

ISO 527-1/-2

Zytel® FR50 BK505

NYLON RESIN

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, we recommend, 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 moulding.

Product information

Resin Identification	PA66-GF25FR(17)	ISO 1043
Part Marking Code	>PA66-GF25FR(17)<	ISO 11469
ISO designation	ISO 16396-PA66,GF25 FR(17),M1CF1GR,S14-110	

Rneological properties	dry/cond.		
Viscosity number	150 ^[1] /* ^[DS]	cm ³ /g	ISO 307, 1628
Moulding shrinkage, parallel	0.3/-	%	ISO 294-4, 2577
Moulding shrinkage, normal	0.7/-	%	ISO 294-4, 2577
[DS]: Derived from similar grade			
[1]: Sulfuric acid 96%			

Typical mechanical properties	dry/cond.	
Tensile modulus	11000/8000	MPa

Tensile stress at break, 5mm/min	160/120	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	2.1/3	%	ISO 527-1/-2
Flexural modulus	9500/7500	MPa	ISO 178
Charpy impact strength, 23°C	65/-	kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	60/-	kJ/m²	ISO 179/1eU
Charpy impact strength, -40°C	50/- ^[DS]	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	10/12	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	9/11	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -40°C	9/10	kJ/m²	ISO 179/1eA
Poisson's ratio	0.34/0.34		

[DS]: Derived from similar grade

Thermal	properties	dry/cond	4
Hichina	properties	di y/cond	٨.

Melting temperature, 10°C/min	260 ^[2] /*	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	80/20	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	242/*	°C	ISO 75-1/-2
Coeff. of linear therm. expansion, parallel, -40-23°C	25/*	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion	21/*	E-6/K	ISO 11359-1/-2
(CLTE), parallel			

Printed: 2024-04-11 Page: 1 of 9



NYLON RESIN

Coeff. of linear therm. expansion, parallel, 55-160°C Coeff. of linear therm. expansion, normal, -40-23°C	12/* 69/*	E-6/K E-6/K	ISO 11359-1/-2 ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	79/*	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal, 55-160°C	110/*	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.25	W/(m K)	ISO 22007-2
Specific heat capacity of melt	2000	J/(kg K)	ISO 22007-4
RTI, electrical, 0.75mm	130	°C	UL 746B
RTI, electrical, 1.5mm	130	°C	UL 746B
RTI, electrical, 3.0mm	130	°C	UL 746B
RTI, impact, 0.75mm	105	°C	UL 746B
RTI, impact, 1.5mm	115	°C	UL 746B
RTI, impact, 3.0mm	115	°C	UL 746B
RTI, strength, 0.75mm	105	°C	UL 746B
RTI, strength, 1.5mm	115/*	°C	UL 746B
RTI, strength, 3.0mm	120	°C	UL 746B
[2]: 1st heating			
Flammability	dry/cond.		
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	0.35/*	mm	IEC 60695-11-10
UL recognition	yes ^[3] /*		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, 0.75mm	960/-	°C	IEC 60695-2-12
Glow Wire Flammability Index, 1.5mm	960/-	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3.0mm	960/-	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 0.75mm	900/-	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 1.5mm	900/-	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 3.0mm	930/-	°C	IEC 60695-2-13
FMVSS Class	SE/B		ISO 3795 (FMVSS 302)
[3]: f1			
Electrical properties	dry/cond.		
Volume resistivity	>1E13/2	Ohm.m	IEC 62631-3-1
	.7		
-	E10 ^[DS]	134	
Electric strength	24/22 ^[DS]	kV/mm	IEC 60243-1
Comparative tracking index	275/- ^[DS]		IEC 60112
[DS]: Derived from similar grade			

Printed: 2024-04-11 Page: 2 of 9



NYLON RESIN

Physical/Other properties	dry/cond.

Humidity absorption, 2mm 1.3/* % Sim. to ISO 62 Water absorption, 2mm 3.4/* $^{[DS]}$ % Sim. to ISO 62 Water absorption, Immersion 24h 0.6 $^{[4]}$ /* % Sim. to ISO 62 Density 1600/- kg/m³ ISO 1183

[DS]: Derived from similar grade

[4]: thickness,2mm

VDA Properties

Emission of organic compounds	4.7 μgC/g	VDA 277
Odour	4.5 class	VDA 270

Injection

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
Screw tangential speed	≤0.2	m/s
Mold Temperature Optimum	100	°C
Min. mould temperature	70	°C
Max. mould temperature	120	°C
Hold pressure range	50 - 100	MPa
Hold pressure time	3	s/mm
Ejection temperature	210	°C

Characteristics

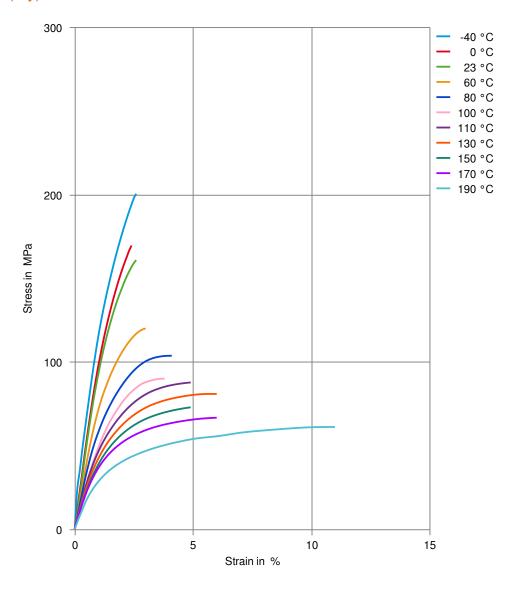
Additives Flame retardant

Printed: 2024-04-11 Page: 3 of 9



NYLON RESIN

Stress-strain (dry)

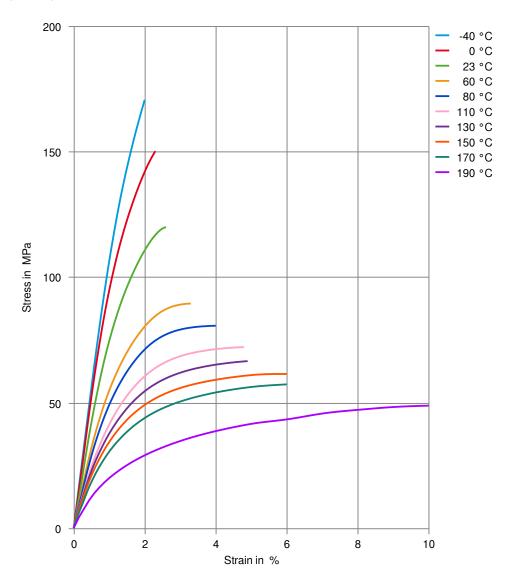


Printed: 2024-04-11 Page: 4 of 9



NYLON RESIN

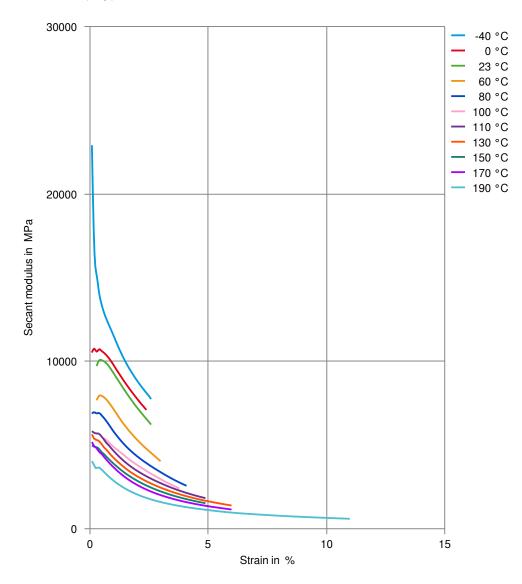
Stress-strain (cond.)



Printed: 2024-04-11 Page: 5 of 9



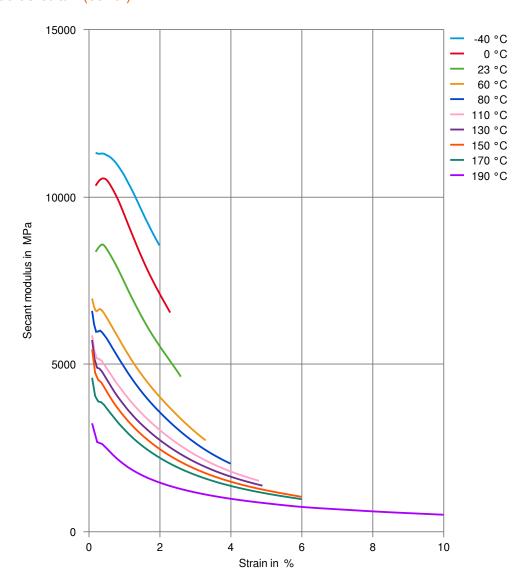
Secant modulus-strain (dry)



Printed: 2024-04-11 Page: 6 of 9



Secant modulus-strain (cond.)



Printed: 2024-04-11 Page: 7 of 9



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
- X Hydrochloric Acid (36% by mass), 23°C
- X Nitric Acid (40% by mass), 23°C
- X Sulfuric Acid (38% by mass), 23°C
- X Sulfuric Acid (5% by mass), 23°C
- X Chromic Acid solution (40% by mass), 23°C

Bases

- X 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

Printed: 2024-04-11 Page: 8 of 9



NYLON RESIN

- ✓ Sodium Carbonate solution (20% by mass), 23°C
- ✓ Sodium Carbonate solution (2% by mass), 23°C
- X Zinc Chloride solution (50% by mass), 23°C

Other

- ✓ Ethyl Acetate, 23°C
- X 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
- X 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).

x 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).

Printed: 2024-04-11 Page: 9 of 9

Revised: 2024-03-28 Source: Celanese Materials Database

NOTICE TO USERS: Values shown are based on testing of laboratory test specimens and represent data that fall within the standard range of properties for natural material. These values alone do not represent a sufficient basis for any part design and are not intended for use in establishing maximum, minimum, or ranges of values for specification purposes. Colourants or other additives may cause significant variations in data values. Properties of moulded parts can be influenced by a wide variety of factors including, but not limited to, material selection, additives, part design, processing conditions and environmental exposure. Other than those products expressly identified as medical grade (including by MT® product designation or otherwise), Celanese's products are not intended for use in medical or dental implants. Regardless of any such product designation, any determination of the suitability of a particular material and part design for any use contemplated by the users and the manner of such use is the sole responsibility of the users, who must assure themselves that the material as subsequently processed meets the needs of their particular product or use. To the best of our knowledge, the information contained in this publication is accurate; however, we do not assume any liability whatsoever for the accuracy and completeness of such information. The information contained in this publication should not be construed as a promise or guarantee of specific properties of our products. It is the sole responsibility of the users to investigate whether any existing patents are infringed by the use of the materials mentioned in this publication. Moreover, there is a need to reduce human exposure to many materials to the lowest practical limits in view of possible adverse effects. To the extent that any hazards may have been mentioned in this publication, we neither suggest nor guarantee that such hazards are the only ones that exist. We recommend that persons intending to rely on any recommendation or to use any e

© 2024 Celanese or its affiliates. All rights reserved. Celanese®, registered C-ball design and all other trademarks identified herein with ®, TM, SM, unless otherwise noted, are trademarks of Celanese or its affiliates. Fortron is a registered trademark of Fortron Industries LLC. KEPITAL is a registered trademark of Korea Engineering Plastics Company, Ltd.