



### Hytrel® 4039

### 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® 4039 is a low modulus grade with nominal hardness of 40D and high fluidity. It contains non-discoloring stabilizer.

#### **Product information**

Resin Identification Part Marking Code	TPC-ET >TPC-ET<	ISO 1043 ISO 11469
Rheological properties		
Melt volume-flow rate	22 cm <sup>3</sup> /10min	ISO 1133
Temperature	220 °C	
Load	2.16 kg	
Melt mass-flow rate	22 g/10min	ISO 1133
Melt mass-flow rate, Temperature	220 °C	
Melt mass-flow rate, Load	2.16 kg	
Moulding shrinkage, parallel	1.0 %	ISO 294-4, 2577
Moulding shrinkage, normal	0.9 %	ISO 294-4, 2577
Typical mechanical properties		
Tensile modulus	45 MPa	ISO 527-1/-2
Stress at 10% strain	3.2 MPa	ISO 527-1/-2
Tensile stress at 50% strain, 1BA	6.7 MPa	ISO 527-1/-2
Tensile stress at break	29 MPa	ISO 527-1/-2
Nominal strain at break	800 %	ISO 527-1/-2
Tensile strain at break	>300 %	ISO 527-1/-2
Flexural modulus	45 MPa	ISO 178
Charpy impact strength, 23°C	N kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	N kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	N kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	N kJ/m²	ISO 179/1eA
Charpy notched impact strength, -40°C	N kJ/m²	ISO 179/1eA
Izod notched impact strength, 23°C	N kJ/m²	ISO 180/1A
Izod notched impact strength, -40°C	N kJ/m²	ISO 180/1A

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Brittleness temperature Shore D hardness, 15s Shore D hardness, max Tear strength, parallel Tear strength, normal	-96 °C 33 37 100 kN/m 100 kN/m	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, 10°C/min Temperature of deflection under load, 0.45 MPa Vicat softening temperature, 50°C/h 10N Coeff. of linear therm. expansion, parallel, -40-23°C Coefficient of linear thermal expansion (CLTE), parallel	193 °C -50 °C 49 °C 130 °C 280 E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, -40-23°C Coefficient of linear thermal expansion (CLTE),	280 E-6/K 200 E-6/K	
normal RTI, electrical, 1.5mm RTI, electrical, 3.0mm RTI, impact, 1.5mm RTI, impact, 3.0mm RTI, strength, 1.5mm RTI, strength, 3.0mm	50 °C 50 °C 50 °C 50 °C 50 °C	UL 746B UL 746B UL 746B UL 746B UL 746B UL 746B
Flammability		
Burning Behav. at 1.5mm nom. thickn. Oxygen index FMVSS Class Burning rate, Thickness 1 mm	HB class 20 % B <80 mm/m	IEC 60695-11-10 ISO 4589-1/-2 ISO 3795 (FMVSS 302) nin ISO 3795 (FMVSS 302)
Electrical properties		
Relative permittivity, 100Hz Relative permittivity, 1MHz Dissipation factor, 100Hz Dissipation factor, 1MHz Volume resistivity Surface resistivity Electric strength Comparative tracking index	4.8 4.7 130 E-4 200 E-4 4E10 Ohm. 3E14 Ohm 18 kV/mr	IEC 62631-3-2
Physical/Other properties		
Humidity absorption, 2mm Water absorption, 2mm Water absorption, Immersion 24h Density Density of melt	0.3 % 0.7 % 0.7 % 1110 kg/m³ 1100 kg/m³	

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### THERMOPLASTIC POLYESTER ELASTOMER

#### Film Properties

WVTR, 23 ° C/85%r.h. 900 g/(m<sup>2\*</sup>d) DIS 15106-1/-2 Thickness of specimen 0.025 mm

#### **VDA Properties**

Emission of organic compounds	10 μgC/g	VDA 277
Odour	4 class	VDA 270

#### Injection

Drying Recommended	yes	
Drying Temperature	100	°C
Drying Time, Dehumidified Dryer	2 - 3	h
Processing Moisture Content	≤0.08	%
Melt Temperature Optimum	225	°C
Min. melt temperature	220	°C
Max. melt temperature	250	°C
Mold Temperature Optimum	40	°C
Min. mould temperature	30	°C
Max. mould temperature	40	°C

#### Extrusion

Drying Temperature	90 - 110	°C
Drying Time, Dehumidified Dryer	2 - 3	h
Processing Moisture Content	≤0.06	%
Melt Temperature Optimum	215	°C
Melt Temperature Range	210 - 225	°C

#### Characteristics

Processing Injection Moulding, Coatable, Casting, Thermoforming

Delivery form Pellets

Special characteristics Light stabilised or stable to light

#### 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 range = 220-250°C Melt temperature optimum = 225°C Mold temperature optimum = 40°C Mold temperature range = 30-40°C

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#### THERMOPLASTIC POLYESTER ELASTOMER

Profile extrusion

#### **PREPROCESSING**

Drying temperature = 100 °C

Drying time, dehumidified dryer = 2-3 h

Processing moisture content = <0.06 %

#### **PROCESSING**

Melt termperature range = 205-230 °C Melt temperature optimum = 215 °C

#### Chemical Media Resistance

#### Mineral oils

✓ Insulating Oil, 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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