

# DuPont™ Hytrel® 7246

## 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® 7246 is a high modulus grade with nominal hardness of 72D. It contains non-discoloring stabilizer. It can be processed by many conventional thermoplastic processing techniques like injection molding and extrusion.**

#### Typical applications:

Tubing, wire and cable jackets, gears and sprockets, oil field parts.

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	12	cm <sup>3</sup> /10min	ISO 1133
Temperature	240	°C	ISO 1133
Load	2.16	kg	ISO 1133
Melt mass-flow rate	13	g/10min	ISO 1133
Melt mass-flow rate, Temperature	240	°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
Mechanical properties (TPE)	Value	Unit	Test Standard
Yield stress	27	MPa	ISO 527-1/-2
Yield strain	23	%	ISO 527-1/-2
Stress at 5% strain	14	MPa	ISO 527-1/-2
Stress at 10% strain	23	MPa	ISO 527-1/-2
Stress at 50% strain	24	MPa	ISO 527-1/-2
Stress at break	50	MPa	ISO 527-1/-2
Strain at break	>300	%	ISO 527-1/-2
Nominal strain at break	530	%	ISO 527-1/-2
Tear strength, parallel	182	kN/m	ISO 34-1
Tear strength, normal	172	kN/m	ISO 34-1
Abrasion resistance	100	mm <sup>3</sup>	ISO 4649
Shore D hardness, max	68	-	ISO 7619-1
Shore D hardness, 15s	64	-	ISO 7619-1
Mechanical properties	Value	Unit	Test Standard
Tensile Modulus	550	MPa	ISO 527-1/-2
Flexural Modulus	550	MPa	ISO 178
Tensile creep modulus			ISO 899-1
1h	360	MPa	
1000h	310	MPa	

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Charpy notched impact strength			ISO 179/1eA
23 °C	36	kJ/m <sup>2</sup>	
-30 °C	8	kJ/m <sup>2</sup>	
-40 °C	7	kJ/m <sup>2</sup>	
Tensile notched impact strength, 23 °C	300	kJ/m <sup>2</sup>	ISO 8256/1
Brittleness temperature	-97	°C	ISO 974
Izod notched impact strength			ISO 180/1A
23 °C	38	kJ/m <sup>2</sup>	
-40 °C	7	kJ/m <sup>2</sup>	
<b>Thermal properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Melting temperature, 10 °C/min	218	°C	ISO 11357-1/-3
Glass transition temperature, 10 °C/min	25	°C	ISO 11357-1/-2
Temp. of deflection under load			ISO 75-1/-2
1.8 MPa	50	°C	
0.45 MPa	100	°C	
Vicat softening temperature			ISO 306
50 °C/h, 50N	140	°C	
50 °C/h, 10N	205	°C	
Coeff. of linear therm. expansion, parallel	180	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion			ISO 11359-1/-2
normal	170	E-6/K	
Normal, -40-23 °C	130	E-6/K	
Parallel, -40-23 °C	120	E-6/K	
Thermal conductivity of melt	0.15	W/(m K)	-
Spec. heat capacity of melt	2150	J/(kg K)	-
Eff. thermal diffusivity	8E-8	m <sup>2</sup> /s	-
RTI, electrical, 1.5mm	85	°C	UL 746B
RTI, impact, 1.5mm	85	°C	UL 746B
RTI, strength, 1.5mm	75	°C	UL 746B
<b>Flammability</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
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
Oxygen index	23	%	ISO 4589-1/-2
FMVSS Class	DNI	-	ISO 3795 (FMVSS 302)
<b>Electrical properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Relative permittivity			IEC 60250
100Hz	4	-	
1MHz	3.5	-	
Dissipation factor			IEC 60250
100Hz	160	E-4	
1MHz	300	E-4	
Volume resistivity	2E10	Ohm*m	IEC 60093
Surface resistivity	>1E15	Ohm	IEC 60093
Electric strength	20	kV/mm	IEC 60243-1
Comparative tracking index	600	-	IEC 60112
<b>Other properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Humidity absorption, 2mm	0.2	%	Sim. to ISO 62
Water absorption, 2mm	0.6	%	Sim. to ISO 62
Density	1260	kg/m <sup>3</sup>	ISO 1183
Density of melt	1110	kg/m <sup>3</sup>	-
Water Absorption, Immersion 24h	0.3	%	Sim. to ISO 62
<b>VDA Properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Emission of organic compounds	300	µgC/g	VDA 277

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## THERMOPLASTIC POLYESTER ELASTOMER

Injection	Value	Unit	Test Standard
Drying Recommended	yes	-	-
Drying Temperature	110	°C	-
Drying Time, Dehumidified Dryer	2 - 3	h	-
Processing Moisture Content	≤0.08	%	-
Melt Temperature Optimum	245	°C	-
Min. melt temperature	240	°C	-
Max. melt temperature	260	°C	-
Mold Temperature Optimum	45	°C	-
Min. mould temperature	45	°C	-
Max. mould temperature	55	°C	-
Hold pressure range	≤70	MPa	-
Extrusion	Value	Unit	Test Standard
Drying Temperature	100 - 120	°C	-
Drying Time, Dehumidified Dryer	2 - 3	h	-
Processing Moisture Content	≤0.06	%	-
Melt Temperature Optimum	235	°C	-
Melt Temperature Range	225 - 245	°C	-

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

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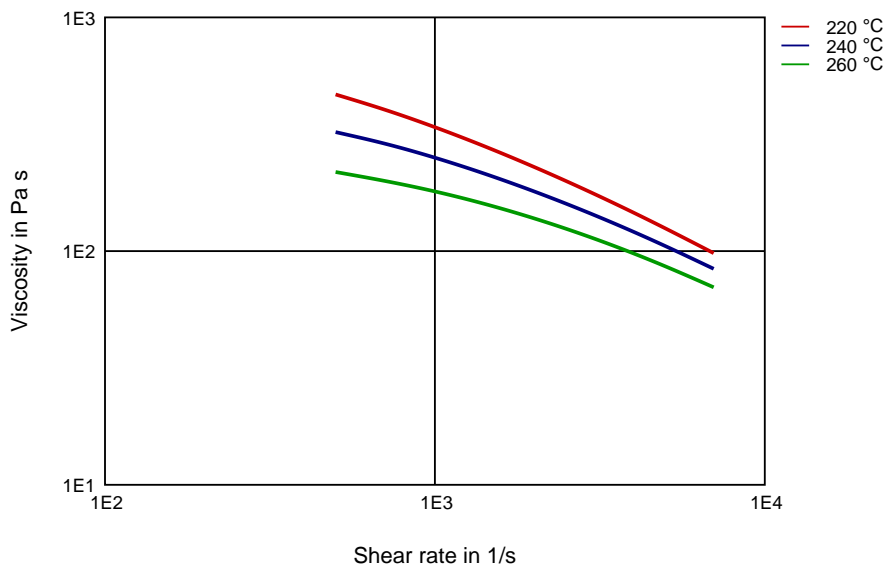


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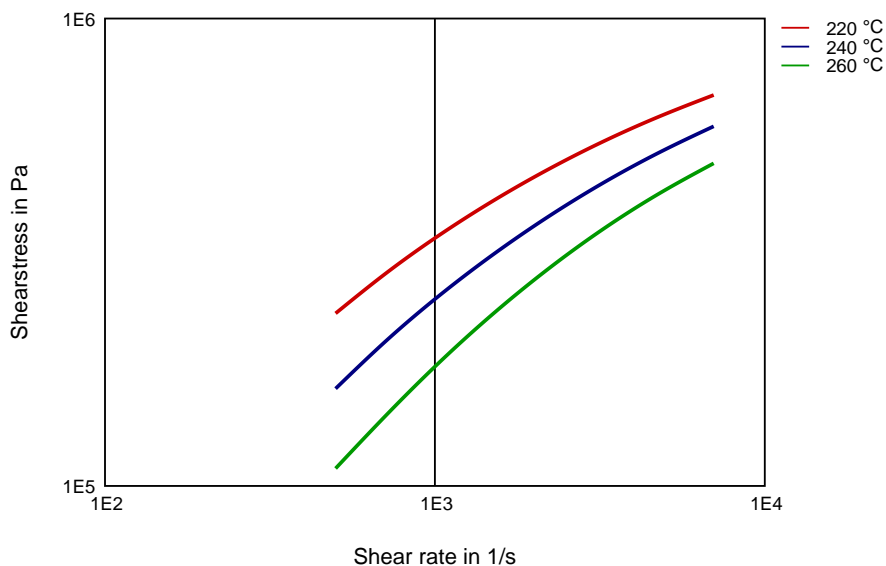
## THERMOPLASTIC POLYESTER ELASTOMER

### Diagrams

#### Viscosity-shear rate



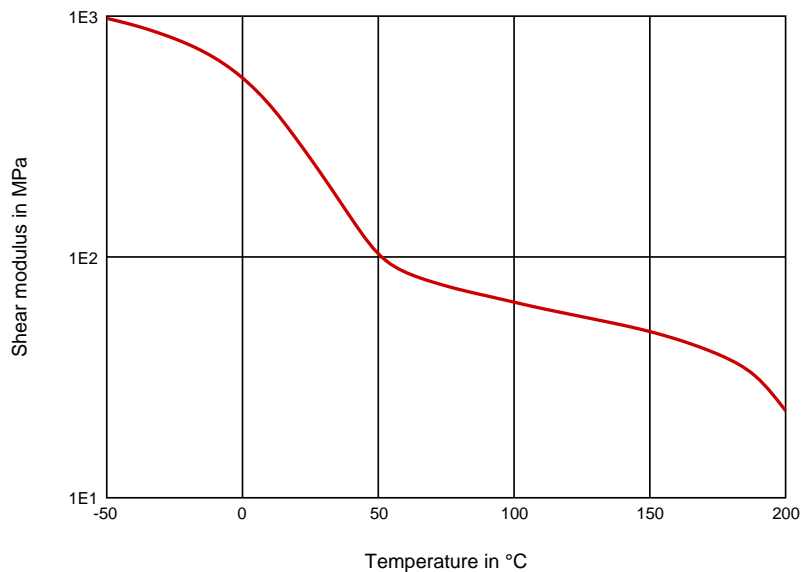
#### Shearstress-shear rate



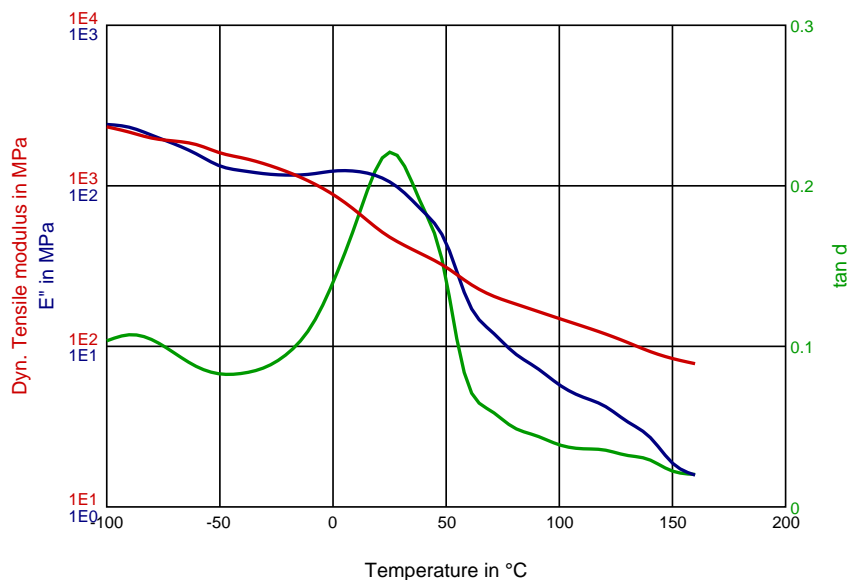
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## THERMOPLASTIC POLYESTER ELASTOMER

Dynamic Shear modulus-temperature



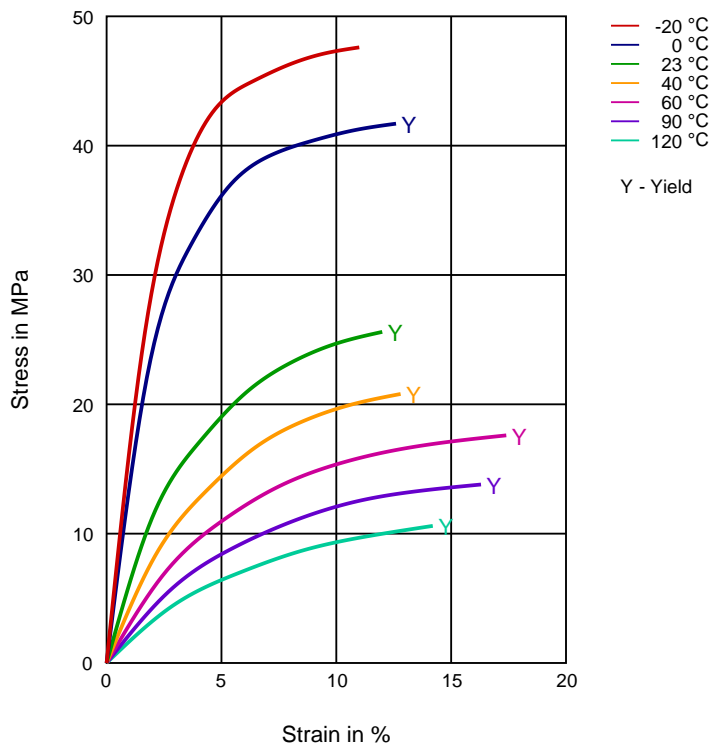
Dynamic Tensile modulus-temperature



# DuPont™ Hytrel® 7246

## THERMOPLASTIC POLYESTER ELASTOMER

Stress-strain



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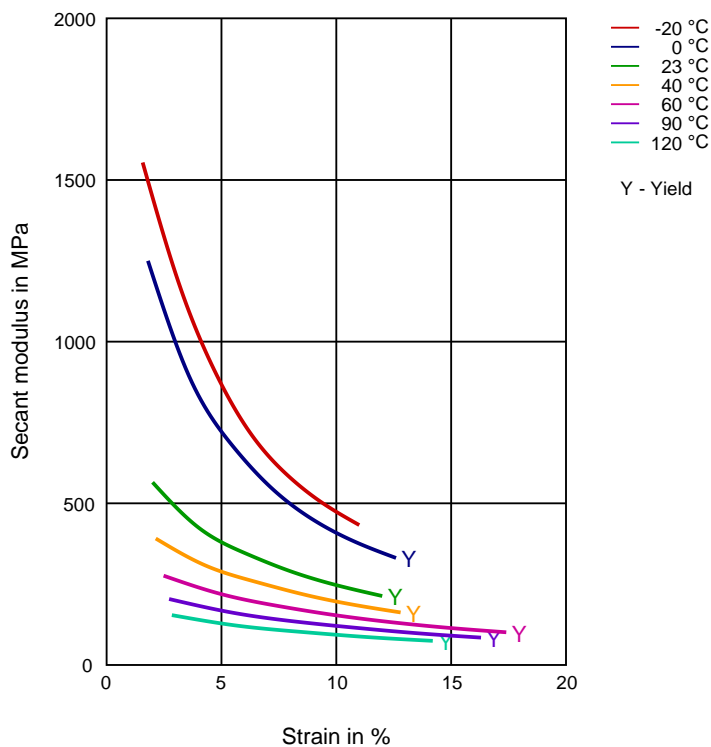


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## THERMOPLASTIC POLYESTER ELASTOMER

Secant modulus-strain



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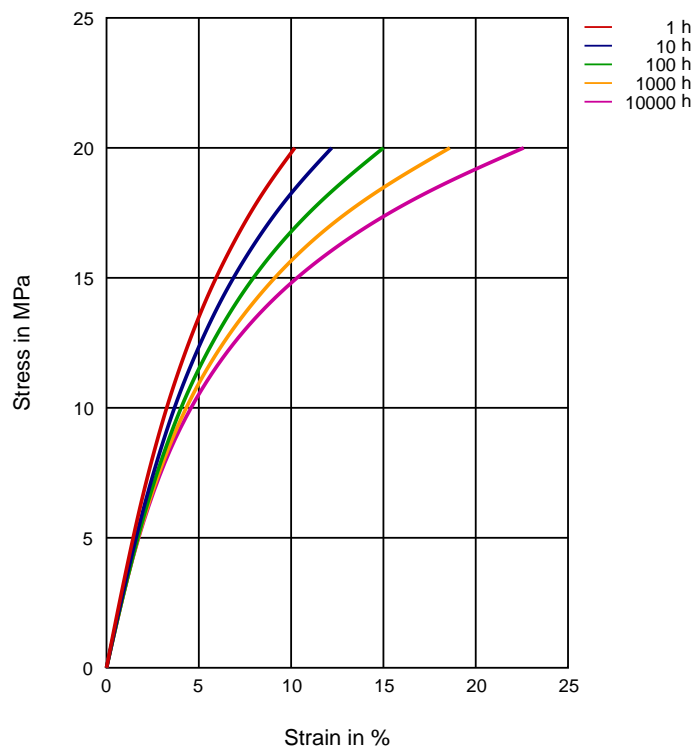
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## THERMOPLASTIC POLYESTER ELASTOMER

Stress-strain (isochronous) 23°C



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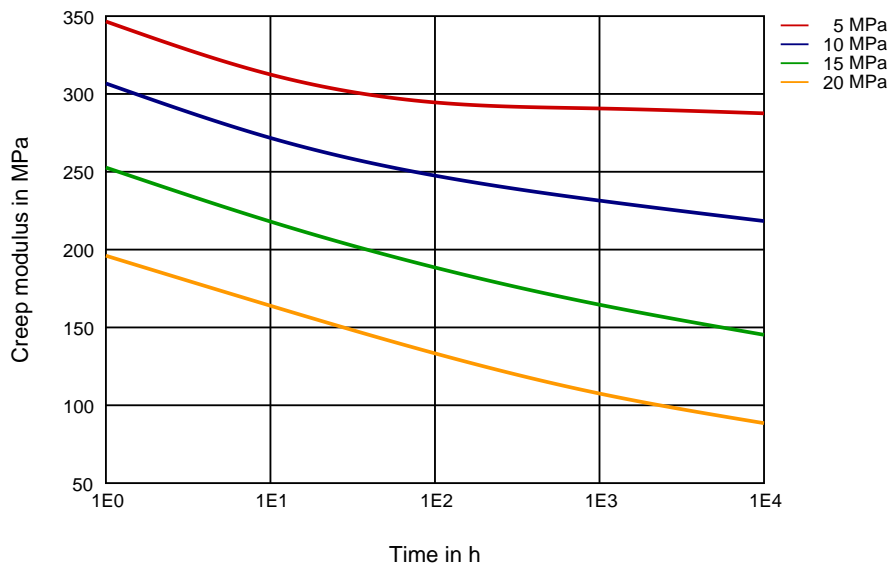




# DuPont™ Hytrel® 7246

## THERMOPLASTIC POLYESTER ELASTOMER

Creep modulus-time 23 °C



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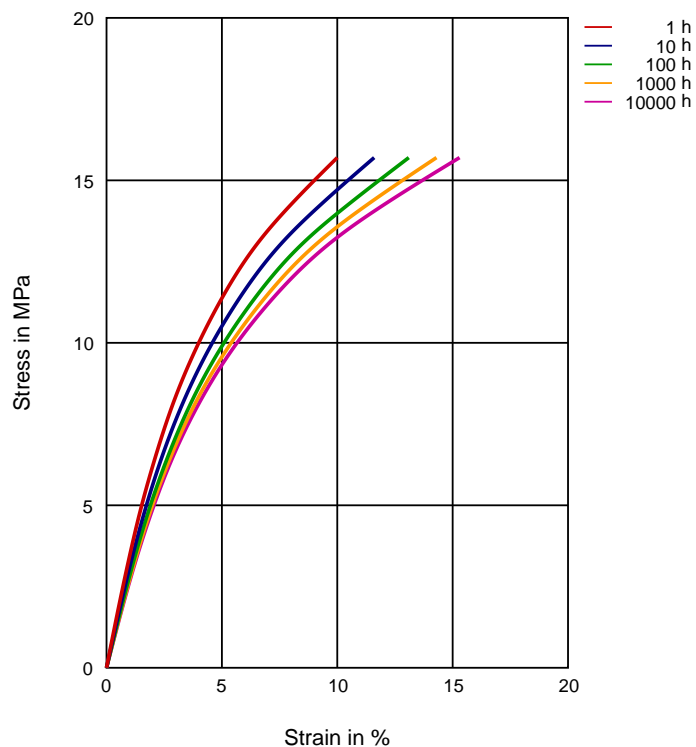
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## THERMOPLASTIC POLYESTER ELASTOMER

Stress-strain (isochronous) 40 °C



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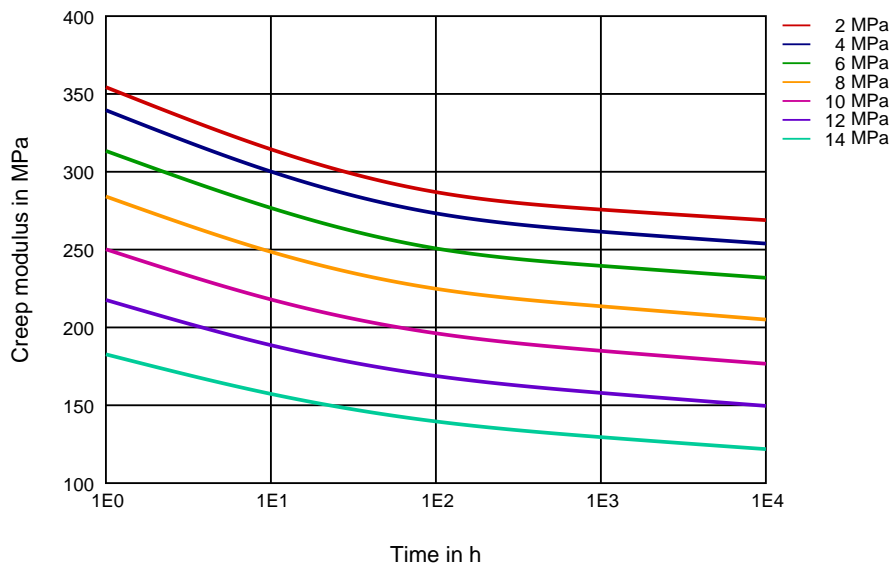
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## THERMOPLASTIC POLYESTER ELASTOMER

Creep modulus-time 40 °C



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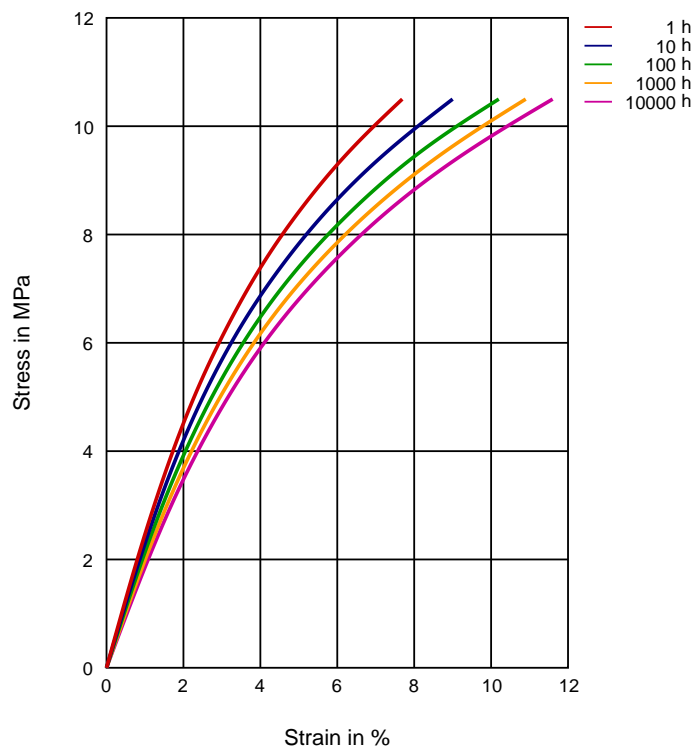
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## THERMOPLASTIC POLYESTER ELASTOMER

Stress-strain (isochronous) 80°C



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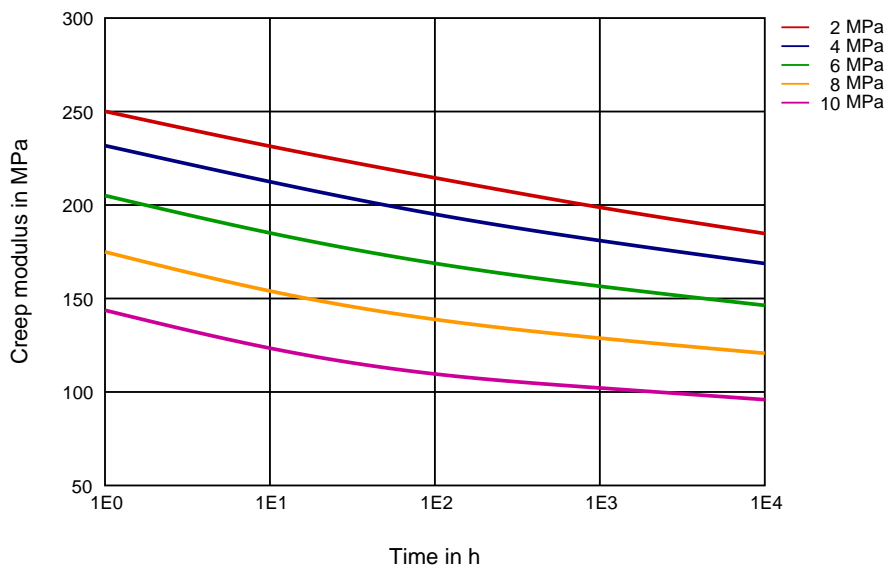
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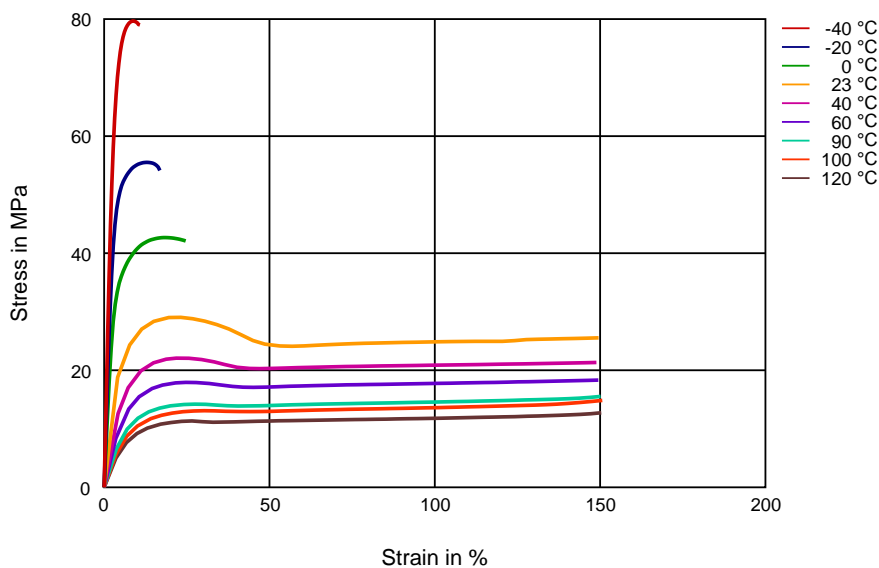
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## THERMOPLASTIC POLYESTER ELASTOMER

### Creep modulus-time 80 °C



### Stress-Strain (TPE)



# DuPont™ Hytrel® 7246

## 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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## THERMOPLASTIC POLYESTER ELASTOMER

- ✓ 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 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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