

# Hytrel® G5544

## 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® G5544 is a medium modulus grade with nominal hardness of 55D. It contains discoloring stabilizer. It can be processed by many conventional thermoplastic processing techniques like injection molding and extrusion.

Typical applications:

Hose and tubing, profiles, moulded and extruded consumer products. Not suited for light-colored finished products.

### Product information

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

### Rheological properties

Melt volume-flow rate	10 cm <sup>3</sup> /10min	ISO 1133
Melt mass-flow rate	10 g/10min	ISO 1133
Temperature	230 °C	ISO 1133
Load	2.16 kg	ISO 1133
Melt mass-flow rate, Temperature	230 °C	ISO 1133
Melt mass-flow rate, Load	2.16 kg	ISO 1133
Moulding shrinkage, parallel	1.6 %	ISO 294-4, 2577
Moulding shrinkage, normal	1.6 %	ISO 294-4, 2577

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### Typical mechanical properties

Tensile Modulus	200 MPa	ISO 527-1/-2
Stress at 5% strain	8.1 MPa	ISO 527-1/-2
Stress at 10% strain	11 MPa	ISO 527-1/-2
Stress at 50% strain	9 MPa	ISO 527-1/-2
Stress at break	33 MPa	ISO 527-1/-2
Nominal strain at break	290 %	ISO 527-1/-2
Strain at break	>300 %	ISO 527-1/-2
Flexural Modulus	190 MPa	ISO 178
Shear Modulus	65 MPa	ISO 6721
Tensile creep modulus, 1h	110 MPa	ISO 899-1
Tensile creep modulus, 1000h	85 MPa	ISO 899-1
Charpy impact strength, 23°C	N kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength, 23°C	90 <sup>[P]</sup> kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -30°C	45 kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -40°C	14 kJ/m <sup>2</sup>	ISO 179/1eA
Tensile notched impact strength, 23°C	285 kJ/m <sup>2</sup>	ISO 8256/1
Izod notched impact strength, 23°C	64 kJ/m <sup>2</sup>	ISO 180/1A
Izod notched impact strength, -40°C	27 kJ/m <sup>2</sup>	ISO 180/1A
Brittleness temperature	-61 °C	ISO 974
Shore D hardness, 15s	52	ISO 48-4 / ISO 868
Shore D hardness, max	56	ISO 868
Tear strength, parallel	123 kN/m	ISO 34-1
Tear strength, normal	136 kN/m	ISO 34-1

[P]: Partial Break

### Thermal properties

Melting temperature, 10°C/min	214 °C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	-35 °C	ISO 11357-1/-3
Temp. of deflection under load, 0.45 MPa	77 °C	ISO 75-1/-2
Vicat softening temperature, 50°C/h 10N	190 °C	ISO 306
Coeff. of linear therm. expansion, parallel, -40-23°C	190 E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, parallel	210 E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, -40-23°C	160 E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	180 E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.15 W/(m K)	ISO 22007-2
Eff. thermal diffusivity	5.44E-8 m <sup>2</sup> /s	
Spec. heat capacity of melt	2110 J/(kg K)	
RTI, electrical, 0.75mm	50 °C	UL 746B
RTI, electrical, 1.5mm	50 °C	UL 746B
RTI, electrical, 3mm	50 °C	UL 746B
RTI, impact, 0.75mm	50 °C	UL 746B
RTI, impact, 1.5mm	50 °C	UL 746B
RTI, impact, 3mm	50 °C	UL 746B

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RTI, strength, 0.75mm	50 °C	UL 746B
RTI, strength, 1.5mm	50 °C	UL 746B
RTI, strength, 3mm	50 °C	UL 746B
TGA curve	available	ISO 11359-1/-2

### Flammability

Burning Behav. at 1.5mm 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	19 %	ISO 4589-1/-2
FMVSS Class	B	ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	25 mm/min	ISO 3795 (FMVSS 302)

### Electrical properties

Relative permittivity, 100Hz	5	IEC 62631-2-1
Relative permittivity, 1MHz	4.5	IEC 62631-2-1
Dissipation factor, 100Hz	200 E-4	IEC 62631-2-1
Dissipation factor, 1MHz	400 E-4	IEC 62631-2-1
Volume resistivity	3E10 Ohm.m	IEC 62631-3-1
Surface resistivity	1E14 Ohm	IEC 62631-3-2
Electric strength	19 kV/mm	IEC 60243-1
Comparative tracking index, 3.0mm	600 PLC	UL 746A

### Other properties

Humidity absorption, 2mm	0.4 %	Sim. to ISO 62
Water absorption, 2mm	2.2 %	Sim. to ISO 62
Water absorption, Immersion 24h	1.6 %	Sim. to ISO 62
Density	1220 kg/m³	ISO 1183
Density of melt	1050 kg/m³	

### VDA Properties

Emission of organic compounds	26 µgC/g	VDA 277
Odour	3 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 %

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Melt Temperature Optimum	240 °C
Min. melt temperature	235 °C
Max. melt temperature	260 °C
Mold Temperature Optimum	45 °C
Min. mould temperature	45 °C
Max. mould temperature	55 °C

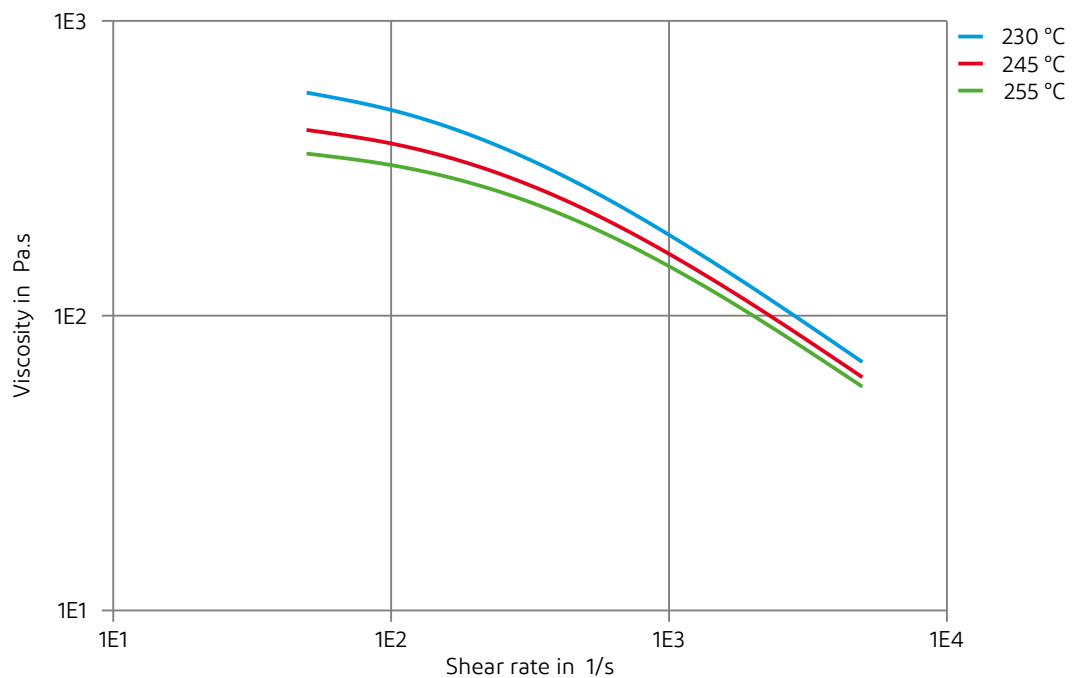
### Extrusion

Drying Temperature	100 °C
Drying Time, Dehumidified Dryer	2 - 3 h
Processing Moisture Content	≤0.06 %
Melt Temperature Optimum	230 °C
Melt Temperature Range	230 - 245 °C

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THERMOPLASTIC POLYESTER ELASTOMER

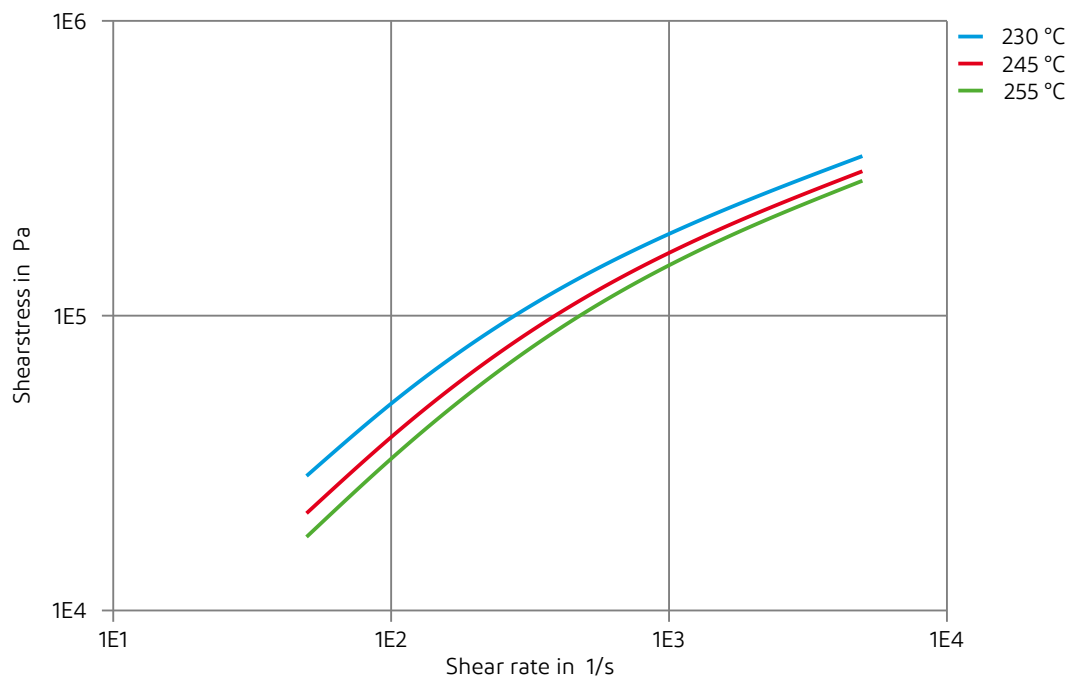
Viscosity-shear rate



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THERMOPLASTIC POLYESTER ELASTOMER

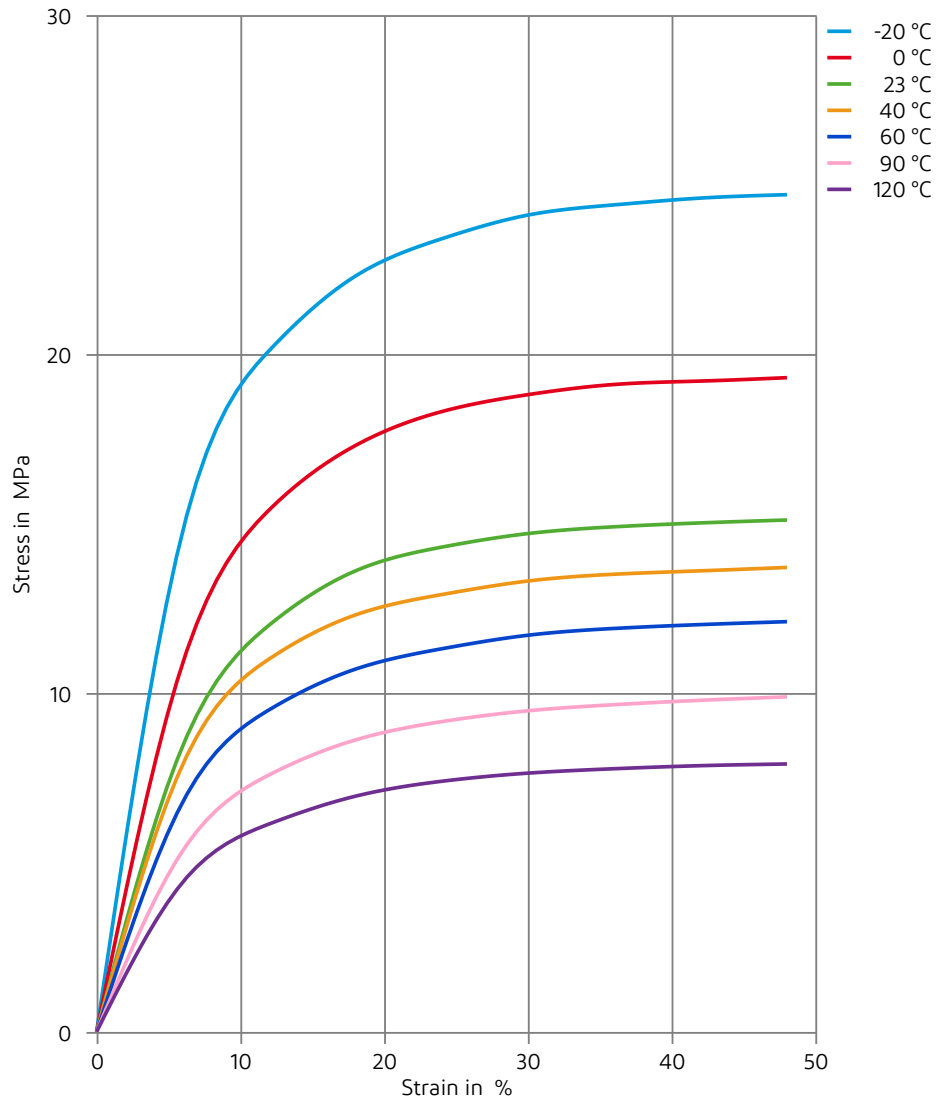
Shearstress-shear rate



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THERMOPLASTIC POLYESTER ELASTOMER

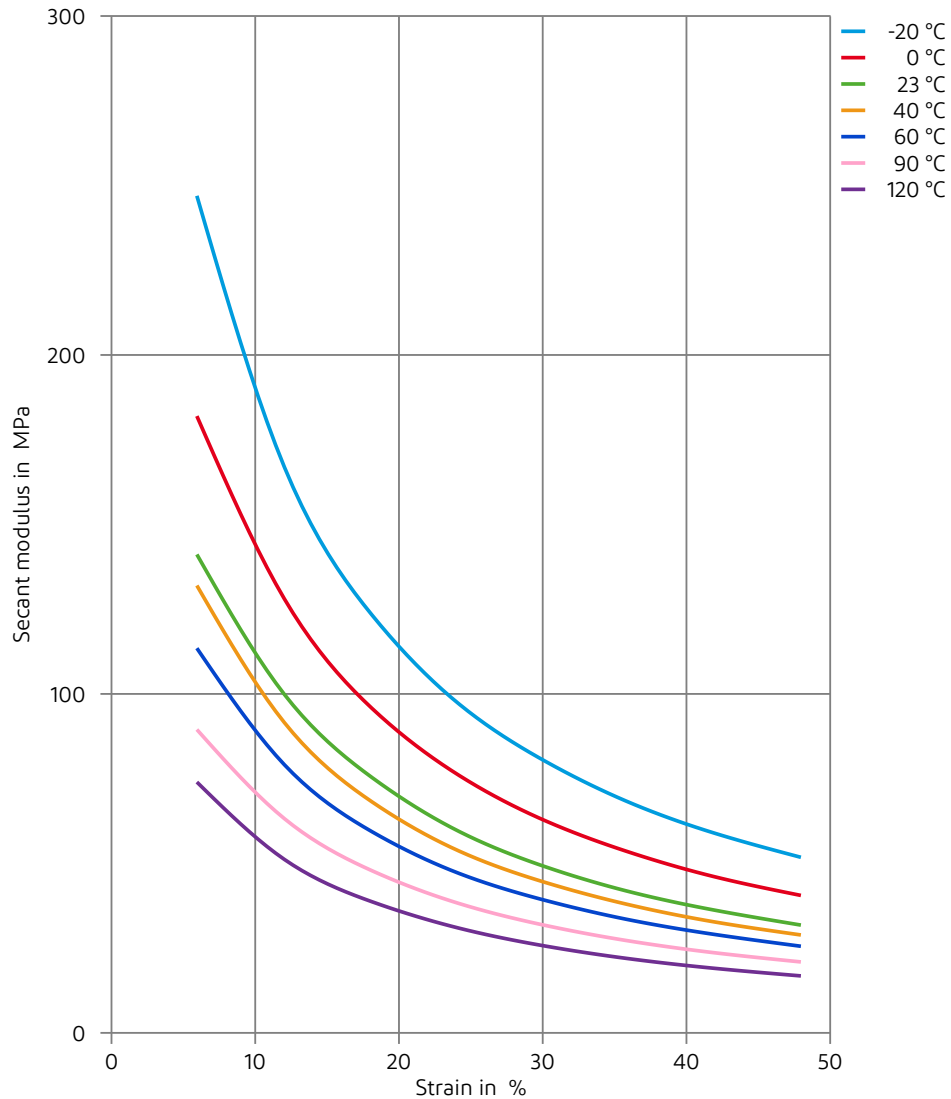
## Stress-strain



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THERMOPLASTIC POLYESTER ELASTOMER

## Secant modulus-strain

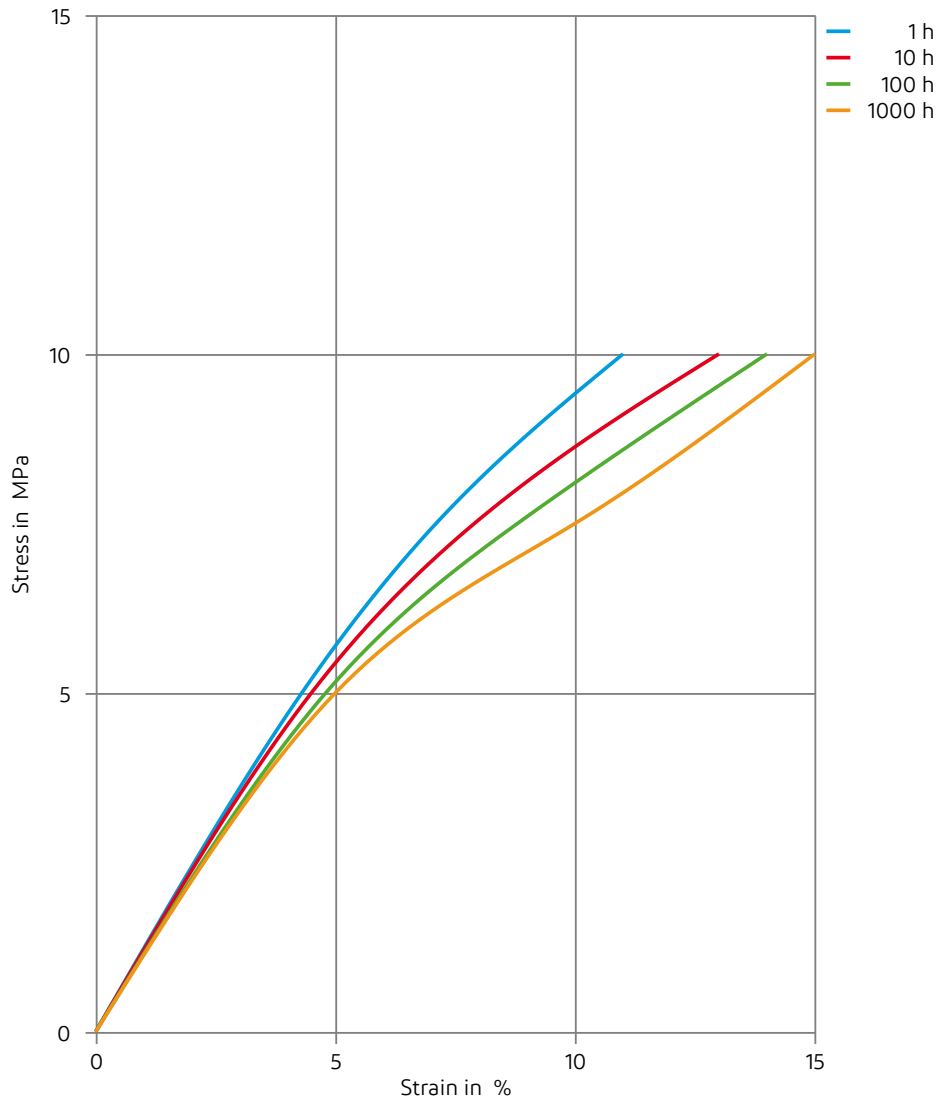




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THERMOPLASTIC POLYESTER ELASTOMER

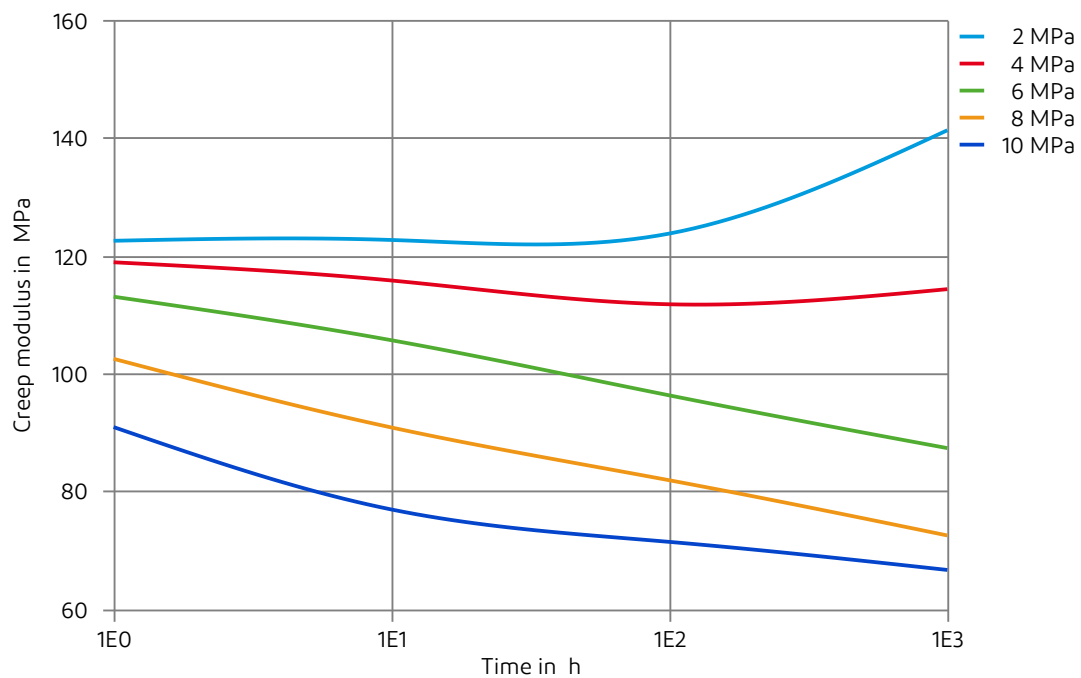
Stress-strain (isochronous) 23°C



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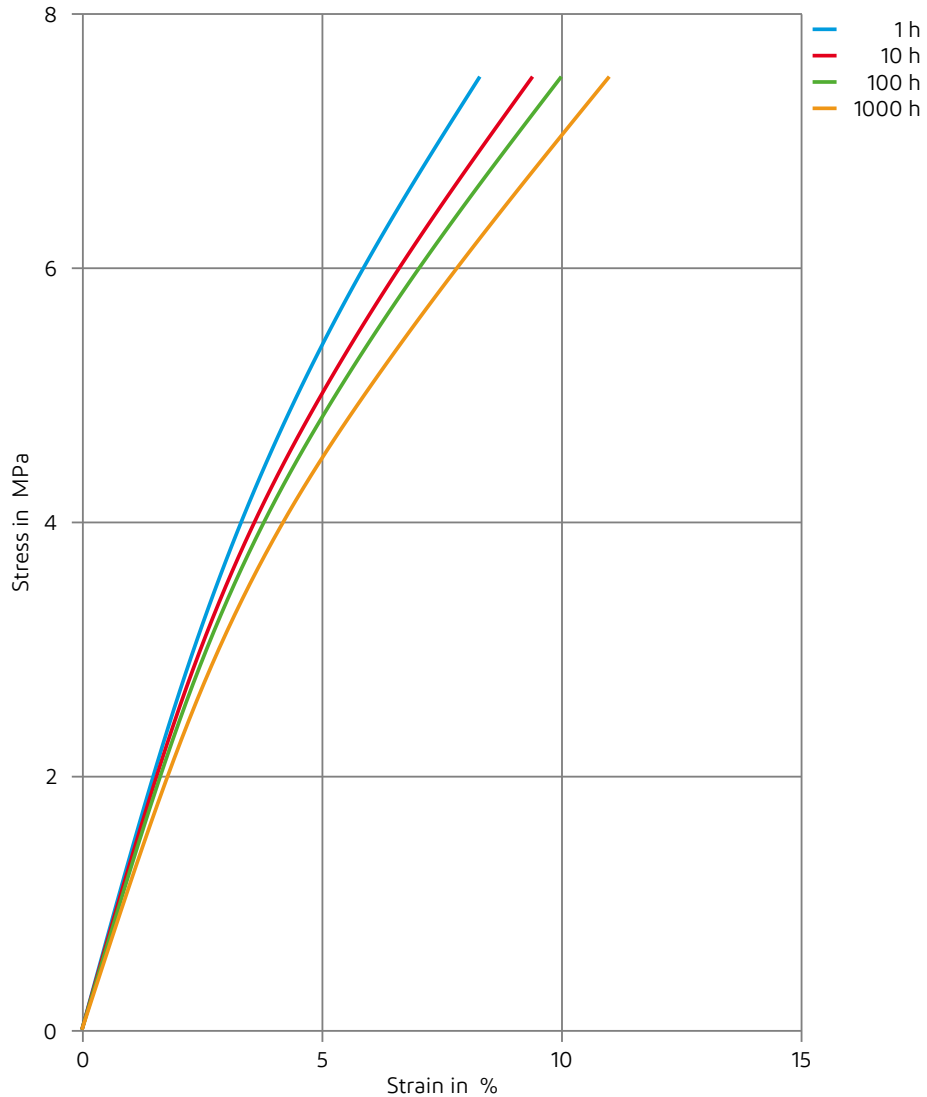
Creep modulus-time 23°C



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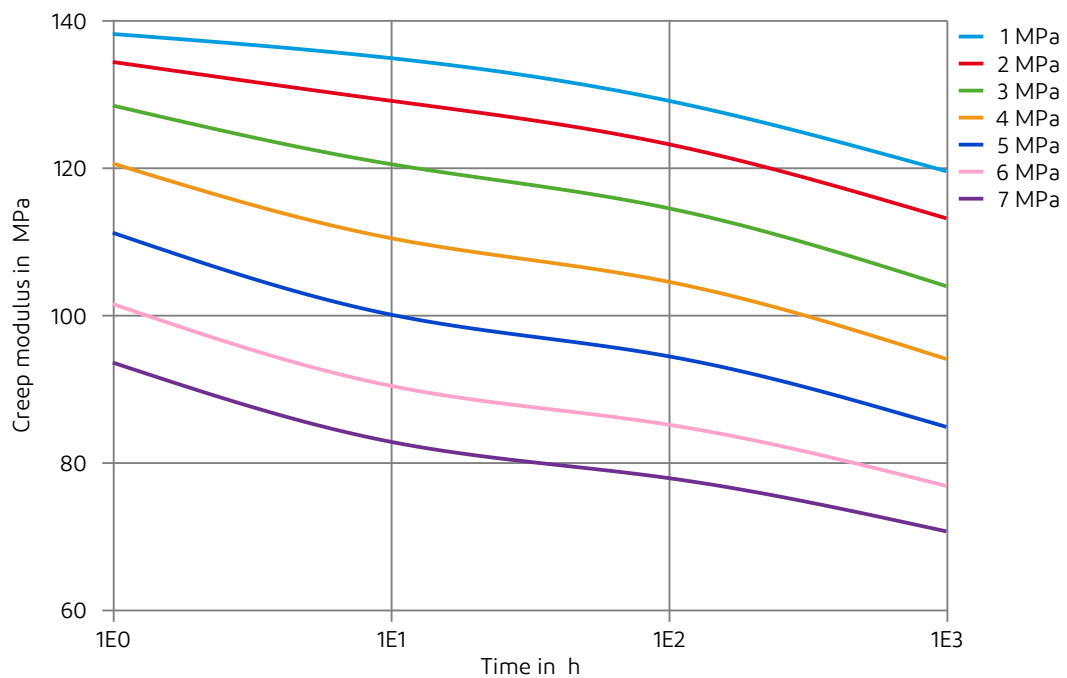
Stress-strain (isochronous) 40°C



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THERMOPLASTIC POLYESTER ELASTOMER

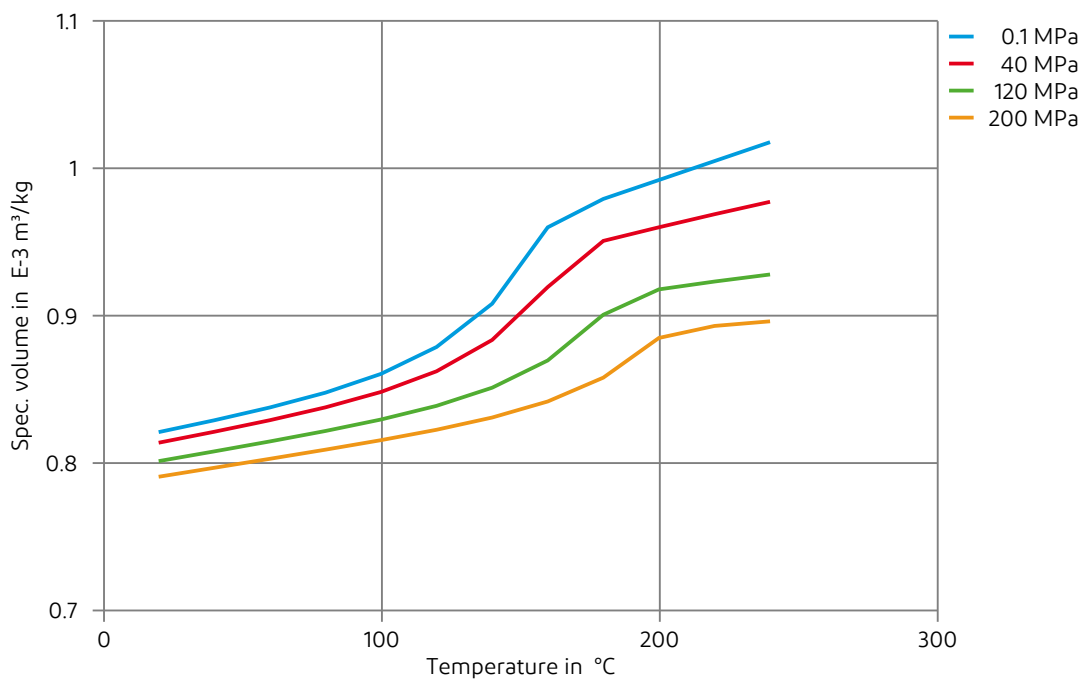
Creep modulus-time 40°C



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THERMOPLASTIC POLYESTER ELASTOMER

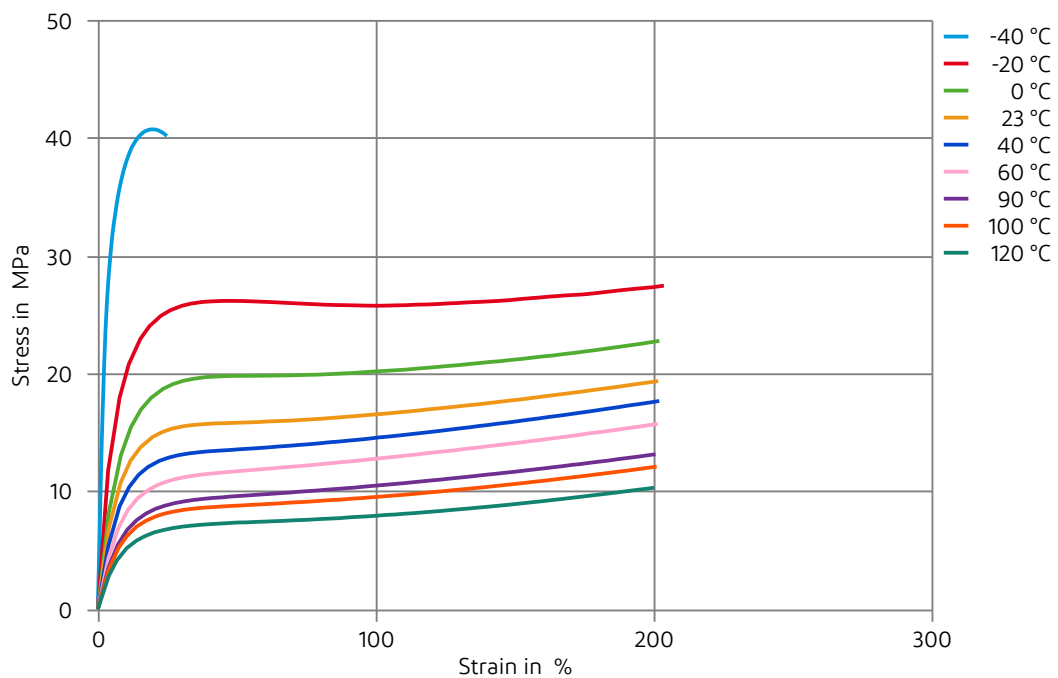
Specific volume-temperature (pvT)



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Stress-Strain (Flexible Materials)



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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

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### 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).

### Mobility & Materials

The information set forth herein is furnished free of charge, is based on technical data that Celanese believes to be reliable, and represents typical values that fall within the normal range of properties. This information relates only to the specific material designated and may not be valid for such material used in combination with other materials or in other processes. It is intended for use by persons having technical skill, at their own discretion and risk. This information should not be used to establish specification limits nor used alone as the basis of design. Handling precaution information is given with the understanding that those using it will satisfy themselves that their particular conditions of use present no health or safety hazards and comply with applicable law. Since conditions of product use and disposal are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. As with any product, evaluation under end-use conditions prior to specification is essential. Nothing herein is to be taken as a license to operate or a recommendation to infringe on patents.

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