Crastin® HR5330HF NC010

THERMOPLASTIC POLYESTER RESIN

Common features of Crastin® thermoplastic polyester resin include mechanical and physical properties such as stiffness and toughness, heat resistance, friction and wear resistance, excellent surface finishes and good colourability. Crastin® thermoplastic polyester resin has excellent electrical insulation characteristics and high arc-resistant grades are available. Many flame retardant grades have UL recognition (class V-0). Crastin® thermoplastic polyester resin typically has high chemical and heat ageing resistance.

The good melt stability of Crastin® thermoplastic polyester resin normally enables the recycling of properly handled production waste.
If recycling is not possible, DuPont recommends, 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.

Crastin® thermoplastic polyester resin typically is used in demanding applications in the electronics, electrical, automotive, mechanical engineering, chemical, domestic appliances and sporting goods industry.

Crastin® HR5330HF is a 30% glass reinforced PBT with high flow (HF), moderately toughened, hydrolysis resistant (HR) resin. Excellent balance of properties between terminal pullout and impact resistance. Developed for USCAR Class 3 and 4 environments.

Product information

Resin Identification	PBT-IGF30	ISO 1043
Part Marking Code	>PBT-IGF30<	ISO 11469

Rheological properties

Melt volume-flow rate	8	cm³/10min	ISO 1133
Temperature	250	°C	ISO 1133
Load	2.16	kg	ISO 1133
Viscosity number	95	cm³/g	ISO 307, 1157, 1628
Intrinsic viscosity	0.8	-	ISO 307, 1157, 1628
Moulding shrinkage, parallel	0.3	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.0	%	ISO 294-4, 2577
Postmoulding shrinkage, normal, 48h at 80°C	0.2	%	ISO 294-4
Postmoulding shrinkage, parallel, 48h at 80°C	0.05	%	ISO 294-4
Flow length	350	mm	
Flow length - pressure	80	MPa	
Flow length - width/thickness	2	mm	

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Typical mechanical properties

Tensile Modulus	8500	MPa	ISO 527-1/-2
Stress at break	125	MPa	ISO 527-1/-2
Strain at break	3.2	%	ISO 527-1/-2
Flexural Modulus	7500	MPa	ISO 178
Flexural Strength	200	MPa	ISO 178
Shear Strength	55	MPa	ASTM D 732
Charpy impact strength, 23°C	70	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	13	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	11.5	kJ/m²	ISO 179/1eA
Izod notched impact strength, 23°C	14	kJ/m²	ISO 180/1A
Izod notched impact strength, -40°C	11	kJ/m²	ISO 180/1A
Izod impact strength, 23°C	65	kJ/m²	ISO 180/1U
Poisson's ratio	0.34[A]	-	

[A]: Assessed

Thermal properties

Melting temperature, 10°C/min	225	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	65	°C	ISO 11357-1/-2
Temp. of deflection under load, 1.8 MPa	207	°C	ISO 75-1/-2
Temp. of deflection under load, 0.45 MPa	221	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h, 50N	215	°C	ISO 306
CLTE, Parallel, -40-23°C	25	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, parallel	20	E-6/K	ISO 11359-1/-2
CLTE, Parallel, 55-160°C	15	E-6/K	ISO 11359-1/-2
CLTE, Normal, -40-23°C	90	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	150	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, Normal, 55-160°C	145	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.28	W/(m K)	
Spec. heat capacity of melt	1730	J/(kg K)	
RTI, electrical, 0.75mm	75	°C	UL 746B
RTI, impact, 0.75mm	75	°C	UL 746B
RTI, strength, 0.75mm	75	°C	UL 746B

Flammability

Burning Behav. at 1.5mm nom. thickn.	HB	class	IEC 60695-11-10
Thickness tested	1.5	mm	IEC 60695-11-10
Burning Behav. at thickness h	HB	class	IEC 60695-11-10
Thickness tested	0.75	mm	IEC 60695-11-10
UL recognition	yes	-	UL 94
Oxygen index	19	%	ISO 4589-1/-2
Glow Wire Flammability Index, 3mm	750	°C	IEC 60695-2-12
FMVSS Class	B	-	ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	30	mm/min	ISO 3795 (FMVSS 302)

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Electrical properties

Relative permittivity, 100Hz	4.4	-	IEC 62631-2-1
Relative permittivity, 1MHz	4.1	-	IEC 62631-2-1
Dissipation factor, 100Hz	25	E-4	IEC 62631-2-1
Dissipation factor, 1MHz	200	E-4	IEC 62631-2-1
Volume resistivity	>1E13	Ohm.m	IEC 62631-3-1
Surface resistivity	1E13	Ohm	IEC 62631-3-2
Electric strength	44	kV/mm	IEC 60243-1
Comparative tracking index	450	-	IEC 60112
Electric Strength, Short Time, 1mm	31	kV/mm	IEC 60243-1
Electric Strength, Short Time, 2mm	19	kV/mm	IEC 60243-1

Other properties

Humidity absorption, 2mm	0.15	%	Sim. to ISO 62
Water absorption, 2mm	0.35	%	Sim. to ISO 62
Density	1500	kg/m³	ISO 1183
Density of melt	1290	kg/m³	

Injection

Drying Recommended	yes	
Drying Temperature	120	°C
Drying Time, Dehumidified Dryer	2 - 4	h
Processing Moisture Content	≤0.04	%
Melt Temperature Optimum	250	°C
Min. melt temperature	240	°C
Max. melt temperature	260	°C
Mold Temperature Optimum	80	°C
Min. mould temperature	30	°C
Max. mould temperature	130	°C
Hold pressure range	≥60	MPa
Hold pressure time	3	s/mm
Back pressure	As low as possible	MPa
Ejection temperature	170	°C

Characteristics

Additives	Release agent

Additional Information

Injection molding	Use of hot-runners is possible with Crastin® HR resins. However we do not recommend temperature settings above 270°C and residence times at 265°C should be below 10 minutes. In case of longer residence times using hot-runners, for example after a shut-

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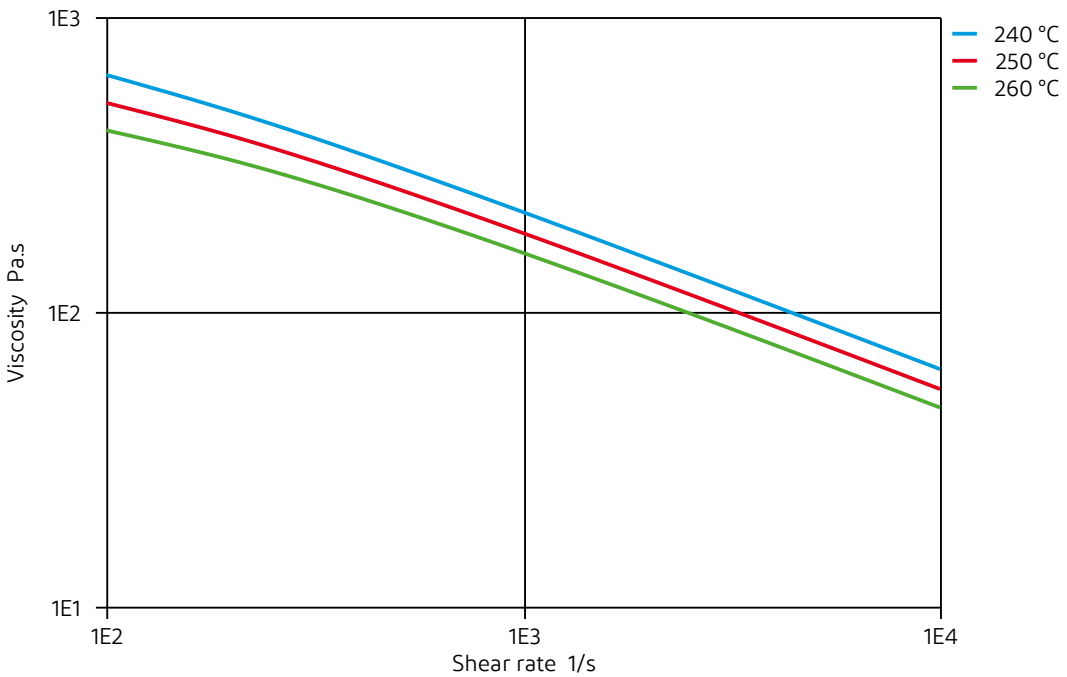
down,
the complete system must be purged with glass reinforced Crastin® (type SK602/605) before starting up again.
For successful processing of Crastin® HR with hot-runners, care should be taken
to maintain a uniform temperature, avoid hot-spots and long residence times.

Viscosity-shear rate



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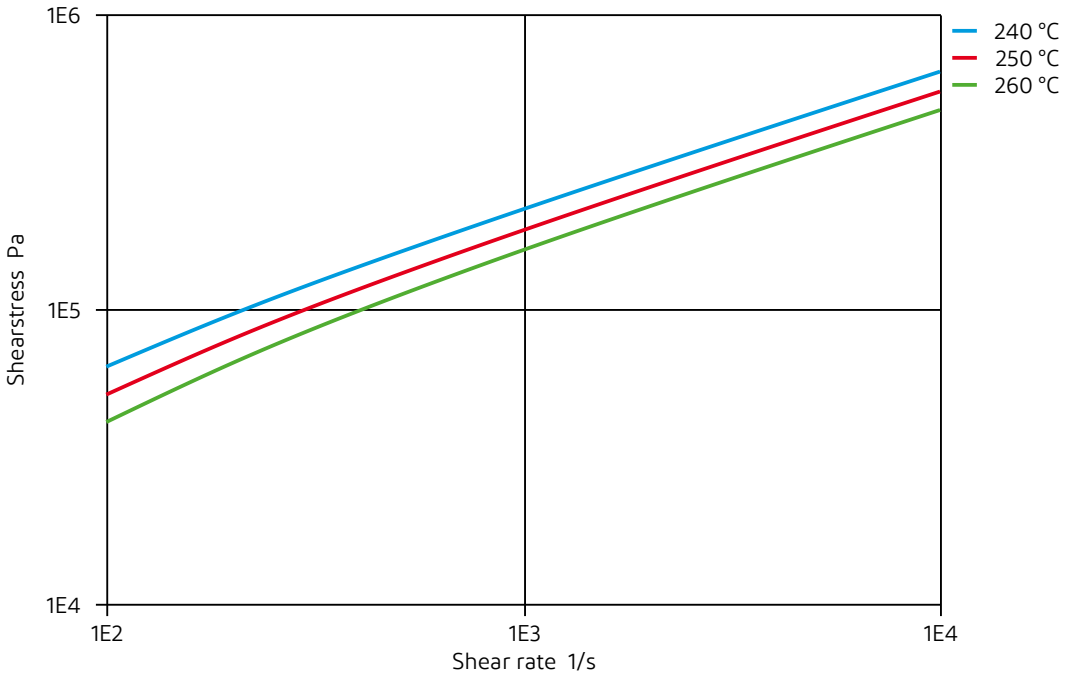
Shearstress-shear rate



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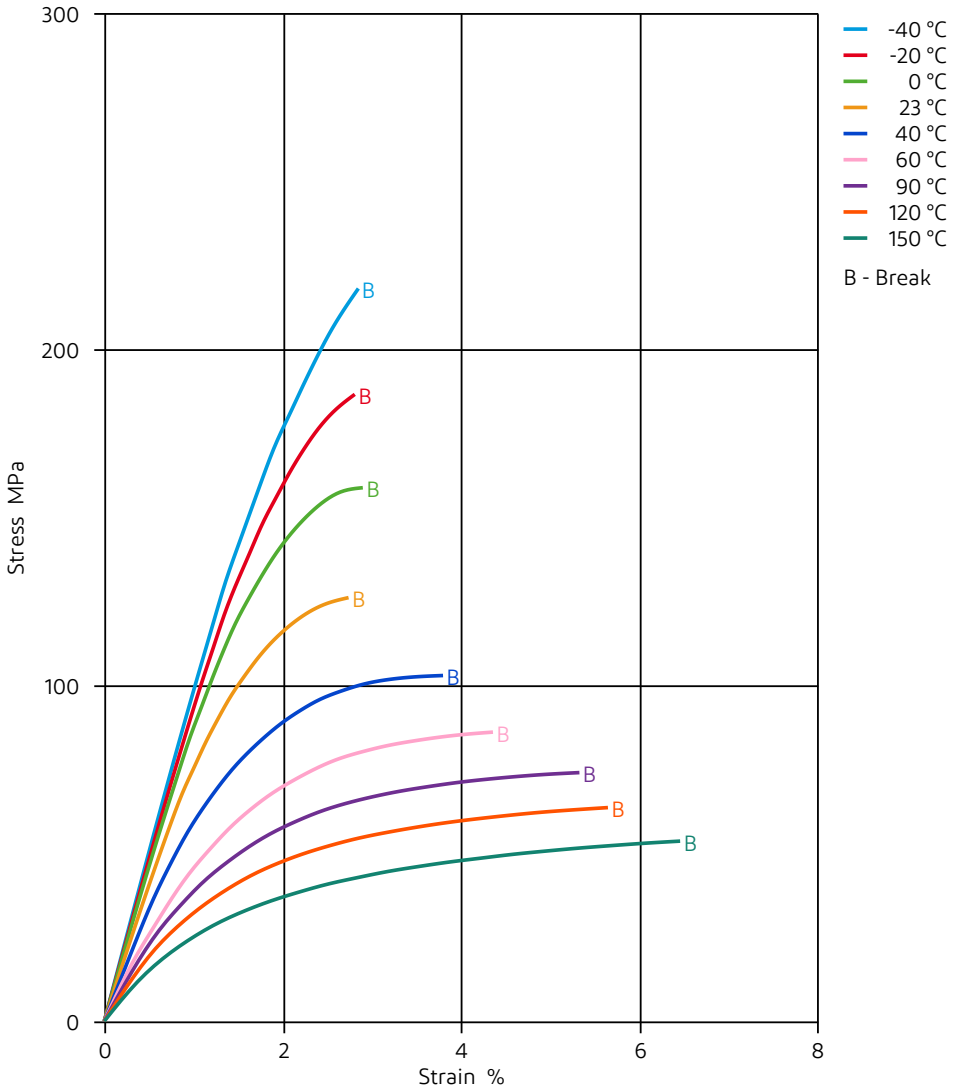
Stress-strain



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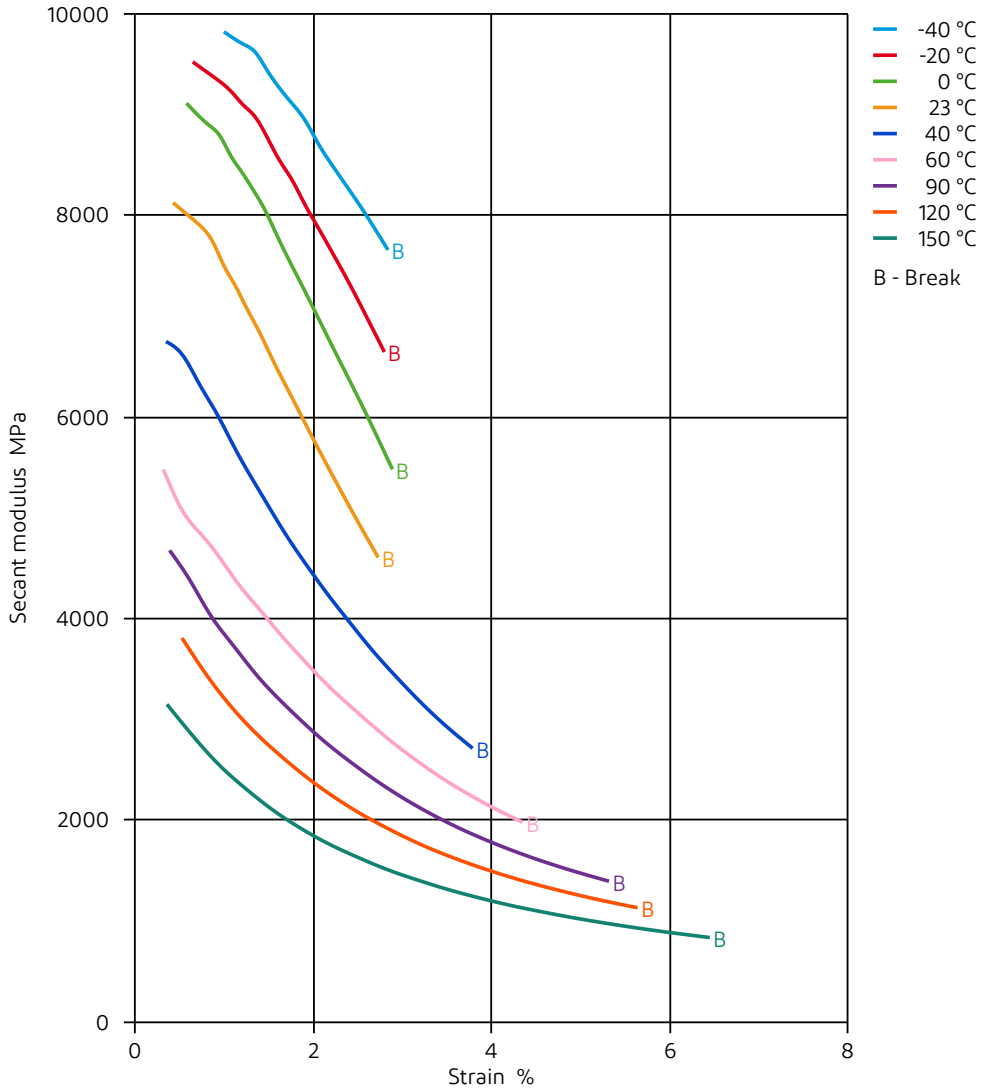
Secant modulus-strain



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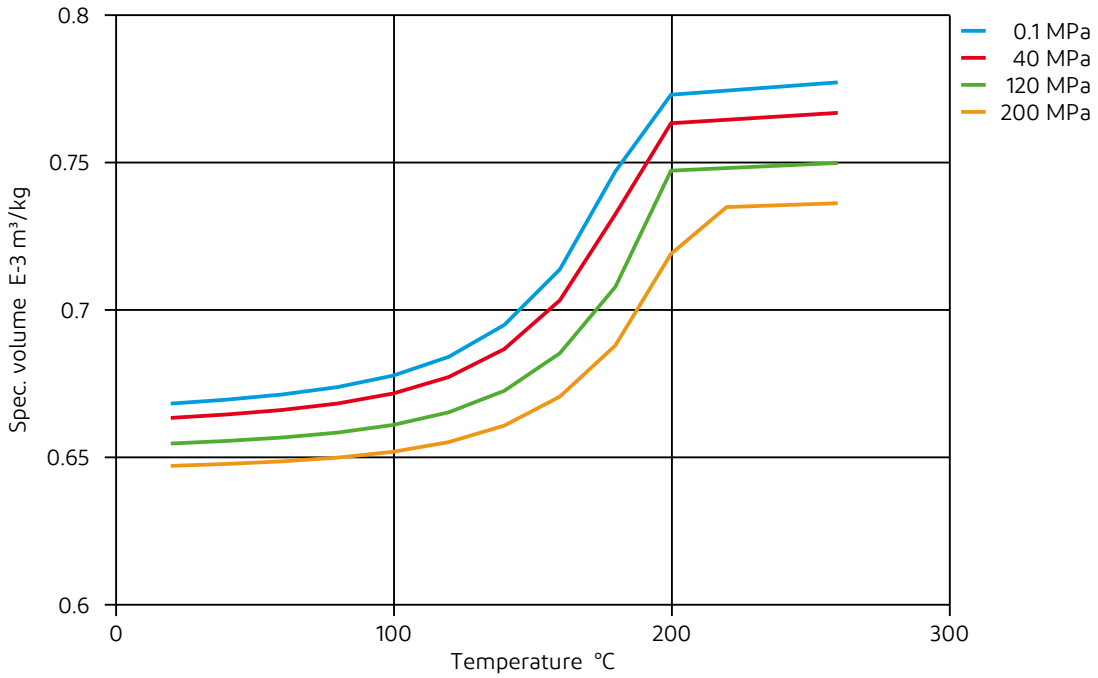
Specific volume-temperature (pvT)



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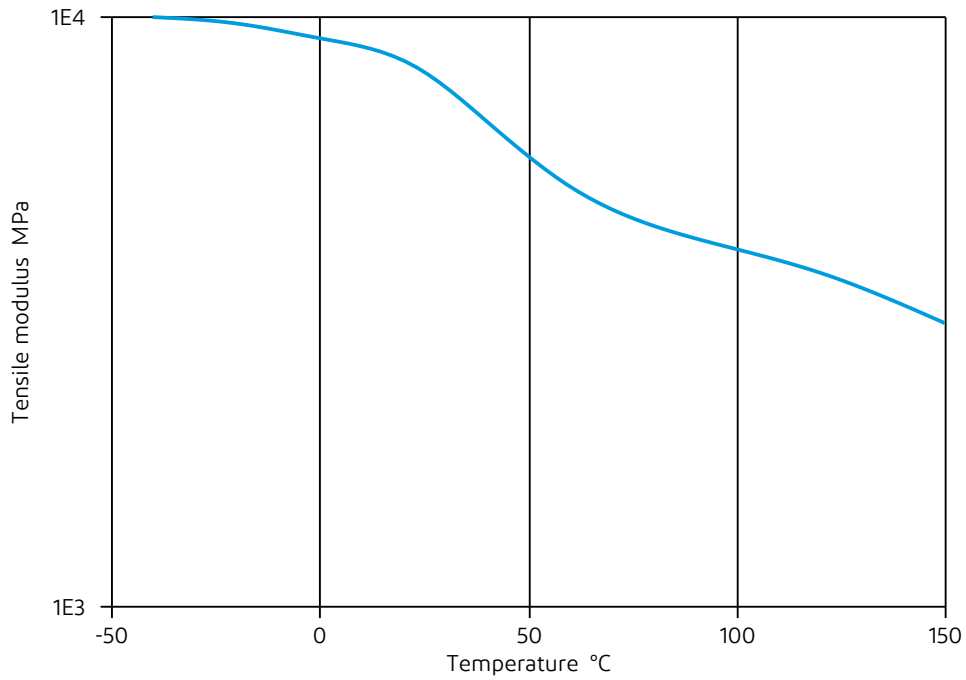
Tensile modulus-temperature



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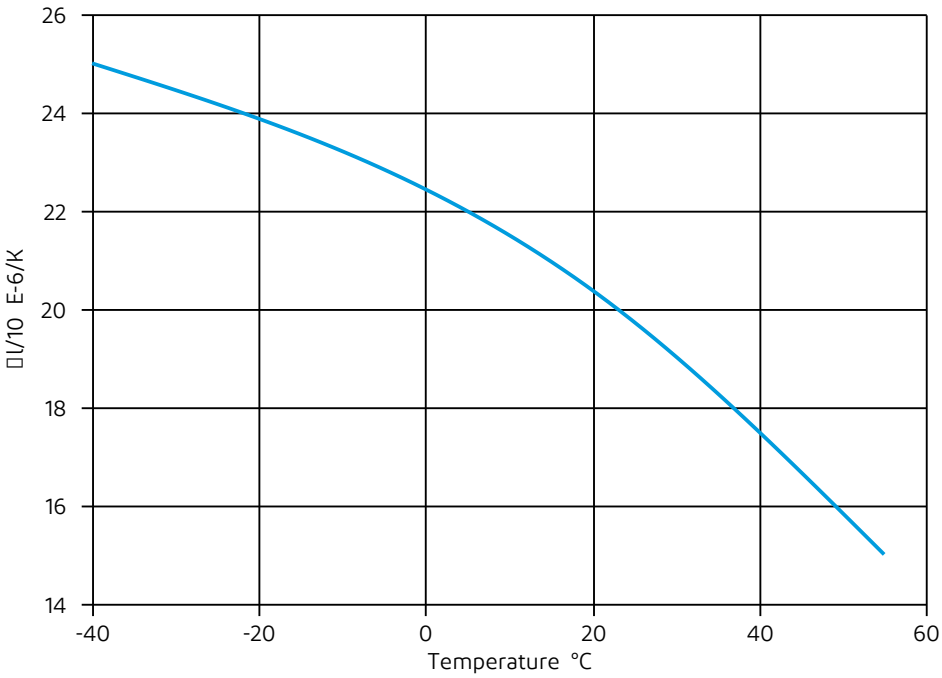
Coeff. of linear thermal expansion



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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).