



DuPont™ Zytel® / Minlon®
nylon resin

PRODUCT AND PROPERTY GUIDE

Introduction

Zytel® is DuPont's registered trademark for its comprehensive range of nylon resins.

Minlon® is DuPont's registered trademark for its range of mineral and mineral / glass reinforced 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 molding, extrusion or blow molding) find extensive use in many applications including: automotive, electrical/electronic, domestic appliances, furniture and construction. Mineral, mineral/glass reinforced, rubber modified, plasticized and flame retardant nylons are available under the Zytel® and Minlon® trademark.

Products and properties

Zytel® / Minlon® nylon resins are classified by chemical composition into the following groups:

- Nylon 66
- Nylon 6
- Nylon 612

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

The key features of Minlon® nylons are:

- Optimum balance of strength & rigidity
- Low warpage
- Dimensional stability
- Paintability

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®/Minlon® nylons described in this brochure include:

- Unreinforced
- Tough/Super tough
- Glass and/or Mineral reinforced
- Toughened/Glass reinforced
- Flame retardant
- High viscosity/Extrusion

Effects of Moisture Absorption

Nylon resins absorb moisture from the air. In particular, nylon 6,6 equilibrates at about 2.5% water at 50% RH and at about 8.5% water at 100% RH. Absorbed moisture plasticizes nylon, somewhat lowering its strength, stiffness, and stress level, but increasing its toughness and elongation. Moisture absorption increases dimensions of nylon 6,6 by about 0.6% at 50% RH and about 2.6% at 100% RH. The process is reversible; that is, strength and stiffness increase and dimensions decrease as moisture content decreases. Absorption and desorption are slow processes. For example, a 1.5 mm (0.060 in) thick dry specimen will reach equilibrium moisture content after 125 days of exposure to 50% RH. Absorption can be accelerated by immersing the sample in hot water.

Zytel® Global Product Offering	
Product	Description
Unreinforced	
Zytel® 101 NC010	General purpose PA66, injection molding and extrusion grade
Zytel® 101L NC010 & BKB080	Lubricated PA66, injection molding grade
Zytel® 101F NC010 & BKB009	Fast molding, lubricated PA66
Zytel® 103FHS NC010 & BKB009	Fast molding, heat stabilized PA66
Zytel® 103HSL NC010 & BKB080	Heat stabilized, lubricated PA66
Zytel® 132F NC010	Fast molding, nucleated, lubricated PA66
Zytel® 145 BK010	Fast cycling, lubricated, UV resistant, high flow PA66; only in black color
Zytel® E51HSB NC010	Very High viscosity, heat stabilized PA66

Tough/Super Tough	
Zytel® MT409AHS NC010 & BK010	Medium tough PA66 with improved flow characteristics
Zytel® ST801A NC010A	Super tough PA6
Zytel® ST801AHS NC010 & BK010	Super tough PA66 with improved flow characteristics
Zytel® ST801AW NC010 & BK195	Super tough PA66 with improved flow characteristics for outdoor weathering
Zytel® ST7301 NC010 & BK356	Super tough, heat stabilized, lubricated PA6

Reinforced Materials	
Zytel® 70G13HS1L NC010 & BK031	13% glass reinforced, heat stabilized, lubricated PA66
Zytel® 70G13L NC010	13% glass reinforced, lubricated PA66
Zytel® 70G25HSLR NC010 & BK099	25% glass reinforced, heat stabilized, lubricated and hydrolysis resistant PA66
Zytel® 70G30HSLR NC010 & BK099	30% glass reinforced, heat stabilized, lubricated and hydrolysis resistant PA66
Zytel® 70G30L NC010	30% glass reinforced, lubricated PA66
Zytel® 70G33HS1L NC010 & BK031	33% glass reinforced, heat stabilized, lubricated PA66
Zytel® 70G33L NC010 & BK031	33% glass reinforced, lubricated PA66
Zytel® 70G35HSL NC010	35% glass reinforced, heat stabilized, lubricated PA66
Zytel® 70G35HSLRA4 BK267	35% glass reinforced, heat stabilized, lubricated, hydrolysis resistant PA66 with easy flow characteristics; only in black color
Zytel® 70G43HSLA BK099	43% glass reinforced, heat stabilized, lubricated PA66 with improved flow characteristics; only in black color
Zytel® 70G43L NC010	43% glass reinforced, lubricated PA66
Zytel® 70G50HSLA BK039B	50% glass reinforced, heat stabilized, hydrolysis resistant PA66 with improved flow characteristics; only in black color
Zytel® 73G15HSL BK363	15% glass reinforced, lubricated PA6; only in black color
Zytel® 73G15L NC010	15% glass reinforced, lubricated PA6
Zytel® 73G30HSL NC010 & BK416	30% glass reinforced, heat stabilized, lubricated PA6
Zytel® 73G30L NC010	30% glass reinforced, lubricated PA6
Zytel® 73G35HSL BK262	35% glass reinforced, heat stabilized, lubricated PA6; only in black color
Zytel® 73G45 BK263	45% glass reinforced PA6; only in black color
Zytel® 73G45L NC010	45% glass reinforced, lubricated PA6
Zytel® 70K20HSL NC010 & BK284	Heat stabilized PA66 modified with Kevlar® fiber for excellent wear resistance
Zytel® 77G33L BK031 & NC010	33% glass reinforced, lubricated PA612
Zytel® 77G43L BK031 & NC010	43% glass reinforced, lubricated PA612
Zytel® FE5382 BK276	33% glass reinforced, heat stabilized PA612; only in black color

Zytel® Global Product Offering	
Product	Description
Toughened Glass Reinforced	
Zytel® 73G30T NC010 & BK261	Toughened, 30% glass reinforced PA6
Zytel® 80G14A NC010A	Toughened, 14% glass reinforced, high flow PA66
Zytel® 80G14AHS NC010 & BK099	Toughened, 14% glass reinforced, high flow PA66
Zytel® 80G25HS BK117	Toughened, 25% glass reinforced, heat stabilized PA66; only in black color
Zytel® 80G33HS1L NC010 & BK104	Toughened, 33% glass reinforced, heat stabilized, lubricated PA66
Zytel® 80G33L NC010	Toughened, 33% glass reinforced, lubricated PA66
Zytel® 80G43HS1L BK104	Toughened, 43% glass reinforced, heat stabilized, lubricated PA66; only in black color

Flame Retardant	
Zytel® FR50 NC010A	25% glass reinforced PA66, UL94-V0 rating
Zytel® FR7025V0F NC010	Unreinforced PA66, UL94-V0 rated
Zytel® FR7026V0F NC010 & BK001	Unreinforced, heat stabilized PA66, UL94-V0 rated
Zytel® FR70M30V0 NC010 & BK010	30% mineral reinforced PA66, UL94-V0 rating

Minlon® Global Product Offering	
Minlon® 73GM40 NC010	40% mineral/glass reinforced, heat stabilized PA6
Minlon® 73M30 NC010	30% mineral reinforced, heat stabilized PA6
Minlon® 73M40 NC010	40% mineral reinforced, heat stabilized PA6
Minlon® EFE6053 BK413	40% mineral/glass reinforced, heat stabilized PA66; only in black color

					Unreinforced - PA66						
					Zytel® 101 NC010		Zytel® 101F NC010		Zytel® 101L NC010		
					Zytel® 101 NC010 is a general purpose polyamide 66 resin for injection molding and extrusion.		Zytel® 101F NC010 is an internally lubricated polyamide 66 resin for injection molding. It was developed for fast cycles and high productivity.		Zytel® 101L NC010 is a lubricated polyamide 66 resin for injection molding.		
DAM		50%RH		DAM		50%RH		DAM		50%RH	
ID	Resin Identification		ISO 1043		PA66		PA66		PA66		
	Part Marking Code		ISO 11469		>PA66<		>PA66<		>PA66<		
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa	82	55	82	55	82	55	
				kpsi	11.9	8	11.9	8.0	11.9	8.0	
	Yield Strain * pull speed @ 50mm/min		ISO 527	%	4.5	25	4.5	25	4.5	25	
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa							
				kpsi							
	Strain at Break * pull speed @ 50mm/min		ISO 527	%	45*		40*	>100*	45*		
	Nominal Strain at Break		ISO 527	%	25	>50	20	>100	25	>100	
	Tensile Modulus		ISO 527	MPa	3100	1400	3100	1400	3100	1400	
				kpsi	450	200	450	200	450	200	
	Tensile Stress	@ 50% Strain	ISO 527	MPa							
				kpsi							
	Tensile Creep Modulus	1h	ISO 899	MPa				1400		1400	
				kpsi				200		200	
		1000h		MPa				930		820	
				kpsi				135		119	
	Poissons Ratio				0.41		0.4		0.41		
	Flexural Modulus		ISO 178	MPa	2800	1200	2800	1200	2800	1200	
				kpsi	410	174	410	174	410	174	
	Flexural Strength		ISO 178	MPa							
				kpsi							
Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2	3		3		3			
	-30°C (-22°F)			4.5	3	4.5	3	4.5	3		
	23°C (73°F)			5.5	15	6	13	5.5	15		
Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2								
	-30°C (-22°F)			400	NB	400	NB	400	NB		
	23°C (73°F)			NB	NB	NB	NB	NB	NB		

					Unreinforced - PA66							
					Zytel® 101 NC010		Zytel® 101F NC010		Zytel® 101L NC010			
					DAM		50%RH		DAM		50%RH	
ID	Resin Identification		ISO 1043		PA66		PA66		PA66			
	Part Marking Code		ISO 11469		>PA66<		>PA66<		>PA66<			
Thermal	Deflection Temperature	0.45MPa	ISO 75-1/-2	C	200		200		200			
				F	392		392		392			
		1.80MPa		C	70		70		70			
				F	158		158		158			
	Melting Temperature	10°C/min	ISO 11357-1/-3	C	262		262		262			
				F	504		504		504			
	CLTE, Parallel	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C								
				E-4/F								
		23 - 55°C (73 - 130°F)		E-4/C			1.0		1.0			
				E-4/F			0.55		0.55			
		55 - 160°C (130 - 320° F)		E-4/C								
				E-4/F								
	CLTE, Normal	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C								
				E-4/F								
		23 - 55°C (73 - 130°F)		E-4/C			1.1		1.1			
				E-4/F			0.61		0.61			
		55 - 160°C (130 - 320° F)		E-4/C								
				E-4/F								
	Vicat Softening Temperature	50N	ISO 306	C			238		238			
				F			460		460			

					Unreinforced - PA66					
					Zytel® 101 NC010		Zytel® 101F NC010		Zytel® 101L NC010	
					Zytel® 101 NC010 is a general purpose polyamide 66 resin for injection molding and extrusion.		Zytel® 101F NC010 is an internally lubricated polyamide 66 resin for injection molding. It was developed for fast cycles and high productivity.		Zytel® 101L NC010 is a lubricated polyamide 66 resin for injection molding.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66		PA66		PA66	
	Part Marking Code		ISO 11469		>PA66<		>PA66<		>PA66<	
Flammability	Flammability Classification		IEC 60695-11-10 UL94		V-2 @ 0.71mm		V-2 @ 0.71mm		V-2 @ 0.71mm	
	5V Rating		IEC 60695-11-20 UL94							
	Oxygen Index		ISO 4589-1/-2	%			28		28	
	Glow Wire Flammability Index		IEC 60695-2-12	C	960 @ 0.71mm		960 @ 0.71mm		960 @ 0.71mm	
	Glow Wire Ignition Temperature		IEC 60695-2-13	C	725 @ 0.71mm 750 @ 1.5mm 800 @ 3.0mm		725 @ 0.71mm 750 @ 1.5mm 800 @ 3.0mm		725 @ 0.71mm 750 @ 1.5mm 800 @ 3.0mm	
	High Amperage Arc Ignition Resistance		UL 746A	PLC	0 @ 0.71mm		0 @ 0.71mm		0 @ 0.71mm	
				arcs	120 @ 0.71mm 168 @ 1.5mm 182 @ 3.0mm 200 @ 6.0mm		120 @ 0.71mm 168 @ 1.5mm 182 @ 3.0mm 200 @ 6.0mm		120 @ 0.71mm 168 @ 1.5mm 182 @ 3.0mm 200 @ 6.0mm	
	High Current Arc Ignition Resistance		UL 746A	PLC						
	High Voltage Arc Tracking Rate		UL 746A	PLC	0		0		0	
				mm/min	5.10		5			
Hot Wire Ignition		UL 746A	PLC	4 @ 0.71mm 3 @ 1.5mm 2 @ 3.0mm		4 @ 0.71mm 3 @ 1.5mm 2 @ 3.0mm		4 @ 0.71mm 3 @ 1.5mm 2 @ 3.0mm		
			s	7 @ 0.71mm 13 @ 1.5mm 17 @ 3.0mm 20 @ 6.0mm		7 @ 0.71mm 13 @ 1.5mm 17 @ 3.0mm 20 @ 6.0mm		7 @ 0.71mm 13 @ 1.5mm 17 @ 3.0mm 20 @ 6.0mm		

					Unreinforced - PA66					
					Zytel® 101 NC010		Zytel® 101F NC010		Zytel® 101L NC010	
					Zytel® 101 NC010 is a general purpose polyamide 66 resin for injection molding and extrusion.		Zytel® 101F NC010 is an internally lubricated polyamide 66 resin for injection molding. It was developed for fast cycles and high productivity.		Zytel® 101L NC010 is a lubricated polyamide 66 resin for injection molding.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66		PA66		PA66	
	Part Marking Code		ISO 11469		>PA66<		>PA66<		>PA66<	
Electrical	Surface Resistivity		IEC 60093	ohm			1E12	1E12	1E12	
	Volume Resistivity		IEC 60093	ohm m			1E13	1E14	1E12	1E10
	Electric Strength	1.0mm	IEC 60243-1	kV/mm			31.5	26	31.5	
				V/mil			800	660	800	
		2.0mm		kV/mm						
				V/mil						
	Relative Permittivity	1E2 Hz	IEC 60250				3.8	8.0	3.8	10.9
		1E3 Hz					3.9	7.0		
		1E6 Hz					3.6	4.6	3.5	4
	Dissipation Factor	1E2 Hz	IEC 60250	E-4			140		80	2100
		1E3 Hz					200	200		
		1E6 Hz					180	1000	180	750
RTI	Arc Resistance	3.0mm	UL 746A	s						
	CTI	3.0mm	IEC 60112 UL 746A	PLC V	0 >600		0 >600		0 >600	
	RTI, Electrical		UL 746B	C	130 @ 0.71mm		130 @ 0.71mm		130 @ 0.71mm	
Other	RTI, Impact		UL 746B	C	75 @ 0.71mm		75 @ 0.71mm		75 @ 0.71mm	
	RTI, Strength		UL 746B	C	85 @ 0.71mm		85 @ 0.71mm		85 @ 0.71mm	
Other	Density		ISO 1183	kg/m3 g/cm3			1140 1.14		1140 1.14	
	Water Absorption	Equilibrium 50%RH	ISO 62, Similar to	%	2.6		2.6		2.6	
		Immersion 24h								
		Saturation, immersed			8.5		8.5		8.5	
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%	1.4		1.4		1.4	
		Parallel, 2.0mm			1.4		1.4		1.4	

					Unreinforced - PA66			
					Zytel® 103FHS NC010		Zytel® 103HSL NC010	
					Zytel® 103FHS NC010 is a heat stabilized, internally lubricated polyamide 66 resin for injection molding. It was developed for fast cycles and high productivity.		Zytel® 103HSL NC010 is a heat stabilized, lubricated polyamide 66 resin for injection molding.	
					DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66		PA66	
	Part Marking Code		ISO 11469		>PA66<		>PA66<	
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa	85	55	85	55
				kpsi	12.3	8.0	12.3	8.0
	Yield Strain * pull speed @ 50mm/min		ISO 527	%	4.5	25	4.5	25
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa				
				kpsi				
	Strain at Break * pull speed @ 50mm/min		ISO 527	%			40*	>100*
	Nominal Strain at Break		ISO 527	%	20	>100	20	>100
	Tensile Modulus		ISO 527	MPa	3100	1400	3100	1400
				kpsi	450	200	450	200
	Tensile Stress	@ 50% Strain	ISO 527	MPa				
				kpsi				
	Tensile Creep Modulus	1h	ISO 899	MPa				1190
				kpsi				170
		1000h		MPa				540
				kpsi				80
	Poissons Ratio							
	Flexural Modulus		ISO 178	MPa	2800	1300	2800	1200
				kpsi	410	190	410	174
	Flexural Strength		ISO 178	MPa				
				kpsi				
	Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2	3		3	
		-30°C (-22°F)			4.5	3	4.5	3.5
		23°C (73°F)			5.5	11	5.5	12
	Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2				
		-30°C (-22°F)			350	NB	400	NB
		23°C (73°F)			NB	NB	NB	NB

Unreinforced - PA66			
Zytel® 103FHS NC010		Zytel® 103HSL NC010	
Zytel® 103FHS NC010 is a heat stabilized, internally lubricated polyamide 66 resin for injection molding. It was developed for fast cycles and high productivity.		Zytel® 103HSL NC010 is a heat stabilized, lubricated polyamide 66 resin for injection molding.	
DAM	50%RH	DAM	50%RH

ID	Resin Identification		ISO 1043	
	Part Marking Code		ISO 11469	
Thermal	Deflection Temperature	0.45MPa	ISO 75-1/-2	C
				F
		1.80MPa		C
				F
	Melting Temperature	10°C/min	ISO 11357-1/-3	C
				F
	CLTE, Parallel	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C
				E-4/F
		23 - 55°C (73 - 130°F)		E-4/C
				E-4/F
		55 - 160°C (130 - 320°F)		E-4/C
				E-4/F
	CLTE, Normal	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C
				E-4/F
		23 - 55°C (73 - 130°F)		E-4/C
				E-4/F
		55 - 160°C (130 - 320°F)		E-4/C
				E-4/F
Vicat Softening Temperature	50N	ISO 306	C	
			F	

					Unreinforced - PA66			
					Zytel® 103FHS NC010		Zytel® 103HSL NC010	
					Zytel® 103FHS NC010 is a heat stabilized, internally lubricated polyamide 66 resin for injection molding. It was developed for fast cycles and high productivity.		Zytel® 103HSL NC010 is a heat stabilized, lubricated polyamide 66 resin for injection molding.	
					DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66		PA66	
	Part Marking Code		ISO 11469		>PA66<		>PA66<	
Flammability	Flammability Classification		IEC 60695-11-10 UL94		V-2 @ 0.71mm		V-2 @ 0.71mm	
	5V Rating		IEC 60695-11-20 UL94					
	Oxygen Index		ISO 4589-1/-2	%	28		28	
	Glow Wire Flammability Index		IEC 60695-2-12	C	850 @ 0.71mm 960 @ 1.5mm		850 @ 0.71mm 960 @ 1.5mm	
	Glow Wire Ignition Temperature		IEC 60695-2-13	C	725 @ 0.71mm		725 @ 0.71mm	
	High Amperage Arc Ignition Resistance		UL 746A	PLC	0 @ 0.71mm		0 @ 0.71mm	
				arcs	200 @ 0.71mm >200 @ 1.5mm		>200 @ 1.5mm	
	High Current Arc Ignition Resistance		UL 746A	PLC				
	High Voltage Arc Tracking Rate		UL 746A	PLC	0		0	
				mm/min				
	Hot Wire Ignition		UL 746A	PLC	4 @ 0.71mm 3 @ 3.0mm		4 @ 0.71mm 3 @ 3.0mm	
				s	9 @ 0.71mm 11 @ 1.5mm 24 @ 3.0mm		9 @ 0.75mm 11 @ 1.5mm 24 @ 3.0mm	

					Unreinforced - PA66			
					Zytel® 103FHS NC010		Zytel® 103HSL NC010	
					Zytel® 103FHS NC010 is a heat stabilized, internally lubricated polyamide 66 resin for injection molding. It was developed for fast cycles and high productivity.		Zytel® 103HSL NC010 is a heat stabilized, lubricated polyamide 66 resin for injection molding.	
					DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66		PA66	
	Part Marking Code		ISO 11469		>PA66<		>PA66<	
Electrical	Surface Resistivity		IEC 60093	ohm			1E12	1E12
	Volume Resistivity		IEC 60093	ohm m			1E13	
	Electric Strength	1.0mm	IEC 60243-1	kV/mm			31	28
				V/mil			786	710
		2.0mm		kV/mm				
				V/mil				
	Relative Permittivity	1E2 Hz	IEC 60250				3.8	12.8
		1E3 Hz						
		1E6 Hz					3.5	4
	Dissipation Factor	1E2 Hz	IEC 60250	E-4			75	5800
		1E3 Hz						
		1E6 Hz					165	700
	Arc Resistance	3.0mm	UL 746A	s				
RTI	CTI	3.0mm	IEC 60112 UL 746A	PLC	0		0	
				V	600		600	
Other	RTI, Electrical		UL 746B	C	140 @ 0.71mm		140 @ 0.71mm	
	RTI, Impact		UL 746B	C	95 @ 0.71mm 110 @ 1.5mm		95 @ 0.71mm 110 @ 1.5mm	
	RTI, Strength		UL 746B	C	115 @ 0.71mm 125 @ 1.5mm		115 @ 0.71mm 125 @ 1.5mm	
	Density		ISO 1183	kg/m3	1140		1140	
				g/cm3	1.14		1.14	
	Water Absorption	Equilibrium 50%RH	ISO 62, Similar to	%	2.6		2.6	
		Immersion 24h						
		Saturation, immersed			8.5		8.5	
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%	1.3		1.3	
		Parallel, 2.0mm			1.4		1.3	

					Unreinforced - PA66					
					Zytel® 132F NC010		Zytel® 145 BK010		Zytel® E51HSB NC010	
					Zytel® 132F NC010 is a nucleated, lubricated polyamide 66 for injection molding. It was developed for fast production cycles and high productivity applications.		Zytel® 145 BK010 is a weather resistant, high flow, fast cycling, modified polyamide 66 resin with improved toughness. It was previously coded Zytel® FE3791 BK010.		Zytel® E51HSB NC010 is a high molecular weight, heat stabilized polyamide 66 resin for injection molding and extrusion.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66		PA66		PA66	
	Part Marking Code		ISO 11469		>PA66<		>PA66<		>PA66<	
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa	91	60	79	50	84	55
				kpsi	13.2	8.7	11.5	7.0	12.2	8.0
	Yield Strain * pull speed @ 50mm/min		ISO 527	%	4.5	22	4	26	4.3	29
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa						
				kpsi						
	Strain at Break * pull speed @ 50mm/min		ISO 527	%	20*				>50*	
	Nominal Strain at Break		ISO 527	%	13	>50	16	130	35	>100
	Tensile Modulus		ISO 527	MPa	3400	1600	3100	1100	3100	1200
				kpsi	493	232	450	160	450	174
	Tensile Stress	@ 50% Strain	ISO 527	MPa						
				kpsi						
	Tensile Creep Modulus	1h	ISO 899	MPa						
				kpsi						
		1000h		MPa						
				kpsi						
	Poissons Ratio									
	Flexural Modulus		ISO 178	MPa	3000	1400	2800	1000	2800	
				kpsi	435	203	410	145	410	
	Flexural Strength		ISO 178	MPa						
				kpsi						
	Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2						
		-30°C (-22°F)			3.5	2.5				
		23°C (73°F)			4	8	6	28	7	21
	Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2						
		-30°C (-22°F)			200					
		23°C (73°F)			300	NB			NB	

Unreinforced - PA66					
Zytel® 132F NC010		Zytel® 145 BK010		Zytel® E51HSB NC010	
Zytel® 132F NC010 is a nucleated, lubricated polyamide 66 for injection molding. It was developed for fast production cycles and high productivity applications.		Zytel® 145 BK010 is a weather resistant, high flow, fast cycling, modified polyamide 66 resin with improved toughness. It was previously coded Zytel® FE3791 BK010.		Zytel® E51HSB NC010 is a high molecular weight, heat stabilized polyamide 66 resin for injection molding and extrusion.	
DAM	50%RH	DAM	50%RH	DAM	50%RH
PA66		PA66		PA66	
>PA66<		>PA66<		>PA66<	
225		190		200	
437		374		392	
75		65		70	
167		149		158	
262		262		262	
504		504		504	
		0.7			
		0.4			
		1.1			
		0.6			
		1.3			
		0.7			
		0.7			
		0.4			
		1.1			
		0.6			
		1.4			
		0.7			

					Unreinforced - PA66					
					Zytel® 132F NC010		Zytel® 145 BK010		Zytel® E51HSB NC010	
					Zytel® 132F NC010 is a nucleated, lubricated polyamide 66 for injection molding. It was developed for fast production cycles and high productivity applications.		Zytel® 145 BK010 is a weather resistant, high flow, fast cycling, modified polyamide 66 resin with improved toughness. It was previously coded Zytel® FE3791 BK010.		Zytel® E51HSB NC010 is a high molecular weight, heat stabilized polyamide 66 resin for injection molding and extrusion.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66		PA66		PA66	
	Part Marking Code		ISO 11469		>PA66<		>PA66<		>PA66<	
Flammability	Flammability Classification		IEC 60695-11-10 UL94		V-2 @ 0.71mm		V-2 @ 0.81mm			
	5V Rating		IEC 60695-11-20 UL94							
	Oxygen Index		ISO 4589-1/-2	%	29					
	Glow Wire Flammability Index		IEC 60695-2-12	C	960 @ 0.71mm					
	Glow Wire Ignition Temperature		IEC 60695-2-13	C	725 @ 0.71mm 750 @ 1.5mm 800 @ 3.0mm					
	High Amperage Arc Ignition Resistance		UL 746A	PLC	0 @ 0.71mm		0 @ 0.81mm			
				arcs	120 @ 0.71mm 168 @ 1.5mm 182 @ 3.0mm 200 @ 6.0mm		120 @ 0.81mm			
	High Current Arc Ignition Resistance		UL 746A	PLC						
	High Voltage Arc Tracking Rate		UL 746A	PLC	0		0			
				mm/min	5					
Hot Wire Ignition			UL 746A	PLC	4 @ 0.71mm 3 @ 1.5mm 2 @ 3.0mm		4 @ 0.81mm 3 @ 1.5mm 2 @ 3.0mm			
				s	7 @ 0.71mm 13 @ 1.5mm 17 @ 3.0mm 20 @ 6.0mm		7 @ 1.81mm 15 @ 1.5mm 30 @ 3.0mm 30 @ 6.0mm			

					Unreinforced - PA66					
					Zytel® 132F NC010		Zytel® 145 BK010		Zytel® E51HSB NC010	
					Zytel® 132F NC010 is a nucleated, lubricated polyamide 66 for injection molding. It was developed for fast production cycles and high productivity applications.		Zytel® 145 BK010 is a weather resistant, high flow, fast cycling, modified polyamide 66 resin with improved toughness. It was previously coded Zytel® FE3791 BK010.		Zytel® E51HSB NC010 is a high molecular weight, heat stabilized polyamide 66 resin for injection molding and extrusion.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66		PA66		PA66	
	Part Marking Code		ISO 11469		>PA66<		>PA66<		>PA66<	
Electrical	Surface Resistivity		IEC 60093	ohm			1E15			
	Volume Resistivity		IEC 60093	ohm m			1E14			
	Electric Strength	1.0mm	IEC 60243-1	kV/mm						
				V/mil						
		2.0mm		kV/mm			24.0			
				V/mil			609			
	Relative Permittivity	1E2 Hz	IEC 60250				4.1			
		1E3 Hz					4.0			
		1E6 Hz					3.7			
	Dissipation Factor	1E2 Hz	IEC 60250	E-4			95			
		1E3 Hz					140			
		1E6 Hz					180			
Arc Resistance	3.0mm	UL 746A	s							
CTI	3.0mm	IEC 60112 UL 746A	PLC	0		0				
			V	>600		600				
RTI	RTI, Electrical		UL 746B	C	130 @ 0.71mm		125 @ 0.81mm			
	RTI, Impact		UL 746B	C	75 @ 0.71mm		65 @ 0.81mm 75 @ 1.5mm			
	RTI, Strength		UL 746B	C	85 @ 0.71mm		65 @ 0.81mm 85 @ 1.5mm			
Other	Density		ISO 1183	kg/m3	1140		1140		1140	
				g/cm3	1.14		1.14		1.14	
	Water Absorption	Equilibrium 50%RH	ISO 62, Similar to	%	2.6				2.6	
		Immersion 24h					1.7			
		Saturation, immersed					8.5			8.5
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%	1.2		1.6		1.3	
Parallel, 2.0mm		0.9				1.5		1.3		

					Toughened - PA66					
					Zytel® ST801A NC010A		Zytel® ST801AHS NC010		Zytel® ST801AW NC010	
					Zytel® ST801A NC010A is a Super Tough, high performance, polyamide 66 resin. It is partially UV stabilized and when appropriately colored offers limited protection to indirect sunlight exposure.		Zytel® ST801AHS NC010 is a Super Tough, high performance polyamide 66 resin. It offers outstanding molding performance in injection molding applications.		Zytel® ST801AW NC010 is a Super Tough, high performance polyamide 66 resin. It is UV stabilized and when appropriately colored offers the best resistance to indirect sunlight in automotive interior applications.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-HI		PA66-HI		PA66-HI	
	Part Marking Code		ISO 11469		>PA66-HI<		>PA66-HI<		>PA66-HI<	
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa	48		52	39	49	35.5
				kpsi	6.9		7.5	5.7	7.1	5.1
	Yield Strain * pull speed @ 50mm/min		ISO 527	%	20	>50	4	>50	5	26.5
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa					45*	48*
				kpsi					6.5*	7.0*
	Strain at Break * pull speed @ 50mm/min		ISO 527	%					74*	
	Nominal Strain at Break		ISO 527	%	50	>50	47	>50	44	>50
	Tensile Modulus		ISO 527	MPa	2000	900	2000	910	1900	775
				kpsi	290	131	290	132	276	112
	Tensile Stress	@ 50% Strain	ISO 527	MPa	49	44	52	45	50	48
				kpsi	7.1	6.3	7.5	6.5	7.2	7.0
	Tensile Creep Modulus	1h	ISO 899	MPa						
				kpsi						
		1000h		MPa						
				kpsi						
	Poissons Ratio									
	Flexural Modulus		ISO 178	MPa	1800	682	1890	823	1800	728
				kpsi	261	99	274	119	261	106
	Flexural Strength		ISO 178	MPa						
				kpsi						
	Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2					21	
		-30°C (-22°F)							23	
		23°C (73°F)							83	
	Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2					240	
		-30°C (-22°F)							NB	
		23°C (73°F)							NB	

Toughened - PA66					
Zytel® ST801A NC010A		Zytel® ST801AHS NC010		Zytel® ST801AW NC010	
Zytel® ST801A NC010A is a Super Tough, high performance, polyamide 66 resin. It is partially UV stabilized and when appropriately colored offers limited protection to indirect sunlight exposure.		Zytel® ST801AHS NC010 is a Super Tough, high performance polyamide 66 resin. It offers outstanding molding performance in injection molding applications.		Zytel® ST801AW NC010 is a Super Tough, high performance polyamide 66 resin. It is UV stabilized and when appropriately colored offers the best resistance to indirect sunlight in automotive interior applications.	
DAM	50%RH	DAM	50%RH	DAM	50%RH
PA66-HI		PA66-HI		PA66-HI	
>PA66-HI<		>PA66-HI<		>PA66-HI<	
157		157		155	
315		315		311	
63		62		60	
145		144		140	
262		262		262	
504		504		504	
1.1		0.8		1.2	
0.6		0.5		0.7	
1.4		0.9		1.4	
0.8		0.5		0.8	
1.6		1.0		1.7	
0.9		0.6		0.9	
1.1		1.0		1.1	
0.6		0.6		0.6	
1.3		1.2		1.2	
0.7		0.7		0.7	
1.3		1.5		1.2	
0.7		0.9		0.7	

					Toughened - PA66					
					Zytel® ST801A NC010A		Zytel® ST801AHS NC010		Zytel® ST801AW NC010	
					Zytel® ST801A NC010A is a Super Tough, high performance, polyamide 66 resin. It is partially UV stabilized and when appropriately colored offers limited protection to indirect sunlight exposure.		Zytel® ST801AHS NC010 is a Super Tough, high performance polyamide 66 resin. It offers outstanding molding performance in injection molding applications.		Zytel® ST801AW NC010 is a Super Tough, high performance polyamide 66 resin. It is UV stabilized and when appropriately colored offers the best resistance to indirect sunlight in automotive interior applications.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-HI		PA66-HI		PA66-HI	
	Part Marking Code		ISO 11469		>PA66-HI<		>PA66-HI<		>PA66-HI<	
Flammability	Flammability Classification		IEC 60695-11-10 UL94		HB @ 0.81mm		HB @ 0.75mm		HB @ 0.75mm	
	5V Rating		IEC 60695-11-20 UL94							
	Oxygen Index		ISO 4589-1/-2	%						
	Glow Wire Flammability Index		IEC 60695-2-12	C						
	Glow Wire Ignition Temperature		IEC 60695-2-13	C						
	High Amperage Arc Ignition Resistance		UL 746A	PLC	0 @ 0.81mm		0 @ 0.75mm		0 @ 0.75mm	
				arcs	>200 @ 0.81mm		>200 @ 0.75mm		150 @ 0.75mm	
	High Current Arc Ignition Resistance		UL 746A	PLC						
	High Voltage Arc Tracking Rate		UL 746A	PLC	0		0		0	
				mm/min			7.6			
Hot Wire Ignition		UL 746A	PLC	4 @ 0.81mm 3 @ 1.5mm		4 @ 0.75mm 3 @ 3.0mm		3 @ 0.75mm 1 @ 3.0mm		
			s	9 @ 0.81mm 15 @ 1.5mm 20 @ 3.0mm		9 @ 0.75mm 14 @ 1.5mm 20 @ 3.0mm		19 @ 0.75mm 28 @ 1.5mm 73 @ 3.0mm		

				Toughened - PA66						
				Zytel® ST801A NC010A		Zytel® ST801AHS NC010		Zytel® ST801AW NC010		
				Zytel® ST801A NC010A is a Super Tough, high performance, polyamide 66 resin. It is partially UV stabilized and when appropriately colored offers limited protection to indirect sunlight exposure.		Zytel® ST801AHS NC010 is a Super Tough, high performance polyamide 66 resin. It offers outstanding molding performance in injection molding applications.		Zytel® ST801AW NC010 is a Super Tough, high performance polyamide 66 resin. It is UV stabilized and when appropriately colored offers the best resistance to indirect sunlight in automotive interior applications.		
				DAM	50%RH	DAM	50%RH	DAM	50%RH	
ID	Resin Identification		ISO 1043		PA66-HI		PA66-HI		PA66-HI	
	Part Marking Code		ISO 11469		>PA66-HI<		>PA66-HI<		>PA66-HI<	
Electrical	Surface Resistivity		IEC 60093	ohm	1.2E16	1.0E12	3.0E15	5.0E12	2.7E15	7.1E12
	Volume Resistivity		IEC 60093	ohm m	3.7E14	8.7E10	1.8E14	2.7E10	2.5E14	2.4E10
	Electric Strength	1.0mm	IEC 60243-1	kV/mm						
				V/mil						
		2.0mm		kV/mm	25	26	24	24	26	26
				V/mil	635	660	610	610	660	660
	Relative Permittivity	1E2 Hz	IEC 60250		3.5	5.9	3.5	6.2	3.4	6.0
		1E3 Hz								
		1E6 Hz			3.3	3.5	3.3	3.6	3.2	3.5
	Dissipation Factor	1E2 Hz	IEC 60250	E-4	50	1580	50	1770	50	1760
		1E3 Hz								
		1E6 Hz			100	380	110	400	110	380
	Arc Resistance	3.0mm	UL 746A	s						
	CTI	3.0mm	IEC 60112 UL 746A	PLC	0		0		0	
V				>600		600	>600	600		
RTI	RTI, Electrical		UL 746B	C	125 @ 0.81mm		130 @ 0.75mm		125 @ 0.75mm	
	RTI, Impact		UL 746B	C	75 @ 0.81mm		65 @ 0.75mm 105 @ 1.5mm		75 @ 0.75mm	
	RTI, Strength		UL 746B	C	85 @ 0.81mm		95 @ 0.75mm 105 @ 1.5mm 110 @ 3.0mm		85 @ 0.75mm	
Other	Density		ISO 1183	kg/m3 g/cm3	1070 1.07		1080 1.08		1080 1.08	
	Water Absorption	Equilibrium 50%RH	ISO 62, Similar to	%						
		Immersion 24h			1.1		1.1		1.17	
		Saturation, immersed					6.7			
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%	1.7		1.8		1.8	
Parallel, 2.0mm		2.0				2.0		2.0		

Toughened - PA66			
Zytel® MT409AHS NC010		Zytel® ST7301 NC010	
Zytel® MT409AHS NC010 is a Medium Toughened, high performance, heat stabilized polyamide 66 resin having good stiffness, improved knit line strength, surface appearance with outstanding processability.		Zytel® ST7301 NC010 is a Super Tough, heat stabilized, lubricated polyamide 6 resin for injection molding and extrusion. It offers outstanding impact resistance over a wide temperature and humidity range and high productivity.	
DAM	50%RH	DAM	50%RH

ID	Resin Identification		ISO 1043		PA66-I		PA6-HI	
	Part Marking Code		ISO 11469		>PA66-I<		>PA6-HI<	
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa	62	43	48	29
				kpsi	9.0	6.2	7	4.2
	Yield Strain * pull speed @ 50mm/min		ISO 527	%	5	28	4	30
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa				
				kpsi				
	Strain at Break * pull speed @ 50mm/min		ISO 527	%			>50*	>50*
	Nominal Strain at Break		ISO 527	%	24	>50	>50	>50
	Tensile Modulus		ISO 527	MPa	2500	1075	1800	540
				kpsi	363	156	261	78.3
	Tensile Stress	@ 50% Strain	ISO 527	MPa	65	44		
				kpsi	9.4	6.3		
	Tensile Creep Modulus	1h	ISO 899	MPa				
				kpsi				
		1000h		MPa				
				kpsi				
	Poissons Ratio							
	Flexural Modulus		ISO 178	MPa	2300	1075	1700	570
				kpsi	334	156	247	82.7
	Flexural Strength		ISO 178	MPa				
				kpsi				
	Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2	13		18	17
		-30°C (-22°F)					17	18
		23°C (73°F)			21		78	118
	Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2				
		-30°C (-22°F)						
		23°C (73°F)						

Toughened - PA66			
Zytel® MT409AHS NC010		Zytel® ST7301 NC010	
Zytel® MT409AHS NC010 is a Medium Toughened, high performance, heat stabilized polyamide 66 resin having good stiffness, improved knit line strength, surface appearance with outstanding processability.		Zytel® ST7301 NC010 is a Super Tough, heat stabilized, lubricated polyamide 6 resin for injection molding and extrusion. It offers outstanding impact resistance over a wide temperature and humidity range and high productivity.	
DAM	50%RH	DAM	50%RH

ID	Resin Identification		ISO 1043	
	Part Marking Code		ISO 11469	
Thermal	Deflection Temperature	0.45MPa	ISO 75-1/-2	C
				F
		1.80MPa		C
				F
	Melting Temperature	10°C/min	ISO 11357-1/-3	C
				F
	CLTE, Parallel	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C
				E-4/F
		23 - 55°C (73 - 130°F)		E-4/C
				E-4/F
		55 - 160°C (130 - 320°F)		E-4/C
				E-4/F
	CLTE, Normal	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C
				E-4/F
		23 - 55°C (73 - 130°F)		E-4/C
				E-4/F
		55 - 160°C (130 - 320°F)		E-4/C
				E-4/F
Vicat Softening Temperature	50N	ISO 306	C	
			F	

Toughened - PA66			
Zytel® MT409AHS NC010		Zytel® ST7301 NC010	
Zytel® MT409AHS NC010 is a Medium Toughened, high performance, heat stabilized polyamide 66 resin having good stiffness, improved knit line strength, surface appearance with outstanding processability.		Zytel® ST7301 NC010 is a Super Tough, heat stabilized, lubricated polyamide 6 resin for injection molding and extrusion. It offers outstanding impact resistance over a wide temperature and humidity range and high productivity.	
DAM	50%RH	DAM	50%RH

ID	Resin Identification		ISO 1043	
	Part Marking Code		ISO 11469	
Flammability	Flammability Classification		IEC 60695-11-10 UL94	
	5V Rating		IEC 60695-11-20 UL94	
	Oxygen Index		ISO 4589-1/-2	%
	Glow Wire Flammability Index		IEC 60695-2-12	C
	Glow Wire Ignition Temperature		IEC 60695-2-13	C
	High Amperage Arc Ignition Resistance		UL 746A	PLC
				arcs
	High Current Arc Ignition Resistance		UL 746A	PLC
	High Voltage Arc Tracking Rate		UL 746A	PLC
				mm/min
	Hot Wire Ignition		UL 746A	PLC
				s

					Toughened - PA66			
					Zytel® MT409AHS NC010		Zytel® ST7301 NC010	
					Zytel® MT409AHS NC010 is a Medium Toughened, high performance, heat stabilized polyamide 66 resin having good stiffness, improved knit line strength, surface appearance with outstanding processability.		Zytel® ST7301 NC010 is a Super Tough, heat stabilized, lubricated polyamide 6 resin for injection molding and extrusion. It offers outstanding impact resistance over a wide temperature and humidity range and high productivity.	
					DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-I		PA6-HI	
	Part Marking Code		ISO 11469		>PA66-I<		>PA6-HI<	
Electrical	Surface Resistivity		IEC 60093	ohm	3.4E15	9.5E12		
	Volume Resistivity		IEC 60093	ohm m	1.9E14	2.9E10		
	Electric Strength	1.0mm	IEC 60243-1	kV/mm				
				V/mil				
		2.0mm		kV/mm	23	22		
				V/mil	585	560		
	Relative Permittivity	1E2 Hz	IEC 60250		3.6	6.6		
		1E3 Hz						
		1E6 Hz			3.4	3.7		
	Dissipation Factor	1E2 Hz	IEC 60250	E-4	50	1800		
		1E3 Hz						
		1E6 Hz			120	440		
	Arc Resistance	3.0mm	UL 746A	s				
	CTI	3.0mm	IEC 60112 UL 746A	PLC	0			
				V	600			
RTI	RTI, Electrical		UL 746B	C	130 @ 0.8mm			
	RTI, Impact		UL 746B	C	65 @ 0.8mm 105 @ 1.5mm			
	RTI, Strength		UL 746B	C	95 @ 0.8mm 105 @ 1.5mm 110 @ 3.0mm			
Other	Density		ISO 1183	kg/m3	1110		1060	
				g/cm3	1.11		1.06	
	Water Absorption	Equilibrium 50%RH	ISO 62, Similar to	%				
		Immersion 24h			1.28			
		Saturation, immersed						
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%	1.7			
Parallel, 2.0mm		1.5				1.2		

					Reinforced - PA66					
					Zytel® 70G13HS1L NC010		Zytel® 70G13L NC010		Zytel® 70G25HSLR NC010	
					Zytel® 70G13HS1L NC010 is a 13% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding.		Zytel® 70G13L NC010 is a 13% glass fiber reinforced polyamide 66 resin for injection molding.		Zytel® 70G25HSLR NC010 is a 25% glass fiber reinforced, heat stabilized, hydrolysis resistant polyamide 66 resin for injection molding.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-GF13		PA66-GF13		PA66-GF25	
	Part Marking Code		ISO 11469		>PA66-GF13<		>PA66-GF13<		>PA66-GF25<	
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa						
				kpsi						
	Yield Strain * pull speed @ 50mm/min		ISO 527	%						
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa	120	75	120	75	180	120
				kpsi	17.4	10.8	17.4	10.9	26.1	17.4
	Strain at Break * pull speed @ 50mm/min		ISO 527	%	3	13	3	13	3	7
	Nominal Strain at Break		ISO 527	%						
	Tensile Modulus		ISO 527	MPa	5500	3500	5500	3500	8400	6100
				kpsi	800	508	800	508	1200	880
	Tensile Stress	@ 50% Strain	ISO 527	MPa						
				kpsi						
	Tensile Creep Modulus	1h	ISO 899	MPa						
				kpsi						
		1000h		MPa						
				kpsi						
	Poissons Ratio									
	Flexural Modulus		ISO 178	MPa	4900	2900	4800	2900		
				kpsi	710	420	700	420		
	Flexural Strength		ISO 178	MPa	190	100	190	100		
				kpsi	27.6	14.5	27.6	14.5		
	Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2	4.5		4.5	4		
		-30°C (-22°F)				4	4.5	4	7	7
		23°C (73°F)			5	6	5	6	10	11
	Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2						
		-30°C (-22°F)			30	30	40	30	60	45
		23°C (73°F)			32	70	40	70	60	80

Reinforced - PA66					
Zytel® 70G13HS1L NC010		Zytel® 70G13L NC010		Zytel® 70G25HSLR NC010	
Zytel® 70G13HS1L NC010 is a 13% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding.		Zytel® 70G13L NC010 is a 13% glass fiber reinforced polyamide 66 resin for injection molding.		Zytel® 70G25HSLR NC010 is a 25% glass fiber reinforced, heat stabilized, hydrolysis resistant polyamide 66 resin for injection molding.	
DAM	50%RH	DAM	50%RH	DAM	50%RH
PA66-GF13		PA66-GF13		PA66-GF25	
>PA66-GF13<		>PA66-GF13<		>PA66-GF25<	
258		258		261	
496		496		502	
238		238		252	
460		460		486	
262		262		262	
504		504		504	
0.42		0.42			
0.23		0.23			
0.40		0.40		0.33	
0.22		0.22		0.18	
0.27		0.27			
0.15		0.15			
0.77		0.77			
0.43		0.43			
0.96		0.96		1.12	
0.53		0.53		0.63	
1.58		1.58			
0.88		0.88			
				257	
				495	

ID	Resin Identification		ISO 1043	
	Part Marking Code		ISO 11469	
Thermal	Deflection Temperature	0.45MPa	ISO 75-1/-2	C
		1.80MPa		F
				C
				F
	Melting Temperature	10°C/min	ISO 11357-1/-3	C
				F
	CLTE, Parallel	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C
		23 - 55°C (73 - 130°F)		E-4/F
				E-4/C
				E-4/F
				E-4/C
				E-4/F
	CLTE, Normal	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C
		23 - 55°C (73 - 130°F)		E-4/F
				E-4/C
				E-4/F
E-4/C				
E-4/F				
Vicat Softening Temperature	50N	ISO 306	C	
			F	

Reinforced - PA66									
Zytel® 70G13HS1L NC010				Zytel® 70G13L NC010				Zytel® 70G25HSLR NC010	
Zytel® 70G13HS1L NC010 is a 13% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding.				Zytel® 70G13L NC010 is a 13% glass fiber reinforced polyamide 66 resin for injection molding.				Zytel® 70G25HSLR NC010 is a 25% glass fiber reinforced, heat stabilized, hydrolysis resistant polyamide 66 resin for injection molding.	
DAM		50%RH		DAM		50%RH		DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-GF13		PA66-GF13		PA66-GF25
	Part Marking Code		ISO 11469		>PA66-GF13<		>PA66-GF13<		>PA66-GF25<
Flammability	Flammability Classification		IEC 60695-11-10 UL94		HB @ 0.71mm		HB @ 0.71mm		HB @ 1.5mm
	5V Rating		IEC 60695-11-20 UL94						
	Oxygen Index		ISO 4589-1/-2	%			24		
	Glow Wire Flammability Index		IEC 60695-2-12	C			650 @ 0.71mm 800 @ 3.0mm		
	Glow Wire Ignition Temperature		IEC 60695-2-13	C			675 @ 0.71mm		
	High Amperage Arc Ignition Resistance		UL 746A	PLC	0 @ 0.71mm		0 @ 0.71mm		0 @ 0.75mm
				arcs	>200 @ 0.71mm		>200 @ 0.71mm		
	High Current Arc Ignition Resistance		UL 746A	PLC					
	High Voltage Arc Tracking Rate		UL 746A	PLC	1		1		0
				mm/min	32.2		32.2		
	Hot Wire Ignition		UL 746A	PLC	4 @ 0.71mm		4 @ 0.71mm		4 @ 1.5mm 2 @ 3.0mm
				s	12 @ 0.71mm 7 @ 1.5mm 8 @ 3.0mm		12 @ 0.71mm 7 @ 1.5mm 8 @ 3.0mm		7 @ 1.5mm 30 @ 3.0mm

					Reinforced - PA66					
					Zytel® 70G13HS1L NC010		Zytel® 70G13L NC010		Zytel® 70G25HSLR NC010	
					Zytel® 70G13HS1L NC010 is a 13% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding.		Zytel® 70G13L NC010 is a 13% glass fiber reinforced polyamide 66 resin for injection molding.		Zytel® 70G25HSLR NC010 is a 25% glass fiber reinforced, heat stabilized, hydrolysis resistant polyamide 66 resin for injection molding.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-GF13		PA66-GF13		PA66-GF25	
	Part Marking Code		ISO 11469		>PA66-GF13<		>PA66-GF13<		>PA66-GF25<	
Electrical	Surface Resistivity		IEC 60093	ohm						
	Volume Resistivity		IEC 60093	ohm m			1E14		1E13	
	Electric Strength	1.0mm	IEC 60243-1	kV/mm						
				V/mil						
		2.0mm		kV/mm			25			
				V/mil			635			
	Relative Permittivity	1E2 Hz	IEC 60250				3.9		3.6	
		1E3 Hz								
		1E6 Hz					3.2			
	Dissipation Factor	1E2 Hz	IEC 60250	E-4			130		70	
		1E3 Hz								
		1E6 Hz					150			
RTI	Arc Resistance	3.0mm	UL 746A	s						
	CTI	3.0mm	IEC 60112 UL 746A	PLC	0		0			
				V	>600		>600			
Other	RTI, Electrical		UL 746B	C	140 @ 0.71mm		125 @ 0.71mm		105 @ 0.71mm 120 @ 1.5mm	
	RTI, Impact		UL 746B	C	125 @ 0.71mm		120 @ 0.71mm		95 @ 1.5mm	
	RTI, Strength		UL 746B	C	140 @ 0.71mm		125 @ 0.71mm		105 @ 0.71mm 120 @ 1.5mm	
Other	Density		ISO 1183	kg/m3	1230		1230		1320	
				g/cm3	1.23		1.23		1.32	
	Water Absorption	Equilibrium 50%RH	ISO 62, Similar to		2.2		2.2		2	
		Immersion 24h		%	1.7		1.7			
		Saturation, immersed			7.6		7.6		6.4	
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%	1.2		1.2		1.1	
		Parallel, 2.0mm			0.7		0.7		0.3	

					Reinforced - PA66							
					Zytel® 70G30HSLR NC010		Zytel® 70G30L NC010		Zytel® 70G33HS1L NC010		Zytel® 70G33L NC010	
					Zytel® 70G30HSLR NC010 is a 30% glass fiber reinforced, heat stabilized, hydrolysis resistant polyamide 66 resin for injection molding.		Zytel® 70G30L NC010 is a 30% glass fiber reinforced polyamide 66 resin for injection molding.		Zytel® 70G33HS1L NC010 is a 33% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding.		Zytel® 70G33L NC010 is a 33% glass fiber reinforced polyamide 66 resin for injection molding.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-GF30		PA66-GF30		PA66-GF33		PA66-GF33	
	Part Marking Code		ISO 11469		>PA66-GF30<		>PA66-GF30<		>PA66-GF33<		>PA66-GF33<	
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa								
				kpsi								
	Yield Strain * pull speed @ 50mm/min		ISO 527	%								
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa	195	130	195	130	200	140	200	140
				kpsi	28.3	18.9	28.3	18.9	29.0	20.3	29.0	20.3
	Strain at Break * pull speed @ 50mm/min		ISO 527	%	3.3	5	3.5	5	3.5	5	3.5	5
	Nominal Strain at Break		ISO 527	%								
	Tensile Modulus		ISO 527	MPa	10000	7200	9800	7200	10500	8000	10500	8000
				kpsi	1450	1045	1400	1045	1520	1160	1520	1160
	Tensile Stress	@ 50% Strain	ISO 527	MPa								
				kpsi								
	Tensile Creep Modulus	1h	ISO 899	MPa		6800						
				kpsi		990						
		1000h		MPa		5100						
				kpsi		740						
	Poissons Ratio										0.39	
	Flexural Modulus		ISO 178	MPa					9300	6205	9300	6205
				kpsi					1350	900	1350	900
	Flexural Strength		ISO 178	MPa					290	200	290	200
				kpsi					42	29	42	29
	Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2					10	10	10	10
		-30°C (-22°F)			10	10			10	10	10	10
		23°C (73°F)			13	15	13	15	13	17	13	17
	Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2								
		-30°C (-22°F)			70	72			70	75	70	75
		23°C (73°F)			82	92	80	93	85	100	85	100

					Reinforced - PA66								
					Zytel® 70G30HSLR NC010		Zytel® 70G30L NC010		Zytel® 70G33HS1L NC010		Zytel® 70G33L NC010		
					Zytel® 70G30HSLR NC010 is a 30% glass fiber reinforced, heat stabilized, hydrolysis resistant polyamide 66 resin for injection molding.		Zytel® 70G30L NC010 is a 30% glass fiber reinforced polyamide 66 resin for injection molding.		Zytel® 70G33HS1L NC010 is a 33% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding.		Zytel® 70G33L NC010 is a 33% glass fiber reinforced polyamide 66 resin for injection molding.		
					DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH	
ID	Resin Identification		ISO 1043		PA66-GF30		PA66-GF30		PA66-GF33		PA66-GF33		
	Part Marking Code		ISO 11469		>PA66-GF30<		>PA66-GF30<		>PA66-GF33<		>PA66-GF33<		
Thermal	Deflection Temperature	0.45MPa	ISO 75-1/-2	C	261					261		261	
				F	502					502		502	
		1.80MPa		C	253		253		252		252		
				F	487		487		486		486		
	Melting Temperature	10°C/min	ISO 11357-1/-3	C	262		262		262		262		
				F	504		504		504		504		
	CLTE, Parallel	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C					0.24		0.24		
				E-4/F					0.13		0.13		
		23 - 55°C (73 - 130°F)		E-4/C	0.22				0.18		0.18		
				E-4/F	0.12				0.10		0.10		
		55 - 160°C (130 - 320°F)		E-4/C					0.13		0.13		
				E-4/F					0.07		0.07		
	CLTE, Normal	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C					0.65		0.65		
				E-4/F					0.36		0.36		
		23 - 55°C (73 - 130°F)		E-4/C	1.07				0.83		0.83		
				E-4/F	0.11				0.46		0.46		
		55 - 160°C (130 - 320°F)		E-4/C					1.37		1.37		
				E-4/F					0.76		0.76		
	Vicat Softening Temperature	50N	ISO 306	C	250								
				F	482								

					Reinforced - PA66							
					Zytel® 70G30HSLR NC010		Zytel® 70G30L NC010		Zytel® 70G33HS1L NC010		Zytel® 70G33L NC010	
					Zytel® 70G30HSLR NC010 is a 30% glass fiber reinforced, heat stabilized, hydrolysis resistant polyamide 66 resin for injection molding.		Zytel® 70G30L NC010 is a 30% glass fiber reinforced polyamide 66 resin for injection molding.		Zytel® 70G33HS1L NC010 is a 33% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding.		Zytel® 70G33L NC010 is a 33% glass fiber reinforced polyamide 66 resin for injection molding.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-GF30		PA66-GF30		PA66-GF33		PA66-GF33	
	Part Marking Code		ISO 11469		>PA66-GF30<		>PA66-GF30<		>PA66-GF33<		>PA66-GF33<	
Flammability	Flammability Classification		IEC 60695-11-10 UL94		HB @ 0.75mm		HB @ 0.71mm		HB @ 0.71mm		HB @ 0.71mm	
	5V Rating		IEC 60695-11-20 UL94									
	Oxygen Index		ISO 4589-1/-2	%					24		24	
	Glow Wire Flammability Index		IEC 60695-2-12	C					725 @ 0.71mm 700 @ 1.5mm 800 @ 3.0mm			
	Glow Wire Ignition Temperature		IEC 60695-2-13	C					750 @ 0.71mm 725 @ 1.5mm 825 @ 3.0mm			
	High Amperage Arc Ignition Resistance		UL 746A	PLC	0 @ 0.75mm		0 @ 0.71mm		0 @ 0.71mm		0 @ 0.71mm	
				arcs	120 @ 0.75mm		120 @ 0.71mm		>200 @ 0.71mm			
	High Current Arc Ignition Resistance		UL 746A	PLC								
	High Voltage Arc Tracking Rate		UL 746A	PLC	0		1		0		1	
				mm/min				32.2		32.2		
Hot Wire Ignition		UL 746A	PLC	4 @ 0.75mm 1 @ 3.0mm		4 @ 0.71mm		4 @ 0.71mm 0 @ 3.0mm		4 @ 0.71mm		
			s	7 @ 0.75mm 7 @ 1.5mm 60 @ 3.0mm		7 @ 0.71mm 7 @ 1.5mm 7 @ 3.0mm		14 @ 0.71mm 10 @ 1.5mm 150 @ 3.0mm		8 @ 0.71mm 6 @ 1.5mm 9 @ 3.0mm		

				Reinforced - PA66							
				Zytel® 70G30HSLR NC010		Zytel® 70G30L NC010		Zytel® 70G33HS1L NC010		Zytel® 70G33L NC010	
				Zytel® 70G30HSLR NC010 is a 30% glass fiber reinforced, heat stabilized, hydrolysis resistant polyamide 66 resin for injection molding.		Zytel® 70G30L NC010 is a 30% glass fiber reinforced polyamide 66 resin for injection molding.		Zytel® 70G33HS1L NC010 is a 33% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding.		Zytel® 70G33L NC010 is a 33% glass fiber reinforced polyamide 66 resin for injection molding.	
				DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043	PA66-GF30		PA66-GF30		PA66-GF33		PA66-GF33	
	Part Marking Code		ISO 11469	>PA66-GF30<		>PA66-GF30<		>PA66-GF33<		>PA66-GF33<	
Electrical	Surface Resistivity		IEC 60093	ohm	>1E15	1E13					
	Volume Resistivity		IEC 60093	ohm m	>1E15	1E9			1E13		1E13
	Electric Strength	1.0mm	IEC 60243-1	kV/mm	38	32					
				V/mil	964	812					
		2.0mm		kV/mm					27		
				V/mil					685		
	Relative Permittivity	1E2 Hz	IEC 60250		4.3	10.8			4.2		4.2
		1E3 Hz									
		1E6 Hz			4.1	4.6			4.0		4.0
	Dissipation Factor	1E2 Hz	IEC 60250	E-4	70	4600			100		100
		1E3 Hz									
		1E6 Hz			150	650			150		150
RTI	Arc Resistance	3.0mm	UL 746A	s							
	CTI	3.0mm	IEC 60112 UL 746A	PLC	1		0		1		0
				V	400		600		408		600
Other	RTI, Electrical		UL 746B	C	140 @ 0.75mm		130 @ 0.71mm		140 @ 0.71mm		130 @ 0.71mm
	RTI, Impact		UL 746B	C	125 @ 0.75mm		120 @ 0.71mm		125 @ 0.71mm		120 @ 0.71mm
	RTI, Strength		UL 746B	C	140 @ 0.75mm		130 @ 0.71mm		140 @ 0.71mm		130 @ 0.71mm
	Density		ISO 1183	kg/m3	1370		1370		1390		1390
				g/cm3	1.37		1.37		1.39		1.39
	Water Absorption	Equilibrium 50% RH	ISO 62, Similar to	%	1.9				1.8		1.8
		Immersion 24h							1.2		1.2
		Saturation, immersed			6				5.7		5.7
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%	1.1				1.1		1.1
		Parallel, 2.0mm			0.3		0.3		0.3		0.3

					Reinforced - PA66			
					Zytel® 70G35HSL NC010	Zytel® 70G35HSLRA4 BK267		
					Zytel® 70G35HSL NC010 is a 35% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding.	Zytel® 70G35HSLRA4 BK267 is a 35% glass fiber reinforced, heat stabilized, hydrolysis resistant polyamide 66 resin for injection molding. It has excellent flow characteristics.		
					DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-GF35		PA66-GF35	
	Part Marking Code		ISO 11469		>PA66-GF35<		>PA66-GF35<	
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa				
				kpsi				
	Yield Strain * pull speed @ 50mm/min		ISO 527	%				
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa	210	145	210	140
				kpsi	30.5	21.0	30.5	20.3
	Strain at Break * pull speed @ 50mm/min		ISO 527	%	3.2	4.6	3	5
	Nominal Strain at Break		ISO 527	%				
	Tensile Modulus		ISO 527	MPa	11200	8300	11200	7800
				kpsi	1600	1200	1600	1130
	Tensile Stress	@ 50% Strain	ISO 527	MPa				
				kpsi				
	Tensile Creep Modulus	1h	ISO 899	MPa				
				kpsi				
		1000h		MPa				
				kpsi				
	Poissons Ratio							
	Flexural Modulus		ISO 178	MPa				
				kpsi				
	Flexural Strength		ISO 178	MPa	300	210		
				kpsi	43.5	30.5		
	Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2				
		-30°C (-22°F)			10	10		
		23°C (73°F)			15	18	15	18
	Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2				
		-30°C (-22°F)			80	75		
		23°C (73°F)			90	100	80	95

Reinforced - PA66			
Zytel® 70G35HSL NC010		Zytel® 70G35HSLRA4 BK267	
Zytel® 70G35HSL NC010 is a 35% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding.		Zytel® 70G35HSLRA4 BK267 is a 35% glass fiber reinforced, heat stabilized, hydrolysis resistant polyamide 66 resin for injection molding. It has excellent flow characteristics.	
DAM	50%RH	DAM	50%RH
PA66-GF35		PA66-GF35	
>PA66-GF35<		>PA66-GF35<	
261			
502			
252		250	
486		480	
262		260	
504		500	
0.2			
0.11			
1			
0.56			
255			
491			

ID	Resin Identification		ISO 1043	
	Part Marking Code		ISO 11469	
Thermal	Deflection Temperature	0.45MPa	ISO 75-1/-2	C
		1.80MPa		F
				C
				F
	Melting Temperature	10°C/min	ISO 11357-1/-3	C
				F
	CLTE, Parallel	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C
		23 - 55°C (73 - 130°F)		E-4/F
				E-4/C
				E-4/F
				E-4/C
		55 - 160°C (130 - 320°F)		E-4/F
	CLTE, Normal	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C
		23 - 55°C (73 - 130°F)		E-4/F
				E-4/C
				E-4/F
				E-4/C
		55 - 160°C (130 - 320°F)		E-4/F
Vicat Softening Temperature	50N	ISO 306	C	
			F	

					Reinforced - PA66			
					Zytel® 70G35HSL NC010	Zytel® 70G35HSLRA4 BK267		
					Zytel® 70G35HSL NC010 is a 35% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding.	Zytel® 70G35HSLRA4 BK267 is a 35% glass fiber reinforced, heat stabilized, hydrolysis resistant polyamide 66 resin for injection molding. It has excellent flow characteristics.		
					DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-GF35		PA66-GF35	
	Part Marking Code		ISO 11469		>PA66-GF35<		>PA66-GF35<	
Flammability	Flammability Classification		IEC 60695-11-10 UL94		HB @ 0.71mm			
	5V Rating		IEC 60695-11-20 UL94					
	Oxygen Index		ISO 4589-1/-2	%				
	Glow Wire Flammability Index		IEC 60695-2-12	C				
	Glow Wire Ignition Temperature		IEC 60695-2-13	C				
	High Amperage Arc Ignition Resistance		UL 746A	PLC	0 @ 0.71mm			
				arcs	120 @ 0.71 mm			
	High Current Arc Ignition Resistance		UL 746A	PLC				
	High Voltage Arc Tracking Rate		UL 746A	PLC	0			
				mm/min				
	Hot Wire Ignition		UL 746A	PLC	4 @ 0.71mm 0 @ 3.0mm			
				s	7 @ 0.71mm 7 @ 1.5mm 120 @ 3.0mm			

					Reinforced - PA66			
					Zytel® 70G35HSL NC010	Zytel® 70G35HSLRA4 BK267		
					Zytel® 70G35HSL NC010 is a 35% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding.	Zytel® 70G35HSLRA4 BK267 is a 35% glass fiber reinforced, heat stabilized, hydrolysis resistant polyamide 66 resin for injection molding. It has excellent flow characteristics.		
					DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-GF35		PA66-GF35	
	Part Marking Code		ISO 11469		>PA66-GF35<		>PA66-GF35<	
Electrical	Surface Resistivity		IEC 60093	ohm	>1E15	1E13		
	Volume Resistivity		IEC 60093	ohm m	1E15	1E9		
	Electric Strength	1.0mm	IEC 60243-1	kV/mm				
				V/mil				
		2.0mm		kV/mm				
				V/mil				
	Relative Permittivity	1E2 Hz	IEC 60250					
		1E3 Hz						
		1E6 Hz			4.1	4.7		
	Dissipation Factor	1E2 Hz	IEC 60250	E-4				
		1E3 Hz						
		1E6 Hz			140	620		
	Arc Resistance	3.0mm	UL 746A	s				
RTI	CTI	3.0mm	IEC 60112 UL 746A	PLC V	2 250			
	RTI, Electrical		UL 746B	C	140 @ 0.71mm			
	RTI, Impact		UL 746B	C	125 @ 0.71mm			
Other	RTI, Strength		UL 746B	C	140 @ 0.71mm			
	Density		ISO 1183	kg/m3 g/cm3	1410 1.41		1410 1.41	
	Water Absorption	Equilibrium 50%RH	ISO 62, Similar to	%	1.7			
		Immersion 24h						
		Saturation, immersed			5.5			
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%	1.1		1.1	
		Parallel, 2.0mm			0.3		0.4	

				Reinforced - PA66							
				Zytel® 70G43HSLA BK099		Zytel® 70G43L NC010		Zytel® 70G50HSLA BK039B			
				Zytel® 70G43HSLA BK099 is a 43% glass fiber reinforced, heat stabilized, black polyamide 66 resin for injection molding.		Zytel® 70G43L NC010 is a 43% glass fiber reinforced polyamide 66 resin for injection molding.		Zytel® 70G50HSLA BK039B is a 50% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding. It has excellent flow characteristics.			
DAM		50%RH		DAM		50%RH		DAM		50%RH	
ID	Resin Identification		ISO 1043		PA66-GF43		PA66-GF43		PA66-GF50		
	Part Marking Code		ISO 11469		>PA66-GF43<		>PA66-GF43<		>PA66-GF50<		
Mechanical	Yield Stress		ISO 527	MPa							
	* pull speed @ 50mm/min			kpsi							
	Yield Strain		ISO 527	%							
	* pull speed @ 50mm/min										
	Stress at Break		ISO 527	MPa	225	160	225	160	245	190	
	* pull speed @ 50mm/min			kpsi	32.6	23.2	32.6	23.2	35.5	27.6	
	Strain at Break		ISO 527	%	2.5	3.5	3	4	2.2	3.2	
	* pull speed @ 50mm/min										
	Nominal Strain at Break		ISO 527	%							
	Tensile Modulus		ISO 527	MPa	14000	11000	14000	11000	16800	13200	
		kpsi		2030	1595	2030	1595	2440	1900		
	Tensile Stress	@ 50% Strain	ISO 527	MPa							
		kpsi									
	Tensile Creep Modulus	1h	ISO 899	MPa				10800			
				kpsi				1566			
		1000h		MPa				7960			
				kpsi				1154			
	Poissons Ratio						0.39				
	Flexural Modulus		ISO 178	MPa			12000	8900			
				kpsi			1740	1290			
Flexural Strength		ISO 178	MPa			340	260				
			kpsi			49.3	37.7				
Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2			11	11				
	-30°C (-22°F)					12	12				
	23°C (73°F)			16	18	16	19	16	18		
Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2								
	-30°C (-22°F)					85	75				
	23°C (73°F)			90	95	100	105	95	100		

Reinforced - PA66					
Zytel® 70G43HSLA BK099		Zytel® 70G43L NC010		Zytel® 70G50HSLA BK039B	
Zytel® 70G43HSLA BK099 is a 43% glass fiber reinforced, heat stabilized, black polyamide 66 resin for injection molding.		Zytel® 70G43L NC010 is a 43% glass fiber reinforced polyamide 66 resin for injection molding.		Zytel® 70G50HSLA BK039B is a 50% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding. It has excellent flow characteristics.	
DAM	50%RH	DAM	50%RH	DAM	50%RH
PA66-GF43		PA66-GF43		PA66-GF50	
>PA66-GF43<		>PA66-GF43<		>PA66-GF50<	
		262			
		504			
255		255		253	
491		491		487	
262		262		262	
504		504		504	
		0.20			
		0.11			
		0.15			
		0.08			
		0.09			
		0.05			
		0.61			
		0.34			
		0.79			
		0.44			
		1.28			
		0.71			
		255			
		491			

					Reinforced - PA66					
					Zytel® 70G43HSLA BK099		Zytel® 70G43L NC010		Zytel® 70G50HSLA BK039B	
					Zytel® 70G43HSLA BK099 is a 43% glass fiber reinforced, heat stabilized, black polyamide 66 resin for injection molding.		Zytel® 70G43L NC010 is a 43% glass fiber reinforced polyamide 66 resin for injection molding.		Zytel® 70G50HSLA BK039B is a 50% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding. It has excellent flow characteristics.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-GF43		PA66-GF43		PA66-GF50	
	Part Marking Code		ISO 11469		>PA66-GF43<		>PA66-GF43<		>PA66-GF50<	
Flammability	Flammability Classification		IEC 60695-11-10 UL94				HB @ 0.71mm		HB @ 0.73mm	
	5V Rating		IEC 60695-11-20 UL94							
	Oxygen Index		ISO 4589-1/-2	%			23			
	Glow Wire Flammability Index		IEC 60695-2-12	C			650 @ 0.71mm 825 @ 3.0mm			
	Glow Wire Ignition Temperature		IEC 60695-2-13	C			675 @ 0.71mm 700 @ 3.0mm			
	High Amperage Arc Ignition Resistance		UL 746A	PLC			0 @ 0.71mm		0 @ 0.83mm	
				arcs			>200 @ 0.71mm			
	High Current Arc Ignition Resistance		UL 746A	PLC						
	High Voltage Arc Tracking Rate		UL 746A	PLC			1			
				mm/min			19.3			
	Hot Wire Ignition		UL 746A	PLC			4 @ 0.71mm		4 @ 0.83mm	
s						28 @ 0.71mm 9 @ 1.5mm 28 @ 3.0mm		18 @ 0.75mm 103 @ 1.5mm 60 @ 3.0mm		

Reinforced - PA66					
Zytel® 70G43HSLA BK099		Zytel® 70G43L NC010		Zytel® 70G50HSLA BK039B	
Zytel® 70G43HSLA BK099 is a 43% glass fiber reinforced, heat stabilized, black polyamide 66 resin for injection molding.		Zytel® 70G43L NC010 is a 43% glass fiber reinforced polyamide 66 resin for injection molding.		Zytel® 70G50HSLA BK039B is a 50% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding. It has excellent flow characteristics.	
DAM	50%RH	DAM	50%RH	DAM	50%RH
PA66-GF43		PA66-GF43		PA66-GF50	
>PA66-GF43<		>PA66-GF43<		>PA66-GF50<	
		1E12			
		1E14	1E10		
		27			
		686			
		4.5			
		4.1	4.9		
		100			
		145	600		
		146			
		0		1	
		>600			
		130 @ 0.71mm		120 @ 0.83mm	
		120 @ 0.71mm		115 @ 0.83mm 125 @ 1.5mm 130 @ 3.0mm	
		130 @ 0.71mm		115 @ 0.83mm 125 @ 1.5mm 130 @ 3.0mm	
1490		1490		1570	
1.49		1.49		1.57	
		1.5			
		0.9			
		4.7			
		1.0			
		0.3			

					Reinforced - PA6					
					Zytel® 73G15HSL BK363		Zytel® 73G15L NC010		Zytel® 73G30HSL NC010	
					Zytel® 73G15HSL BK363 is a 15% glass fiber reinforced, heat stabilized, black polyamide 6 resin for injection molding.		Zytel® 73G15L NC010 is a 15% glass fiber reinforced polyamide 6 resin for injection molding.		Zytel® 73G30HSL NC010 is a 30% glass fiber reinforced, heat stabilized polyamide 6 resin for injection molding.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA6-GF15		PA6-GF15		PA6-GF30	
	Part Marking Code		ISO 11469		>PA6-GF15<		>PA6-GF15<		>PA6-GF30<	
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa						
				kpsi						
	Yield Strain * pull speed @ 50mm/min		ISO 527	%						
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa	130	77	135	72	185	115
				kpsi	18.9	11.2	19.6	10.4	26.8	16.7
	Strain at Break * pull speed @ 50mm/min		ISO 527	%	2.3	10	4	10	3.5	6
	Nominal Strain at Break		ISO 527	%						
	Tensile Modulus		ISO 527	MPa	6500	4000	6000	3500	9700	5800
				kpsi	940	580	870	508	1410	840
	Tensile Stress	@ 50% Strain	ISO 527	MPa						
				kpsi						
	Tensile Creep Modulus	1h	ISO 899	MPa						6190
				kpsi						898
		1000h		MPa						4630
				kpsi						671
	Poissons Ratio									
	Flexural Modulus		ISO 178	MPa			5000			
				kpsi			725			
	Flexural Strength		ISO 178	MPa						
				kpsi						
Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2			6				
	-30°C (-22°F)					6	14	10	21	
	23°C (73°F)			6	7	7	15	16	23	
Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2							
	-30°C (-22°F)					45	54	80	84	
	23°C (73°F)			40	70	50	95	100	100	

Reinforced - PA6					
Zytel® 73G15HSL BK363		Zytel® 73G15L NC010		Zytel® 73G30HSL NC010	
Zytel® 73G15HSL BK363 is a 15% glass fiber reinforced, heat stabilized, black polyamide 6 resin for injection molding.		Zytel® 73G15L NC010 is a 15% glass fiber reinforced polyamide 6 resin for injection molding.		Zytel® 73G30HSL NC010 is a 30% glass fiber reinforced, heat stabilized polyamide 6 resin for injection molding.	
DAM	50%RH	DAM	50%RH	DAM	50%RH
PA6-GF15		PA6-GF15		PA6-GF30	
>PA6-GF15<		>PA6-GF15<		>PA6-GF30<	
		220		220	
		428		428	
204		200		210	
399		392		410	
221		221		221	
430		430		430	
		0.39			
		0.22			
		0.37		0.22	
		0.21		0.12	
		0.17			
		0.09			
		0.81			
		0.45			
		1.09		1.02	
		0.61		0.57	
		1.34			
		0.74			
		215		215	
		419		419	

Reinforced - PA6					
Zytel® 73G15HSL BK363		Zytel® 73G15L NC010		Zytel® 73G30HSL NC010	
Zytel® 73G15HSL BK363 is a 15% glass fiber reinforced, heat stabilized, black polyamide 6 resin for injection molding.		Zytel® 73G15L NC010 is a 15% glass fiber reinforced polyamide 6 resin for injection molding.		Zytel® 73G30HSL NC010 is a 30% glass fiber reinforced, heat stabilized polyamide 6 resin for injection molding.	
DAM	50%RH	DAM	50%RH	DAM	50%RH

ID	Resin Identification		ISO 1043		PA6-GF15		PA6-GF15		PA6-GF30	
	Part Marking Code		ISO 11469		>PA6-GF15<		>PA6-GF15<		>PA6-GF30<	
Flammability	Flammability Classification		IEC 60695-11-10 UL94		HB @ 0.75mm		HB @ 1.5mm			
	5V Rating		IEC 60695-11-20 UL94							
	Oxygen Index		ISO 4589-1/-2	%			21			
	Glow Wire Flammability Index		IEC 60695-2-12	C						
	Glow Wire Ignition Temperature		IEC 60695-2-13	C						
	High Amperage Arc Ignition Resistance		UL 746A	PLC					0 @ 0.75mm	
				arcs						
	High Current Arc Ignition Resistance		UL 746A	PLC						
	High Voltage Arc Tracking Rate		UL 746A	PLC						
				mm/min						
	Hot Wire Ignition		UL 746A	PLC					4 @ 0.75mm	
				s						

					Reinforced - PA6					
					Zytel® 73G15HSL BK363		Zytel® 73G15L NC010		Zytel® 73G30HSL NC010	
					Zytel® 73G15HSL BK363 is a 15% glass fiber reinforced, heat stabilized, black polyamide 6 resin for injection molding.		Zytel® 73G15L NC010 is a 15% glass fiber reinforced polyamide 6 resin for injection molding.		Zytel® 73G30HSL NC010 is a 30% glass fiber reinforced, heat stabilized polyamide 6 resin for injection molding.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA6-GF15		PA6-GF15		PA6-GF30	
	Part Marking Code		ISO 11469		>PA6-GF15<		>PA6-GF15<		>PA6-GF30<	
Electrical	Surface Resistivity		IEC 60093	ohm						
	Volume Resistivity		IEC 60093	ohm m						
	Electric Strength	1.0mm	IEC 60243-1	kV/mm						
				V/mil						
		2.0mm		kV/mm						
				V/mil						
	Relative Permittivity	1E2 Hz	IEC 60250							
		1E3 Hz								
		1E6 Hz								
	Dissipation Factor	1E2 Hz	IEC 60250	E-4						
		1E3 Hz								
		1E6 Hz								
RTI	Arc Resistance	3.0mm	UL 746A	s						
	CTI	3.0mm	IEC 60112 UL 746A	PLC V						
Other	RTI, Electrical		UL 746B	C	65 @ 1.5mm		65 @ 1.5mm		65 @ 0.75mm	
	RTI, Impact		UL 746B	C	65 @ 1.5mm		65 @ 1.5mm		65 @ 0.75mm	
	RTI, Strength		UL 746B	C	65 @ 1.5mm		65 @ 1.5mm		65 @ 0.75mm	
	Density		ISO 1183	kg/m3	1250		1230		1360	
				g/cm3	1.25		1.23		1.36	
		Equilibrium 50%RH	ISO 62, Similar to				2.5		1.9	
		Immersion 24h		%						
		Saturation, immersed					7.6		6.3	
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%			0.8		0.6	
		Parallel, 2.0mm					0.3		0.2	

					Reinforced - PA6			
					Zytel® 73G30L NC010		Zytel® 73G35HSL BK262	
					Zytel® 73G30L NC010 is a 30% glass fiber reinforced polyamide 6 resin for injection molding.		Zytel® 73G35HSL BK262 is a 35% glass fiber reinforced, heat stabilized, black polyamide 6 resin for injection molding.	
					DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA6-GF30		PA6-GF35	
	Part Marking Code		ISO 11469		>PA6-GF30<		>PA6-GF35<	
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa kpsi				
	Yield Strain * pull speed @ 50mm/min		ISO 527	%				
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa kpsi	185 26.8	115 16.7	190 27.6	115 16.7
	Strain at Break * pull speed @ 50mm/min		ISO 527	%	3.5	6	3.2	5
	Nominal Strain at Break		ISO 527	%				
	Tensile Modulus		ISO 527	MPa kpsi	9800 1420	6000 870	11000 1600	6500 940
	Tensile Stress	@ 50% Strain	ISO 527	MPa kpsi				
	Tensile Creep Modulus	1h	ISO 899	MPa kpsi				
		1000h		MPa kpsi				
	Poissons Ratio							
	Flexural Modulus		ISO 178	MPa kpsi	8200 1190			
	Flexural Strength		ISO 178	MPa kpsi				
	Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2	11		11	12
		-30°C (-22°F)			11	21		
		23°C (73°F)			16	23	16	22
	Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2				
		-30°C (-22°F)			80	84		
		23°C (73°F)			100	97	90	90

Reinforced - PA6			
Zytel® 73G30L NC010		Zytel® 73G35HSL BK262	
Zytel® 73G30L NC010 is a 30% glass fiber reinforced polyamide 6 resin for injection molding.		Zytel® 73G35HSL BK262 is a 35% glass fiber reinforced, heat stabilized, black polyamide 6 resin for injection molding.	
DAM	50%RH	DAM	50%RH

ID	Resin Identification		ISO 1043	
	Part Marking Code		ISO 11469	
Thermal	Deflection Temperature	0.45MPa	ISO 75-1/-2	C
		1.80MPa		F
				C
				F
	Melting Temperature	10°C/min	ISO 11357-1/-3	C
		F		
	CLTE, Parallel	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C
		23 - 55°C (73 - 130°F)		E-4/F
				E-4/C
				E-4/F
				E-4/C
		55 - 160°C (130 - 320°F)		E-4/F
	CLTE, Normal	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C
		23 - 55°C (73 - 130°F)		E-4/F
				E-4/C
				E-4/F
				E-4/C
		55 - 160°C (130 - 320°F)		E-4/F
	Vicat Softening Temperature	50N	ISO 306	C
				F

					Reinforced - PA6			
					Zytel® 73G30L NC010		Zytel® 73G35HSL BK262	
					Zytel® 73G30L NC010 is a 30% glass fiber reinforced polyamide 6 resin for injection molding.		Zytel® 73G35HSL BK262 is a 35% glass fiber reinforced, heat stabilized, black polyamide 6 resin for injection molding.	
					DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA6-GF30		PA6-GF35	
	Part Marking Code		ISO 11469		>PA6-GF30<		>PA6-GF35<	
Flammability	Flammability Classification		IEC 60695-11-10 UL94		HB @ 1.5mm			
	5V Rating		IEC 60695-11-20 UL94					
	Oxygen Index		ISO 4589-1/-2	%	21			
	Glow Wire Flammability Index		IEC 60695-2-12	C				
	Glow Wire Ignition Temperature		IEC 60695-2-13	C				
	High Amperage Arc Ignition Resistance		UL 746A	PLC	0 @ 0.75mm			
				arcs	150 @ 0.75mm			
	High Current Arc Ignition Resistance		UL 746A	PLC				
	High Voltage Arc Tracking Rate		UL 746A	PLC				
				mm/min				
	Hot Wire Ignition		UL 746A	PLC	4 @ 0.75mm 2 @ 3.0mm			
				s	11 @ 0.75mm 36 @ 1.5mm 148 @ 3.0mm			

					Reinforced - PA6			
					Zytel® 73G30L NC010	Zytel® 73G35HSL BK262		
					Zytel® 73G30L NC010 is a 30% glass fiber reinforced polyamide 6 resin for injection molding.	Zytel® 73G35HSL BK262 is a 35% glass fiber reinforced, heat stabilized, black polyamide 6 resin for injection molding.		
					DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA6-GF30		PA6-GF35	
	Part Marking Code		ISO 11469		>PA6-GF30<		>PA6-GF35<	
Electrical	Surface Resistivity		IEC 60093	ohm				
	Volume Resistivity		IEC 60093	ohm m				
	Electric Strength	1.0mm	IEC 60243-1	kV/mm				
				V/mil				
		2.0mm		kV/mm				
				V/mil				
	Relative Permittivity	1E2 Hz	IEC 60250					
		1E3 Hz						
		1E6 Hz						
	Dissipation Factor	1E2 Hz	IEC 60250	E-4				
		1E3 Hz						
		1E6 Hz						
RTI	Arc Resistance	3.0mm	UL 746A	s				
	CTI	3.0mm	IEC 60112 UL 746A	PLC	0			
				V	600			
Other	RTI, Electrical		UL 746B	C	65 @ 0.75mm		65 @ 0.75mm	
	RTI, Impact		UL 746B	C	65 @ 0.75mm		65 @ 0.75mm	
	RTI, Strength		UL 746B	C	65 @ 0.75mm		65 @ 0.75mm	
Other	Density		ISO 1183	kg/m3	1360		1410	
	Water Absorption	Equilibrium 50%RH	ISO 62, Similar to	g/cm3	1.36		1.41	
		Immersion 24h		%	1.9			
		Saturation, immersed		%	6.3			
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%	0.6			
		Parallel, 2.0mm		%	0.2			

					Reinforced - PA6					
					Zytel® 73G45 BK263		Zytel® 73G45L NC010		Zytel® 73G50HSLA BK416	
					Zytel® 73G45 BK263 is a 45% glass fiber reinforced, black polyamide 6 resin for injection molding.		Zytel® 73G45L NC010 is a 45% glass fiber reinforced polyamide 6 resin for injection molding.		Zytel® 73G50HSLA BK416 is a 50% glass fiber reinforced, heat stabilized, lubricated, polyamide 6 resin for injection molding. It has an excellent surface appearance and gloss.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA6-GF45		PA6-GF45		PA6-GF50	
	Part Marking Code		ISO 11469		>PA6-GF45<		>PA6-GF45<		>PA6-GF50<	
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa						
				kpsi						
	Yield Strain * pull speed @ 50mm/min		ISO 527	%						
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa	215	145	230	160	233	170
				kpsi	31.2	21	33.4	23.2	34	25
	Strain at Break * pull speed @ 50mm/min		ISO 527	%	3	5	3	5	2.2	3.3
	Nominal Strain at Break		ISO 527	%						
	Tensile Modulus		ISO 527	MPa	14200	9000	14500	9700	15500	12000
				kpsi	2060	1300	2100	1410	2250	1700
	Tensile Stress	@ 50% Strain	ISO 527	MPa						
				kpsi						
	Tensile Creep Modulus	1h	ISO 899	MPa						
				kpsi						
	1000h			MPa						
				kpsi						
	Poissons Ratio									
	Flexural Modulus		ISO 178	MPa			13000		14300	11100
				kpsi			1890		2070	1610
	Flexural Strength		ISO 178	MPa						
				kpsi						
Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2							
	-30°C (-22°F)					19	23			
	23°C (73°F)			19	24	20	25	19	20	
Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2							
	-30°C (-22°F)					115	101			
	23°C (73°F)			100	100	115	111	90	98	

Reinforced - PA6					
Zytel® 73G45 BK263		Zytel® 73G45L NC010		Zytel® 73G50HSLA BK416	
Zytel® 73G45 BK263 is a 45% glass fiber reinforced, black polyamide 6 resin for injection molding.		Zytel® 73G45L NC010 is a 45% glass fiber reinforced polyamide 6 resin for injection molding.		Zytel® 73G50HSLA BK416 is a 50% glass fiber reinforced, heat stabilized, lubricated, polyamide 6 resin for injection molding. It has an excellent surface appearance and gloss.	
DAM	50%RH	DAM	50%RH	DAM	50%RH
PA6-GF45		PA6-GF45		PA6-GF50	
>PA6-GF45<		>PA6-GF45<		>PA6-GF50<	
		221		219	
		430		428	
		213		212	
		415		414	
221		221		219	
430		430		426	
		0.16			
		0.09			
		1			
		0.56			
		215			
		419			

Reinforced - PA6									
Zytel® 73G45 BK263				Zytel® 73G45L NC010				Zytel® 73G50HSLA BK416	
Zytel® 73G45 BK263 is a 45% glass fiber reinforced, black polyamide 6 resin for injection molding.				Zytel® 73G45L NC010 is a 45% glass fiber reinforced polyamide 6 resin for injection molding.				Zytel® 73G50HSLA BK416 is a 50% glass fiber reinforced, heat stabilized, lubricated, polyamide 6 resin for injection molding. It has an excellent surface appearance and gloss.	
DAM		50%RH		DAM		50%RH		DAM	

ID	Resin Identification		ISO 1043		PA6-GF45		PA6-GF45		PA6-GF50	
	Part Marking Code		ISO 11469		>PA6-GF45<		>PA6-GF45<		>PA6-GF50<	
Flammability	Flammability Classification		IEC 60695-11-10 UL94		HB @ 1.5mm					
	5V Rating		IEC 60695-11-20 UL94							
	Oxygen Index		ISO 4589-1/-2	%						
	Glow Wire Flammability Index		IEC 60695-2-12	C						
	Glow Wire Ignition Temperature		IEC 60695-2-13	C						
	High Amperage Arc Ignition Resistance		UL 746A	PLC						
				arcs						
	High Current Arc Ignition Resistance		UL 746A	PLC						
	High Voltage Arc Tracking Rate		UL 746A	PLC						
				mm/min						
	Hot Wire Ignition		UL 746A	PLC						
				s						

					Reinforced - PA6					
					Zytel® 73G45 BK263		Zytel® 73G45L NC010		Zytel® 73G50HSLA BK416	
					Zytel® 73G45 BK263 is a 45% glass fiber reinforced, black polyamide 6 resin for injection molding.		Zytel® 73G45L NC010 is a 45% glass fiber reinforced polyamide 6 resin for injection molding.		Zytel® 73G50HSLA BK416 is a 50% glass fiber reinforced, heat stabilized, lubricated, polyamide 6 resin for injection molding. It has an excellent surface appearance and gloss.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA6-GF45		PA6-GF45		PA6-GF50	
	Part Marking Code		ISO 11469		>PA6-GF45<		>PA6-GF45<		>PA6-GF50<	
Electrical	Surface Resistivity		IEC 60093	ohm						
	Volume Resistivity		IEC 60093	ohm m						
	Electric Strength	1.0mm	IEC 60243-1	kV/mm						
				V/mil						
		2.0mm		kV/mm						
				V/mil						
	Relative Permittivity	1E2 Hz	IEC 60250							
		1E3 Hz								
		1E6 Hz								
	Dissipation Factor	1E2 Hz	IEC 60250	E-4						
		1E3 Hz								
		1E6 Hz								
	Arc Resistance	3.0mm	UL 746A	s						
	CTI	3.0mm	IEC 60112 UL 746A	PLC						
V										
RTI	RTI, Electrical		UL 746B	C			65 @ 1.5mm			
	RTI, Impact		UL 746B	C			65 @ 1.5mm			
	RTI, Strength		UL 746B	C			65 @ 1.5mm			
Other	Density		ISO 1183	kg/m3	1510		1510		1580	
				g/cm3	1.51		1.51		1.58	
	Water Absorption	Equilibrium 50%RH	ISO 62, Similar to	%			1.5			
		Immersion 24h								
		Saturation, immersed					4.9			
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%			0.9		0.58	
Parallel, 2.0mm						0.15		0.33		

				Reinforced - PA66		Reinforced - PA612					
				Zytel® 70K20HSL NC010		Zytel® 77G33L NC010		Zytel® 77G43L NC010		Zytel® FE5382 BK276	
				Zytel® 70K20HSL NC010 is a heat stabilized PA66 resin modified with Kevlar aramid fiber for excellent wear resistance.		Zytel® 77G33L NC010 is a 33% glass fiber reinforced polyamide 612 resin for injection molding.		Zytel® 77G43L NC010 is a 43% glass fiber reinforced polyamide 612 resin for injection molding.		Zytel® FE5382 BK276 is a 33% glass fiber reinforced, heat stabilized, black polyamide 612 resin developed for electrical bobbins and encapsulation applications.	
				DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-RF20	PA612-GF33	PA612-GF43	PA612-GF33	PA612-GF33		
	Part Marking Code		ISO 11469		>PA66-RF20<	>PA612-GF33<	>PA612-GF43<	>PA612-GF33<	>PA612-GF33<		
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa kpsi							
	Yield Strain * pull speed @ 50mm/min		ISO 527	%							
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa kpsi	110 16.0	85 12.3	168 24.4	140 20.3	200 29	165 23.9	170 24.7
	Strain at Break * pull speed @ 50mm/min		ISO 527	%	5.2	7.2	3.2	3.2	3	5	2.5
	Nominal Strain at Break		ISO 527	%							
	Tensile Modulus		ISO 527	MPa kpsi	5300 769	3500 510	9500 1380	7900 1150	12500 1810	11500 1650	9800 1420
	Tensile Stress	@ 50% Strain	ISO 527	MPa kpsi							
	Tensile Creep Modulus	1h	ISO 899	MPa kpsi							
		1000h		MPa kpsi							
	Poissons Ratio					0.39		0.42			
	Flexural Modulus		ISO 178	MPa kpsi	4900 710	3300 478	8200 1190	7000 1015	11000 1600		8400 1220
	Flexural Strength		ISO 178	MPa kpsi							
	Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2			12	10	17		10
		-30°C (-22°F)					11	10	17		
		23°C (73°F)			6	9	13	12	17		12
	Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2							
		-30°C (-22°F)					60	65	85		
		23°C (73°F)			50	65	80	90	100		

					Reinforced - PA66		Reinforced - PA612					
					Zytel® 70K20HSL NC010		Zytel® 77G33L NC010		Zytel® 77G43L NC010		Zytel® FE5382 BK276	
					Zytel® 70K20HSL NC010 is a heat stabilized PA66 resin modified with Kevlar aramid fiber for excellent wear resistance.		Zytel® 77G33L NC010 is a 33% glass fiber reinforced polyamide 612 resin for injection molding.		Zytel® 77G43L NC010 is a 43% glass fiber reinforced polyamide 612 resin for injection molding.		Zytel® FE5382 BK276 is a 33% glass fiber reinforced, heat stabilized, black polyamide 612 resin developed for electrical bobbins and encapsulation applications.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-RF20		PA612-GF33		PA612-GF43		PA612-GF33	
	Part Marking Code		ISO 11469		>PA66-RF20<		>PA612-GF33<		>PA612-GF43<		>PA612-GF33<	
Thermal	Deflection Temperature	0.45MPa	ISO 75-1/-2	C	255		216		217			
				F	491		421		423			
		1.80MPa		C	222		200		203		200	
				F	432		392		397		392	
	Melting Temperature	10°C/min	ISO 11357-1/-3	C	263		218		218		218	
				F	505		424		424		424	
	CLTE, Parallel	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C			0.26		0.21			
				E-4/F			0.14		0.12			
		23 - 55°C (73 - 130°F)		E-4/C			0.17		0.1			
				E-4/F			0.09		0.06			
		55 - 160°C (130 - 320°F)		E-4/C			0.16		0.16			
				E-4/F			0.09		0.09			
	CLTE, Normal	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C			0.83		0.73			
				E-4/F			0.46		0.41			
		23 - 55°C (73 - 130°F)		E-4/C			1.13		1.04			
				E-4/F			0.63		0.58			
		55 - 160°C (130 - 320°F)		E-4/C			1.58		1.39			
				E-4/F			0.88		0.77			
	Vicat Softening Temperature	50N	ISO 306	C	250							
				F	482							

				Reinforced - PA66		Reinforced - PA612					
				Zytel® 70K20HSL NC010		Zytel® 77G33L NC010		Zytel® 77G43L NC010		Zytel® FE5382 BK276	
				Zytel® 70K20HSL NC010 is a heat stabilized PA66 resin modified with Kevlar aramid fiber for excellent wear resistance.		Zytel® 77G33L NC010 is a 33% glass fiber reinforced polyamide 612 resin for injection molding.		Zytel® 77G43L NC010 is a 43% glass fiber reinforced polyamide 612 resin for injection molding.		Zytel® FE5382 BK276 is a 33% glass fiber reinforced, heat stabilized, black polyamide 612 resin developed for electrical bobbins and encapsulation applications.	
				DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-RF20		PA612-GF33		PA612-GF43		PA612-GF33
	Part Marking Code		ISO 11469		>PA66-RF20<		>PA612-GF33<		>PA612-GF43<		>PA612-GF33<
Flammability	Flammability Classification		IEC 60695-11-10 UL94				HB @ 0.71mm		HB @ 0.71mm		HB @ 0.75mm
	5V Rating		IEC 60695-11-20 UL94								
	Oxygen Index		ISO 4589-1/-2	%			23				
	Glow Wire Flammability Index		IEC 60695-2-12	C			675 @ 0.71mm 700 @ 3.0mm				
	Glow Wire Ignition Temperature		IEC 60695-2-13	C			700 @ 0.71mm 700 @ 1.5mm 725 @ 3.0mm				
	High Amperage Arc Ignition Resistance	UL 746A	PLC				0 @ 0.71mm		0 @ 0.71mm		
			arcs				200 @ 0.71mm >200 @ 1.5mm		200 @ 0.71mm >200 @ 1.5mm		
	High Current Arc Ignition Resistance	UL 746A	PLC								
	High Voltage Arc Tracking Rate	UL 746A	PLC				0		0		
			mm/min				19.3				
	Hot Wire Ignition	UL 746A	PLC				4 @ 0.71mm 3 @ 1.5mm		4 @ 0.71mm 3 @ 3.0mm		
			s				8 @ 0.71mm 17 @ 1.5mm 20 @ 3.0mm		8 @ 0.71mm 14 @ 1.5mm 26 @ 3.0mm		

				Reinforced - PA66		Reinforced - PA612					
				Zytel® 70K20HSL NC010		Zytel® 77G33L NC010		Zytel® 77G43L NC010		Zytel® FE5382 BK276	
				Zytel® 70K20HSL NC010 is a heat stabilized PA66 resin modified with Kevlar aramid fiber for excellent wear resistance.		Zytel® 77G33L NC010 is a 33% glass fiber reinforced polyamide 612 resin for injection molding.		Zytel® 77G43L NC010 is a 43% glass fiber reinforced polyamide 612 resin for injection molding.		Zytel® FE5382 BK276 is a 33% glass fiber reinforced, heat stabilized, black polyamide 612 resin developed for electrical bobbins and encapsulation applications.	
				DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-RF20		PA612-GF33		PA612-GF43		PA612-GF33
	Part Marking Code		ISO 11469		>PA66-RF20<		>PA612-GF33<		>PA612-GF43<		>PA612-GF33<
Electrical	Surface Resistivity		IEC 60093	ohm			1E12				
	Volume Resistivity		IEC 60093	ohm m			1E13		1E13		
	Electric Strength	1.0mm	IEC 60243-1	kV/mm							
				V/mil							
		2.0mm		kV/mm			27				
				V/mil			686				
	Relative Permittivity	1E2 Hz	IEC 60250				4.1				
		1E3 Hz									
		1E6 Hz					3.8		3.6		
	Dissipation Factor	1E2 Hz	IEC 60250	E-4			135				
		1E3 Hz									
		1E6 Hz					150		200		
	Arc Resistance	3.0mm	UL 746A	s			145		145		
	CTI	3.0mm	IEC 60112 UL 746A	PLC V			0 600		0 >600		
RTI	RTI, Electrical		UL 746B	C			105 @ 0.71mm 120 @ 1.5mm		105 @ 0.71mm 120 @ 1.5mm		65 @ 0.75mm
	RTI, Impact		UL 746B	C							65 @ 0.75mm
	RTI, Strength		UL 746B	C			120 @ 1.5mm		120 @ 1.5mm		65 @ 0.75mm
Other	Density		ISO 1183	kg/m3 g/cm3	1190 1.19		1320 1.32		1420 1.42		1320 1.32
	Water Absorption	Equilibrium 50% RH	ISO 62, Similar to	%	2.7		0.7				
		Immersion 24h					0.3				
		Saturation, immersed			6.8		1.8		1.7		
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%	1.4		0.9		0.8		
		Parallel, 2.0mm			0.9		0.3		0.3		

					Toughened Glass Reinforced - PA6		Toughened Glass Reinforced - PA66			
					Zytel® 73G30T NC010		Zytel® 80G14A NC010A		Zytel® 80G14AHS NC010	
					Zytel® 73G30T NC010 is a 30% glass fiber reinforced, toughened polyamide 6 resin for injection molding.		Zytel® 80G14A NC010A is a 14% glass fiber reinforced, toughened, high flow polyamide 66 resin. It offers outstanding performance in injection molding applications.		Zytel® 80G14AHS NC010 is a 14% glass fiber reinforced, toughened, high flow, heat stabilized polyamide 66 resin. It offers outstanding performance in injection molding applications.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA6-IGF30		PA66-IGF14		PA66-IGF14	
	Part Marking Code		ISO 11469		>PA6-IGF30<		>PA66-IGF14<		>PA66-IGF14<	
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa						
				kpsi						
	Yield Strain * pull speed @ 50mm/min		ISO 527	%						
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa	170	110	108	66	110	72
				kpsi	24.7	16	15.7	10	16.0	10
	Strain at Break * pull speed @ 50mm/min		ISO 527	%	3	6	3.8	10	3.8	9
	Nominal Strain at Break		ISO 527	%						
	Tensile Modulus		ISO 527	MPa	9100	5700	4800	3400	5000	3300
				kpsi	1320	830	700	490	725	480
	Tensile Stress	@ 50% Strain	ISO 527	MPa						
				kpsi						
	Tensile Creep Modulus	1h	ISO 899	MPa						
				kpsi						
		1000h		MPa						
				kpsi						
	Poissons Ratio									
	Flexural Modulus		ISO 178	MPa	9000	5700	4400		4400	3120
				kpsi	1310	830	640		640	450
Flexural Strength		ISO 178	MPa							
			kpsi							
Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2				6		6	
	-30°C (-22°F)			13	12		7		7	
	23°C (73°F)			20	25	13	17	13	17	
Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2							
	-30°C (-22°F)			100	94		71		71	
	23°C (73°F)			100	100		76		76	

Toughened Glass Reinforced - PA6		Toughened Glass Reinforced - PA66			
Zytel® 73G30T NC010		Zytel® 80G14A NC010A		Zytel® 80G14AHS NC010	
Zytel® 73G30T NC010 is a 30% glass fiber reinforced, toughened polyamide 6 resin for injection molding.		Zytel® 80G14A NC010A is a 14% glass fiber reinforced, toughened, high flow polyamide 66 resin. It offers outstanding performance in injection molding applications.		Zytel® 80G14AHS NC010 is a 14% glass fiber reinforced, toughened, high flow, heat stabilized polyamide 66 resin. It offers outstanding performance in injection molding applications.	
DAM	50%RH	DAM	50%RH	DAM	50%RH
PA6-IGF30		PA66-IGF14		PA66-IGF14	
>PA6-IGF30<		>PA66-IGF14<		>PA66-IGF14<	
221		258			
430		496			
210		240		240	
410		464		464	
221		263		263	
430		505		505	
0.28					
0.16					
1.2					
0.67					
215					
419					

					Toughened Glass Reinforced - PA6		Toughened Glass Reinforced - PA66			
					Zytel® 73G30T NC010		Zytel® 80G14A NC010A		Zytel® 80G14AHS NC010	
					Zytel® 73G30T NC010 is a 30% glass fiber reinforced, toughened polyamide 6 resin for injection molding.		Zytel® 80G14A NC010A is a 14% glass fiber reinforced, toughened, high flow polyamide 66 resin. It offers outstanding performance in injection molding applications.		Zytel® 80G14AHS NC010 is a 14% glass fiber reinforced, toughened, high flow, heat stabilized polyamide 66 resin. It offers outstanding performance in injection molding applications.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA6-IGF30		PA66-IGF14		PA66-IGF14	
	Part Marking Code		ISO 11469		>PA6-IGF30<		>PA66-IGF14<		>PA66-IGF14<	
Flammability	Flammability Classification		IEC 60695-11-10 UL94		HB @ 0.85mm					
	5V Rating		IEC 60695-11-20 UL94							
	Oxygen Index		ISO 4589-1/-2	%						
	Glow Wire Flammability Index		IEC 60695-2-12	C						
	Glow Wire Ignition Temperature		IEC 60695-2-13	C						
	High Amperage Arc Ignition Resistance		UL 746A	PLC						
				arcs						
	High Current Arc Ignition Resistance		UL 746A	PLC						
	High Voltage Arc Tracking Rate		UL 746A	PLC						
				mm/min						
	Hot Wire Ignition		UL 746A	PLC						
				s						

					Toughened Glass Reinforced - PA6		Toughened Glass Reinforced - PA66			
					Zytel® 73G30T NC010		Zytel® 80G14A NC010A		Zytel® 80G14AHS NC010	
					Zytel® 73G30T NC010 is a 30% glass fiber reinforced, toughened polyamide 6 resin for injection molding.		Zytel® 80G14A NC010A is a 14% glass fiber reinforced, toughened, high flow polyamide 66 resin. It offers outstanding performance in injection molding applications.		Zytel® 80G14AHS NC010 is a 14% glass fiber reinforced, toughened, high flow, heat stabilized polyamide 66 resin. It offers outstanding performance in injection molding applications.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA6-IGF30		PA66-IGF14		PA66-IGF14	
	Part Marking Code		ISO 11469		>PA6-IGF30<		>PA66-IGF14<		>PA66-IGF14<	
Electrical	Surface Resistivity		IEC 60093	ohm						
	Volume Resistivity		IEC 60093	ohm m						
	Electric Strength	1.0mm	IEC 60243-1	kV/mm						
				V/mil						
		2.0mm		kV/mm						
				V/mil						
	Relative Permittivity	1E2 Hz	IEC 60250							
		1E3 Hz								
		1E6 Hz								
	Dissipation Factor	1E2 Hz	IEC 60250	E-4						
		1E3 Hz								
		1E6 Hz								
RTI	Arc Resistance	3.0mm	UL 746A	s						
	CTI	3.0mm	IEC 60112 UL 746A	PLC V						
Other	RTI, Electrical		UL 746B	C	65 @ 1.5mm					
	RTI, Impact		UL 746B	C	65 @ 1.5mm					
	RTI, Strength		UL 746B	C	65 @ 1.5mm					
	Density		ISO 1183	kg/m3	1340		1190		1190	
				g/cm3	1.34		1.19		1.19	
		Equilibrium 50%RH	ISO 62, Similar to		1.8					
		Immersion 24h		%						
		Saturation, immersed			6.2					
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%	1		0.8		0.8	
		Parallel, 2.0mm			0.2		0.7		0.7	

					Toughened Glass Reinforced - PA66							
					Zytel® 80G25HS BK117		Zytel® 80G33HS1L NC010		Zytel® 80G33L NC010		Zytel® 80G43HS1L BK104	
					Zytel® 80G25HS BK117 is a 25% glass fiber reinforced, toughened, heat stabilized, black polyamide 66 resin for injection molding.		Zytel® 80G33HS1L NC010 is a 33% glass fiber reinforced heat stabilized polyamide 66 resin with outstanding impact resistance developed using DuPont Super Tough technology.		Zytel® 80G33L NC010 is a 33% glass fiber reinforced polyamide 66 resin with outstanding impact resistance developed using DuPont Super Tough technology.		Zytel® 80G43HS1L BK104 is a 43% glass fiber reinforced, heat stabilized, black polyamide 66 resin with superior impact resistance.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-IGF25		PA66-IGF33		PA66-IGF33		PA66-IGF43	
	Part Marking Code		ISO 11469		>PA66-IGF25<		>PA66-IGF33<		>PA66-IGF33<		>PA66-IGF43<	
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa								
				kpsi								
	Yield Strain * pull speed @ 50mm/min		ISO 527	%								
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa	122	87	146	108	142	95	169	
				kpsi	17.7	12.6	21.2	15.7	20.6	13.8	24.5	
	Strain at Break * pull speed @ 50mm/min		ISO 527	%	4	8	3.7	7	4	5	3.3	
	Nominal Strain at Break		ISO 527	%								
	Tensile Modulus		ISO 527	MPa	6900	4700	8900	6200	8700	5800	11700	
				kpsi	1000	682	1291	899	1260	840	1700	
	Tensile Stress	@ 50% Strain	ISO 527	MPa								
				kpsi								
	Tensile Creep Modulus	1h	ISO 899	MPa								
				kpsi								
		1000h		MPa								
				kpsi								
	Poissons Ratio						0.35					
	Flexural Modulus		ISO 178	MPa	6000		7500	6200	7400	5200	10300	
				kpsi	870		1090	899	1070	750	1490	
	Flexural Strength		ISO 178	MPa								
				kpsi								
Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2			14	18	13	13	15		
	-30°C (-22°F)			14	13	18	17	14	14			
	23°C (73°F)			22	24	20	28	20	22	23		
Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2									
	-30°C (-22°F)			89	87	106	100	80	75			
	23°C (73°F)			83	81	97	98	91	80	90		

					Toughened Glass Reinforced - PA66							
					Zytel® 80G25HS BK117		Zytel® 80G33HS1L NC010		Zytel® 80G33L NC010		Zytel® 80G43HS1L BK104	
					Zytel® 80G25HS BK117 is a 25% glass fiber reinforced, toughened, heat stabilized, black polyamide 66 resin for injection molding.		Zytel® 80G33HS1L NC010 is a 33% glass fiber reinforced heat stabilized polyamide 66 resin with outstanding impact resistance developed using DuPont Super Tough technology.		Zytel® 80G33L NC010 is a 33% glass fiber reinforced polyamide 66 resin with outstanding impact resistance developed using DuPont Super Tough technology.		Zytel® 80G43HS1L BK104 is a 43% glass fiber reinforced, heat stabilized, black polyamide 66 resin with superior impact resistance.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-IGF25		PA66-IGF33		PA66-IGF33		PA66-IGF43	
	Part Marking Code		ISO 11469		>PA66-IGF25<		>PA66-IGF33<		>PA66-IGF33<		>PA66-IGF43<	
Thermal	Deflection Temperature	0.45MPa	ISO 75-1/-2	C	258		261		262		261	
				F	496		502		504		502	
		1.80MPa		C	240		246		247		250	
				F	464		475		477		482	
	Melting Temperature	10°C/min	ISO 11357-1/-3	C	262		262		262		262	
				F	504		504		504		504	
	CLTE, Parallel	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C			0.22		0.22			
				E-4/F			0.12		0.12			
		23 - 55°C (73 - 130°F)		E-4/C			0.15		0.15			
				E-4/F			0.08		0.08			
		55 - 160°C (130 - 320°F)		E-4/C			0.14		0.14			
				E-4/F			0.08		0.08			
	CLTE, Normal	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C			0.96		0.96			
				E-4/F			0.53		0.53			
		23 - 55°C (73 - 130°F)		E-4/C			1.19		1.19			
				E-4/F			0.66		0.66			
		55 - 160°C (130 - 320°F)		E-4/C			1.30		1.30			
				E-4/F			0.72		0.72			
	Vicat Softening Temperature	50N	ISO 306	C			245					
				F			473					

					Toughened Glass Reinforced - PA66							
					Zytel® 80G25HS BK117		Zytel® 80G33HS1L NC010		Zytel® 80G33L NC010		Zytel® 80G43HS1L BK104	
					Zytel® 80G25HS BK117 is a 25% glass fiber reinforced, toughened, heat stabilized, black polyamide 66 resin for injection molding.		Zytel® 80G33HS1L NC010 is a 33% glass fiber reinforced heat stabilized polyamide 66 resin with outstanding impact resistance developed using DuPont Super Tough technology.		Zytel® 80G33L NC010 is a 33% glass fiber reinforced polyamide 66 resin with outstanding impact resistance developed using DuPont Super Tough technology.		Zytel® 80G43HS1L BK104 is a 43% glass fiber reinforced, heat stabilized, black polyamide 66 resin with superior impact resistance.	
					DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH
ID	Resin Identification		ISO 1043		PA66-IGF25		PA66-IGF33		PA66-IGF33		PA66-IGF43	
	Part Marking Code		ISO 11469		>PA66-IGF25<		>PA66-IGF33<		>PA66-IGF33<		>PA66-IGF43<	
Flammability	Flammability Classification		IEC 60695-11-10 UL94				HB @ 0.75mm		HB @ 0.75mm			
	5V Rating		IEC 60695-11-20 UL94									
	Oxygen Index		ISO 4589-1/-2	%					23			
	Glow Wire Flammability Index		IEC 60695-2-12	C					650 @ 0.75mm 775 @ 3.0mm			
	Glow Wire Ignition Temperature		IEC 60695-2-13	C					675 @ 0.75mm 725 @ 3.0mm			
	High Amperage Arc Ignition Resistance		UL 746A	PLC			0 @ 0.75mm		0 @ 0.75mm			
				arcs			150 @ 0.75mm		150 @ 0.75mm			
	High Current Arc Ignition Resistance		UL 746A	PLC								
	High Voltage Arc Tracking Rate		UL 746A	PLC			0		0			
				mm/min								
Hot Wire Ignition		UL 746A	PLC			3 @ 0.75mm 1 @ 1.5mm		3 @ 0.75mm 2 @ 1.5mm 1 @ 3.0mm				
			s			18 @ 0.75mm 103 @ 1.5mm 60 @ 3.0mm		17 @ 0.75mm 51 @ 1.5mm 63 @ 3.0mm				

					Toughened Glass Reinforced - PA66								
					Zytel® 80G25HS BK117		Zytel® 80G33HS1L NC010		Zytel® 80G33L NC010		Zytel® 80G43HS1L BK104		
					Zytel® 80G25HS BK117 is a 25% glass fiber reinforced, toughened, heat stabilized, black polyamide 66 resin for injection molding.		Zytel® 80G33HS1L NC010 is a 33% glass fiber reinforced heat stabilized polyamide 66 resin with outstanding impact resistance developed using DuPont Super Tough technology.		Zytel® 80G33L NC010 is a 33% glass fiber reinforced polyamide 66 resin with outstanding impact resistance developed using DuPont Super Tough technology.		Zytel® 80G43HS1L BK104 is a 43% glass fiber reinforced, heat stabilized, black polyamide 66 resin with superior impact resistance.		
DAM		50%RH		DAM		50%RH		DAM		50%RH			
ID	Resin Identification		ISO 1043		PA66-IGF25		PA66-IGF33		PA66-IGF33		PA66-IGF43		
	Part Marking Code		ISO 11469		>PA66-IGF25<		>PA66-IGF33<		>PA66-IGF33<		>PA66-IGF43<		
Electrical	Surface Resistivity		IEC 60093	ohm			1E12						
	Volume Resistivity		IEC 60093	ohm m			>1E13	1E9					
	Electric Strength	1.0mm	IEC 60243-1	kV/mm									
				V/mil									
		2.0mm		kV/mm									
				V/mil									
	Relative Permittivity	1E2 Hz	IEC 60250										
		1E3 Hz											
		1E6 Hz				3.6	4.3						
	Dissipation Factor	1E2 Hz	IEC 60250	E-4									
		1E3 Hz											
		1E6 Hz				130	600						
	Arc Resistance	3.0mm	UL 746A	s									
	CTI	3.0mm	IEC 60112 UL 746A	PLC			1		1				
V					400		600						
RTI	RTI, Electrical		UL 746B	C			130 @ 0.75mm		120 @ 0.75mm				
	RTI, Impact		UL 746B	C			65 @ 0.75mm 105 @ 1.5mm		65 @ 0.75mm 105 @ 1.5mm				
	RTI, Strength		UL 746B	C			85 @ 0.75mm 95 @ 1.5mm 105 @ 3.0mm		85 @ 0.75mm 95 @ 1.5mm 105 @ 3.0mm				
Other	Density		ISO 1183	kg/m3 g/cm3	1250 1.25		1330 1.33		1320 1.32		1430 1.43		
	Water Absorption	Equilibrium 50% RH	ISO 62, Similar to	%			1.5						
		Immersion 24h					0.85		0.83				
		Saturation, immersed					4.5						
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%			0.7		0.8		0.6		
		Parallel, 2.0mm			0.3		0.3		0.3		0.2		

					Flame Retardant - PA66								
					Zytel® FR50 NC010A		Zytel® FR7025V0F NC010		Zytel® FR7026V0F NC010		Zytel® FR70M30V0 NC010		
					Zytel® FR50 NC010A is a 25% glass fiber reinforced, flame retardant polyamide 66 resin for injection molding.		Zytel® FR7025V0F NC010 is a flame retardant polyamide 66 resin for injection molding. It does not contain elemental phosphorous, halogens or heavy metals.		Zytel® FR7026V0F NC010 is a flame retardant polyamide 66 resin for injection molding. It does not contain elemental phosphorous, halogens or heavy metals.		Zytel® FR70M30V0 NC010 is a 30% mineral reinforced, flame retardant polyamide 66 resin for injection molding.		
					DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH	
ID	Resin Identification		ISO 1043		PA66-GF25FR(17)		PA66-FR(30)		PA66-FR(30)		PA66-MD30FR(17)		
	Part Marking Code		ISO 11469		>PA66-GF25FR(17)<		>PA66-FR(30)<		>PA66-FR(30)<		>PA66-MD30FR(17)<		
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa			90*		90*	60*			
				kpsi			13*		13*	9*			
	Yield Strain * pull speed @ 50mm/min		ISO 527	%			4*		4*	21*			
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa	170		82		90		73	50	
				kpsi	24.7		12		13		10.6	7.3	
	Strain at Break * pull speed @ 50mm/min		ISO 527	%	2.5		13		14		2	6	
	Nominal Strain at Break		ISO 527	%			10		10	30			
	Tensile Modulus		ISO 527	MPa	10640		3750		3750	1800	6500	3500	
				kpsi	1543		545		545	260	940	510	
	Tensile Stress	@ 50% Strain	ISO 527	MPa									
				kpsi									
	Tensile Creep Modulus	1h	ISO 899	MPa									
				kpsi									
		1000h		MPa									
				kpsi									
	Poissons Ratio												
	Flexural Modulus		ISO 178	MPa	9446		3660						
				kpsi	1370		530						
	Flexural Strength		ISO 178	MPa									
				kpsi									
Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2	10.8		3							
	-30°C (-22°F)						3	2	2	2			
	23°C (73°F)			11.3		4		4	7	2.5	3		
Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2										
	-30°C (-22°F)									20	19		
	23°C (73°F)					135		135	110	20	30		

					Flame Retardant - PA66							
					Zytel® FR50 NC010A		Zytel® FR7025V0F NC010		Zytel® FR7026V0F NC010		Zytel® FR70M30V0 NC010	
					Zytel® FR50 NC010A is a 25% glass fiber reinforced, flame retardant polyamide 66 resin for injection molding.		Zytel® FR7025V0F NC010 is a flame retardant polyamide 66 resin for injection molding. It does not contain elemental phosphorous, halogens or heavy metals.		Zytel® FR7026V0F NC010 is a flame retardant polyamide 66 resin for injection molding. It does not contain elemental phosphorous, halogens or heavy metals.		Zytel® FR70M30V0 NC010 is a 30% mineral reinforced, flame retardant polyamide 66 resin for injection molding.	
DAM		50%RH		DAM		50%RH		DAM		50%RH		
ID	Resin Identification		ISO 1043		PA66-GF25FR(17)		PA66-FR(30)		PA66-FR(30)		PA66-MD30FR(17)	
	Part Marking Code		ISO 11469		>PA66-GF25FR(17)<		>PA66-FR(30)<		>PA66-FR(30)<		>PA66-MD30FR(17)<	
Thermal	Deflection Temperature	0.45MPa	ISO 75-1/-2	C			235				238	
				F			455				460	
		1.80MPa		C	246		83		70		145	
				F	475		181		158		293	
	Melting Temperature	10°C/min	ISO 11357-1/-3	C	261		263		263		263	
				F	502		505		505		505	
	CLTE, Parallel	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C								
				E-4/F								
		23 - 55°C (73 - 130°F)		E-4/C							0.64	
				E-4/F							0.36	
		55 - 160°C (130 - 320°F)		E-4/C								
				E-4/F								
	CLTE, Normal	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C								
				E-4/F								
		23 - 55°C (73 - 130°F)		E-4/C							0.81	
				E-4/F							0.45	
		55 - 160°C (130 - 320°F)		E-4/C								
				E-4/F								
	Vicat Softening Temperature	50N	ISO 306	C							235	
				F							455	

Flame Retardant - PA66											
Zytel® FR50 NC010A				Zytel® FR7025V0F NC010				Zytel® FR7026V0F NC010			
Zytel® FR50 NC010A is a 25% glass fiber reinforced, flame retardant polyamide 66 resin for injection molding.				Zytel® FR7025V0F NC010 is a flame retardant polyamide 66 resin for injection molding. It does not contain elemental phosphorous, halogens or heavy metals.				Zytel® FR7026V0F NC010 is a flame retardant polyamide 66 resin for injection molding. It does not contain elemental phosphorous, halogens or heavy metals.			
DAM		50%RH		DAM		50%RH		DAM		50%RH	
ID	Resin Identification		ISO 1043		PA66-GF25FR(17)		PA66-FR(30)		PA66-FR(30)		PA66-MD30FR(17)
	Part Marking Code		ISO 11469		>PA66-GF25FR(17)<		>PA66-FR(30)<		>PA66-FR(30)<		>PA66-MD30FR(17)<
Flammability	Flammability Classification		IEC 60695-11-10 UL94		V-0 @ 0.35mm		V-0 @ 0.75mm		V-0 @ 0.4mm		V-2 @ 0.75mm
	5V Rating		IEC 60695-11-20 UL94		5VA @ 1.5mm						5VA @ 1.5mm
	Oxygen Index		ISO 4589-1/-2	%					39		
	Glow Wire Flammability Index		IEC 60695-2-12	C	960 @ 0.75mm		960 @ 0.75mm		960 @ 0.4mm		960 @ 0.75mm
	Glow Wire Ignition Temperature		IEC 60695-2-13	C	900 @ 0.75mm 930 @ 3.0mm		775 @ 0.75mm		960 @ 0.4mm		800 @ 0.75mm
	High Amperage Arc Ignition Resistance	UL 746A	PLC				0 @ 0.75mm		0 @ 0.4mm		0 @ 0.75mm
			arcs								
	High Current Arc Ignition Resistance	UL 746A	PLC		0 @ 0.75mm		0 @ 0.75mm		0 @ 0.82mm		0 @ 0.75mm
	High Voltage Arc Tracking Rate	UL 746A	PLC		1		0		0		1
			mm/min								
	Hot Wire Ignition	UL 746A	PLC		0 @ 0.75mm		3 @ 0.75mm 1 @ 3.0mm		3 @ 0.4mm 2 @ 3.0mm		3 @ 0.75mm 2 @ 1.5mm 0 @ 3.0mm
			s								

				Flame Retardant - PA66									
				Zytel® FR50 NC010A		Zytel® FR7025V0F NC010		Zytel® FR7026V0F NC010		Zytel® FR70M30V0 NC010			
				Zytel® FR50 NC010A is a 25% glass fiber reinforced, flame retardant polyamide 66 resin for injection molding.		Zytel® FR7025V0F NC010 is a flame retardant polyamide 66 resin for injection molding. It does not contain elemental phosphorous, halogens or heavy metals.		Zytel® FR7026V0F NC010 is a flame retardant polyamide 66 resin for injection molding. It does not contain elemental phosphorous, halogens or heavy metals.		Zytel® FR70M30V0 NC010 is a 30% mineral reinforced, flame retardant polyamide 66 resin for injection molding.			
				DAM	50%RH	DAM	50%RH	DAM	50%RH	DAM	50%RH		
ID	Resin Identification		ISO 1043		PA66-GF25FR(17)		PA66-FR(30)		PA66-FR(30)		PA66-MD30FR(17)		
Electrical	Part Marking Code		ISO 11469		>PA66-GF25FR(17)<		>PA66-FR(30)<		>PA66-FR(30)<		>PA66-MD30FR(17)<		
	Surface Resistivity		IEC 60093	ohm							>1E15		
	Volume Resistivity		IEC 60093	ohm m							>1E13	1E9	
	Electric Strength	1.0mm	IEC 60243-1	kV/mm							40	33	
				V/mil							1015	838	
		2.0mm		kV/mm									
				V/mil									
	Relative Permittivity	1E2 Hz	IEC 60250								4.1	9.1	
		1E3 Hz											
		1E6 Hz								3.7	4.2		
	Dissipation Factor	1E2 Hz	IEC 60250	E-4							140	410	
		1E3 Hz											
1E6 Hz										140	500		
Arc Resistance	3.0mm	UL 746A	s										
CTI	3.0mm	IEC 60112 UL 746A	PLC V			0		0		2			
RTI	RTI, Electrical		UL 746B	C	130 @ 0.75mm		130 @ 0.75mm		130 @ 0.82mm		105 @ 0.75mm 120 @ 1.5mm		
	RTI, Impact		UL 746B	C	105 @ 0.75mm 115 @ 1.5mm		75 @ 0.75mm		95 @ 0.82mm		95 @ 0.75mm 105 @ 1.5mm 115 @ 3.0mm		
	RTI, Strength		UL 746B	C	105 @ 0.75mm 115 @ 1.5mm 120 @ 3.0mm		85 @ 0.75mm		110 @ 0.82mm		105 @ 0.75mm 115 @ 1.5mm		
Other	Density		ISO 1183	kg/m3 g/cm3	1600 1.6		1170 1.17		1150 1.15		1620 1.62		
	Water Absorption	Equilibrium 50% RH	ISO 62, Similar to	%							1.3		
		Immersion 24h					1.8						
		Saturation, immersed									4		
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%	0.8				1.4		0.9		
Parallel, 2.0mm		0.3						1.2		0.8			

				Mineral Reinforced								
				Minlon® EFE6053 BK413		Minlon® 73GM40 NC010		Minlon® 73M30 NC010		Minlon® 73M40 NC010		
				Minlon® EFE6053 BK413 is a 40% mineral/glass reinforced, heat stabilized polyamide 66 resin for injection molding.		Minlon® 73GM40 NC010 is a 40% mineral/glass reinforced, heat stabilized polyamide 6 resin for injection molding.		Minlon® 73M30 NC010 is a 30% mineral reinforced, heat stabilized polyamide 6 resin for injection molding. It has isotropic properties and low warpage.		Minlon® 73M40 NC010 is a 40% mineral reinforced, heat stabilized polyamide 6 resin for injection molding. It has isotropic properties and low warpage.		
DAM		50%RH		DAM		50%RH		DAM		50%RH		
ID	Resin Identification		ISO 1043		PA66-(GF+MD)40		PA6-(MD+GF)40		PA6-MD30		PA6-MD40	
	Part Marking Code		ISO 11469		>PA66-(GF+MD)40<		>PA6-(MD+GF)40<		>PA6-MD30<		>PA6-MD40<	
Mechanical	Yield Stress * pull speed @ 50mm/min		ISO 527	MPa								
				kpsi								
	Yield Strain * pull speed @ 50mm/min		ISO 527	%								
	Stress at Break * pull speed @ 50mm/min		ISO 527	MPa	160	97	140	80	82	55	87	59
				kpsi	23.2	14.0	20.3	11.6	11.9	8	12.6	8.6
	Strain at Break * pull speed @ 50mm/min		ISO 527	%	2.2	4.6	3	6	15	40	10	25
	Nominal Strain at Break		ISO 527	%								
	Tensile Modulus		ISO 527	MPa	10000	6500	8300	4600	4800	1700	6000	2200
				kpsi	1500	940	1200	670	700	250	870	320
	Tensile Stress	@ 50% Strain	ISO 527	MPa								
				kpsi								
	Tensile Creep Modulus	1h	ISO 899	MPa						1180		
				kpsi						171		
		1000h		MPa						740		
				kpsi						107		
	Poissons Ratio											
	Flexural Modulus		ISO 178	MPa	9900				4800	1800	5900	
				kpsi	1400				700	260	860	
	Flexural Strength		ISO 178	MPa								
				kpsi								
Notched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eA	kJ/m2									
	-30°C (-22°F)			4	6	5.5	4	3.5	3.5	4	5	
	23°C (73°F)			4.5	6.5	7	12	5.5	11	5.5	8	
Unnotched Charpy Impact Strength	-40°C (-40°F)	ISO 179/1eU	kJ/m2									
	-30°C (-22°F)			40	40	50	50	85	85	95	95	
	23°C (73°F)			45	50	60	65	110	NB	130	NB	

					Mineral Reinforced							
					Minlon® EFE6053 BK413		Minlon® 73GM40 NC010		Minlon® 73M30 NC010		Minlon® 73M40 NC010	
					Minlon® EFE6053 BK413 is a 40% mineral/glass reinforced, heat stabilized polyamide 66 resin for injection molding.		Minlon® 73GM40 NC010 is a 40% mineral/glass reinforced, heat stabilized polyamide 6 resin for injection molding.		Minlon® 73M30 NC010 is a 30% mineral reinforced, heat stabilized polyamide 6 resin for injection molding. It has isotropic properties and low warpage.		Minlon® 73M40 NC010 is a 40% mineral reinforced, heat stabilized polyamide 6 resin for injection molding. It has isotropic properties and low warpage.	
ID	Resin Identification		ISO 1043		PA66-(GF+MD)40		PA6-(MD+GF)40		PA6-MD30		PA6-MD40	
	Part Marking Code		ISO 11469		>PA66-(GF+MD)40<		>PA6-(MD+GF)40<		>PA6-MD30<		>PA6-MD40<	
Thermal	Deflection Temperature	0.45MPa	ISO 75-1/-2	C	256				196		196	
				F	493				385		385	
		1.80MPa		C	240		195		78		110	
				F	464		383		172		230	
	Melting Temperature	10°C/min	ISO 11357-1/-3	C	262		221		221		221	
				F	504		430		430		430	
	CLTE, Parallel	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C								
				E-4/F								
		23 - 55°C (73 - 130°F)		E-4/C	0.28		0.41		0.88		0.65	
				E-4/F	0.16		0.23		0.49		0.36	
		55 - 160°C (130 - 320°F)		E-4/C								
				E-4/F								
	CLTE, Normal	-40 - 23°C (-40 - 73°F)	ISO 11359-1/-2	E-4/C								
				E-4/F								
		23 - 55°C (73 - 130°F)		E-4/C	0.87		0.77		1.02		0.75	
				E-4/F	0.48		0.43		0.57		0.42	
		55 - 160°C (130 - 320°F)		E-4/C								
				E-4/F								
	Vicat Softening Temperature	50N	ISO 306	C	250		212		210		210	
				F	482		414		410		410	

Mineral Reinforced											
Minlon® EFE6053 BK413				Minlon® 73GM40 NC010				Minlon® 73M30 NC010			
Minlon® EFE6053 BK413 is a 40% mineral/glass reinforced, heat stabilized polyamide 66 resin for injection molding.				Minlon® 73GM40 NC010 is a 40% mineral/glass reinforced, heat stabilized polyamide 6 resin for injection molding.				Minlon® 73M30 NC010 is a 30% mineral reinforced, heat stabilized polyamide 6 resin for injection molding. It has isotropic properties and low warpage.			
DAM		50%RH		DAM		50%RH		DAM		50%RH	
ID	Resin Identification		ISO 1043		PA66-(GF+MD)40	PA6-(MD+GF)40	PA6-MD30	PA6-MD40			
	Part Marking Code		ISO 11469		>PA66-(GF+MD)40<	>PA6-(MD+GF)40<	>PA6-MD30<	>PA6-MD40<			
Flammability	Flammability Classification		IEC 60695-11-10 UL94								
	5V Rating		IEC 60695-11-20 UL94								
	Oxygen Index		ISO 4589-1/-2	%							
	Glow Wire Flammability Index		IEC 60695-2-12	C							
	Glow Wire Ignition Temperature		IEC 60695-2-13	C							
	High Amperage Arc Ignition Resistance	UL 746A	PLC								
			arcs								
	High Current Arc Ignition Resistance	UL 746A	PLC								
	High Voltage Arc Tracking Rate	UL 746A	PLC								
			mm/min								
Hot Wire Ignition		UL 746A	PLC								
			s								

					Mineral Reinforced								
					Minlon® EFE6053 BK413		Minlon® 73GM40 NC010		Minlon® 73M30 NC010		Minlon® 73M40 NC010		
					Minlon® EFE6053 BK413 is a 40% mineral/glass reinforced, heat stabilized polyamide 66 resin for injection molding.		Minlon® 73GM40 NC010 is a 40% mineral/glass reinforced, heat stabilized polyamide 6 resin for injection molding.		Minlon® 73M30 NC010 is a 30% mineral reinforced, heat stabilized polyamide 6 resin for injection molding. It has isotropic properties and low warpage.		Minlon® 73M40 NC010 is a 40% mineral reinforced, heat stabilized polyamide 6 resin for injection molding. It has isotropic properties and low warpage.		
DAM		50%RH		DAM		50%RH		DAM		50%RH			
ID	Resin Identification		ISO 1043		PA66-(GF+MD)40		PA6-(MD+GF)40		PA6-MD30		PA6-MD40		
	Part Marking Code		ISO 11469		>PA66-(GF+MD)40<		>PA6-(MD+GF)40<		>PA6-MD30<		>PA6-MD40<		
Electrical	Surface Resistivity		IEC 60093	ohm									
	Volume Resistivity		IEC 60093	ohm m									
	Electric Strength	1.0mm	IEC 60243-1	kV/mm	28								
				V/mil	710								
		2.0mm		kV/mm									
				V/mil									
	Relative Permittivity	1E2 Hz	IEC 60250		4.9	13.9							
		1E3 Hz											
		1E6 Hz			4.8	5							
	Dissipation Factor	1E2 Hz	IEC 60250	E-4	140	5400							
		1E3 Hz											
		1E6 Hz			130	700							
Arc Resistance	3.0mm	UL 746A	s										
CTI	3.0mm	IEC 60112 UL 746A	PLC V										
RTI	RTI, Electrical		UL 746B	C					65 @ 0.85mm		65 @ 0.85mm		
	RTI, Impact		UL 746B	C					65 @ 0.85mm		65 @ 0.85mm		
	RTI, Strength		UL 746B	C					65 @ 0.85mm		65 @ 0.85mm		
Other	Density		ISO 1183	kg/m3 g/cm3	1470 1.47		1460 1.46		1350 1.35		1450 1.45		
	Water Absorption	Equilibrium 50% RH	ISO 62, Similar to	%	1.5		1.6		2.1		1.8		
		Immersion 24h											
		Saturation, immersed			5		5.6		6.3		5.4		
	Molding Shrinkage	Normal, 2.0mm	ISO 294-4	%	1.1		0.7		0.9		0.8		
		Parallel, 2.0mm			0.4		0.5		0.9		0.8		

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K22006 11/2008