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Rynite® FR543 NC010

THERMOPLASTIC POLYESTER RESIN

Rynite® FR543 NC010 is a 43% Glass Reinforced, Flame Retardant, Polyethylene Terephthalate

Product information

Resin Identification	PET-GF43FR(17)		ISO 1043
Part Marking Code	>PET-GF43FR(17)<		ISO 11469

Rheological properties

Moulding shrinkage, parallel	0.2	%	ISO 294-4, 2577
Moulding shrinkage, normal	0.8	%	ISO 294-4, 2577
Postmoulding shrinkage, normal, 48h at 80°C	0.35	%	ISO 294-4
Postmoulding shrinkage, parallel, 48h at 80°C	0.05	%	ISO 294-4

Typical mechanical properties

Tensile modulus	17000	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	170	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	1.8	%	ISO 527-1/-2
Flexural modulus	14500	MPa	ISO 178
Compressive strength	230	MPa	ISO 604
Tensile creep modulus, 1000h	15000	MPa	ISO 899-1
Charpy impact strength, 23°C	43	kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	30	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	10	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	10	kJ/m²	ISO 179/1eA
Hardness, Rockwell, M-scale	102		ISO 2039-2
Hardness, Rockwell, R-scale	122		ISO 2039-2
Poisson's ratio	0.33		

Tribological properties

Coefficient of static friction, against itself	0.18		ISO 8295
Coefficient of static friction, against steel	0.16		ISO 8295

Thermal properties

Melting temperature, 10°C/min	254	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	90	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	225	°C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	240	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h 50N	225	°C	ISO 306
Coefficient of linear thermal expansion (CLTE), parallel	10	E-6/K	ISO 11359-1/-2
CLTE, Parallel, 23-55°C(73-130°F)	11	E-6/K	ASTM E 831
Coefficient of linear thermal expansion (CLTE), normal	80	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, Normal,23-55°C (73-130°F)	79	E-6/K	ASTM E 831

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Thermal conductivity, flow	0.31	W/(m K)	ISO 22007-2
Thermal conductivity of melt	0.3	W/(m K)	ISO 22007-2
Specific heat capacity of melt	1560	J/(kg K)	ISO 22007-4
RTI, electrical, 0.75mm	155	°C	UL 746B
RTI, electrical, 1.5mm	155	°C	UL 746B
RTI, electrical, 3.0mm	155	°C	UL 746B
RTI, impact, 0.75mm	155	°C	UL 746B
RTI, impact, 1.5mm	155	°C	UL 746B
RTI, impact, 3.0mm	155	°C	UL 746B
RTI, strength, 0.75mm	155	°C	UL 746B
RTI, strength, 1.5mm	155	°C	UL 746B
RTI, strength, 3.0mm	155	°C	UL 746B

Flammability

Burning Behav. at 1.5mm nom. thickn.	V-0	class	IEC 60695-11-10
Thickness tested	1.5	mm	IEC 60695-11-10
UL recognition	yes		UL 94
Burning Behav. at thickness h	V-0	class	IEC 60695-11-10
Thickness tested	0.8	mm	IEC 60695-11-10
UL recognition	yes		UL 94
Oxygen index	35	%	ISO 4589-1/-2
Glow Wire Flammability Index, 3.0mm	960	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 3.0mm	960	°C	IEC 60695-2-13
Glow Wire Temperature, No Flame, 0.75mm	960	°C	IEC 60335-1
Glow Wire Temperature, No Flame, 1mm	960	°C	IEC 60335-1
Glow Wire Temperature, No Flame, 1.5mm	960	°C	IEC 60335-1
Glow Wire Temperature, No Flame, 2mm	960	°C	IEC 60335-1
Glow Wire Temperature, No Flame, 3mm	960	°C	IEC 60335-1
FMVSS Class	B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	<80	mm/min	ISO 3795 (FMVSS 302)

Electrical properties

Relative permittivity, 100Hz	4.6		IEC 62631-2-1
Relative permittivity, 1MHz	4.1		IEC 62631-2-1
Dissipation factor, 100Hz	368	E-4	IEC 62631-2-1
Dissipation factor, 1MHz	131	E-4	IEC 62631-2-1
Volume resistivity	>1E13	Ohm.m	IEC 62631-3-1
Surface resistivity	1E15	Ohm	IEC 62631-3-2
Electric strength	37	kV/mm	IEC 60243-1
Comparative tracking index	225		IEC 60112
Comparative tracking index, 23°C	2	PLC	UL 746A

Physical/Other properties

Humidity absorption, 2mm	0.1	%	Sim. to ISO 62
Water absorption, 2mm	0.6	%	Sim. to ISO 62
Density	1790	kg/m³	ISO 1183
Density of melt	1610	kg/m³	

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Injection

Drying Recommended	yes	
Drying Temperature	120	°C
Drying Time, Dehumidified Dryer	4 - 6	h
Processing Moisture Content	≤0.02[1]	%
Melt Temperature Optimum	280	°C
Min. melt temperature	270	°C
Max. melt temperature	290	°C
Screw tangential speed	≤0.2	m/s
Mold Temperature Optimum	95	°C
Min. mould temperature	85	°C
Max. mould temperature	105[2]	°C
Hold pressure range	≥80	MPa
Hold pressure time	4	s/mm
Back pressure	As low as possible	MPa
Ejection temperature	196	°C

[1]: At levels above 0.02%, strength and toughness will decrease, even though parts may not exhibit surface defects.

[2]: (6mm - 1mm thickness)

Characteristics

Processing	Injection Moulding
Delivery form	Pellets
Additives	Release agent, Flame retardant
Special characteristics	Flame retardant

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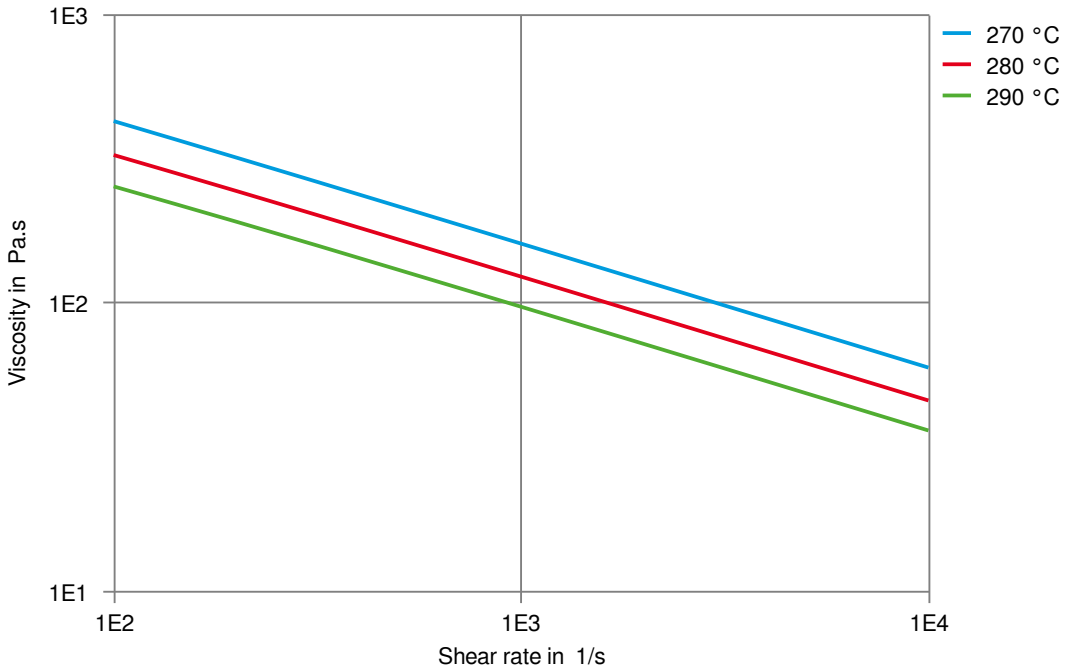
Viscosity-shear rate



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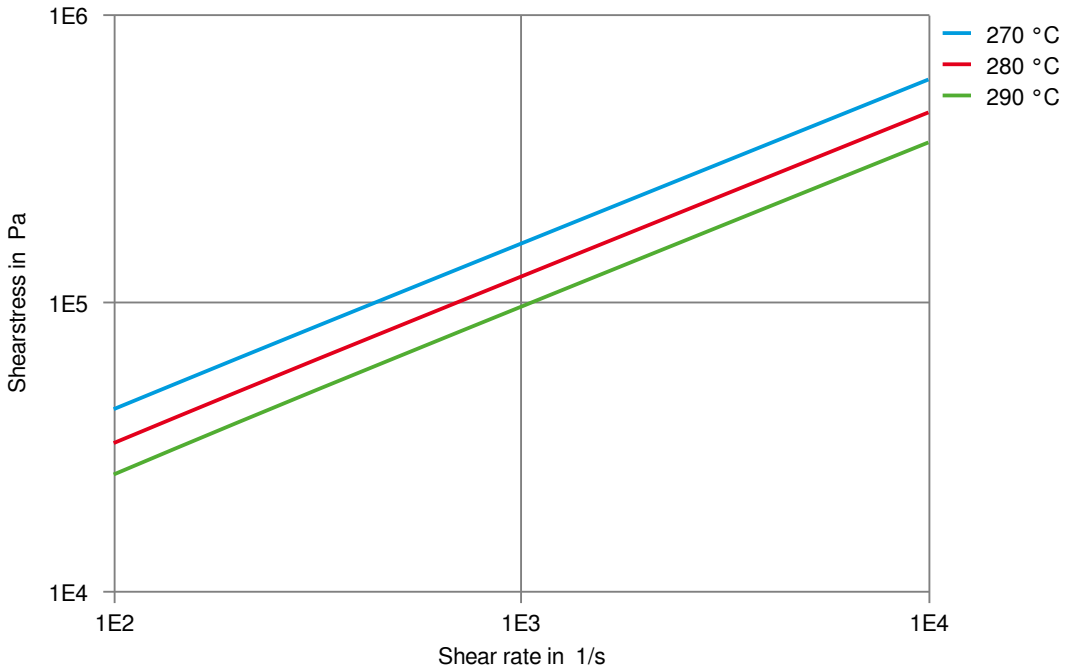
Shearstress-shear rate



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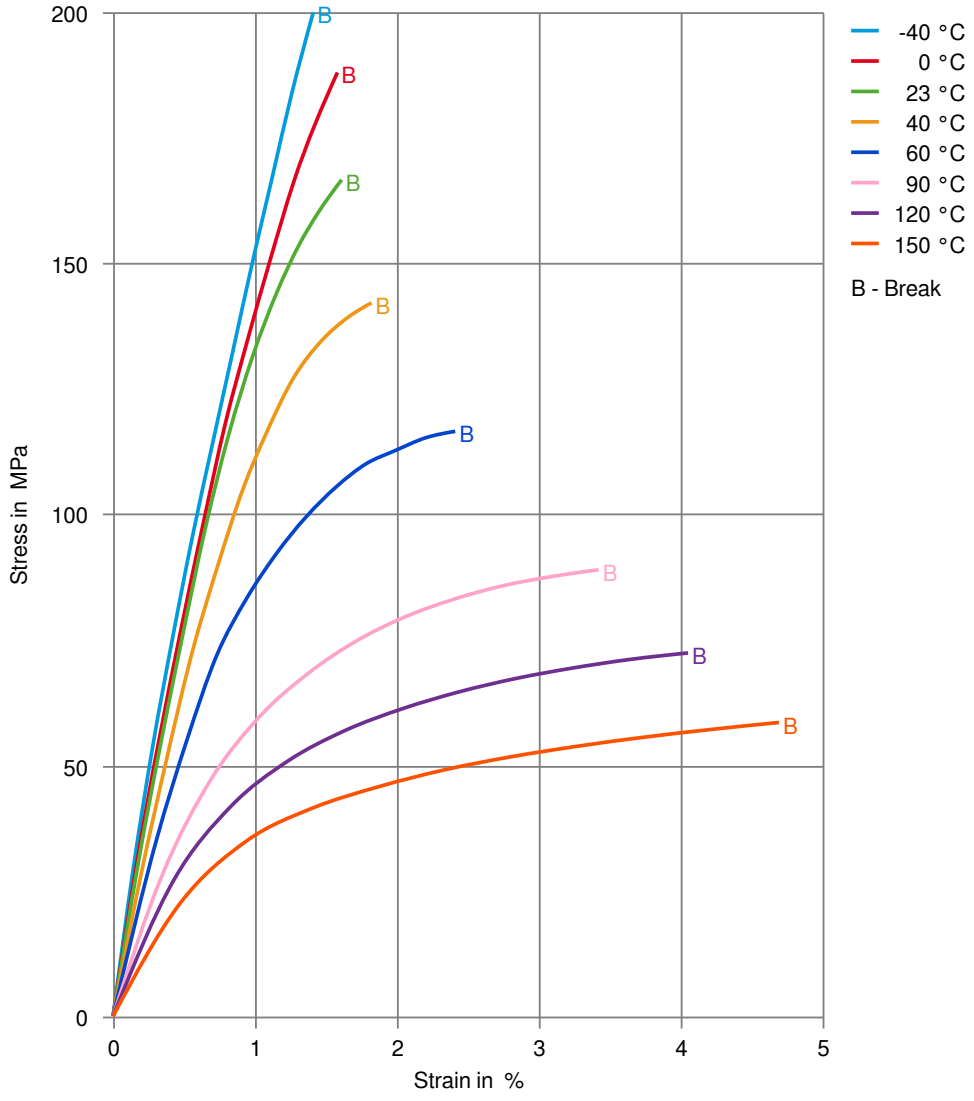
Stress-strain



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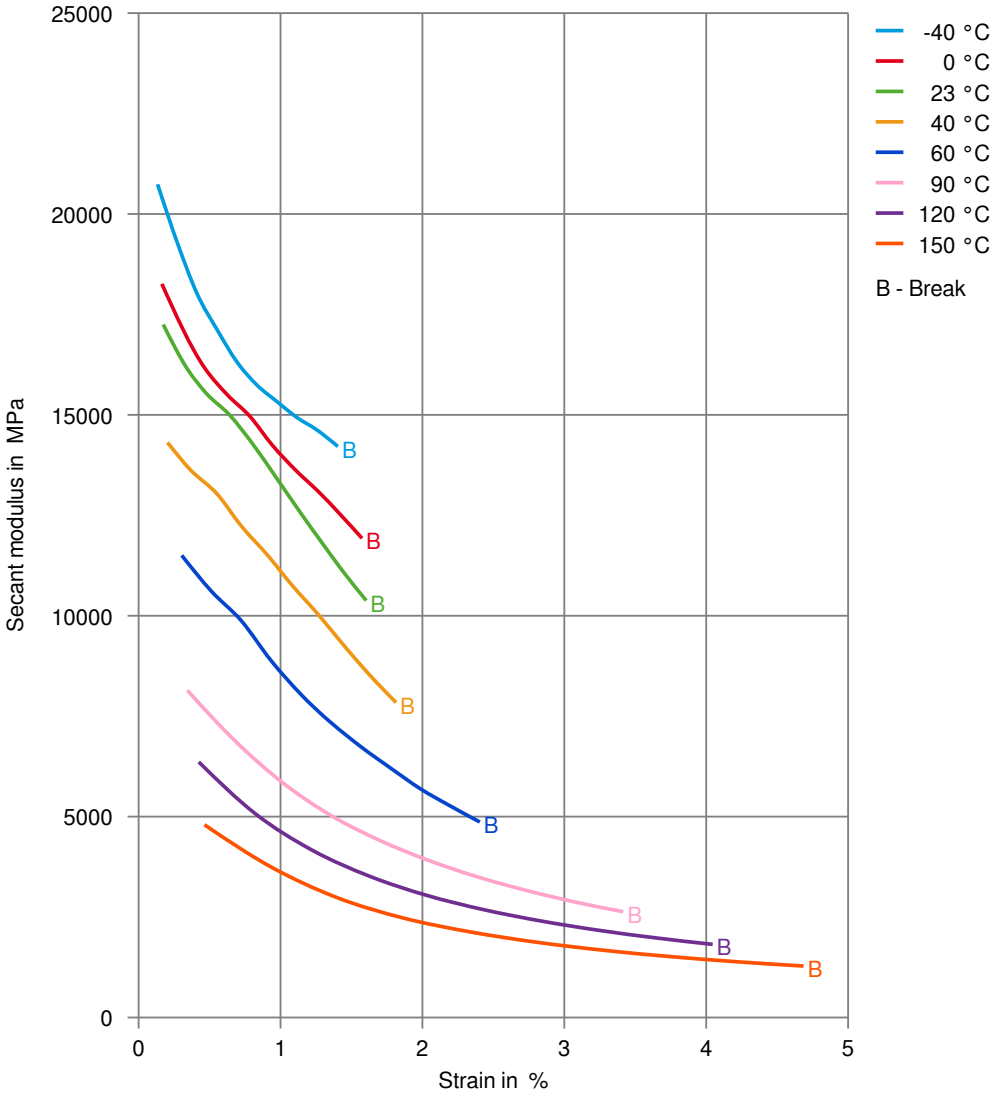
Secant modulus-strain



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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

Salt solutions

- ✔ Sodium Chloride solution (10% by mass), 23°C
- ✘ Sodium Hypochlorite solution (10% by mass), 23°C

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- ✔ 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).