



### 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® HTR8223 BK320 is designed for blow moulding or processing techniques requiring high melt viscosity. It has nominal hardness of 42D.

Typical applications:

Constant velocity joint boots.

#### **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
Temperature	230	°C	
Load	10	kg	
Melt mass-flow rate		g/10min	ISO 1133
Melt mass-flow rate, Temperature	230	°C	
Melt mass-flow rate, Load	10	kg	
Moulding shrinkage, parallel	1.6	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.6	%	ISO 294-4, 2577
Typical mechanical properties			
Tensile modulus	75	MPa	ISO 527-1/-2
Stress at 5% strain	3.5	MPa	ISO 527-1/-2
Stress at 10% strain	5.5	MPa	ISO 527-1/-2
Tensile stress at 50% strain, 1BA	10	MPa	ISO 527-1/-2
Tensile stress at 100% strain	13	MPa	ISO 527-1/-2
Stress at 300% strain	19	MPa	ISO 527-1/-2
Tensile stress at break	26	MPa	ISO 527-1/-2
Nominal strain at break	680	%	ISO 527-1/-2
Tensile strain at break	>300		ISO 527-1/-2
Flexural modulus	79	MPa	ISO 178
Charpy impact strength, -40°C		kJ/m²	ISO 179/1eU
Charpy notched impact strength, -40°C		kJ/m²	ISO 179/1eA
Izod notched impact strength, 23°C	N	kJ/m²	ISO 180/1A

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Izod notched impact strength, -45°C Brittleness temperature Shore D hardness, 15s Shore D hardness, max Tear strength, parallel Tear strength, normal Abrasion resistance	-100 36 42 120 130	kJ/m² °C  kN/m kN/m mm³	ISO 180/1A ISO 974 ISO 48-4 / ISO 868 ISO 868 ISO 34-1 ISO 34-1
Thermal properties			
Melting temperature, 10°C/min Glass transition temperature, 1 Hz Vicat softening temperature, 50°C/h 10N Coefficient of linear thermal expansion (CLTE), parallel	195 -48 150 170	°C	ISO 11357-1/-3 ISO 6721 ISO 306 ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	170	E-6/K	ISO 11359-1/-2
Effective thermal diffusivity, flow	5.44E-8	m²/s	ISO 22007-4
Flammability			
FMVSS Class Burning rate, Thickness 1 mm	B <80	mm/min	ISO 3795 (FMVSS 302) ISO 3795 (FMVSS 302)
Electrical properties			
Dissipation factor, 100Hz Dissipation factor, 1MHz Volume resistivity Surface resistivity Electric strength Comparative tracking index	125 9E10 2E14	Ohm.m	IEC 62631-2-1 IEC 62631-2-1 IEC 62631-3-1 IEC 62631-3-2 IEC 60243-1 IEC 60112
Physical/Other properties			
Humidity absorption, 2mm Water absorption, 2mm Water absorption, Immersion 24h Density Density of melt		%	Sim. to ISO 62 Sim. to ISO 62 Sim. to ISO 62 ISO 1183
Injection			
Drying Recommended Drying Temperature Drying Time, Dehumidified Dryer Processing Moisture Content Melt Temperature Optimum Min. melt temperature Max. melt temperature Mold Temperature Optimum Min. mould temperature		h % °C °C	

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Max. mould temperature 46 °C Ejection temperature 110 °C

Extrusion

Processing Moisture Content ≤0.06 % Melt Temperature Optimum 230 °C

**Blow Molding** 

Drying Temperature≤100 °CProcessing Moisture Content≤0.02 %Melt Temperature Optimum235 °C

#### Characteristics

Processing Injection Moulding, Film Extrusion, Extrusion, Sheet Extrusion, Other Extrusion,

Coatable, Blow Moulding, Casting, Thermoforming

Delivery form Pellets

Special characteristics Light stabilised or stable to light, Heat stabilised or stable to heat

#### **Automotive**

OEM STANDARD ADDITIONAL INFORMATION

General Motors GMW17479P-TPC-ET-Type 1B

Mercedes-Benz

Mercedes-Benz

DBL5562.17

Mercedes-Benz

DBL5562.31

Mercedes-Benz

DBL5562.33

Mercedes-Benz

DBL5562.34

Mercedes-Benz

DBL5562.36

Mercedes-Benz

DBL5562.50

Stellantis B62 0300 / 61/212E-210M/H710(grease X71 01994\_15\_00207

 VW Group
 3124/13/J8/M5/R4 TL 522 81-A TPC-ET

 VW Group
 TL 522 81-B TPC-ET

 VW Group
 TL 522 81-D TPC-ET

 VW Group
 VW 50123 TPC-ET

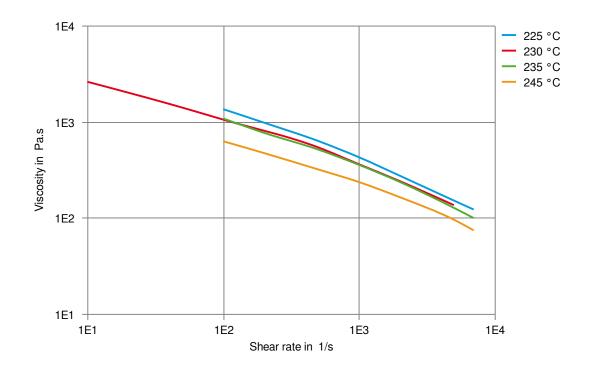
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Viscosity-shear rate



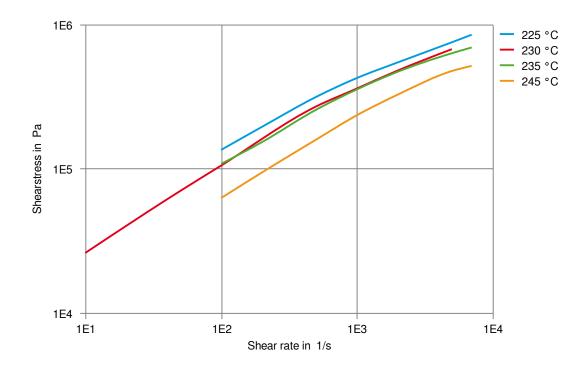
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Shearstress-shear rate



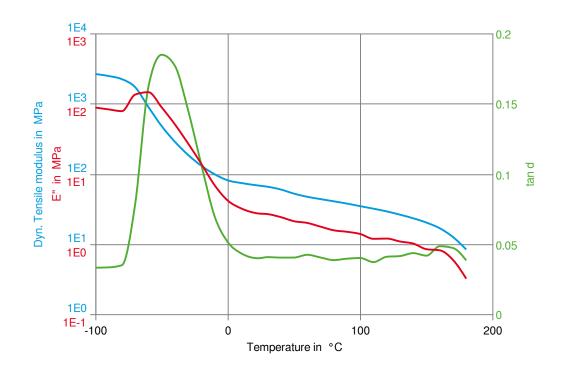
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Dynamic Tensile modulus-temperature



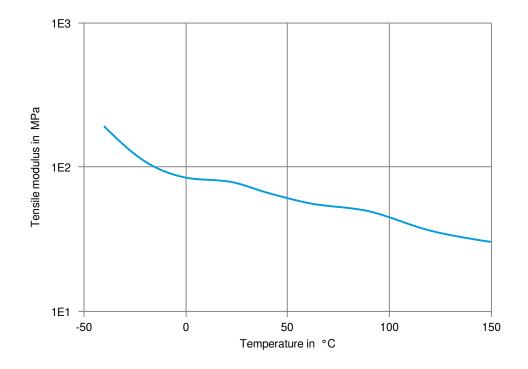
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Tensile modulus-temperature



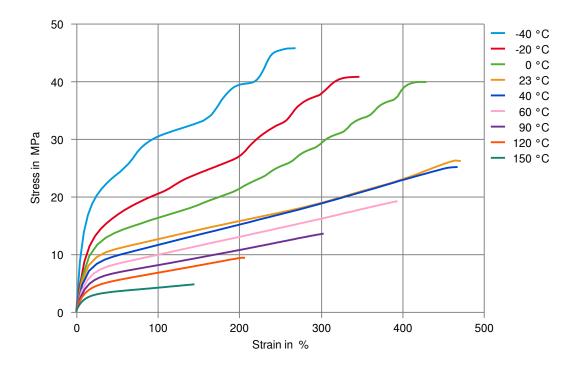
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### THERMOPLASTIC POLYESTER ELASTOMER

Stress-Strain (Flexible Materials)



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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
- X Hydrochloric Acid (36% by mass), 23°C
- X Nitric Acid (40% by mass), 23°C
- X Sulfuric Acid (38% by mass), 23°C
- ✓ Sulfuric Acid (5% by mass), 23°C
- X 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

X Acetone, 23°C

#### **Ethers**

X Diethyl ether, 23°C

#### Mineral oils

- ✓ SAE 10W40 multigrade motor oil, 23°C
- X SAE 10W40 multigrade motor oil, 130°C
- X SAE 80/90 hypoid-gear oil, 130°C
- ✓ Insulating Oil, 23°C
- ★ Motor oil OS206 304 Ref.Eng.Oil, ISP, 135°C

#### Standard Fuels

- ★ ISO 1817 Liquid 1 E5, 60°C
- X ISO 1817 Liquid 2 M15E4, 60°C
- X ISO 1817 Liquid 3 M3E7, 60°C
- X 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
- X 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
- X Hydrogen peroxide, 23°C
- X 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
- X 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).

x 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).

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