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# Hytrel® ECO 3078B

## 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® ECO 3078B is a very low modulus grade, with nominal hardness of 30D. It contains non-discoloring stabilizer. It can be processed by many conventional thermoplastic processing techniques like injection molding and extrusion. It has same performance and processing properties as Hytrel® 3078.

Hytrel® ECO 3078B 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.

Food compliance:
Refer to Hytrel® 3078FG

Typical applications:
Compounding, extrusion, injection moulded and over-moulded parts for consumer use.

## Rheological properties

| | | | |
|---|---|---|---|
| Melt volume-flow rate | 5 | $cm^3$/10min | ISO 1133 |
| Melt mass-flow rate | 5 | g/10min | ISO 1133 |
| Temperature | 190 | °C | |
| Load | 2.16 | kg | |
| Melt mass-flow rate, Temperature | 190 | °C | |
| Melt mass-flow rate, Load | 2.16 | kg | |
| Moulding shrinkage, parallel | 0.8 | % | ISO 294-4, 2577 |
| Moulding shrinkage, normal | 0.5 | % | ISO 294-4, 2577 |

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### Typical mechanical properties

| | | | |
|---|---|---|---|
| Tensile Modulus | 22 | MPa | ISO 527-1/-2 |
| Stress at 10% strain | 1.8 | MPa | ISO 527-1/-2 |
| Stress at 50% strain | 5 | MPa | ISO 527-1/-2 |
| Stress at break | 24 | MPa | ISO 527-1/-2 |
| Nominal strain at break | 900 | % | ISO 527-1/-2 |
| Strain at break | >300 | % | ISO 527-1/-2 |
| Flexural Modulus | 27 | MPa | ISO 178 |
| Tensile creep modulus, 1000h | 18 | MPa | ISO 899-1 |
| 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 |
| Poisson's ratio | 0.5 | | |
| Brittleness temperature | -98 | °C | ISO 974 |
| Shore D hardness, 15s | 24 | | ISO 48-4 / ISO 868 |
| Shore D hardness, max | 30 | | ISO 868 |
| Tear strength, parallel | 80 | kN/m | ISO 34-1 |
| Tear strength, normal | 77 | kN/m | ISO 34-1 |

[1]: measured on 1BA specimen pulled at 50mm/min

### Thermal properties

| | | | |
|---|---|---|---|
| Melting temperature, 10°C/min | 170 | °C | ISO 11357-1/-3 |
| Glass transition temperature, 10°C/min | -60 | °C | ISO 11357-1/-3 |
| Vicat softening temperature, 50°C/h 10N | 80 | °C | ISO 306 |
| Coeff. of linear therm. expansion, parallel | 177 | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal | 206 | E-6/K | ISO 11359-1/-2 |
| Thermal conductivity of melt | 0.15 | W/(m K) | Internal |
| Eff. thermal diffusivity | 5.44E-8 | m²/s | Internal |
| Spec. heat capacity of melt | 2150 | J/(kg K) | Internal |
| RTI, electrical, 1.5mm | 50 | °C | UL 746B |
| RTI, electrical, 3mm | 50 | °C | UL 746B |
| RTI, impact, 1.5mm | 50 | °C | UL 746B |
| RTI, impact, 3mm | 50 | °C | UL 746B |
| RTI, strength, 1.5mm | 50 | °C | UL 746B |
| RTI, strength, 3mm | 50 | °C | UL 746B |

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# Hytrel® ECO 3078B

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### Flammability

| | | | |
|---|---|---|---|
| Burning Behav. at 1.5mm nom. thickn. | HB | class | UL 94 |
| Thickness tested | 1.5 | mm | UL 94 |
| UL recognition | yes | | UL 94 |
| Burning Behav. at thickness h | HB | class | UL 94 |
| Thickness tested | 3 | mm | UL 94 |
| UL recognition | yes | | UL 94 |
| Oxygen index | 19 | % | ISO 4589-1/-2 |
| FMVSS Class | B | | ISO 3795 (FMVSS 302) |
| Burning rate, Thickness 1 mm | 33 | mm/min | ISO 3795 (FMVSS 302) |

### Electrical properties

| | | | |
|---|---|---|---|
| Relative permittivity, 100Hz | 5.4 | | IEC 62631-2-1 |
| Relative permittivity, 1MHz | 5.3 | | IEC 62631-2-1 |
| Dissipation factor, 100Hz | 70 | E-4 | IEC 62631-2-1 |
| Dissipation factor, 1MHz | 150 | E-4 | IEC 62631-2-1 |
| Volume resistivity | 1E11 | Ohm.m | IEC 62631-3-1 |
| Surface resistivity | 1E14 | Ohm | IEC 62631-3-2 |
| Electric strength | 18 | kV/mm | IEC 60243-1 |

### Other properties

| | | | |
|---|---|---|---|
| Humidity absorption, 2mm | 0.2 | % | Sim. to ISO 62 |
| Water absorption, 2mm | 0.8 | % | Sim. to ISO 62 |
| Water absorption, Immersion 24h | 0.5 | % | Sim. to ISO 62 |
| Density | 1070 | kg/m³ | ISO 1183 |
| Density of melt | 940 | kg/m³ | Internal |

### Injection

| | | | |
|---|---|---|---|
| Drying Recommended | yes | | |
| Drying Temperature | 80 | °C | |
| Drying Time, Dehumidified Dryer | 2 - 3 | h | |
| Processing Moisture Content | ≤0.08 | % | |
| Melt Temperature Optimum | 205 | °C | Internal |
| Min. melt temperature | 190 | °C | |
| Max. melt temperature | 210 | °C | |
| Mold Temperature Optimum | 30 | °C | |
| Min. mould temperature | 30 | °C | |
| Max. mould temperature | 40 | °C | |

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THERMOPLASTIC POLYESTER ELASTOMER

## Extrusion

| | | |
|---|---|---|
| Drying Temperature | 70 - 90 | °C |
| Drying Time, Dehumidified Dryer | 2 - 3 | h |
| Processing Moisture Content | ≤0.06 | % |
| Melt Temperature Optimum | 200 | °C |
| Melt Temperature Range | 190 - 205 | °C |

## Characteristics

| | |
|---|---|
| Additives | Biobased |

## Additional information

Profile extrusion

### PREPROCESSING

Drying temperature = 80 °C
Drying time, dehumidified dryer = 2-3 h
Processing moisture content = <0.06 %

### PROCESSING

Melt temperature optimum = 200 °C
Melt temperature range = 190-205 °C

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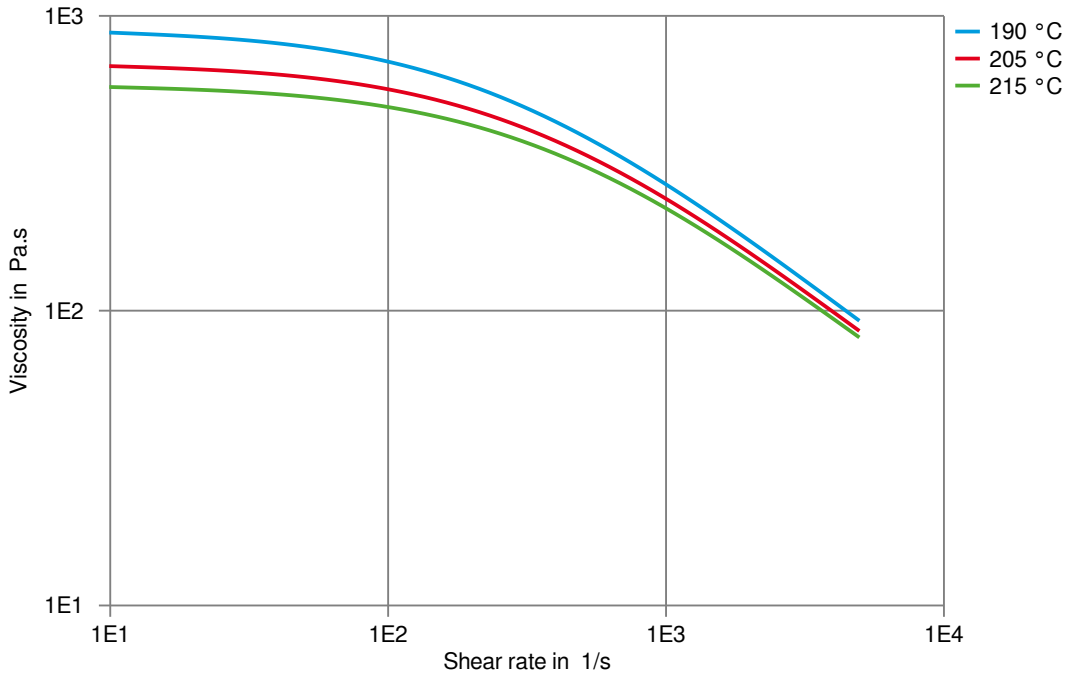
## THERMOPLASTIC POLYESTER ELASTOMER

### Viscosity-shear rate



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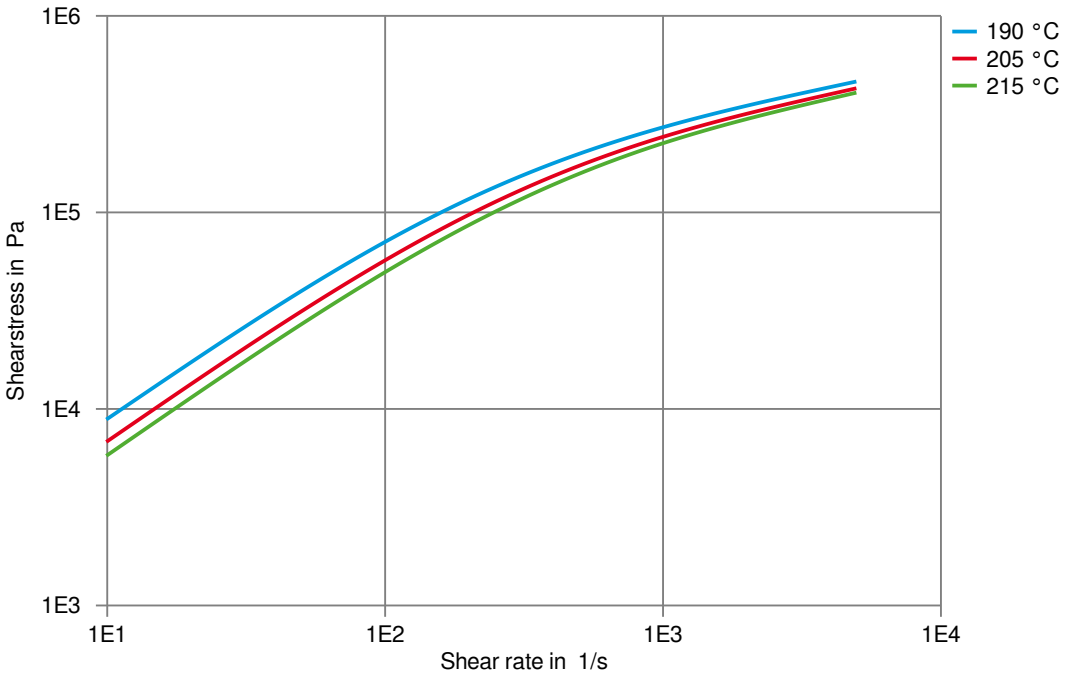
## THERMOPLASTIC POLYESTER ELASTOMER

### Shearstress-shear rate



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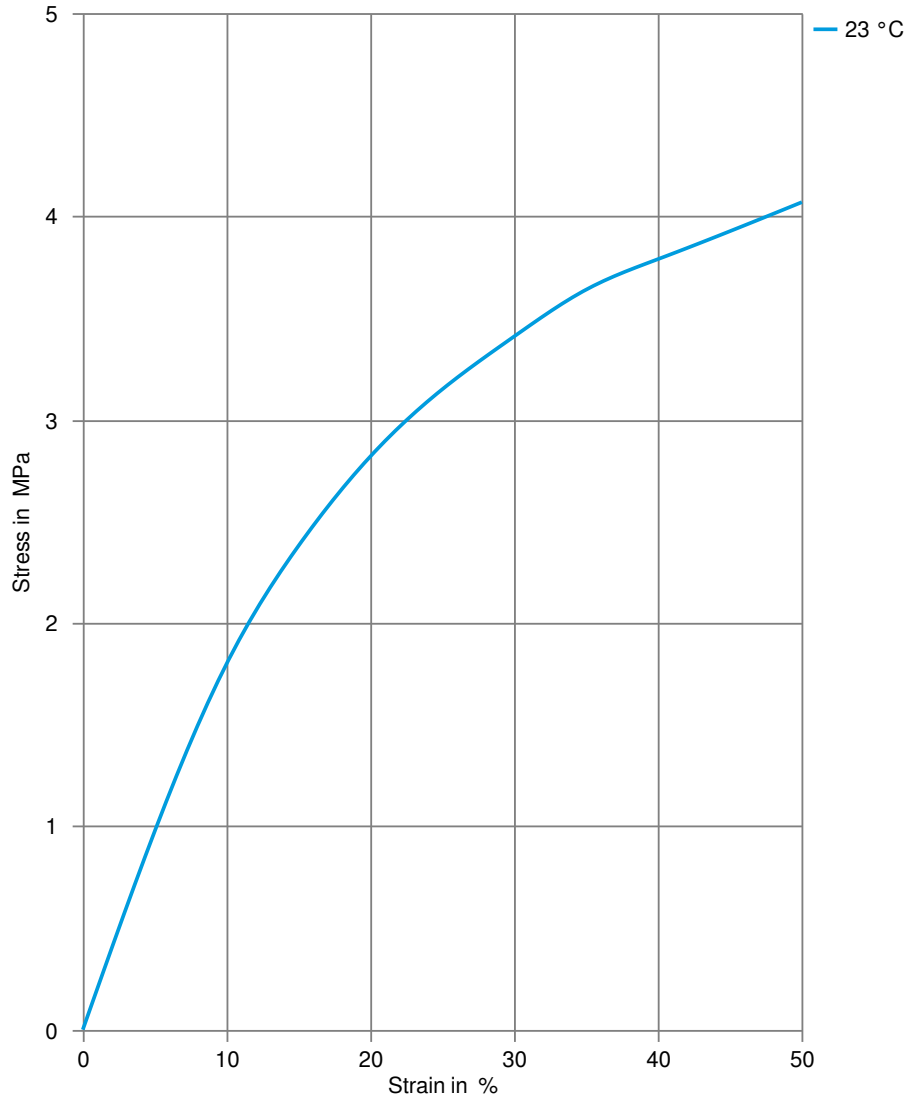
### Stress-strain



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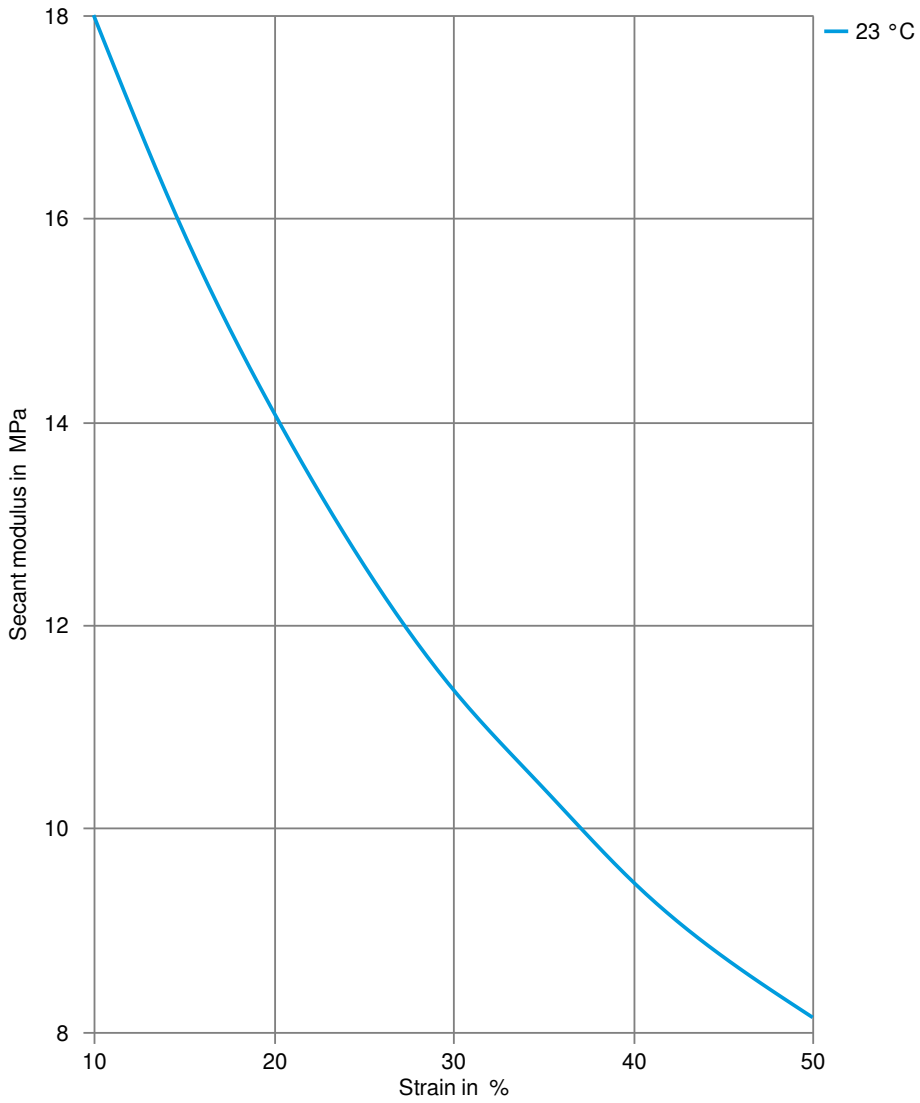
### Secant modulus-strain



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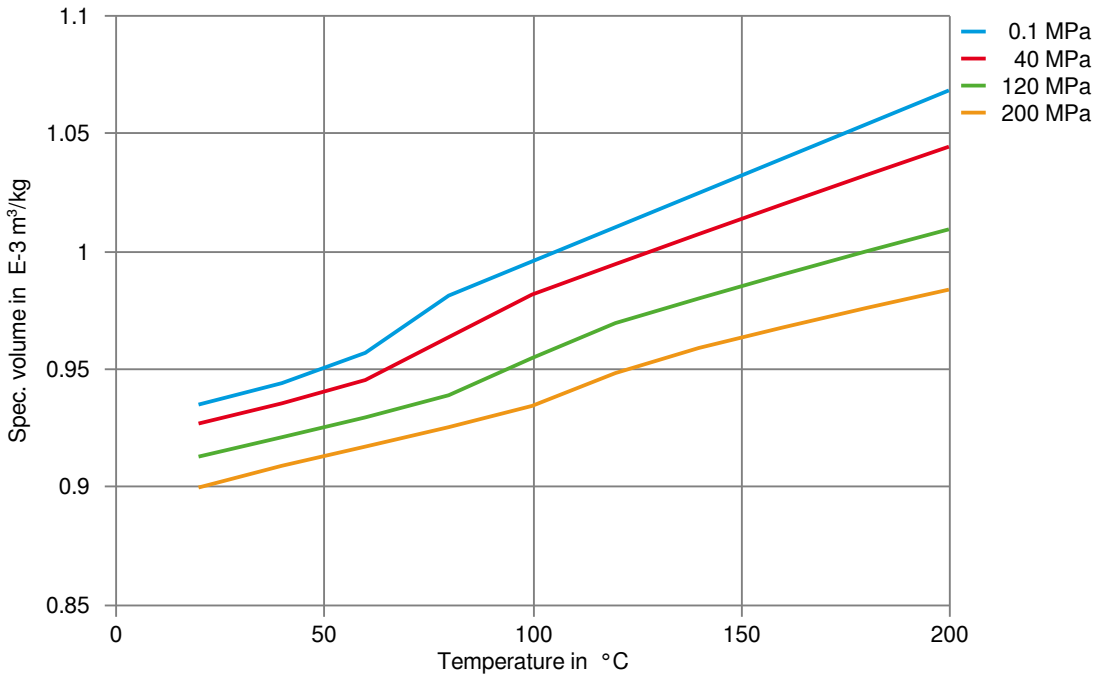
### Specific volume-temperature (pvT)



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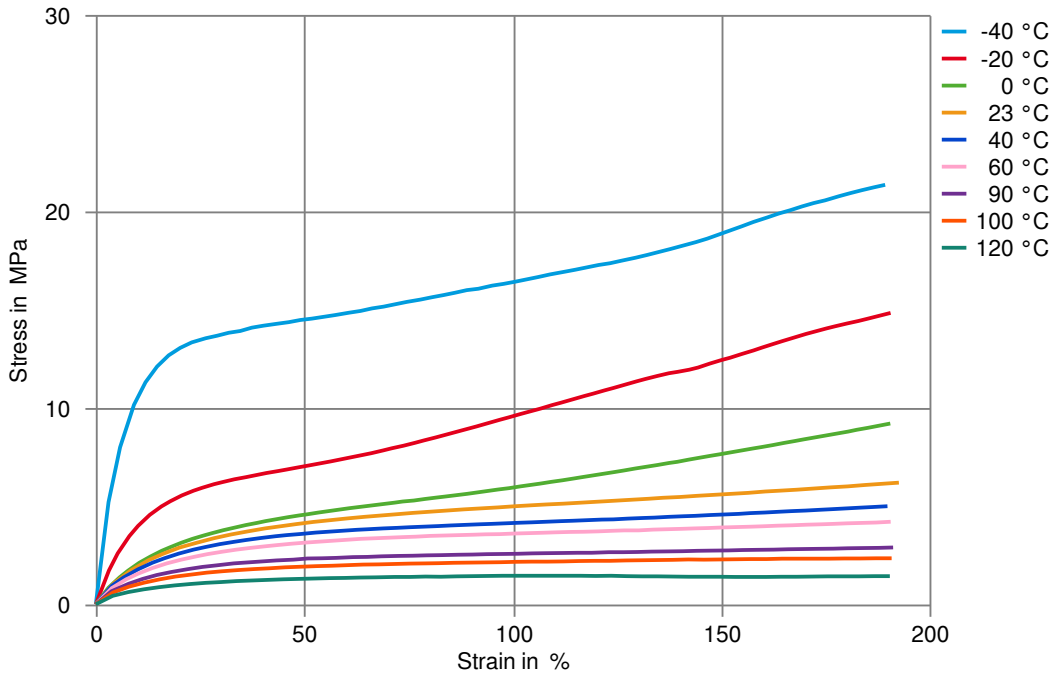
### Stress-Strain (Flexible Materials)



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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).