OMEGA-TRON ® NYLONS (PA)

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OMEGA-TRON ® NYLONS

SHEET, ROD AND TUBE

OMEGA-TRON ® NYLONS are chemically known as polyamides and available in sheet, rod and tube. There are many different versions of OMEGATRON ® Nylons and they are produced either by casting or extrusion. They are semi-crystalline thermoplastic obtained by the polymerisation of caprolactam. The extrusion of a high viscosity polymer results in a product with excellent mechanical properties and a very high standard of quality. OMEGA-TRON ® is tough and durable. The most common engineering Nylons are PA6 and PA66 and the process of production is in part a determination of the nylon properties of the end product. Typical applications would be medium speed and temperature in a rugged, abrasive, impact and high load environment.

MAIN ADVANTAGES OF OMEGA-TRON ® NYLON SHEET, ROD AND TUBE

- Excellent bearing properties
- Optimal toughness, rigidity and mechanical strength
- Great sliding and wear properties
- High impact strength
- Low power factor requirements
- Various FDA compliant grades available
- Good electrical insulating properties

WEAKNESSES OF OMEGA-TRON® NYLON SHEET, ROD AND TUBE

- Sometimes difficult to machine.

APPLICATIONS

- Bearings, Bushes, Rollers, Support and Guide wheels
- Gears, Sprockets, Star wheels
- Wear pads, Buffer pads
- Wire rope sheaves
- Conveyor parts, Tension rollers
- High load bearing applications
- The automotive industry is the biggest user of nylon resins. Good mechanical properties and resistance to heat and fuels make these materials suitable for mechanical and electrical hardware and under-the-hood components.






PROPERTIES of OMEGA-TRON ® NYLONS

Criteria	Test Method	Units	PA6 E	PA6 E MoS_2	PA6 GF30	PA66	PA66 MoS_2	PA66 GF30
PHYSICAL								
Density	ISO 1183	g/cm³	1,13	1,14	1,35	1,14	1,14	1,35
Specific Gravity	ISO 1183	cm³/g	0,89	0,88	0,74	0,88	0,88	0,74
THERMAL								
Min Service Temp		°C	-40	-40	-40	-30	-30	-30
Max Service Temp		°C	90	100	105	92	100	110
Max Service Temp Short Term		°C	150	165	180	170	175	180
Melting Point		°C	230	220	220	255	255	255
Thermal Conductivity	ISO 8302	W/(mK)	0,23	0,23	0,28	0,23	0,23	0,27
Heat Distortion at 1.80Mpa	ISO 75	°C	75	100	210	100	105	230
Heat Distortion at 0.45Mpa	ISO 75	°C	190	195	220	210	215	250
Glass Transition	DSC	°C	45	45	45	50	50	50
Specific Heat	ISO 220O7	J/g.K	1,70	1,70	1,50	1,70	1,80	1,50
Flammability	UL-94		HB	HB	HB	V2	HB	HB
Oxygen Index	ASTM D621	%	24	25	25	27	26	27
Coefficient of Linear Expansion	ISO 11359	10^{-5}m/m°C	7,8	7,0	2,7	7,0	5,5	2,9
MECHANICAL								
Impact resistance	ISO 179	KJ/m²	no br.	no br.	80	no br.	no br.	17
Ball Indentation Strength	ISO 2039	Mpa	160	170	220	170	180	270
Hardness	ISO2039	Shore (D)	M88	M88	M88	M89	M88	M95
Moisture Absorption	ISO 62	%	3,0	2,7	2,1	2,8	3,0	1,5
Moisture Absorption at Saturation	ISO 62	%	9,5	8,5	6,6	8,5	7,0	5,5
Resistance to UV/ Weathering			NO			NO		YES
Wear		V	0,23	0,16	-	0,9	0,08	-
Friction Sliding Coefficient vs steel	ISO 8295	Mpa	0,35	0,30	0,38	0,35	0,30	0,38
Friction Sliding Coefficient vs self	ISO 8295	Mpa	0,40	0,35	0,60	0,40	0,35	0,60
Tensile Strength at Yield	ISO 527	Mpa	85	85	92	80	90	100
Tensile Strength at Break	ISO 527	Mpa	-	-	180	-	-	200
Compressive Strength	ISO 604	Mpa	24	25	28	25	25	28
Elongation at Break	ISO 527	%	70	40	5	40	35	5
Creep Rupture Strength		Mpa	45	-	-	55	-	-
Flexural Modulus	ISO 178	Mpa	3200	3300	8500	3330	4000	9700
Modulus of Elasticity	ISO 527	Mpa	3200	3300	8500	3330	4000	9700
ELECTRICAL								
Dielectric Strength	ISO 243	kV/mm	25	24	25	22	24	30
Dielectric Constant	IEC 250		3,6	3,5	3,6	4,0	3,5	3,6
Surface Resisitivity	IEC 60093	Ω	$>10^{12}$	$>10^{12}$	$>10^{12}$	$>10^{12}$	$>10^{12}$	$>10^{12}$
Volume Resistivity	IEC 093	Ω. Cm	10^{14}	10^{14}	10^{14}	10^{14}	10^{14}	10^{14}
Dissipation Factor	IEC 250		0,06	0,05	0,05	0,06	0,06	0,06
CHEMICAL								
Acids			VG	VG	VG	VG(weak acids)	VG	VG
Alkalis			VG	VG	VG	VG(weak alkalis)	VG	VG
Oils / Petroleum			VG	VG	VG	VG	VG	VG
Good Resistance					solvents, fuels, lubrificants	fuels, hydron carbons, alcohols,organic solvents		
Poor Resistance			hot water, washing soda			hot water, washing soda		hot water, washing soda
Food Safe	FDA		YES	NO	NO	YES	NO	NO

Criteria	Test Method	Units	PA6G	PA6G MoS_2	PA6G Oil	PA6G HS Blue	PA11	PA12
PHYSICAL								
Density	ISO 1183	g/cm³	1,15	1,15	1,15	1,15	1,04	1,02
Specific Gravity	ISO 1183	cm³/g	0,87	0,87	0,87	0,87	0,96	0,98
THERMAL								
Min Service Temp		°C	-30	-30	-30	-30	-50	-50
Max Service Temp		°C	100	100	100	115	100	80
Max Service Temp Short Term		°C	160	180	170	180	150	140
Melting Point		°C	220	220	220	220	183	179
Thermal Conductivity	ISO 8302	W/(mK)	0,24	0,23	0,23	0,2	0,23	0,23
Heat Distortion at 1.80Mpa	ISO 75	°C	95	95	90	200	55	50
Heat Distortion at 0.45Mpa	ISO 75	°C	195	195	180	210	150	140
Glass Transition	DSC	°C	40	40	40	40	43	41
Specific Heat	ISO 220O7	J/g.K	1,70	1,70	1,70	1,80	2,10	2,10
Flammability	UL-94		HB	HB	HB	HB	V2	V2
Oxygen Index	ASTM D621	%	25	25	25	20	22	22
Coefficient of Linear Expansion	ISO 11359	10^{-5}m/m°C	5,5	8,5	9,0	8,0	10,0	10,0
MECHANICAL								
Impact resistance	ISO 179	KJ/m²	no br.	-	-	-	no br.	no br.
Ball Indentation Strength	ISO 2039	Mpa	160	175	125	170	90	95
Hardness	ISO2039	Shore (D)	M88	M88	M82	M88	M83	M84
Moisture Absorption	ISO 62	%	2,5	2,5	2,3	2,5	0,9	0,7
Moisture Absorption at Saturation	ISO 62	%	6,5	6,5	6,0	7,0	1,9	1,6
Resistance to UV/ Weathering			NO				NO	NO
Wear		V	-	-	-	-	0,8	0,8
Friction Sliding Coefficient vs steel	ISO 8295	Mpa	0,35	0,30	0,25	0,35	0,32	0,32
Friction Sliding Coefficient vs self	ISO 8295	Mpa	0,40	0,35	0,30	0,40	0,38	0,38
Tensile Strength at Yield	ISO 527	Mpa	85	90	70	85	47	60
Tensile Strength at Break	ISO 527	Mpa	-	-	-	-	-	46-52
Compressive Strength	ISO 604	Mpa	26	25	22	23	23	23
Elongation at Break	ISO 527	%	50	30	40	50	280	35
Creep Rupture Strength		Mpa	50	-	-	-	23	23
Flexural Modulus	ISO 178	Mpa	3300	3500	2500	4000	1800	1800
Modulus of Elasticity	ISO 527	Mpa	3300	3500	2500	4000	1800	1800
ELECTRICAL								
Dielectric Strength	IEC 243	kV/mm	30	24	30	29	40	33
Dielectric Constant	IEC 250		3,7	3,5	3,7	3,7	3,6	3,6
Surface Resisitivity	IEC 60093	Ω	$>10^{12}$	$>10^{12}$	$>10^{12}$	$>10^{12}$	$>10^{15}$	$>10^{15}$
Volume Resistivity	IEC 093	Ω. Cm	10^{14}	10^{14}	10^{14}	10^{14}	10^{14}	10^{14}
Dissipation Factor	IEC 250		0,05	0,05	0,06	0,06	0,055	0,035
CHEMICAL								
Acids			VG	VG	VG	VG	G(weak acids)	G(weak acids)
Alkalis			VG	VG	VG	VG	VG(weak alkalis)	VG(weak alkalis)
Oils / Petroleum			VG	VG	VG	VG	VG	VG
Good Resistance			aliphatic and aromatic hydrocarbons (oils, fuels, fats)				hot water, washing soda, organic acids, hydron carbons, fuels,	hot water, washing soda, organic acids, hydron carbons, fuels,
Poor Resistance			hot water, washing soda				alcohols	alcohols
Food Safe	FDA		YES	NO	NO	NO	YES	YES

DIFFERENT VERSIONS OF OMEGA-TRON ® NYLON SHEET, ROD AND TUBE

OMEGA-TRON ® - PA6E: This material offers an optimal combination of mechanical strength, stiffness, toughness, mechanical damping properties and wears resistance. These properties, together with a favorable electrical insulating ability and a good chemical resistance make OMEGA-TRON ® 6SA a general purpose for mechanical construction and maintenance.
OMEGA-TRON ® - PA6E MoS_2
OMEGA-TRON ® - PA6 GF30
OMEGA-TRON ® - PA66: Material with a higher mechanical strength, stiffness, heat and wear resistance than OMEGA-TRON ® PA6E. It also has a better creep resistance but its impact strength and mechanical damping ability are reduced. Well suited for machining on automatic lathes.
OMEGA-TRON ® - PA66 MoS_2
OMEGA-TRON ® - PA66 GF30: Compared with virgin OMEGA-TRON ® PA66, this 30% glass fibre reinforced Nylon grade offers increased strength, stiffness, creep resistance and dimensional stability whilst retaining an excellent wear resistance. It also allows high maximum service temperatures.
OMEGA-TRON ® - PA6G: The characteristics of this cast nylon grade come very close to those of OMEGA-TRON ® PA66. Its production method (direct polymerisation in the mould) offers the possibility of manufacturing large stock shapes as well as custom casting which require only minimal machining.
OMEGA-TRON ® - PA6G MOS_2: This gives excellent wear resistance, self-lubrication and low friction characteristics. It is an ideal material for dynamic bearing applications, even at temperatures up to 100ºC. These superior mechanical properties, combined with low moisture absorption, extend its range of uses over standard nylon.
OMEGA-TRON ® - PA6G Oil: Is an internally lubricated cast Nylon 6 which is self-lubricating in the real meaning of the word. It has been specifically developed for unlubricated moving parts applications and yields a considerable enlargement of the application possibilities of Nylons. This is because of its reduced coefficient of friction (less 50%) and improved wear resistance (up to a factor of 10).
OMEGA-TRON ® - PA6G HS Blue: features a better retention of stiffness and creep resistance over a wide range of temperatures as well as superior heat aging resistance. Therefore, applications for OMEGA-TRON ® PA6G HS Blue are suited in the higher temperature area (80º -150ºC) where stiffness, creep resistance, heat aging resistance, fatigue strength and wear resistance of OMEGA-TRON ® PA6E; OMEGA-TRON ® A66, OMEGATAL ® and PETP fall short.
OMEGA-TRON ® - PA11
OMEGA-TRON ® - PA12

DELIVERY PROGRAM

SHEET: Normal sheet sizes - 2000mm x 1000mm & 3050mm x 1220mm

AVAILABLE THICKNESSES: 0.5mm; 0.8mm; 1.0mm; 1.5mm; 2.0mm; 3.0mm; 4.0mm; 5.0mm; 6.0mm; 8mm; 10mm; 12mm; 15mm; 20mm; 25mm; 30mm; 35mm; 40mm; 45mm; 50mm; 60mm; 70mm; 80mm; 90mm; 100mm; 110mm; 120mm; 125mm; 150mm; 160mm; 170mm; 180mm; 190mm; 200mm; 220mm; 250mm; 280mm; 300mm; 320mm; 350mm; 380mm; 400mm; 420mm; 450mm; 500mm

ROD: Normal lengths- 3000mm; 2000mm & 1000mm

AVAILABLE DIAMETERS: 6mm; 8mm; 10mm; 12mm; 15mm; 16mm; 20mm; 25mm; 30mm; 35mm; 40mm; 45mm; 50mm; 55mm; 60mm; 65mm; 70mm; 75mm; 80mm; 85mm; 90mm; 95mm; 100mm; 110mm; 120mm; 125mm; 130mm; 140mm; 150mm; 160mm; 170mm; 175mm; 180mm; 190mm; 200mm; 210mm; 220mm; 230mm; 240mm; 250mm; 260mm; 270mm; 280mm; 280mm; 290mm; 300mm; 310mm;320mm; 325mm; 330mm; 340mm; 350mm;360mm;370mm; 375mm; 380mm; 390mm; 400mm; 410mm; 420mm; 425mm; 430mm; 440mm; 450mm; 460mm; 470mm; 475mm; 480mm; 490mm; 500mm; 550mm; 600mm; 650mm; 700mm; 750mm; 800mm; 850mm; 900mm; 1000mm; 1100mm; 1200mm; 1300mm; 1400mm; 1500mm; 1600mm; 1700mm; 1800mm; 1900mm; 2000mm

TUBE: Normal lengths - 3000mm, 2000mm & 1000mm

AVAILABLE DIAMETERS: 25mm; 30mm; 35mm; 40mm; 45mm; 50mm; 55mm; 60mm; 65mm; 70mm; 75mm; 80mm; 85mm; 90mm; 95mm; 100mm; 105mm; 110mm; 115mm; 120mm; 125mm; 130mm; 135mm; 140mm; 145mm; 150mm; 160mm; 170mm; 180mm; 190mm; 200mm; 210mm; 220mm; 230mm; 240mm; 250mm; 260mm; 270mm; 280mm; 290mm; 300mm; 310mm; 320mm; 330mm; 340mmn; 350mm; 360mm; 370mm; 380mm; 390mm; 400mm' 410mm; 420mm; 430mm; 440mm; 450mm; 460mm; 470mm; 480mm; 490mm; 500mm; 510mm; 520mm; 530mm; 540mm; 550mm; 560mm; 570mm; 580mm; 590mm; 600mm; 610mm; 620mm; 630mm; 640mm; 650mm.

These Tubes come in various wall thicknesses – some sizes up to 30 different variations in wall thickness.