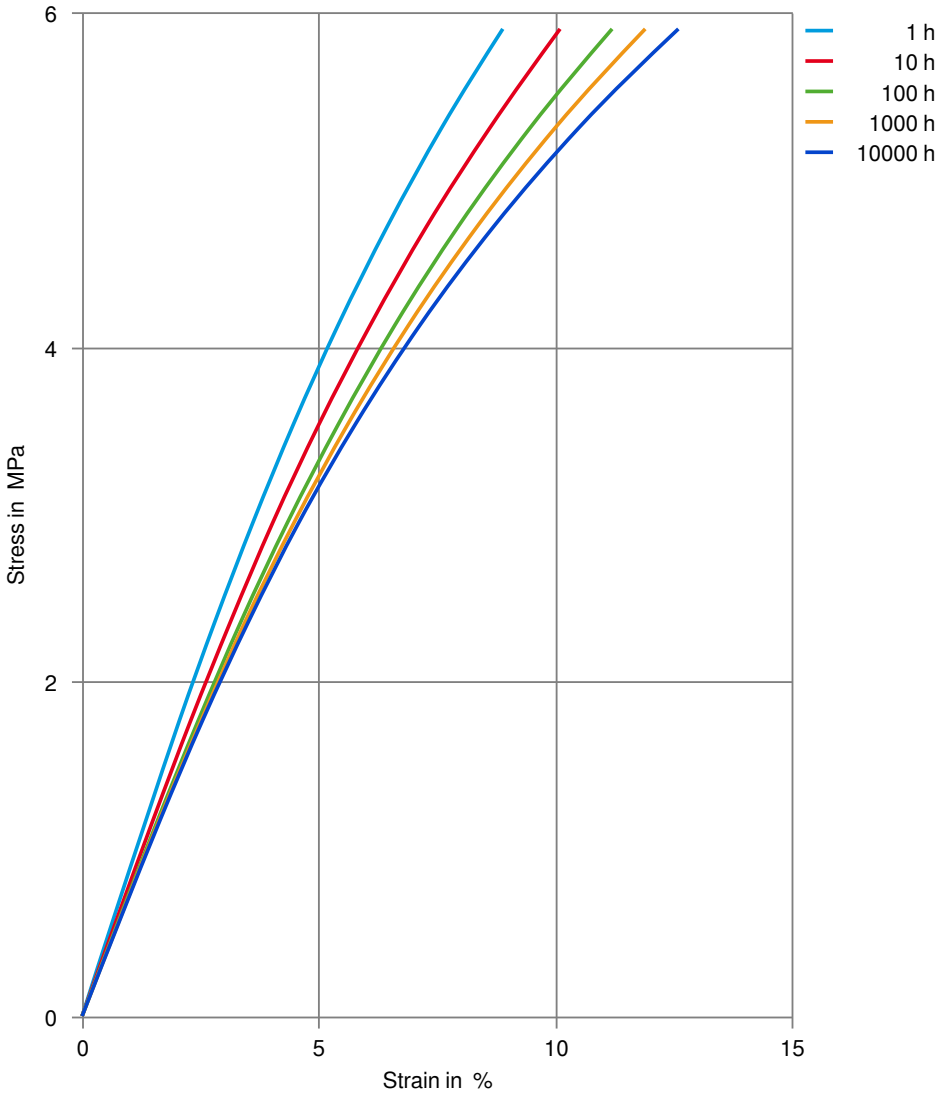
THERMOPLASTIC POLYESTER ELASTOMER

Stress-strain (isochronous) 80 °C



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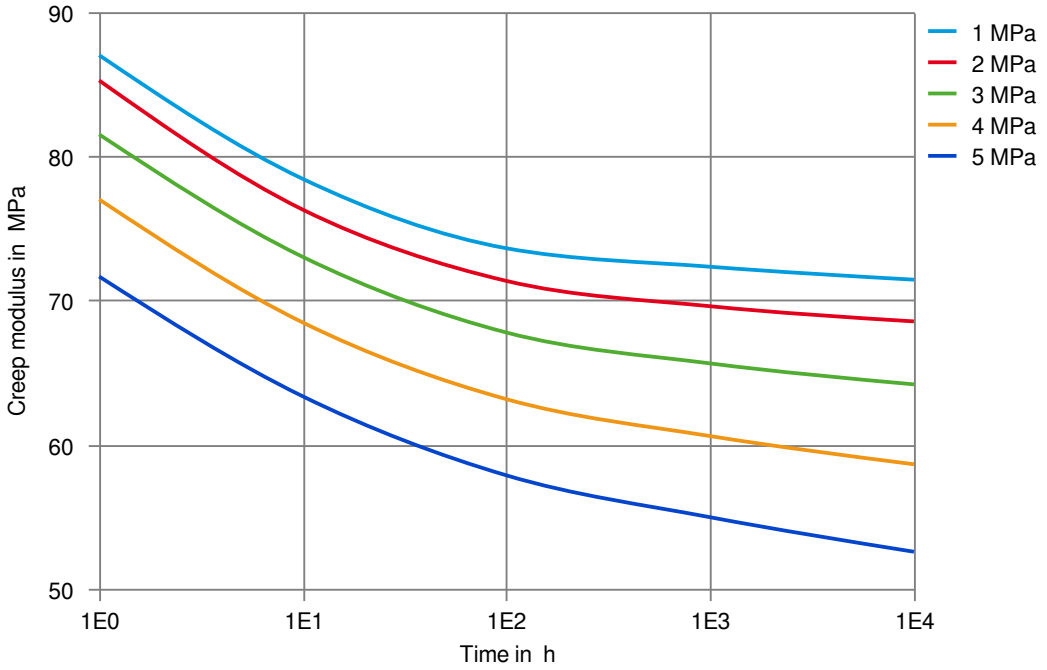
THERMOPLASTIC POLYESTER ELASTOMER

Creep modulus-time 80 °C



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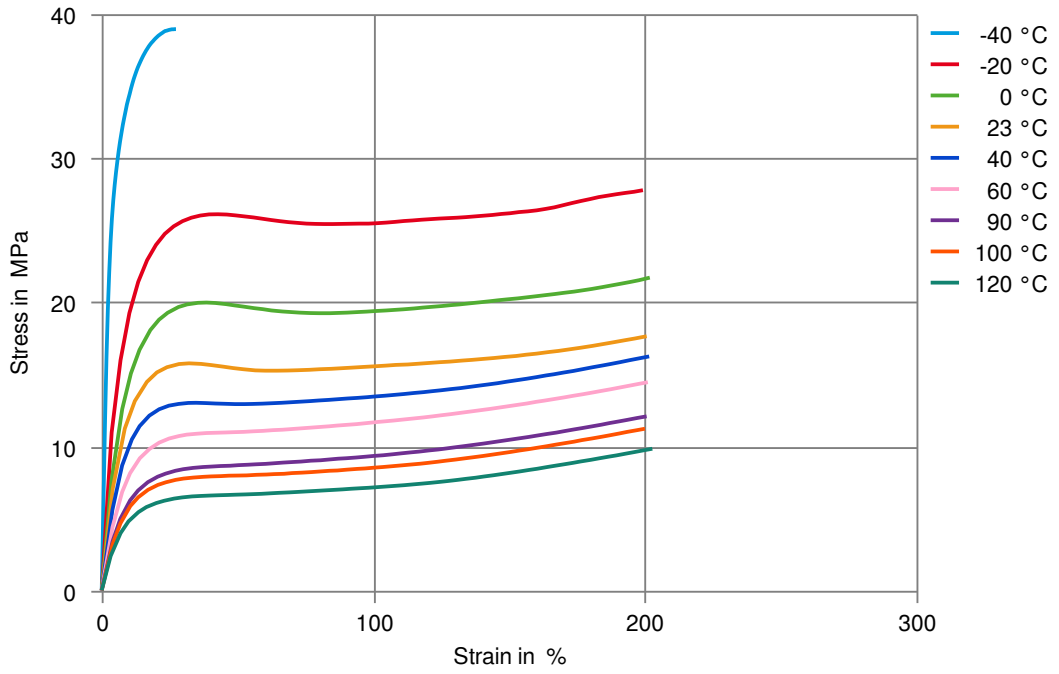
THERMOPLASTIC POLYESTER ELASTOMER

Stress-Strain (Flexible Materials)
(measured on Hytrel® 5556)



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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
- ✔ 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

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- ✔ 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).