DuPont™ Zytel®

nylon resin

Product guide and properties


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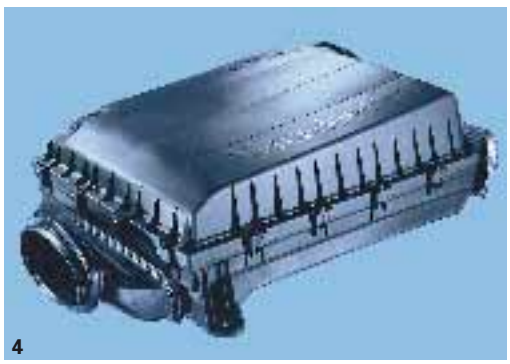
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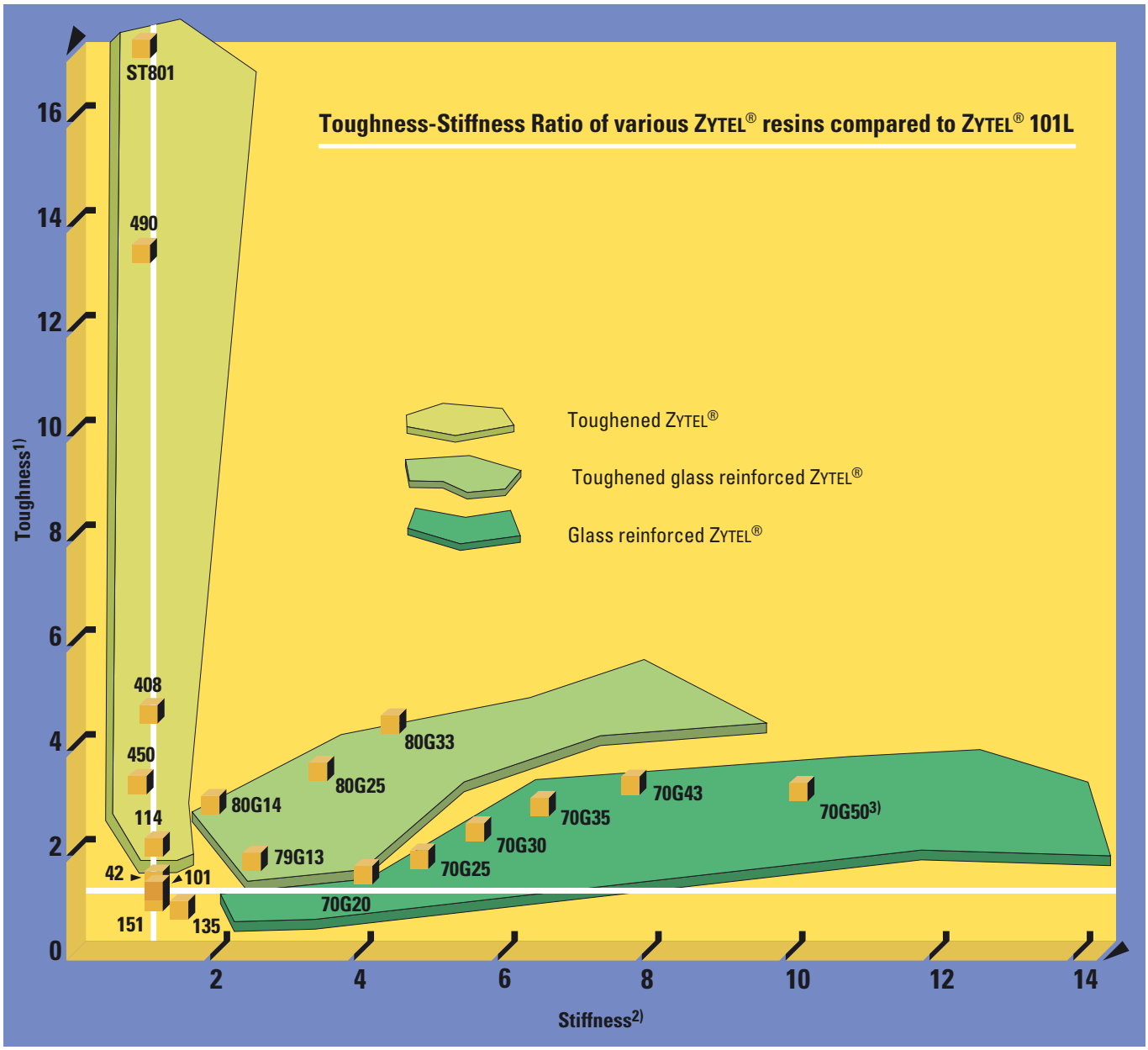
The miracles of science™



1) Notched Izod impact, DAM 2) Flexural modulus, 50% RH 3) Preliminary data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Photographs
1 – Residual circuit breaker – glass-mineral reinforced
2 – Air intake manifold – glass reinforced
3 – Sole for cycling shoes – glass reinforced
4 – Flat filter housing – glass reinforced
5 – Resonator – glass reinforced
6 – Hedge-trimmer housing – glass reinforced

DuPont™ Zytel®

nylon resin

Introduction

ZYTEL® is DuPont's registered trademark for its comprehensive range of nylon resins. Since the invention of nylon by DuPont in the 1930s, it has become the most widely used of all engineering polymers. Due to their excellent balance of properties, nylon components (produced by injection moulding, extrusion or blow moulding) find extensive use in many applications including: automotive, electrical/electronic, domestic appliances, furniture and construction.

Products and properties

ZYTEL® nylon resins are classified by chemical compositon into the following groups:
– Nylon 66
– Nylon 6
– Nylon 66/6 blends
– Nylon 612
– Transparent amorphous nylon
– Semi-aromatic High Temperature Nylon.

The key features of ZYTEL® nylons are:
– High mechanical strength
– Excellent balance of stiffness/toughness
– Good high temperature performance
– Good electrical and flammability properties
– Good abrasion and chemical resistance.

Properties such as melting point, moisture absorption and modulus of elasticity are primarily determined by the type of nylon.

In addition, nylons can be readily modified and reinforced, to create a wide range of products with tailored properties for specific processes and end-uses.

Major "families" of ZYTEL® nylons described in this brochure include:
– Unreinforced
– Tough/Supertough
– Glass reinforced
– Toughened/glass reinforced
– Flame retardant
– High viscosity/Extrusion
– Speciality
– High performance polyamide resin.

Only standard compositions are described in this brochure.

Properties of ZYTEL® HTN resins are given in the brochure "ZYTEL® HTN – Product guide and properties".

Mineral and mineral/glass reinforced nylons are also available under the MINLON® trademark. Information on these products is given in the brochure "MINLON® – Product guide and properties".

Data

All data in this brochure is taken from Campus version 4.0 (measured according to ISO standards), except where otherwise specified. In addition, all data is for natural colour material except where otherwise specified.

Physical description

ZYTEL® nylon resins are solid granular materials, typically cylinder cut with nominal dimensions of $3 \times 2{,}5$ mm. Most compositions are available in colours, either cube blended or fully compounded.

Packaging

ZYTEL® nylon resins are available in 4 standard packaging types:
– 40×25 kg bags
– 1000 kg octabin
– 1000 kg octabin (with bottom unloading)
– Bulk shipments.

Full details of these packaging types are given in the brochures: "Introduction to Engineering Polymers Packaging Materials" and "Silo Shipments".

Processing

ZYTEL® nylon resins are supplied in moisture proof packaging, so that drying should not normally be necessary. However, nylon resins are hygroscopic and absorb moisture on exposure to the atmosphere.

If excessive moisture absorption has occurred, then the resin must be dried at 80° C to less than 0,2% moisture content before processing.

These products can be processed on conventional injection moulding, blow moulding or extrusion equipment, depending on the grade selected. Detailed recommendations for processing ZYTEL® nylon resins can be obtained from DuPont sales and distributor offices listed on the back of this brochure.

Compositions

Designation	Description	
Unreinforced		**p. 6**
Zytel® 101L	Lubricated PA66	
Zytel® 101F	Fast moulding PA66	
Zytel® 103HSL	Heat stabilised lubricated PA66	
Zytel® 103FHS	Fast moulding heat stabilised PA66	
Zytel® 105F	Lubricated UV resistant PA66 (Black)	
Zytel® EFE1068	Slightly nucleated PA66	
Zytel® 135F	Nucleated lubricated PA66	
Zytel® 7335F	Nucleated lubricated PA6	
Zytel® 151L	Lubricated PA612	
Zytel® 153HSL	Heat stabilised lubricated PA612	
Toughened		**p. 9**
Zytel® 114L BK097	Impact modified PA66 (Black)	
Zytel® 408	Toughened PA66	
Zytel® 450	Toughened PA66	
Zytel® 490	Toughened PA66	
Zytel® 7300T	Toughened PA6	
Zytel® 7331T	Toughened PA6	
Supertough		**p. 10**
Zytel® ST801	Supertough PA66	
Zytel® ST7301	Supertough PA6	
Specialities		**p. 11**
Zytel® FN718	PA66 based flexible nylon alloy	
Zytel® FN727	PA6 based flexible nylon alloy	
Zytel® ST811HS	Toughened PA6 extrusion grade, heat stabilised	
Glass reinforced*		**p. 11**
Zytel® 70G20HSL	20% glass reinforced heat stabilised and lubricated PA66	
Zytel® 70G25HSL	25% glass reinforced heat stabilised PA66	
Zytel® 70G30HSL	30% glass reinforced heat stabilised PA66	
Zytel® 70G35HSL	35% glass reinforced heat stabilised PA66	
Zytel® 70G43HSL	43% glass reinforced heat stabilised PA66	
Zytel® 70G50HSL	50% glass reinforced heat stabilised PA66	
Zytel® 73G15L/HSL	15% glass reinforced PA6	
Zytel® 73G20L	20% glass reinforced PA6	
Zytel® 73G30L/HSL	30% glass reinforced PA6	
Zytel® 73G35L/HSL	35% glass reinforced PA6	
Zytel® 73G45L/HSL	45% glass reinforced PA6	
Hydrolysis resistant, glass reinforced		**p. 15**
Zytel® 70G25HSLR	25% glass reinforced, hydrolysis resistant PA66, heat stabilised and lubricated	
Zytel® 70G30HSLR	30% glass reinforced, hydrolysis resistant PA66, heat stabilised and lubricated	
Zytel® 70G30HSR2	30% glass reinforced, ultra-high hydrolysis resistant PA66, heat stabilised and lubricated	

* Certain NC's are available in lubricated and non-heat stabilised.

Compositions

Designation	Description	
Glass reinforced (Speciality)		**p. 16**
Zytel® 70G33GRA	Glass reinforced lubricated PA66	
Zytel® 70G35HSLX	35% glass reinforced hot oil and grease resistant PA66	
Zytel® 70G35HSLRA4	Easy flow glass reinforced PA66	
Zytel® 70GB40HSL	40% glass bead reinforced heat stabilised PA66	
Zytel® 74G33EHSL	33% glass reinforced heat stabilised PA66/6 blend	
Zytel® 74G33EL	33% glass reinforced PA66/6 blend	
Zytel® 77G33L	33% glass reinforced PA612	
Zytel® 70K20HSL	20% Kevlar® reinforced PA66	
Toughened glass reinforced		**p. 18**
Zytel® 79G13L	Toughened 13% glass reinforced PA66	
Zytel® 80G14	Toughened 14% glass reinforced PA66	
Zytel® 80G25	Toughened 25% glass reinforced PA66	
Zytel® 80G33HS1L	Toughened 33% glass reinforced heat stabilised PA66	
Zytel® 73G30T	Toughened 30% glass reinforced PA6	
Flame retardant		**p. 20**
Zytel® FR7026V0F	Unreinforced PA66 polymer, UL94 V0 (0,5 mm)	
Zytel® FR72G25V0	25% glass reinforced PA66/6 copolymer, UL94 V0 (0,5 mm)	
Zytel® FR70G25GW	25% glass reinforced glow wire 850°C PA66 at 1 mm	
Zytel® FR70G25V0	25% glass reinforced PA66, UL94 V0 (0,5 mm)	
Zytel® FR70M30V0	30% mineral reinforced PA66, UL94 V0 (1,6 mm)	
Zytel® FR70M40GW	40% mineral reinforced glow wire 960°C PA66 at 1,5 mm	
High viscosity/Extrusion		**p. 22**
Zytel® E40	High viscosity PA66 (VN = 180-150)	
Zytel® E42A	High viscosity PA66 (VN = 225-325)	
Zytel® E51HSB	High viscosity heat stabilised PA66 (VN = 272-352)	
Zytel® 158	High viscosity PA612	

Properties of ZYTEL® nylon resins

					Unreinforced			
					PA66		PA66	
					ZYTEL® 101L		ZYTEL® 101F	
	Property	Test conditions	Standard ISO	Units	DAM	50% RH	DAM	50% RH
MECHANICAL	Yield stress	50 mm/min, 23°C	527-1/-2	MPa	83	53	83	53
	Yield strain	50 mm/min, 23°C	527-1/-2	%	4,5	25	4,5	25
	Stress at break (tensile)	5 mm/min, 23°C	527-1/-2	MPa				
	Strain at break (tensile)	5 mm/min, 23°C	527-1/-2	%				
		50 mm/min, 23°C			40	>50	40	>50
	Nominal strain at break	50 mm/min, 23°C	527-1/-2	%	22	>100	18	>100
	Tensile modulus	1 mm/min, 23°C	527-1/-2	MPa	3100	1200	3100	1200
	Charpy impact strength (unnotched)	23°C	179/1eU	kJ/m²	NB	NB	NB	NB
		–30°C			NB	NB	NB	NB
	Charpy impact strength (notched)	23°C	179/1eA	kJ/m²	5	15	5	15
		–30°C			4	4	4	4
	Izod impact strength (notched)	23°C	180/1A	kJ/m²	5	13	5	13
		–30°C			5	4	5	4
THERMAL	Melting temperature	10°C/min	11357-1/-3	°C	263		263	
	Temperature of deflection under load	0,45 MPa	75-1/-2	°C	200		200	
		1,8 MPa			70		70	
	Vicat softening temperature	50N, 50°C/h	306	°C	240		240	
	Coefficient of linear thermal expansion							
	Parallel (in flow direction)	23°C-55°C	11359-2	10^{-4}/°C	1		1	
	Normal (perpendicular to flow)	23°C-55°C			1,1		1,1	
ELECTRICAL	Comparative tracking index	23°C	IEC 60112	V	600		600	
	Electric strength (dielectric strength)	1 mm, 23°C	IEC 60243-1	kV/mm	31	28	31	26
	Surface resistivity	23°C	IEC 60093	ohm	10^{12}	$>10^{15}$	10^{12}	10^{12}
	Volume resistivity	23°C	IEC 60093	ohm · m	10^{12}	10^{10}	10^{14}	10^{11}
	Relative permittivity	10^2 Hz, 1 mm, 23°C	IEC 60250		3,8	10,9	3,8	10,9
		10^6 Hz, 1 mm, 23°C			3,5	4	3,5	4,6
	Dissipation factor	10^2 Hz, 1 mm, 23°C	IEC 60250	10^{-4}	80	2100	140	2100
		10^6 Hz, 1 mm, 23°C			180	750	180	1000
OTHERS	Density		1183	kg/m³	1140		1140	
	Flammability classification [1]	1,5 mm	UL 94/ISO1210		V2		V2	
	Glow wire flammability index	1,5 mm	60695-2-1	°C	850		850	
	Oxygen index		4589-1-2	%	28	31	28	
	Water absorption	Equilibrium, 50% RH, 23°C	Similar	%	2,7		2,7	
		Saturation, immersed, 23°C	to ISO 62		8,5		8,5	
	Rockwell hardness	Scale M, 23°C	2039/2		79	59	71	
		Scale R, 23°C			121	108	113	
	Ball indentation hardness H 358/30	23°C	2039-1	MPa		85		
	H 961/30	23°C			160			
	Mould shrinkage [2] Parallel (in flow direction)	2 mm	294-4	%	1,3		1,3	
	Normal (perpendicular to flow)	2 mm			1,3		1,3	

1) Numerical flame test ratings are not intended to present behaviour of moulded parts in real life fire conditions; each end-user must determine whether any potential flammability hazards exist with parts moulded from ZYTEL® nylon resins. UL yellow cards available upon request.
2) Depends on moulding conditions.

All the above information is subject to the disclaimer printed on the back page of this document.

Unreinforced

PA66		PA66		PA66		PA66		PA66		PA6	
ZYTEL® 103HSL		ZYTEL® 103FHS		ZYTEL® 105F		ZYTEL® EFE1068		ZYTEL® 135F		ZYTEL® 7335F	
DAM	**50% RH**	**DAM**	**50% RH**	**DAM**	**50% RH**	**DAM**	**50% RH**	**DAM**	**50% RH**	**DAM**	**50% RH**
85	54	85	54	85	60	85	59	98	69	90	55
4,4	25	4,4	25		25	4,5	25	4,5	18	4	24
40	>50	35	>50	30	>50	35	>60	18	>50	30	>50
20	>100	20	>100	24	>50	18	>60	13	>50	8	>50
3100	1250	3100	1250	3200	1500	3100	1500	3600	2100	4000	1400
NB	NB	NB	NB	45	NB	NB	NB	NB	NB	40	NB
NB	NB	NB	NB	55	55			NB	NB	110	60
5	14	5	14	6	15	6	13	4	9	4	18
4	4	4	4	4	3			3	3	2	3
5	14	5	14	5	12	5	11	3	6,5	3	1,5
6	5		5	4	3			2,3	2	2	1,5
263		263		263		263		263		223	
200		200		205				210		185	
70		70		70		70		90		70	
240		240		240				245		200	
1		1		1		0,85		1,21		0,76	
1,1		1,1		1,1		0,82		1,21		0,92	
525								600		600	
31	28							25			
10^{12}	10^{12}			10^{15}	10^{13}						
10^{13}	10^{10}			10^{13}	10^{10}					10^{13}	
3,8	13							3,9	8,7	4,2	
3,5	4			3,6	4,6			3,8	3,9		
75	5800							70	2400	300	
165	700			300	600			200	600		
1140		1140		1140		1140		1140		1130	
V2		V2		V2		V2		V2		HB	
950		950						850			
28		28		27							
2,7		2,7		2,7		2,8		2,7		3	
8,5		8,5		8,5		8,5		8,5		9	
								87	64		
121		121		121				123	116		
1,3				1,5				0,8		0,5	
1,3								1,3		0,5	

Properties of ZYTEL® nylon resins

					Unreinforced			
					PA612		PA612	
					ZYTEL® 151L		ZYTEL® 153HSL	
	Property	Test conditions	Standard ISO	Units	DAM	50% RH	DAM	50% RH
MECHANICAL	Yield stress	50 mm/min, 23°C	527-1/-2	MPa	62	54	62	53
	Yield strain	50 mm/min, 23°C	527-1/-2	%	4,5	18	4,4	19
	Stress at break (tensile)	5 mm/min, 23°C	527-1/-2	MPa				
	Strain at break (tensile)	5 mm/min, 23°C	527-1/-2	%				
		50 mm/min, 23°C			100	>100		
	Nominal strain at break	50 mm/min, 23°C	527-1/-2	%	17	>50	30	>50
	Tensile modulus	1 mm/min, 23°C	527-1/-2	MPa	2400	1700	2400	1600
	Charpy impact strength (unnotched)	23°C	179/1eU	kJ/m²	NB	NB	NB	NB
		–30°C			NB	40	NB	NB
	Charpy impact strength (notched)	23°C	179/1eA	kJ/m²	3,5	4	4	7
		–30°C			3,5	3	5	4
	Izod impact strength (notched)	23°C	180/1A	kJ/m²	4	4,5	4	6
		–30°C			4,5	3	5	5
THERMAL	Melting temperature	10°C/min	11357-1/-3	°C	218		218	
	Temperature of deflection under load	0,45 MPa	75-1/-2	°C	135		135	
		1,8 MPa			62		62	
	Vicat softening temperature	50N, 50°C/h	306	°C	181		181	
	Coefficient of linear thermal expansion							
	Parallel (in flow direction)	23°C-55°C	11359-2	10^{-4}/°C	1,1		1,2	
	Normal (perpendicular to flow)	23°C-55°C			1,2		1,2	
ELECTRICAL	Comparative tracking index	23°C	IEC 60112	V				
	Electric strength (dielectric strength)	1 mm, 23°C	IEC 60243-1	kV/mm				
	Surface resistivity	23°C	IEC 60093	ohm	10^{12}		10^{12}	10^{12}
	Volume resistivity	23°C	IEC 60093	ohm · m	10^{13}	10^{11}	10^{13}	10^{11}
	Relative permittivity	10^2 Hz, 1 mm, 23°C	IEC 60250		3,6	5	3,6	5,3
		10^6 Hz, 1 mm, 23°C			3,2	4	3,2	3,4
	Dissipation factor	10^2 Hz, 1 mm, 23°C	IEC 60250	10^{-4}	135	700	140	1000
		10^6 Hz, 1 mm, 23°C			160	400	160	400
OTHERS	Density		1183	kg/m³	1060		1060	
	Flammability classification [1]	1,5 mm	UL 94/ISO1210		V2		HB	
	Glow wire flammability index	1,5 mm	60695-2-1	°C			675	
	Oxygen index		4589-1-2	%	27		27	
	Water absorption	Equilibrium, 50% RH, 23°C	Similar	%	1,3		1,3	
		Saturation, immersed, 23°C	to ISO 62		3		3	
	Rockwell hardness	Scale M, 23°C	2039/2					
		Scale R, 23°C			114	103	114	
	Ball indentation hardness H 358/30	23°C	2039-1	MPa				
	H 961/30	23°C						
	Mould shrinkage [2]	Parallel (in flow direction) 2 mm	294-4	%	1,2		1,2	
		Normal (perpendicular to flow) 2 mm			1,2		1,2	

1) Numerical flame test ratings are not intended to present behaviour of moulded parts in real life fire conditions; each end-user must determine whether any potential flammability hazards exist with parts moulded from ZYTEL® nylon resins. UL yellow cards available upon request.
2) Depends on moulding conditions.

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Toughened

PA66		PA66		PA66		PA66		PA6		PA6	
ZYTEL® 114L BK097		ZYTEL® 408		ZYTEL® 450		ZYTEL® 490		ZYTEL® 7300T		ZYTEL® 7331T	
DAM	**50% RH**	**DAM**	**50% RH**	**DAM**	**50% RH**	**DAM**	**50% RH**	**DAM**	**50% RH**	**DAM**	**50% RH**
75	52	61	43	55	40	55	40	68	40	62	39
7	25	6	26	5,4	29	5,5	29	4	30	4,4	26
30	>100	55	>100	50	>100	50	>100	40	>100	86	>100
20	>50	35	>50	28	>50	33	>50	15	>50	49	>50
3000	1400	2200	1100	2200	1000	2100	950	2750	890	2630	970
NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB	NB
NB	NB	NB	NB	NB	NB	NB	NB	NB	NB		
12	20	18	25	18	50	67	104	14	110	16	30
8	5	15	6	10	9	20	15	9	5	10	6
10	15	19	20	17	70	66	83	11	90	16	32
7	5	11	4	10	8	17	16	13	6	10	5
263		263		263		263		223		223	
150		155		92		85		75		194	
75		65		65		70		55		55	
225		210		195		220		195			
1,21		1,32		1,61		1,52		1,04			
1,21		1,32		1,61		1,52		1,22			
575		600		600		600					
		33,5									
		10^{15}	10^{15}								
10^{12}	10^{11}	10^{13}	10^{11}	10^{13}	10^{10}						
3,7	6,6	3,2	7								
3,2	3,6	2,9	3,7								
		200	1500								
200	600	200	500								
1120		1090		1080		1080		1100		1090	
HB		HB		HB		HB		HB			
		675									
		19									
2,5		2,2		2,2		2,3		2,6			
7,9		7		7		7,1		9			
76		71	50								
118		115	102								
	85										
123											
1,1		1,2		1,7		1,6		0,6			
1,2		0,9		1,3		1,1		0,7		1	

Properties of ZYTEL® nylon resins

					Supertough			
					PA66		PA6	
					ZYTEL® ST801		ZYTEL® ST7301	
	Property	Test conditions	Standard ISO	Units	DAM	50% RH	DAM	50% RH
MECHANICAL	Yield stress	50 mm/min, 23°C	527-1/-2	MPa	50	43	48	30
	Yield strain	50 mm/min, 23°C	527-1/-2	%	5,7	37	4	32
	Stress at break (tensile)	5 mm/min, 23°C	527-1/-2	MPa				
	Strain at break (tensile)	5 mm/min, 23°C	527-1/-2	%				
		50 mm/min, 23°C			60	>100	90	>200
	Nominal strain at break	50 mm/min, 23°C	527-1/-2	%	40	>50	>30	>200
	Tensile modulus	1 mm/min, 23°C	527-1/-2	MPa	2000	900	1900	660
	Charpy impact strength (unnotched)	23°C	179/1eU	kJ/m²	NB	NB	NB	NB
		–30°C			NB	NB	NB	NB
	Charpy impact strength (notched)	23°C	179/1eA	kJ/m²	80	115	80	125
		–30°C			18	17	19	18
	Izod impact strength (notched)	23°C	180/1A	kJ/m²	80	94	60	90
		–30°C			20	20		
THERMAL	Melting temperature	10°C/min	11357-1/-3	°C	263		223	
	Temperature of deflection under load	0,45 MPa	75-1/-2	°C	130		75	
		1,8 MPa			65		50	
	Vicat softening temperature	50N, 50°C/h	306	°C	205			
	Coefficient of linear thermal expansion							
	Parallel (in flow direction)	23°C-55°C	11359-2	10^{-4}/°C	1,2			
	Normal (perpendicular to flow)	23°C-55°C			0,9			
ELECTRICAL	Comparative tracking index	23°C	IEC 60112	V	600			
	Electric strength (dielectric strength)	1 mm, 23°C	IEC 60243-1	kV/mm	31	39		
	Surface resistivity	23°C	IEC 60093	ohm	10^{15}	10^{15}		
	Volume resistivity	23°C	IEC 60093	ohm · m	10^{12}	10^{11}		
	Relative permittivity	10^2 Hz, 1 mm, 23°C	IEC 60250		3,2	8		
		10^6 Hz, 1 mm, 23°C			2,9	3,6		
	Dissipation factor	10^2 Hz, 1 mm, 23°C	IEC 60250	10^{-4}	80	1800		
		10^6 Hz, 1 mm, 23°C			140	550		
OTHERS	Density		1183	kg/m³	1080		1060	
	Flammability classification 1)	1,5 mm	UL 94/ISO1210		HB		HB	
	Glow wire flammability index	1,5 mm	60695-2-1	°C	675			
	Oxygen index		4589-1-2	%	20			
	Water absorption	Equilibrium, 50% RH, 23°C	Similar	%	2,2			
		Saturation, immersed, 23°C	to ISO 62		6,7			
	Rockwell hardness	Scale M, 23°C	2039/2					
		Scale R, 23°C			112	89		
	Ball indentation hardness H 358/30	23°C	2039-1	MPa				
	H 961/30	23°C						
	Mould shrinkage 2)	Parallel (in flow direction) 2 mm	294-4	%	1,6			
		Normal (perpendicular to flow) 2 mm			1		1,3	

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2) Depends on moulding conditions.

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Specialities						Glass reinforced			
PA66		PA6		PA6		PA66		PA66	
Zytel® FN718		Zytel® FN727		Zytel® ST811HS		Zytel® 70G20HSL		Zytel® 70G25HSL	
DAM	50% RH	DAM	50% RH	DAM	50% RH	DAM	50% RH	DAM	50% RH
30		23	25	31					
50	>50	44	>50	4					
>50	>50	>50	>50			159	103	180	115
						2,9	7	3,1	5
		130							
>50		>50		>50	>50				
960	420	770	350	900	400	7300	5000	8600	6100
		NB	NB	NB	NB	55	75	65	85
		NB	NB	NB	NB	50	45	53	47
125		130		71	129	9	9,5	10	12
35		65		14	13	9	9	10	11
NB	NB	NB	NB			8	9	10	11
NB	NB					7	7	8	8
263		223		218		263		263	
				170		260		263	
50		45		47		250		250	
220		180		95		255		255	
1,2		1,2	1,2	2		0,35		0,33	
				1,8		1,11		1,12	
						400		400	
						>10^{15}	10^{12}	10^{15}	10^{13}
						>10^{13}	10^{9}	10^{13}	10^{9}
						3,9	4,4	4,1	4,5
						160	700	150	730
1040		1020		1040		1290		1330	
HB				HB		HB		HB	
				2,3		2,1		2	
				6,8		6,8		6,4	
					57	102	85	103	87
					70	122	115	123	116
						250	155	252	164
1,4				1,8		0,45		0,4	
1,3						1,1		1,1	

Properties of ZYTEL® nylon resins

					Glass reinforced			
					PA66		PA66	
					ZYTEL® 70G30HSL		ZYTEL® 70G35HSL	
	Property	Test conditions	Standard ISO	Units	DAM	50% RH	DAM	50% RH
MECHANICAL	Yield stress	50 mm/min, 23°C	527-1/-2	MPa				
	Yield strain	50 mm/min, 23°C	527-1/-2	%				
	Stress at break (tensile)	5 mm/min, 23°C	527-1/-2	MPa	200	140	215	150
	Strain at break (tensile)	5 mm/min, 23°C	527-1/-2	%	3,4	5	3,2	4,6
		50 mm/min, 23°C			3	5		
	Nominal strain at break	50 mm/min, 23°C	527-1/-2	%				
	Tensile modulus	1 mm/min, 23°C	527-1/-2	MPa	10000	7200	11200	8300
	Charpy impact strength (unnotched)	23°C	179/1eU	kJ/m²	82	95	95	100
		–30°C			80	73	88	75
	Charpy impact strength (notched)	23°C	179/1eA	kJ/m²	14	15	15	17
		–30°C			10	10	10	10
	Izod impact strength (notched)	23°C	180/1A	kJ/m²	13	17	12	15
		–30°C			12	10	10	10
THERMAL	Melting temperature	10°C/min	11357-1/-3	°C	263		263	
	Temperature of deflection under load	0,45 MPa	75-1/-2	°C	260		260, 261	
		1,8 MPa			250		250	
	Vicat softening temperature	50N, 50°C/h	306	°C	250		255	
	Coefficient of linear thermal expansion							
	Parallel (in flow direction)	23°C-55°C	11359-2	10^{-4}/°C	0,22		0,2	
	Normal (perpendicular to flow)	23°C-55°C			1,07		1	
ELECTRICAL	Comparative tracking index	23°C	IEC 60112	V	400		400	
	Electric strength (dielectric strength)	1 mm, 23°C	IEC 60243-1	kV/mm	38	32		
	Surface resistivity	23°C	IEC 60093	ohm	$>10^{15}$	10^{13}	$>10^{15}$	10^{13}
	Volume resistivity	23°C	IEC 60093	ohm · m	$>10^{13}$	10^{9}	10^{13}	10^{9}
	Relative permittivity	10^2 Hz, 1 mm, 23°C	IEC 60250		4,4	10,8		
		10^6 Hz, 1 mm, 23°C			4,1	4,6	4,1	4,7
	Dissipation factor	10^2 Hz, 1 mm, 23°C	IEC 60250	10^{-4}	70	4600		
		10^6 Hz, 1 mm, 23°C			150	650	140	620
OTHERS	Density		1183	kg/m³	1370		1410	
	Flammability classification[1]	1,5 mm	UL 94/ISO1210		HB		HB	
	Glow wire flammability index	1,5 mm	60695-2-1	°C				
	Oxygen index		4589-1-2	%				
	Water absorption	Equilibrium, 50% RH, 23°C	Similar	%	2		1,7	
		Saturation, immersed, 23°C	to ISO 62		6		5,5	
	Rockwell hardness	Scale M, 23°C	2039/2		104	88	105	89
		Scale R, 23°C			124	117	125	117
	Ball indentation hardness H 358/30	23°C	2039-1	MPa				
	H 961/30	23°C			275	187	285	203
	Mould shrinkage[2]	Parallel (in flow direction) 2 mm	294-4	%	0,35		0,35	
		Normal (perpendicular to flow) 2 mm			1,1		1,1	

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Glass reinforced

PA66		PA66		PA6		PA6		PA6	
ZYTEL® 70G43HSL		ZYTEL® 70G50HSL		ZYTEL® 73G15L/HSL		ZYTEL® 73G20L		ZYTEL® 73G30L/HSL	
DAM	50% RH	DAM	50% RH	DAM	50% RH	DAM	50% RH	DAM	50% RH
240	175	260	205	135	75	150	90	185	115
3	4	2,6	3,5	4	8	3,5	6,5	3,5	5,5
14000	11000	17300	13500	6000	3500	7100	4300	9600	6200
100	110	113	117	50	85	71	90	95	95
75	85	100	100	45	54	66	60	80	84
15	17	20	22	7,8	14	10	16	13	21
12	12	17	16	6	14	10	16	10	21
16	18	19	21	6	9	8	15	14	19
12	11	16	16	5	5	7	7	11	11
263		263		223		223		223	
263		263		220		220		220	
254		258		200		204		210	
255		255		215		215		215	
0,2		0,15		0,37		0,31		0,22	
1		0,73		1,09		1,17		1,02	
				32	34				
>10^{12}		10^{16}	10^{13}	10^{15}	10^{15}			10^{14}	10^{13}
>10^{13}	10^{10}	10^{13}	10^{9}	10^{13}	10^{9}			10^{13}	10^{8}
		4,1		4,1				4,4	
4	4,9	3,8		3,7				4,1	
145	600								
1490		1560		1230		1270		1360	
HB		HB		HB		HB		HB	
23				21				21	
1,5		1,2		2,5		2,3		1,9	
4,7		4,2		7,6		7,2		6.3	
105	90								
125	118								
295	218								
0,3		0,4		0,35		0,35		0,2	
1		1		0,65		0,65		0,7	

Properties of ZYTEL® nylon resins

					Glass reinforced			
					PA6		PA6	
		Test			ZYTEL® 73G35L/HSL		ZYTEL® 73G45L/HSL	
	Property	conditions	Standard ISO	Units	DAM	50% RH	DAM	50% RH
MECHANICAL	Yield stress	50 mm/min, 23°C	527-1/-2	MPa				
	Yield strain	50 mm/min, 23°C	527-1/-2	%				
	Stress at break (tensile)	5 mm/min, 23°C	527-1/-2	MPa	200	130	220	150
	Strain at break (tensile)	5 mm/min, 23°C	527-1/-2	%	3	5	2,5	4
		50 mm/min, 23°C						
	Nominal strain at break	50 mm/min, 23°C	527-1/-2	%				
	Tensile modulus	1 mm/min, 23°C	527-1/-2	MPa	11100	7500	1400	9800
	Charpy impact strength (unnotched)	23°C	179/1eU	kJ/m²	100	102	105	111
		–30°C			100	102	115	101
	Charpy impact strength (notched)	23°C	179/1eA	kJ/m²	18	21	21	23
		–30°C			18	21	21	23
	Izod impact strength (notched)	23°C	180/1A	kJ/m²	16	24	18	22
		–30°C			12	13	15	14
THERMAL	Melting temperature	10°C/min	11357-1/-3	°C	223		223	
	Temperature of deflection under load	0,45 MPa	75-1/-2	°C	222		221	
		1,8 MPa			212		213	
	Vicat softening temperature	50N, 50°C/h	306	°C	215		215	
	Coefficient of linear thermal expansion							
	Parallel (in flow direction)	23°C-55°C	11359-2	10^{-4}/°C	0,2		0,16	
	Normal (perpendicular to flow)	23°C-55°C			1,06		1	
ELECTRICAL	Comparative tracking index	23°C	IEC 60112	V				
	Electric strength (dielectric strength)	1 mm, 23°C	IEC 60243-1	kV/mm				
	Surface resistivity	23°C	IEC 60093	ohm				
	Volume resistivity	23°C	IEC 60093	ohm · m				
	Relative permittivity	10^2 Hz, 1 mm, 23°C	IEC 60250					
		10^6 Hz, 1 mm, 23°C						
	Dissipation factor	10^2 Hz, 1 mm, 23°C	IEC 60250	10^{-4}				
		10^6 Hz, 1 mm, 23°C						
OTHERS	Density		1183	kg/m³	1420		1510	
	Flammability classification[1]	1,5 mm	UL 94/ISO1210		HB		HB	
	Glow wire flammability index	1,5 mm	60695-2-1	°C				
	Oxygen index		4589-1-2	%				
	Water absorption	Equilibrium, 50% RH, 23°C	Similar	%	1,8		1,5	
		Saturation, immersed, 23°C	to ISO 62		5,8		4,9	
	Rockwell hardness	Scale M, 23°C	2039/2					
		Scale R, 23°C						
	Ball indentation hardness H 358/30	23°C	2039-1	MPa				
	H 961/30	23°C						
	Mould shrinkage[2]	Parallel (in flow direction) 2 mm	294-4	%	0,2		0,2	
		Normal (perpendicular to flow) 2 mm			0,7		0,7	

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Hydrolysis resistant, glass reinforced

PA66		PA66		PA66	
ZYTEL® 70G25HSLR		ZYTEL® 70G30HSLR		ZYTEL® 70G30HSR2	
DAM	50% RH	DAM	50% RH	DAM	50% RH
180	115	200	140	200	140
3,1	5	3,3	5	3,3	5
8600	6100	10000	7400	10000	7200
50	60	80	90	80	90
60	45	70	72		
8	8	14	15	12	15
7	7	10	10		
		13	17	11	15
		12	10		
263		263		263	
260		260			
255		255		255	
257		250			
0,33		0,22			
1,12		1,07			
		400			
		38	32		
		10^{15}	10^{13}		
$>10^{13}$		$>10^{13}$	10^{9}		
3,6		4,3	10,8		
		4,1	4,6		
70		70	4600		
		150	650		
1300		1370		1350	
HB		HB			
2		1,9			
6,4		6			
0,4		0,35		0,35	
1,1		1,1		1,1	

Properties of ZYTEL® nylon resins

					Glass reinforced (specialty)			
					PA66		PA66	
					ZYTEL® 70G33GRA		ZYTEL® 70G35HSLX	
	Property	Test conditions	Standard ISO	Units	DAM	50% RH	DAM	50% RH
MECHANICAL	Yield stress	50 mm/min, 23°C	527-1/-2	MPa				
	Yield strain	50 mm/min, 23°C	527-1/-2	%				
	Stress at break (tensile)	5 mm/min, 23°C	527-1/-2	MPa	190	135	210	150
	Strain at break (tensile)	5 mm/min, 23°C	527-1/-2	%	2,5	4	3	4, 5
		50 mm/min, 23°C						
	Nominal strain at break	50 mm/min, 23°C	527-1/-2	%				
	Tensile modulus	1 mm/min, 23°C	527-1/-2	MPa	12500	8500	11500	8500
	Charpy impact strength (unnotched)	23°C	179/1eU	kJ/m²	80	90	88	92
		–30°C					75	66
	Charpy impact strength (notched)	23°C	179/1eA	kJ/m²	12	16	13	17
		–30°C					11	10
	Izod impact strength (notched)	23°C	180/1A	kJ/m²	12	14	12	15
		–30°C						
THERMAL	Melting temperature	10°C/min	11357-1/-3	°C	260		263	
	Temperature of deflection under load	0,45 MPa	75-1/-2	°C	255		260	
		1,8 MPa			250		252	
	Vicat softening temperature	50N, 50°C/h	306	°C			255	
	Coefficient of linear thermal expansion							
	Parallel (in flow direction)	23°C-55°C	11359-2	10^{-4}/°C			0,2	
	Normal (perpendicular to flow)	23°C-55°C					0,8	
ELECTRICAL	Comparative tracking index	23°C	IEC 60112	V				
	Electric strength (dielectric strength)	1 mm, 23°C	IEC 60243-1	kV/mm				
	Surface resistivity	23°C	IEC 60093	ohm				
	Volume resistivity	23°C	IEC 60093	ohm · m			10^{13}	
	Relative permittivity	10^2 Hz, 1 mm, 23°C	IEC 60250				4,3	
		10^6 Hz, 1 mm, 23°C						
	Dissipation factor	10^2 Hz, 1 mm, 23°C	IEC 60250	10^{-4}			60	
		10^6 Hz, 1 mm, 23°C						
OTHERS	Density		1183	kg/m³	1450		1410	
	Flammability classification[1]	1,5 mm	UL 94/ISO1210					
	Glow wire flammability index	1,5 mm	60695-2-1	°C				
	Oxygen index		4589-1-2	%				
	Water absorption	Equilibrium, 50% RH, 23°C	Similar	%			1,7	
		Saturation, immersed, 23°C	to ISO 62				5,5	
	Rockwell hardness	Scale M, 23°C	2039/2					
		Scale R, 23°C						
	Ball indentation hardness H 358/30	23°C	2039-1	MPa				
	H 961/30	23°C						
	Mould shrinkage[2]	Parallel (in flow direction) 2 mm	294-4	%			0,2	
		Normal (perpendicular to flow) 2 mm					1	

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Glass reinforced (specialty)

PA66		PA66		PA66/6 blend		PA66/6 blend		PA612		PA66	
ZYTEL® 70G35HSLRA4		ZYTEL® 70GB40HSL		ZYTEL® 74G33EHSL		ZYTEL® 74G33EL		ZYTEL® 77G33L		70K20HSL	
DAM	50% RH	DAM	50% RH	DAM	50% RH	DAM	50% RH	DAM	50% RH	DAM	50% RH
210	140	55	51	206	140	205	145	165	135	110	85
3	5	6,5	18	3,3	4,8	3,1	4,4	3	3	5	7
				3,3	4,7						
11200	7800	5400	2800	10300	7500	10300	7500	9500	7900	5300	3500
80	95	30	80	84	102	84	102	70	65	50	65
		25	25					60	40		
15	18	4	6,5	13	17	14	17	12	12	6,5	9
		2,5	2,5					10	10		
14	16	3,5	6,5	12	16	13	15	12	12	5	7
		3	3					10	10		
263		263		260		260		218		263	
		222		257				215		255	
249		102		250		253		200		205	
		245									
		0,6						0,17			
		0,6				1		1,13			
		425						600			
								27			
								10^{12}			
		$>10^{13}$						10^{13}			
		4,6						4,1			
								3,8			
								135			
								150	200		
1430		1460		1400		1360		1320		1200	
								HB			
								675			
								23			
		1,4						0,7		2,2	
		7,3						1,8		6,8	
								118			
0,35		1,3				0,2		0,3			
		1,2						0,6			

Properties of ZYTEL® nylon resins

					Toughened glass reinforced			
					PA66		PA66	
					ZYTEL® 79G13L		ZYTEL® 80G14	
	Property	Test conditions	Standard ISO	Units	DAM	50% RH	DAM	50% RH
MECHANICAL	Yield stress	50 mm/min, 23°C	527-1/-2	MPa				
	Yield strain	50 mm/min, 23°C	527-1/-2	%				
	Stress at break (tensile)	5 mm/min, 23°C	527-1/-2	MPa	118	70	110	70
	Strain at break (tensile)	5 mm/min, 23°C	527-1/-2	%	4	10	4	10
		50 mm/min, 23°C						
	Nominal strain at break	50 mm/min, 23°C	527-1/-2	%				
	Tensile modulus	1 mm/min, 23°C	527-1/-2	MPa	5100	3700	5100	3400
	Charpy impact strength (unnotched)	23°C	179/1eU	kJ/m²	67	60	70	75
		–30°C			59	54	85	90
	Charpy impact strength (notched)	23°C	179/1eA	kJ/m²	8	14	18	20
		–30°C			6	6	10	9
	Izod impact strength (notched)	23°C	180/1A	kJ/m²	8	9	14	20
		–30°C			6	4	7	7
THERMAL	Melting temperature	10°C/min	11357-1/-3	°C	263		263	
	Temperature of deflection under load	0,45 MPa	75-1/-2	°C	260		255	
		1,8 MPa			242		240	
	Vicat softening temperature	50N, 50°C/h	306	°C	240		240	
	Coefficient of linear thermal expansion							
	Parallel (in flow direction)	23°C-55°C	11359-2	10^{-4}/°C	0,5		0,39	
	Normal (perpendicular to flow)	23°C-55°C			1,3		1,2	
ELECTRICAL	Comparative tracking index	23°C	IEC 60112	V	475		600	
	Electric strength (dielectric strength)	1 mm, 23°C	IEC 60243-1	kV/mm	37	35	36	36,5
	Surface resistivity	23°C	IEC 60093	ohm	$>10^{15}$	10^{14}	$>10^{15}$	10^{14}
	Volume resistivity	23°C	IEC 60093	ohm · m	$>10^{13}$	10^{10}	10^{13}	10^{10}
	Relative permittivity	10^2 Hz, 1 mm, 23°C	IEC 60250		3,9	9,8	3,8	7,3
		10^6 Hz, 1 mm, 23°C			3,7	4,5	3,5	3,9
	Dissipation factor	10^2 Hz, 1 mm, 23°C	IEC 60250	10^{-4}	65	2500	70	180
		10^6 Hz, 1 mm, 23°C			130	660	150	580
OTHERS	Density		1183	kg/m³	1210		1180	
	Flammability classification[1]	1,5 mm	UL 94/ISO1210		HB			
	Glow wire flammability index	1,5 mm	60695-2-1	°C				
	Oxygen index		4589-1-2	%				
	Water absorption	Equilibrium, 50% RH, 23°C	Similar	%	2,2		2	
		Saturation, immersed, 23°C	to ISO 62		6,5		6,2	
	Rockwell hardness	Scale M, 23°C	2039/2		90	74	103	
		Scale R, 23°C			120	110		
	Ball indentation hardness H 358/30	23°C	2039-1	MPa				
	H 961/30	23°C			180	100		
	Mould shrinkage[2]	Parallel (in flow direction) 2 mm	294-4	%	0,5		0,35	
		Normal (perpendicular to flow) 2 mm			0,8		0,8	

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Toughened glass reinforced

PA66		PA66		PA6	
ZYTEL® 80G25		ZYTEL® 80G33HS1L		ZYTEL® 73G30T	
DAM	50% RH	DAM	50% RH	DAM	50% RH
120	85	160	115	165	110
4	8	3,5	6	3	6
7000	4700	9000	6300	9200	5700
80	80	95	95	106	100
89	87	100	100	105	94
23	24	25	28	20	25
14	13	18	18	12	12
20	24	23	26	15	20
12	12	15	16	10	11
263		263		223	
258		259		221	
240		245		210	
		245		215	
		0,15		0,28	
		1,19		1,2	
				35	39
		10^{12}	10^{10}	10^{15}	10^{15}
		$>10^{13}$	10^{9}	$>10^{13}$	10^{9}
		4	9,3	4,1	
		3,6	4,3	3,8	
		130	600		
1260		1330		1340	
HB		HB		HB	
1,8		1,5		1,8	
4,8		4,5		6,2	
		70			
		110			
0,3		0,3		0,2	
0,75		0,8		0,4	

Properties of ZYTEL® nylon resins

					Flame retardant			
					PA66 Polymer		PA66/6 Copolymer	
					ZYTEL® FR7026V0F		ZYTEL® FR72G25V0	
	Property	Test conditions	Standard ISO	Units	DAM	50% RH	DAM	50% RH
MECHANICAL	Yield stress	50 mm/min, 23°C	527-1/-2	MPa				
	Yield strain	50 mm/min, 23°C	527-1/-2	%				
	Stress at break (tensile)	5 mm/min, 23°C	527-1/-2	MPa	85	10	135	100
	Strain at break (tensile)	5 mm/min, 23°C	527-1/-2	%	14	85	2,5	3,5
		50 mm/min, 23°C			10			
	Nominal strain at break	50 mm/min, 23°C	527-1/-2	%	7	45		
	Tensile modulus	1 mm/min, 23°C	527-1/-2	MPa	3750	1900	9200	6500
	Charpy impact strength (unnotched)	23°C	179/1eU	kJ/m²	80		55	60
		–30°C					70	60
	Charpy impact strength (notched)	23°C	179/1eA	kJ/m²	4	9	12	14
		–30°C					11	9
	Izod impact strength (notched)	23°C	180/1A	kJ/m²	44		9	13
		–30°C					8	8
THERMAL	Melting temperature	10°C/min	11357-1/-3	°C	263		242	
	Temperature of deflection under load	0,45 MPa	75-1/-2	°C	230		240	
		1,8 MPa			70		215	
	Vicat softening temperature	50N, 50°C/h	306	°C			220	
	Coefficient of linear thermal expansion							
	Parallel (in flow direction)	23°C-55°C	11359-2	10^{-4}/°C			0,2	
	Normal (perpendicular to flow)	23°C-55°C					1,06	
ELECTRICAL	Comparative tracking index	23°C	IEC 60112	V			325	
	Electric strength (dielectric strength)	1 mm, 23°C	IEC 60243-1	kV/mm			35	25
	Surface resistivity	23°C	IEC 60093	ohm				
	Volume resistivity	23°C	IEC 60093	ohm · m			$>10^{13}$	
	Relative permittivity	10^2 Hz, 1 mm, 23°C	IEC 60250				4,5	
		10^6 Hz, 1 mm, 23°C					4,4	
	Dissipation factor	10^2 Hz, 1 mm, 23°C	IEC 60250	10^{-4}			180	
		10^6 Hz, 1 mm, 23°C					130	
OTHERS	Density		1183	kg/m³	1150		1490	
	Flammability classification[1]	1,5 mm	UL 94/ISO1210		V0		V0 (3 mm)	
	Glow wire flammability index	1,5 mm	60695-2-1	°C	960		960	
	Oxygen index		4589-1-2	%	29			
	Water absorption	Equilibrium, 50% RH, 23°C	Similar	%	2,6		1,1	
		Saturation, immersed, 23°C	to ISO 62		6,4		4,1	
	Rockwell hardness	Scale M, 23°C	2039/2					
		Scale R, 23°C						
	Ball indentation hardness H 358/30	23°C	2039-1	MPa				
	H 961/30	23°C					213	106
	Mould shrinkage[2]	Parallel (in flow direction) 2 mm	294-4	%	1,2		0,3	
		Normal (perpendicular to flow) 2 mm			1		0,8	

1) Numerical flame test ratings are not intended to present behaviour of moulded parts in real life fire conditions; each end-user must determine whether any potential flammability hazards exist with parts moulded from ZYTEL® nylon resins. UL yellow cards available upon request.
2) Depends on moulding conditions.

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Flame retardant

PA66		PA66		PA66		PA66	
ZYTEL® FR70G25GW		ZYTEL® FR70G25V0		ZYTEL® FR70M30V0		ZYTEL® FR70M40GW	
DAM	50% RH	DAM	50% RH	DAM	50% RH	DAM	50% RH
147	105	125	110	73	54	81	55
2,6	3	2	2,6	2	5	2	4
						2	4
9400	7200	9000	7500	8600	4500	8350	5200
54	54	43	45	20	25	25	30
		45	40	20	20		
6,5	6,5	10	10	2,5	3	2	3
		9	6,5	2	2		
5	5	6,5	6,5	2,3	2,5	2,7	2,7
		6	6	2	2		
263		263		263		263	
				240			
250		243		200		175	
		235		235			
		0,26		0,64			
		0,83		0,81			
400		325		325		425	
		37	26	40	33		
				$>10^{15}$			
		10^{13}		$>10^{13}$	10^{9}		
		4,3		4,1	9,1		
				3,7	4,2		
		160		140	4100		
		120		140	500		
1440		1490		1620		1620	
V2 (0,8 mm)		V0		V0		V2	
850		960		960		960	
				38			
		0,9		1,3			
		3,4		4			
		227	133				
0,3		0,23		1		0,75	
0,8				1		0,75	

Properties of ZYTEL® nylon resins

					High viscosity/Extrusion			
					PA66		PA66	
					ZYTEL® E40		ZYTEL® E42A	
	Property	Test conditions	Standard ISO	Units	DAM	50% RH	DAM	50% RH
MECHANICAL	Yield stress	50 mm/min, 23°C	527-1/-2	MPa	85	55	86	52
	Yield strain	50 mm/min, 23°C	527-1/-2	%	4,4	28	5	27
	Stress at break (tensile)	5 mm/min, 23°C	527-1/-2	MPa				
	Strain at break (tensile)	5 mm/min, 23°C	527-1/-2	%				
		50 mm/min, 23°C						
	Nominal strain at break	50 mm/min, 23°C	527-1/-2	%	50	>50	>50	>50
	Tensile modulus	1 mm/min, 23°C	527-1/-2	MPa	3000	1200	3100	1200
	Charpy impact strength (unnotched)	23°C	179/1eU	kJ/m²	NB	NB	NB	NB
		–30°C			NB	NB	NB	NB
	Charpy impact strength (notched)	23°C	179/1eA	kJ/m²	6	20	6	20
		–30°C			4	3	5	4
	Izod impact strength (notched)	23°C	180/1A	kJ/m²	5,6	12,6	5,5	12
		–30°C			3	2	4,5	4
THERMAL	Melting temperature	10°C/min	11357-1/-3	°C	263		263	
	Temperature of deflection under load	0,45 MPa	75-1/-2	°C	205		205	
		1,8 MPa			72		72	
	Vicat softening temperature	50N, 50°C/h	306	°C	240			
	Coefficient of linear thermal expansion							
	Parallel (in flow direction)	23°C-55°C	11359-2	10^{-4}/°C	1	1	1	
	Normal (perpendicular to flow)	23°C-55°C			1	1	1	
ELECTRICAL	Comparative tracking index	23°C	IEC 60112	V	600			
	Electric strength (dielectric strength)	1 mm, 23°C	IEC 60243-1	kV/mm			30,5	
	Surface resistivity	23°C	IEC 60093	ohm				10^{12}
	Volume resistivity	23°C	IEC 60093	ohm · m	10^{13}		10^{13}	10^{11}
	Relative permittivity	10^2 Hz, 1 mm, 23°C	IEC 60250		3,9		4,3	10,3
		10^6 Hz, 1 mm, 23°C					3,6	4,2
	Dissipation factor	10^2 Hz, 1 mm, 23°C	IEC 60250	10^{-4}	100		150	2000
		10^6 Hz, 1 mm, 23°C					240	750
OTHERS	Density		1183	kg/m³	1140		1140	
	Flammability classification[1]	1,5 mm	UL 94/ISO1210				HB	
	Glow wire flammability index	1,5 mm	60695-2-1	°C				
	Oxygen index		4589-1-2	%				
	Water absorption	Equilibrium, 50% RH, 23°C	Similar	%	2,7		2,7	
		Saturation, immersed, 23°C	to ISO 62		8,5		8,5	
	Rockwell hardness	Scale M, 23°C	2039/2					
		Scale R, 23°C						
	Ball indentation hardness H 358/30	23°C	2039-1	MPa				
	H 961/30	23°C						
	Mould shrinkage[2]	Parallel (in flow direction) 2 mm	294-4	%	1,4		1,4	
		Normal (perpendicular to flow) 2 mm			1,4		1,4	

1) Numerical flame test ratings are not intended to present behaviour of moulded parts in real life fire conditions; each end-user must determine whether any potential flammability hazards exist with parts moulded from ZYTEL® nylon resins. UL yellow cards available upon request.
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High viscosity/Extrusion

PA66		PA612	
ZYTEL® E51HSB		ZYTEL® 158	
DAM	50% RH	DAM	50% RH
85	55	62	52
4,3	29	4,3	19
>50	>100	35	>50
3000	1200	2400	1500
NB	NB	NB	NB
		NB	NB
7	21	4,2	8
		4,2	4
6	19	4	6
	2,5	5	4,5
263		218	
200		135	
70		62	
240		180	
1	1	1,2	
1	1	1,2	
600		600	
		10^{12}	
10^{13}		10^{13}	10^{11}
3,9		3,6	6
		3,2	4
100		140	
		165	1000
1140		1060	
		HB	
		25	28
2,7		1,3	
8,5		3	
		114	108
1,5		1,2	
1,5		1,2	

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