DuPont™ Zytel® 80G33HS1L NC010

NYLON RESIN

Product Information

Common features of Zytel® nylon resin include mechanical and physical properties such as high mechanical strength, excellent balance of stiffness and toughness, good high temperature performance, good electrical and flammability properties, good abrasion and chemical resistance. In addition, Zytel® nylon resins are available in different modified and reinforced grades to create a wide range of products with tailored properties for specific processes and end-uses. Zytel® nylon resin, including most flame retardant grades, offer the ability to be coloured.

The good melt stability of Zytel® nylon 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 (-31kJ/g of base polymer) in appropriately equipped installations. For disposal, local regulations have to be observed.

Zytel® nylon resin typically is used in demanding applications in the automotive, furniture, domestic appliances, sporting goods and construction industry.

Zytel® 80G33HS1L NC010 is a 33% glass fiber reinforced heat stabilized polyamide 66 resin with outstanding impact resistance developed using DuPont Super Tough technology.

Product information	Value	Unit	Test Standard
Resin Identification	PA66-IGF33	-	ISO 1043
Part Marking Code	PA66-IGF33	-	ISO 11469
Rheological properties	**dry / cond**	**Unit**	**Test Standard**
Viscosity number	3990[1] / *	in³/lb	ISO 307, 1157, 1628
Molding shrinkage, parallel	0.3 / -	%	ISO 294-4, 2577
Molding shrinkage, normal	0.7 / -	%	ISO 294-4, 2577
1: sulfuric acid 96%			
Mechanical properties	**dry / cond**	**Unit**	**Test Standard**
Tensile Modulus	1.29E6 / 899236	psi	ISO 527-1/-2
Stress at break	21200 / 15700	psi	ISO 527-1/-2
Strain at break	3.7 / 7	%	ISO 527-1/-2
Flexural Modulus	1.09E6 / 899000	psi	ISO 178
Tensile creep modulus			ISO 899-1
1h	* / 769000	psi	
1000h	* / 624000	psi	
Charpy impact strength			ISO 179/1eU
73°F	46.1 / 46.6	ftlb/in²	
-22°F	50.4 / 47.6	ftlb/in²	
Charpy notched impact strength			ISO 179/1eA
73°F	9.51 / 13.3	ftlb/in²	
-22°F	8.56 / 8.09	ftlb/in²	
-40°F	6.66 / 8.56	ftlb/in²	
Izod notched impact strength			ISO 180/1A
73°F	9.99 / 12.4	ftlb/in²	
-22°F	8.09 / 7.61	ftlb/in²	
-40°F	7.14 / 7.14	ftlb/in²	
Izod impact strength			ISO 180/1U
73°F	38.1 / 38.1	ftlb/in²	
-22°F	38.1 / 35.7	ftlb/in²	
Hardness, Rockwell, M-scale	70 / -	-	ISO 2039-2
Hardness, Rockwell, R-scale	110 / -	-	ISO 2039-2
Thermal properties	**dry / cond**	**Unit**	**Test Standard**
Melting temperature, 18°F/min	504 / *	°F	ISO 11357-1/-3
Glass transition temperature, 18°F/min	167 / -	°F	ISO 11357-1/-2
Temp. of deflection under load			ISO 75-1/-2
260 psi	475 / *	°F	
65 psi	502 / *	°F	
Vicat softening temperature, 90°F/h, 11 lbf	473 / *	°F	ISO 306
Coeff. of linear therm. expansion, parallel	8.33E-6 / *	in/in/°F	ISO 11359-1/-2

To find out more, visit DuPont Performance Polymers or contact nearest DuPont location.

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Coeff. of linear therm. expansion, normal	6.67E-5 / *	in/in/°F	ISO 11359-1/-2
Thermal conductivity of melt	0.22	W/(m K)	-
Spec. heat capacity of melt	2200	J/(kg K)	-
Eff. thermal diffusivity	9E-8	m²/s	-
RTI, electrical			UL 746B
30mil	266	°F	
60mil	266	°F	
120mil	266	°F	
RTI, impact			UL 746B
30mil	149	°F	
60mil	221	°F	
120mil	221	°F	
RTI, strength			UL 746B
30mil	185	°F	
60mil	203 / *	°F	
120mil	221	°F	
Flammability	**dry / cond**	**Unit**	**Test Standard**
Burning Behav. at 60mil nom. thickn.	HB / *	class	IEC 60695-11-10
Thickness tested	0.0591 / *	in	IEC 60695-11-10
UL recognition	yes / *	-	UL 94
Burning Behav. at thickness h	HB / *	class	IEC 60695-11-10
Thickness tested	0.0295 / *	in	IEC 60695-11-10
UL recognition	yes / *	-	UL 94
Glow Wire Flammability Index, 40mil	1200 / -	°F	IEC 60695-2-12
FMVSS Class	SE/B	-	ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	0.906[2]	in/min	ISO 3795 (FMVSS 302)
2: SE/B			
Electrical properties	**dry / cond**	**Unit**	**Test Standard**
Relative permittivity, 1MHz	3.6 / 4.3	-	IEC 62631-2-1
Dissipation factor, 1MHz	130 / 600	E-4	IEC 62631-2-1
Volume resistivity	>1E13 / 1E9	Ohm*m	IEC 62631-3-1
Surface resistivity	* / 1E12	Ohm	IEC 62631-3-2
Comparative tracking index	- / 425	-	IEC 60112
Other properties	**dry / cond**	**Unit**	**Test Standard**
Humidity absorption, 80mil	1.5 / *	%	Sim. to ISO 62
Water absorption, 80mil	4.5 / *	%	Sim. to ISO 62
Density	1.33 / -	g/cm³	ISO 1183
Density of melt	69.9	lb/ft³	-
Water Absorption, Immersion 24h	0.85 / *	%	Sim. to ISO 62
VDA Properties	**dry / cond**	**Unit**	**Test Standard**
Emission of organic compounds	25	µgC/g	VDA 277
Odor test	3	class	VDA 270
Fogging, G-value (condensate)	0.8 / *	mg	ISO 6452
Injection	**dry / cond**	**Unit**	**Test Standard**
Drying Recommended	yes		-
Drying Temperature	≥176	°F	-
Drying Time, Dehumidified Dryer	2 - 4	h	-
Processing Moisture Content	≤0.2	%	-
Melt Temperature Optimum	563	°F	-
Min. melt temperature	545	°F	-
Max. melt temperature	581	°F	-
Max. screw tangential speed	0.2 / *	m/s	-
Mold Temperature Optimum	176	°F	-
Min. mold temperature	122	°F	-
Max. mold temperature	212	°F	-
Hold pressure range	7250 - 14500	psi	-

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Hold pressure time	0.0762	s/mil	-
Ejection temperature	410	°F	-

Characteristics			
Processing	• Injection Molding		
Delivery form	• Pellets		
Additives	• Lubricants	• Release agent	
Special characteristics	• Heat stabilized or stable to heat		
Regional Availability	• North America • Europe	• Asia Pacific • South and Central America	• Near East/Africa • Global

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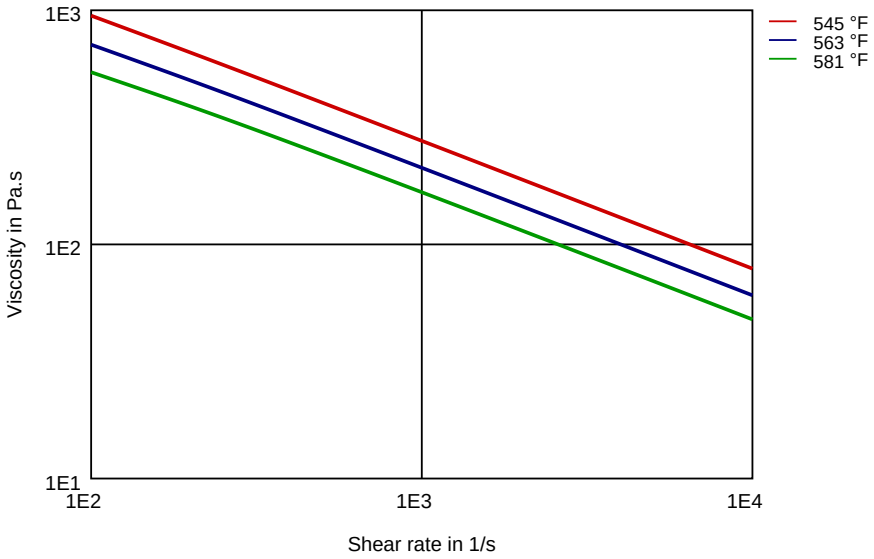
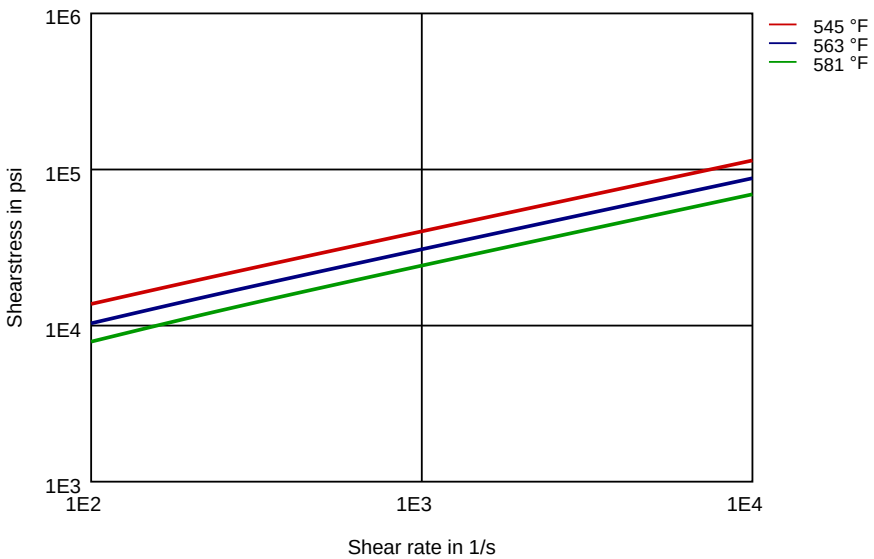
Diagrams

Viscosity-shear rate



Shearstress-shear rate



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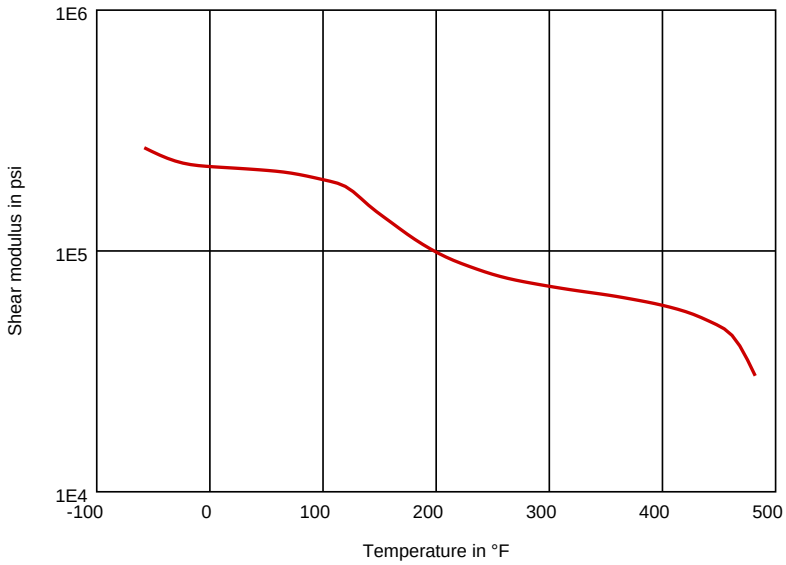
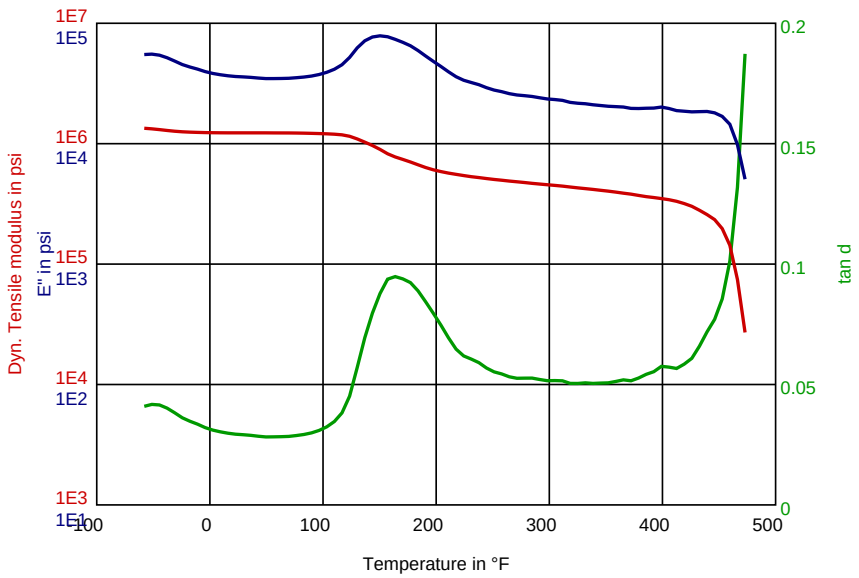
Dynamic Shear modulus-temperature (dry)



Dynamic Tensile modulus-temperature (dry)



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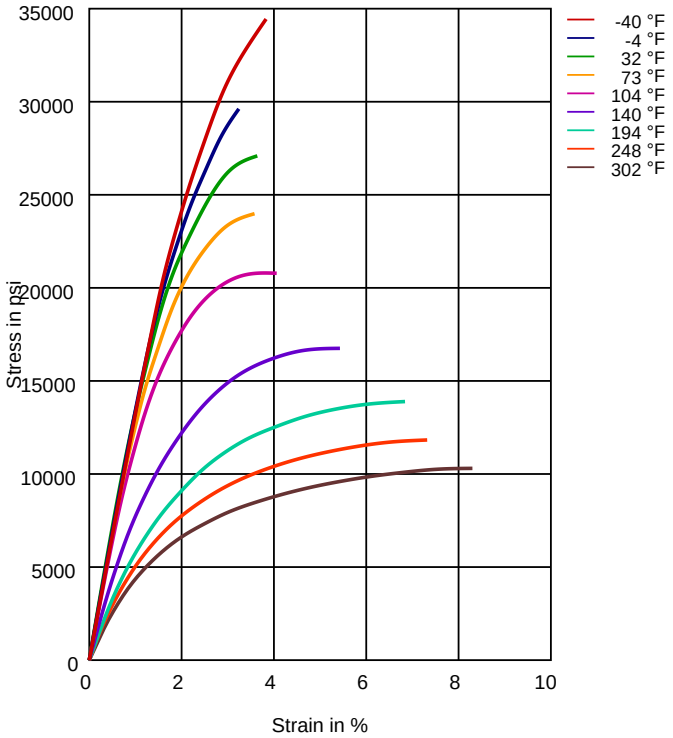
Stress-strain (dry)



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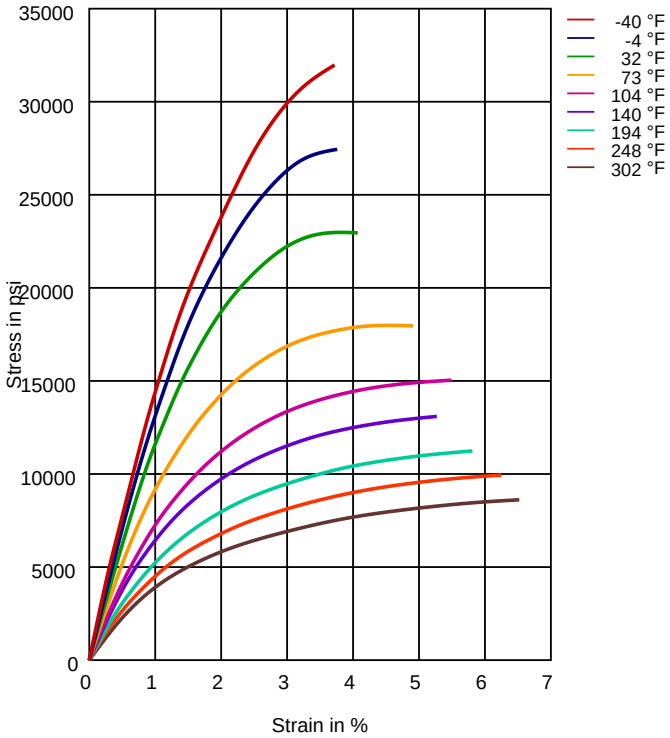
Stress-strain (cond.)



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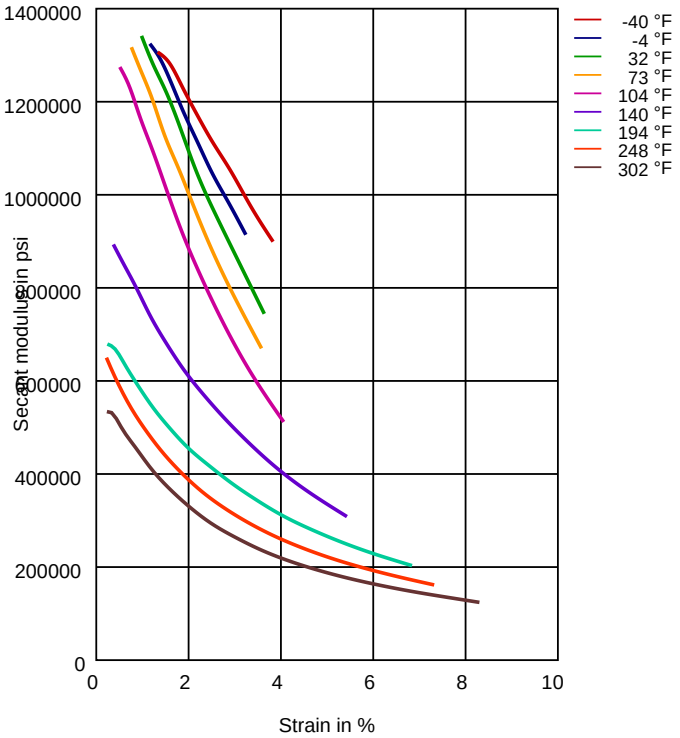
Secant modulus-strain (dry)



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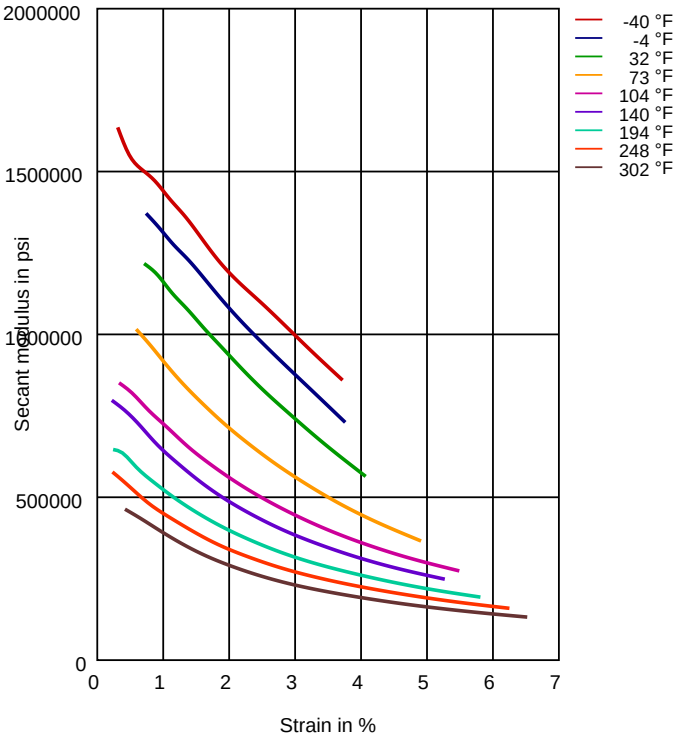
Secant modulus-strain (cond.)



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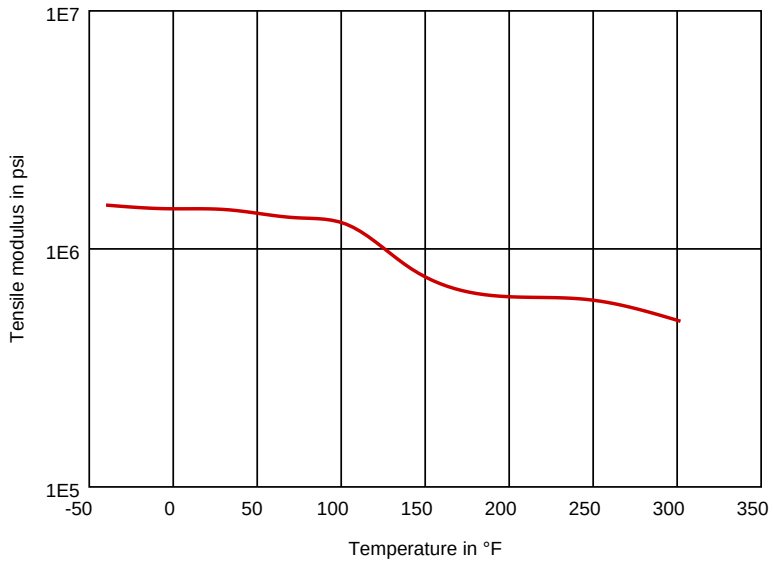
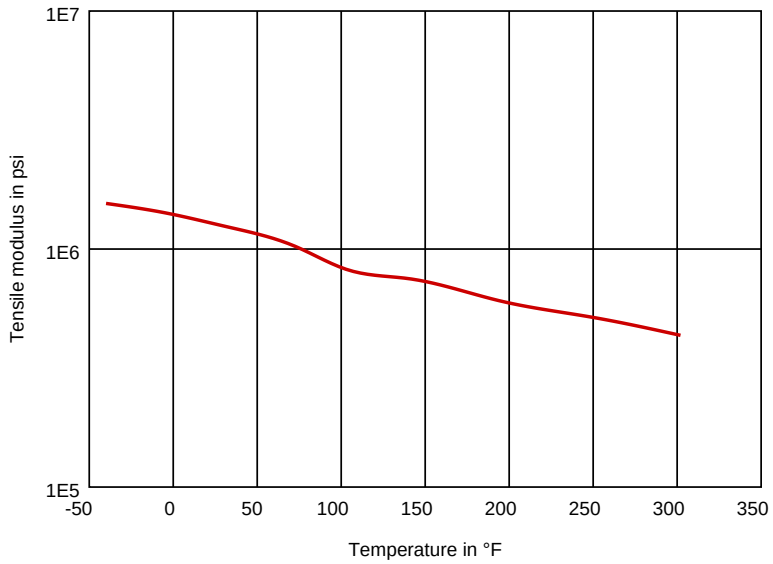
Tensile modulus-temperature (dry)



Tensile modulus-temperature (cond.)



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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)

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✓	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)
✓	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).

Contact DuPont for Material Safety Data Sheet, general guides and/or additional information about ventilation, handling, purging, drying, etc. ISO Mechanical properties measured at 160 mil (Hytrel® measured at 80 mil), IEC Electrical properties measured at 80 mil, all ASTM properties measured at 120 mil, and test temperatures are 73°F unless otherwise stated.

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