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# Hytrel® 4039 ECO-B 652

## 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 ECO-B 652 is a low modulus grade with nominal hardness of 40D and high fluidity. It contains non-discoloring stabilizer. It has same performance and processing properties as Hytrel® 4039.

Hytrel® 4039 ECO-B 652 belongs to the Hytrel® ECO-B family. The products of this family are partially produced using bio-feedstock derived from waste*. This results in reduced lifecycle greenhouse gas emissions and lower fossil resource use.

*certified bio-circular according to ISCC Plus mass balance approach.

## Rheological properties

| | | | |
|---|---|---|---|
| Melt volume-flow rate | 22 | $cm^3$/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 | $kJ/m^2$ | ISO 179/1eU |
| Charpy impact strength, -30°C | N | $kJ/m^2$ | ISO 179/1eU |
| Charpy notched impact strength, 23°C | N | $kJ/m^2$ | ISO 179/1eA |
| Charpy notched impact strength, -30°C | N | $kJ/m^2$ | ISO 179/1eA |
| Charpy notched impact strength, -40°C | N | $kJ/m^2$ | ISO 179/1eA |
| Izod notched impact strength, 23°C | N | $kJ/m^2$ | ISO 180/1A |
| Izod notched impact strength, -40°C | N | $kJ/m^2$ | ISO 180/1A |
| Brittleness temperature | -96 | °C | ISO 974 |

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| | | | |
|---|---|---|---|
| Shore D hardness, 15s | 33 | | ISO 48-4 / ISO 868 |
| Shore D hardness, max | 37 | | ISO 868 |
| Tear strength, parallel | 100 | kN/m | ISO 34-1 |
| Tear strength, normal | 100 | kN/m | ISO 34-1 |

## Thermal properties

| | | | |
|---|---|---|---|
| Melting temperature, 10°C/min | 193 | °C | ISO 11357-1/-3 |
| Glass transition temperature, 10°C/min | -50 | °C | ISO 11357-1/-3 |
| Temperature of deflection under load, 0.45 MPa | 49 | °C | ISO 75-1/-2 |
| Vicat softening temperature, 50°C/h 10N | 130 | °C | ISO 306 |
| Coeff. of linear therm. expansion, parallel, -40-23°C | 280 | E-6/K | ISO 11359-1/-2 |
| Coefficient of linear thermal expansion (CLTE), parallel | 220 | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal, -40-23°C | 280 | E-6/K | ISO 11359-1/-2 |
| Coefficient of linear thermal expansion (CLTE), normal | 200 | E-6/K | ISO 11359-1/-2 |
| RTI, electrical, 1.5mm | 50 | °C | UL 746B |
| RTI, electrical, 3.0mm | 50 | °C | UL 746B |
| RTI, impact, 1.5mm | 50 | °C | UL 746B |
| RTI, impact, 3.0mm | 50 | °C | UL 746B |
| RTI, strength, 1.5mm | 50 | °C | UL 746B |
| RTI, strength, 3.0mm | 50 | °C | UL 746B |

## Flammability

| | | | |
|---|---|---|---|
| Burning Behav. at 1.5mm nom. thickn. | HB | class | IEC 60695-11-10 |
| Oxygen index | 20 | % | ISO 4589-1/-2 |
| FMVSS Class | B | | ISO 3795 (FMVSS 302) |
| Burning rate, Thickness 1 mm | <80 | mm/min | ISO 3795 (FMVSS 302) |

## Electrical properties

| | | | |
|---|---|---|---|
| Relative permittivity, 100Hz | 4.8 | | IEC 62631-2-1 |
| Relative permittivity, 1MHz | 4.7 | | IEC 62631-2-1 |
| Dissipation factor, 100Hz | 130 | E-4 | IEC 62631-2-1 |
| Dissipation factor, 1MHz | 200 | E-4 | IEC 62631-2-1 |
| Volume resistivity | 4E10 | Ohm.m | IEC 62631-3-1 |
| Surface resistivity | 3E14 | Ohm | IEC 62631-3-2 |
| Electric strength | 18 | kV/mm | IEC 60243-1 |
| Comparative tracking index | 600 | | IEC 60112 |

## Physical/Other properties

| | | | |
|---|---|---|---|
| Humidity absorption, 2mm | 0.3 | % | Sim. to ISO 62 |
| Water absorption, 2mm | 0.7 | % | Sim. to ISO 62 |
| Water absorption, Immersion 24h | 0.7 | % | Sim. to ISO 62 |
| Density | 1110 | kg/m³ | ISO 1183 |
| Density of melt | 1100 | kg/m³ | |

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## Film Properties

| | | | |
|---|---|---|---|
| WVTR, 23 °C/85%r.h. | 900 | g/(m²*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 |
| Sustainability | Bio-Content |

## 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

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Mold temperature optimum = 40 °C
Mold temperature range = 30-40 °C

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



Revised: 2025-04-22 Source: Celanese Materials Database