

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.

General 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	144 ⁽¹⁾ / *	cm ³ / g	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	8900 / 6200	MPa	ISO 527-1/-2
Stress at break	146 / 108	MPa	ISO 527-1/-2
Strain at break	3.7 / 7	%	ISO 527-1/-2
Flexural Modulus	7500 / 6200	MPa	ISO 178
Tensile creep modulus			ISO 899-1
1h	* / 5300	MPa	
1000h	* / 4300	MPa	
Charpy impact strength			ISO 179/1eU
73 °F	97 / 98	kJ/m ²	
-22 °F	106 / 100	kJ/m ²	
Charpy notched impact strength			ISO 179/1eA
73 °F	20 / 28	kJ/m ²	
-22 °F	18 / 17	kJ/m ²	
-40 °F	14 / 18	kJ/m ²	
Izod notched impact strength			ISO 180/1A
73 °F	21 / 26	kJ/m ²	
-22 °F	17 / 16	kJ/m ²	
-40 °F	15 / 15	kJ/m ²	
Izod impact strength			ISO 180/1U
73 °F	80 / 80	kJ/m ²	
-22 °F	80 / 75	kJ/m ²	
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	262 / *	°C	ISO 11357-1/-3
Glass transition temperature, 18 °F/min	75 / -	°C	ISO 11357-1/-2
Temp. of deflection under load			ISO 75-1/-2
260 psi	246 / *	°C	
65 psi	261 / *	°C	
Vicat softening temperature, 90 °F/h, 11 lbf	245 / *	°C	ISO 306
Coeff. of linear therm. expansion, parallel	15 / *	E-6/K	ISO 11359-1/-2

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Coeff. of linear therm. expansion, normal	120 / *	E-6/K	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	m ² /s	-
RTI, electrical			UL 746B
30mil	130 / *	°C	
60mil	130 / *	°C	
120mil	130	°C	
RTI, impact			UL 746B
30mil	65	°C	
60mil	105 / *	°C	
120mil	105	°C	
RTI, strength			UL 746B
30mil	85	°C	
60mil	95 / *	°C	
120mil	105	°C	
Flammability	dry / cond	Unit	Test Standard
Burning Behav. at 60mil nom. thickn.	HB / *	class	IEC 60695-11-10
Thickness tested	1.5 / *	mm	IEC 60695-11-10
UL recognition	yes / *	-	UL 94
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
FMVSS Class	SE/B	-	ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	23 ^[2]	mm/min	ISO 3795 (FMVSS 302)
2: SE/B			
Electrical properties	dry / cond	Unit	Test Standard
Relative permittivity, 1MHz	3.6 / 4.3	-	IEC 60250
Dissipation factor, 1MHz	130 / 600	E-4	IEC 60250
Volume resistivity	>1E13 / 1E9	Ohm*m	IEC 60093
Surface resistivity	* / 1E12	Ohm	IEC 60093
Comparative tracking index	- / 400	-	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	1330 / -	kg/m ³	ISO 1183
Density of melt	1120	kg/m ³	-
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	80	°C	-
Drying Time, Dehumidified Dryer	2 - 4	h	-
Processing Moisture Content	≤0.2	%	-
Melt Temperature Optimum	295	°C	-
Min. melt temperature	285	°C	-
Max. melt temperature	305	°C	-
Max. screw tangential speed	0.2 / *	m/s	-
Mold Temperature Optimum	80	°C	-
Min. mold temperature	50	°C	-
Max. mold temperature	100	°C	-
Hold pressure range	50 - 100	MPa	-
Hold pressure time	3	s/mm	-

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Ejection temperature 210 °C -

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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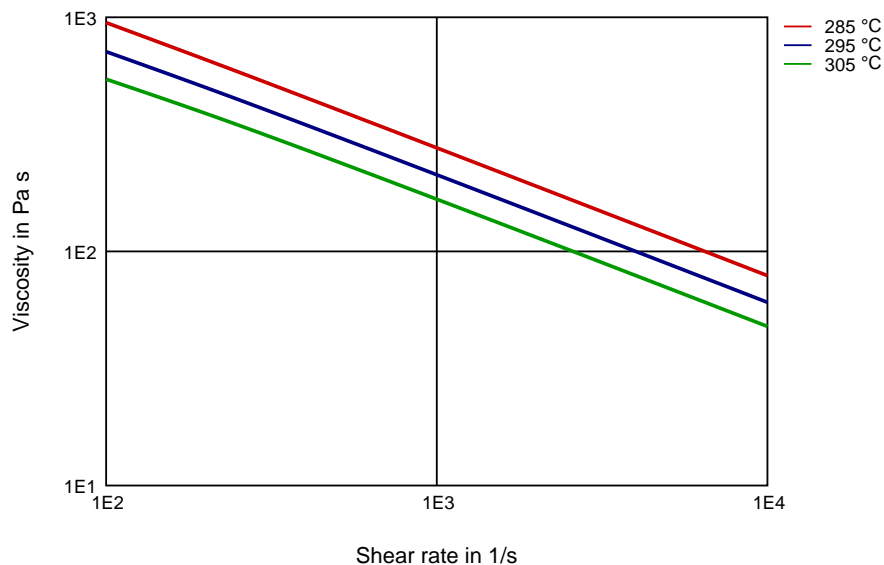


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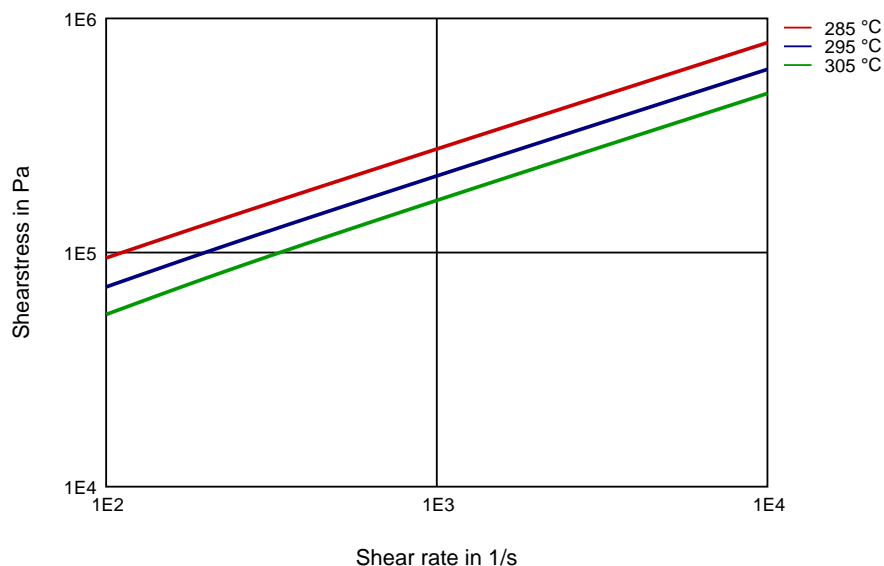
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Diagrams

Viscosity-shear rate



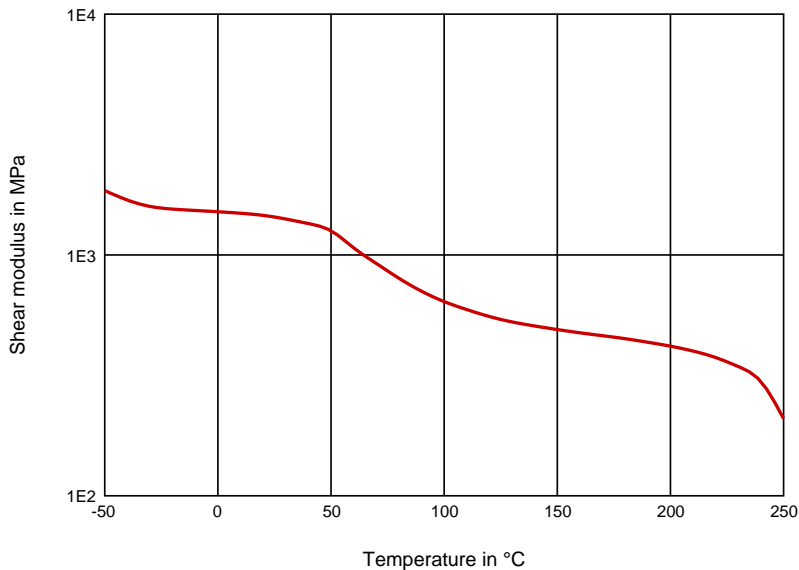
Shearstress-shear rate



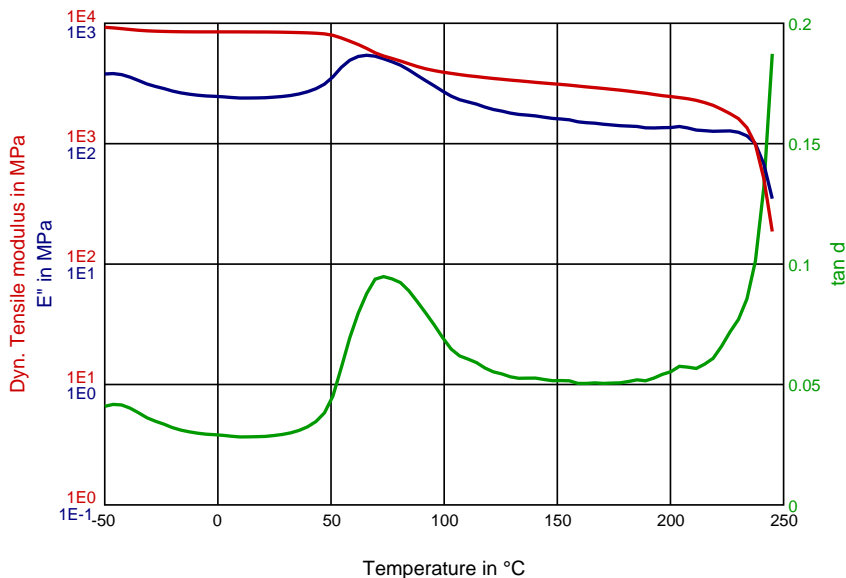
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Dynamic Shear modulus-temperature (dry)



Dynamic Tensile modulus-temperature (dry)



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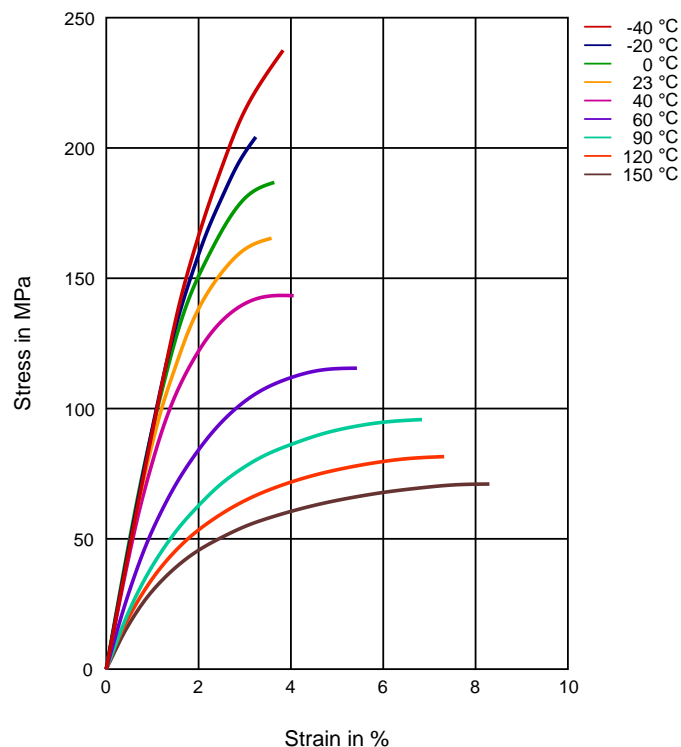
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Stress-strain (dry)



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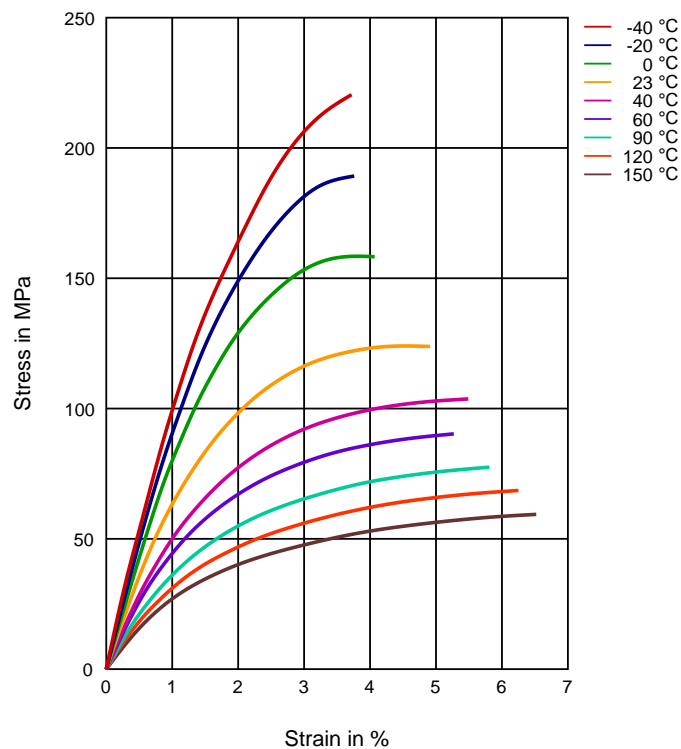
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Stress-strain (cond.)



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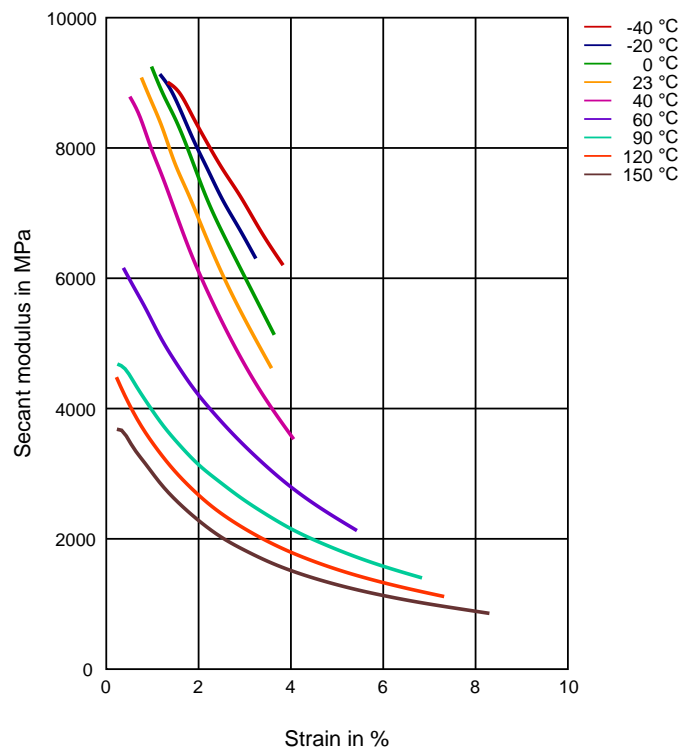
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Secant modulus-strain (dry)



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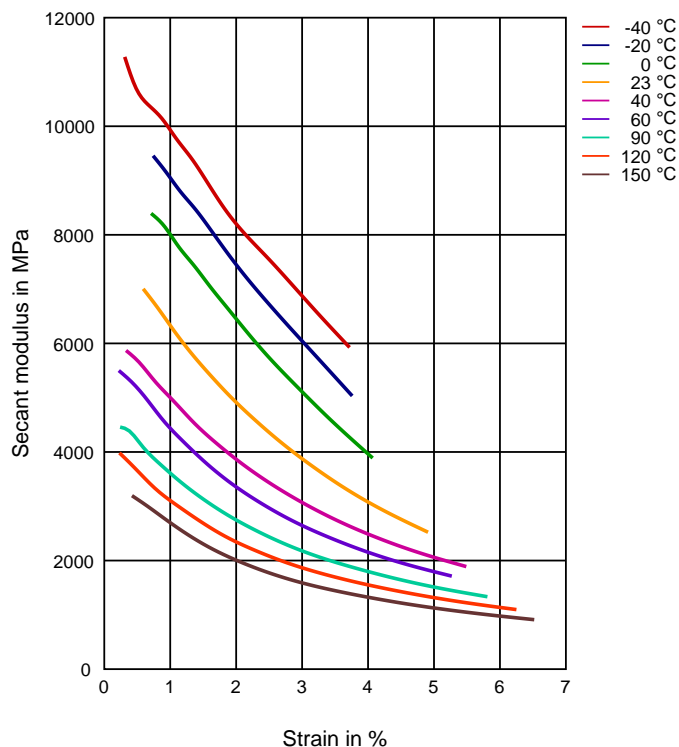
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Secant modulus-strain (cond.)



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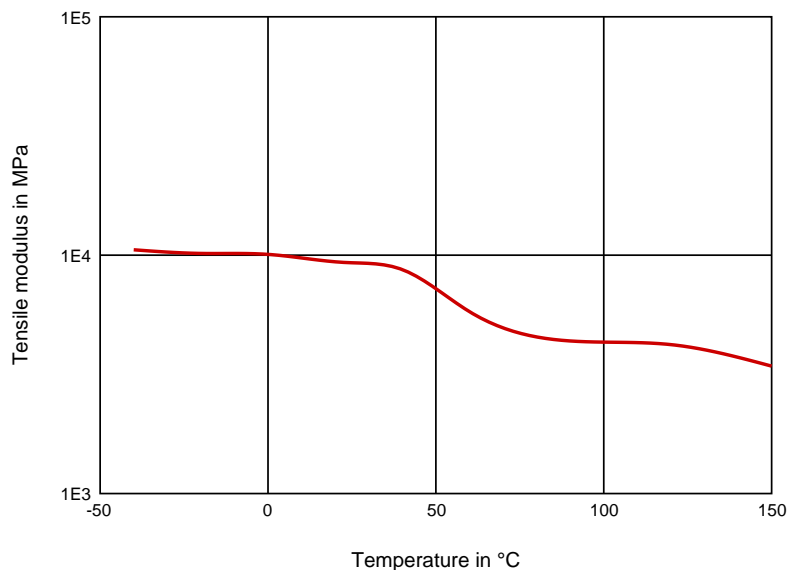
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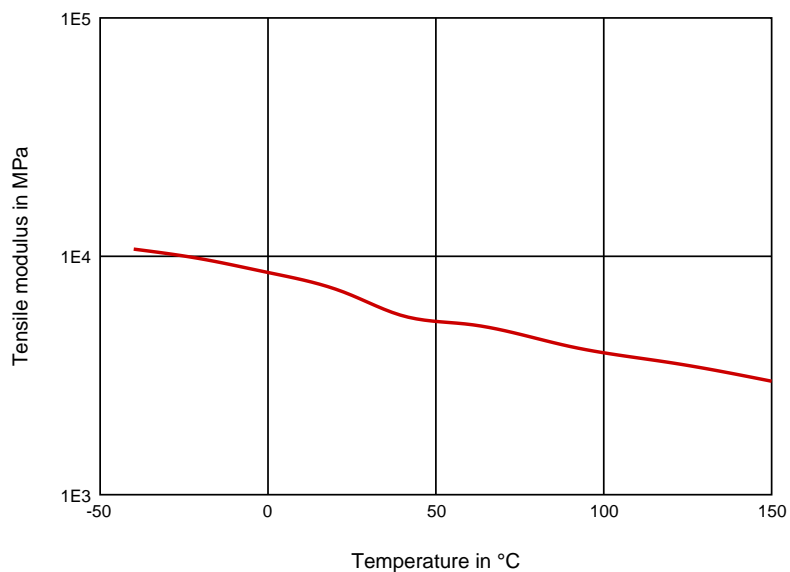
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Tensile modulus-temperature (dry)



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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