

# DuPont™ Zytel® FR50 BK505

## 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® FR50 BK505 is a 25% glass fiber reinforced, flame retardant polyamide 66 resin for injection molding.**

General information	Value	Unit	Test Standard
Resin Identification	PA66-GF25FR(17)	-	ISO 1043
Part Marking Code	PA66-GF25FR(17)	-	ISO 11469
Rheological properties	dry / cond	Unit	Test Standard
Molding shrinkage, parallel	0.3 / -	%	ISO 294-4, 2577
Molding shrinkage, normal	0.7 / -	%	ISO 294-4, 2577
Mechanical properties	dry / cond	Unit	Test Standard
Tensile Modulus	10640 / -	MPa	ISO 527-1/-2
Stress at break	158 / -	MPa	ISO 527-1/-2
Strain at break	2.1 / -	%	ISO 527-1/-2
Flexural Modulus	9410 / -	MPa	ISO 178
Charpy notched impact strength			ISO 179/1eA
73°F	8.4 / -	kJ/m <sup>2</sup>	
-40°F	7.9 / -	kJ/m <sup>2</sup>	
Thermal properties	dry / cond	Unit	Test Standard
Melting temperature, 18°F/min	260 <sup>(1)</sup> / *	°C	ISO 11357-1/-3
Temp. of deflection under load, 260 psi	242 / *	°C	ISO 75-1/-2
Coeff. of linear therm. expansion, parallel	21 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion			ISO 11359-1/-2
normal	79 / *	E-6/K	
Normal, -40-23°C	69 / *	E-6/K	
Normal, 55-160°C	110 / *	E-6/K	
Parallel, -40-23°C	25 / *	E-6/K	
Parallel, 55-160°C	12 / *	E-6/K	
RTI, electrical			UL 746B
30mil	130 / *	°C	
60mil	130 / *	°C	
120mil	130	°C	
RTI, impact			UL 746B
30mil	105	°C	
60mil	115 / *	°C	
120mil	115	°C	
RTI, strength			UL 746B
30mil	105	°C	
60mil	115 / *	°C	
120mil	120	°C	

1: 1st heating

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Flammability	dry / cond	Unit	Test Standard
Burning Behav. at 60mil 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	0.75 / *	mm	IEC 60695-11-10
UL recognition	yes / *	-	UL 94
Burning Behav. 5V at thickness h	5VA / *	class	IEC 60695-11-20
Thickness tested	1.5 / *	mm	IEC 60695-11-20
UL recognition	yes / *	-	UL 94
Oxygen index	35 / *	%	ISO 4589-1/-2
Glow Wire Flammability Index			IEC 60695-2-12
30mil	960 / -	°C	
60mil	960 / -	°C	
120mil	960 / -	°C	
Glow Wire Ignition Temperature			IEC 60695-2-13
30mil	900 / -	°C	
60mil	900 / -	°C	
120mil	930 / -	°C	
Flammability, 3.0mm	V-0 / *	-	IEC 60695-11-10
FMVSS Class	B	-	ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	<100	mm/min	ISO 3795 (FMVSS 302)
Electrical properties	dry / cond	Unit	Test Standard
CTI, 23°C	2 / -	PLC	UL 746A
Other properties	dry / cond	Unit	Test Standard
Density	1600 / -	kg/m <sup>3</sup>	ISO 1183
Water Absorption, Immersion 24h 2: thickness, 2mm	0.6 <sup>[2]</sup> / *	%	Sim. to ISO 62
VDA Properties	Value	Unit	Test Standard
Emission of organic compounds	4.7	µgC/g	VDA 277
Odor test	4.5	class	VDA 270
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	290	°C	-
Min. melt temperature	280	°C	-
Max. melt temperature	300	°C	-
Max. screw tangential speed	0.2 / *	m/s	-
Mold Temperature Optimum	100	°C	-
Min. mold temperature	50	°C	-
Max. mold temperature	90	°C	-
Hold pressure range	50 - 100	MPa	-
Hold pressure time	3	s/mm	-
Ejection temperature	210	°C	-

Characteristics			
Processing	• Injection Molding		
Delivery form	• Pellets		
Additives	• Lubricants		
Regional Availability	• North America	• Asia Pacific	• Near East/Africa
	• Europe	• South and Central America	• Global

Revised: 2018-02-11

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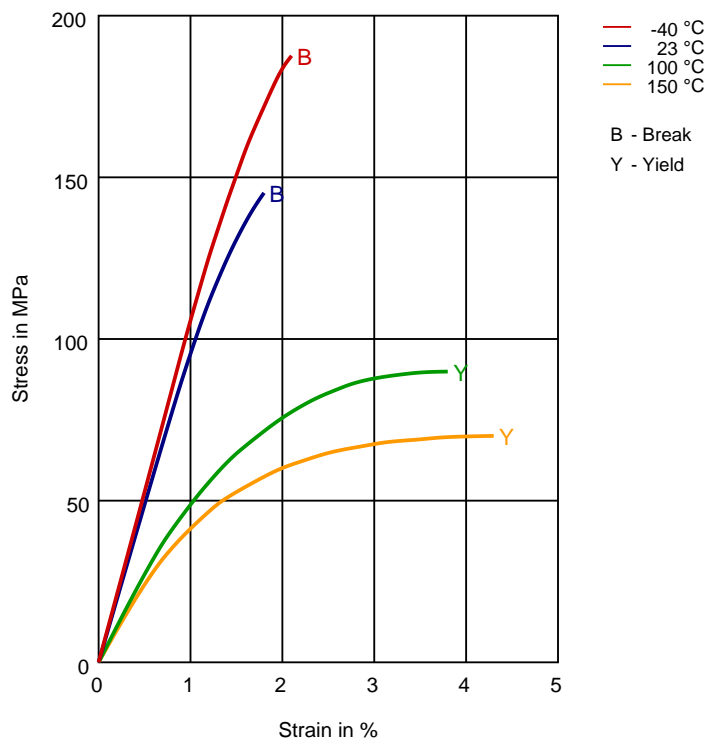
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# DuPont™ Zytel® FR50 BK505

## NYLON RESIN

Diagrams

Stress-strain (dry)



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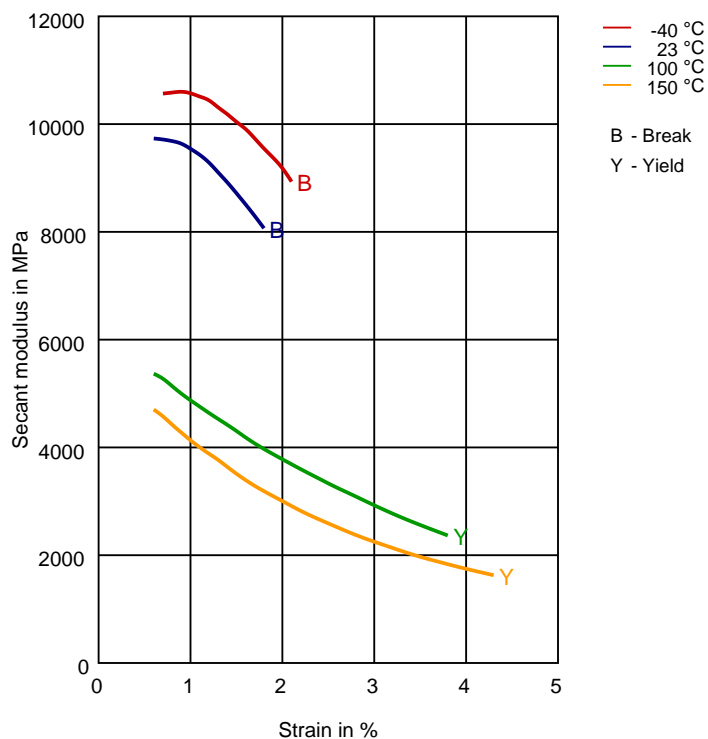
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# DuPont™ Zytel® FR50 BK505

## NYLON RESIN

Secant modulus-strain (dry)



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## NYLON RESIN

### 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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