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Hytrel® 4068FG

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® 4068FG is a high performance thermoplastic polyester elastomer developed for applications in contact with food.

FOOD CONTACT

This product is manufactured according to Good Manufacturing Practice (GMP) principles and generally accepted in food contact applications in Europe and the USA when meeting applicable use conditions. For details, individual compliance statements are available from our representative.

Product information

Resin Identification	TPC-ET	ISO 1043
Part Marking Code	>TPC-ET<	ISO 11469

Rheological properties

Melt volume-flow rate	8.8	cm^3/10min	ISO 1133
Melt mass-flow rate	8.5	g/10min	ISO 1133
Temperature	220	°C	
Load	2.16	kg	
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 5% strain	2.4	MPa	ISO 527-1/-2
Stress at 10% strain	3.5	MPa	ISO 527-1/-2
Stress at 50% strain	6.7	MPa	ISO 527-1/-2
Stress at break	29	MPa	ISO 527-1/-2
Nominal strain at break	800	%	ISO 527-1/-2
Strain at break	>300	%	ISO 527-1/-2
Flexural Modulus	47	MPa	ISO 178
Tensile creep modulus, 1000h	21	MPa	ISO 899-1

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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
Tensile notched impact strength, 23°C	145	kJ/m²	ISO 8256/1
Izod notched impact strength, 23°C	N	kJ/m²	ISO 180/1A
Izod notched impact strength, -30°C	N	kJ/m²	ISO 180/1A
Izod notched impact strength, -40°C	N	kJ/m²	ISO 180/1A
Shore D hardness, 15s	31		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
Abrasion resistance	180	mm³	ISO 4649

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
Vicat softening temperature, 50°C/h 10N	130	°C	ISO 306
Coeff. of linear therm. expansion, parallel	230	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	230	E-6/K	ISO 11359-1/-2
Eff. thermal diffusivity	5.44E-8	m²/s	Internal

Flammability

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
Electric strength	18	kV/mm	IEC 60243-1
Comparative tracking index	600		IEC 60112

Other properties

Humidity absorption, 2mm	0.3	%	Sim. to ISO 62
Water absorption, 2mm	0.7	%	Sim. to ISO 62
Density	1110	kg/m³	ISO 1183

VDA Properties

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

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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	Internal
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

Additional information

Injection molding

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

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

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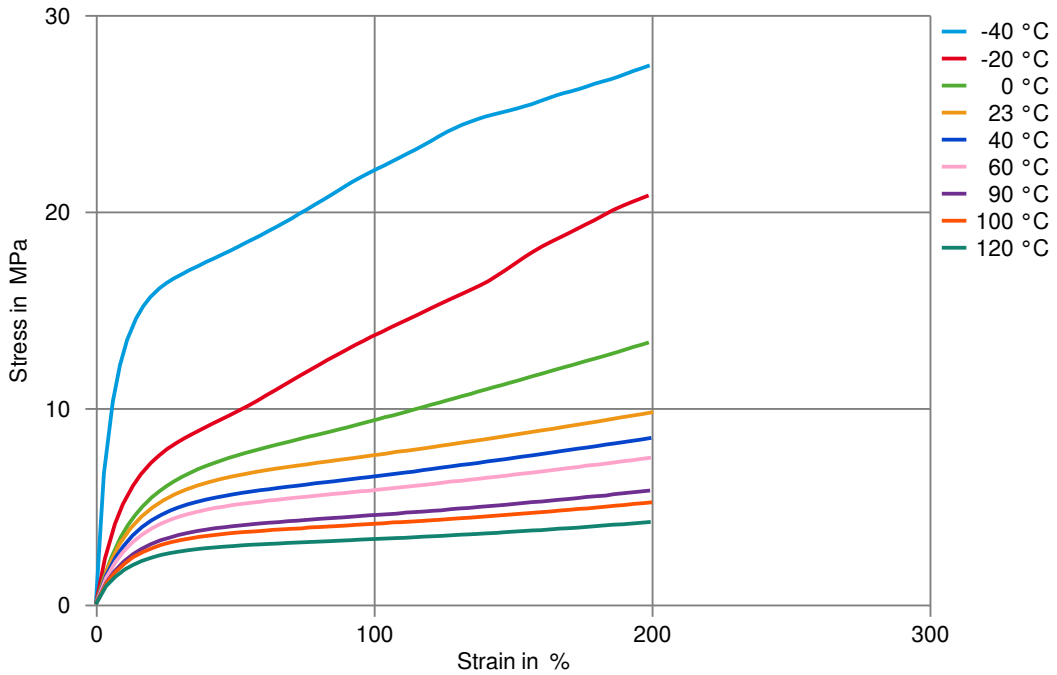
Stress-Strain (Flexible Materials)



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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).