Engineering Plastics
Nylon Pa.6, Pom, Pvc, Pet, PP
PeHd, Pehmw, Peuhmw, PTFE
Tondi, Tubi e lastre

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NYLON PA.6 + MOS

It is said that during the Second World War, when Japan prevented the United States the import of silk from China , a major U.S. chemical companies - **DuPont** - created a substitute material for military parachute's manufacturing, calling it **NYLON,** acronym of **"Now You've Lost , Old Nippon !".** Maybe it's a legend , but nylon, technically classified polyamide, was for decades **a material almost irreplaceable in many specific plastic industry applications** and it will be for long time.
The starting monomer for the polymerization is caprolactam , obtained from phenol or cyclohexane . The polymerization reaction proceeds through reaction of an intermediate, obtained with water addiction, which opens the ring of caprolactam giving an acid reagent. The polymerization is conducted in autoclave at 250-270 °C with water, using a salt of PA66 or aminocaproic acid as initiator. Monofunctional monomers are also added to control molecular weight and the chemical reaction is conducted in batch and continuous reactors . **It's widely used in mechanical parts construction due to excellent features. Hardness, toughness , light weight, high impact resistance even at low temperatures , low coefficient of friction, high power attenuation , make it preferable in many applications in various mechanical fields.**

Benefits

From laboratory experiments on **Nylon 6 + MoS** reinforced with glass fibers at 30% and using the same thermal stabilizer, demonstrated that, after aging at 150 ° C and 170 ° C, for some mechanical tests (such as the collision resistance), the value decrease compared to ambient temperature is best for PA6 + MoS. At 190 ° C, after 3000 hours of aging, the value of the impact resistance is no longer measurable. The resistance of the elastic modulus in the temperature, at 3000 hours and the conditions of 150, 170 and 190 ° C, also increases of 350 MPa. Other advantages of PA6 + MoS are lower cost then PA66 and its easy injection molding. Furthermore, this material has a lower shrinkage, is more isotropic, corrodes less metals then plasticizing screws, it is good for vibration welding and it offers a wide application fields, ensuring a great impact resistance. PA6 + MoS have a greater UV resistance due to its black coloration so it's better then PA6 for external applications.

HER PRINCIPAL CHARACTERISTICS:

- Among the polymers PA6 + MoS has the highest mechanical strength even at high temperatures and in harsh environments.
- High tenacity, good tensile breakage resistance, good compressive breakage resistance and excellent impact resistance.
- Low friction and abrasion coefficient, lower then PA6; self-lubricating so doesn't require lubrication.
- High resistance to oils and fats machines, not resistant to concentrated acids but it has good resistance to aging and weathering.
- Resistance to fatigue, it keeps its characteristics even under repeated efforts.
- High moisture absorption, lower then PA6.

TYPICAL APPLICATIONS:

- **Mechanical:** Widely used in mechanical industry for its characteristics and properties. Used for pulleys, cams, bearings, gears, shock absorbers, anti-wear guides and sliding components, bearings, wheels and many other applications.
- **Alimentary:** It's not a food contact material, due to additives presence.
- **Chemical:** Resistant to inorganic alkalis and solvents but it's not acid resistant.
- **Thermal:** Suitable up to 90 ° C. With higher temperature its mechanical characteristics decrease immediately.
- **Electrical:** It's not suited for electrical using due to its high moisture absorption that changes its electrical properties.

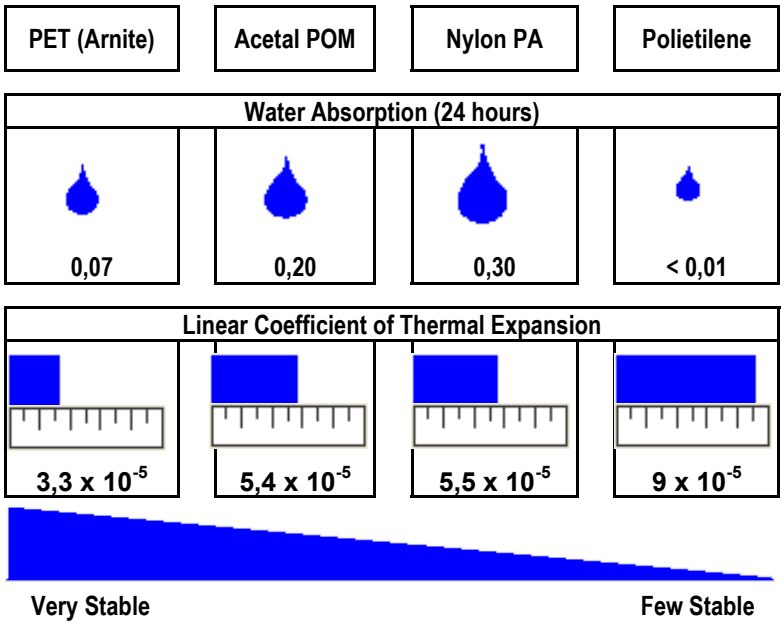
DEFECTS:

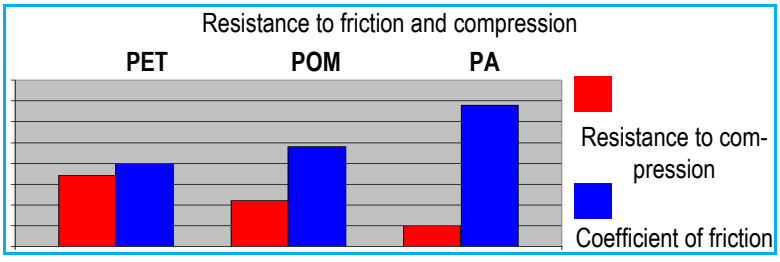
It's not a Food Contact Material because it contains additives.
The polyamides (including nylon) are hygroscopic materials. The hygroscopicity of this material, which varies from 3.5% (with a relative humidity equal to 65%) to 100% (with 100% humidity), is essential to establish the size of pieces because mechanical, electrical and dimensional properties change with this value. Dry Pa 6 can be fragile; instead wet Pa 6 is malleable and impact resistant. Not resistant to concentrated acids.

Applications:

Sprockets, bushings, gears, cams, spindles, manifolds, power piston pumps, valves and valve bodies, tracks, electrical insulators, screw conveyors, pump components, connectors and rotors food system ... etc..

Table of the Stability plastics





ISO Denomination	DIN (VDE)	ISO (IEC)	ASTM (UL)	UNITED' OF MEASURE	PA 6 estruso	PA 6 + Mos^2 estruso	PA 6G colato	PA 6G +MoS_2 Colato	PA 6G Modificato colato	PA 6G lubrificanti colato
Colour	-	-	-	-	Naturale-Nero Natural - Black	Antracite Anthracite	Avorio Ivory	Antracite Anthracite	Azzurro Blue	Giallo Yellow
Density	53479	1183	D 792	g/cm^3	1,14	1,15	1,15	1,16	1,15	1,15
Mechanical property 23 °C										
Test of traction - load of enervation	53455	R 527	D 638M	N/mm^2	78	78	85	94	85	80
	53455	R 527	D 638M	N/mm^2	45	45	55	65	55	55
- load of break	53455	R 527	D 638M	N/mm^2	-	-	-	-	-	-
	53455	R 527	D 638M	N/mm^2	-	-	-	-	-	-
- Elongation at breack	53455	R 527	D 638M	%	>50	>50	25	25	50	25
	53455	R 527	D 638M	%	>100	>100	>50	>50	>100	>50
- Modulus of elasticity	53455	R 527	D 638M	N/mm^2	3100	3100	3300	3400	3000	3200
	53455	R 527	D 638M	N/mm^2	1600	1600	1900	2000	1800	1800
Creep traction test ;	53444	899	D 2990	N/mm^2	18	18	22	23	22	21
-load to get 1% of extension in 1.000h	53444	899	D 2990	N/mm^2	7	7	10	11	10	9
Test of compression										
- load to 2% of nominal deformation	53454	604	D 695	N/mm^2	33	33	44	46	44	40
Impact strenght Izod - whit notched	-	180/2A(1A)	D256	KJ/m^2; J/m	5,5;55	5,5;55	3;30	3;30	6;60	3;30
	-	180/2A(1A)	D256	KJ/m^2; J/m	15;150	15;150	6;60	6;60	12;120	6;60
Impact strenght Charpy - whit notched	53453	179/3D	-	KJ/m^2	4	4	4	4	5	4
	53453	179/3D	-	KJ/m^2	15	15	12	12	15	12
Impact strenght Charpy - whitout notched	53453	179/3D	-	KJ/m^2	nessuna rottura	nessuna rottura	nessuna rottura	nessuna rottura	nessuna rottura	nessuna rottura
Hardness Shore	53505	-	D 2240	-	-	-	-	-	-	-
Hardness Rockwell	-	2039-2	D 785	-	M 85	M 85	M 88	M 90	M 85	M 82
Coefficent of attrition (to dry vs. steels) dynamic	-	-	-	-	0,25-0,50	0,25-0,50	0,25-0,50	0,15-0,35	0,20-0,45	0,10-0,25
Thermal property										
Melting point	-	-	-	°C	220	220	220	220	220	220
Temperature of glassy transition	-	-	-	°C	-	-	-	-	-	-
Thermal conductivity to 23 °C	52612	-	-	W/(K.m)	0,28	0,28	0,29	0,30	0,29	0,29
Coefficent of linear thermic expans. :										
- middle value berween 23 and 60 °C	-	-	-	$M/(m.k)x10^{-6}$	90	90	80	75	80	85
- middle value berween 23 and 100 °C	-	-	-	$M/(m.k)x10^{-6}$	105	105	90	85	90	95
Temperature of inflexion under load:										
- method A : 1,8 N/mm^2	53461	75	D 648	°C	80	80	95	95	95	95
Least temperature of use	-	-	-	°C	-40	-40	-40	-30	-40	-40
Maximum temperature of use admitted in air :										
- for brief periods	-	-	-	°C	160	160	170	170	180	170
- in continuous : for 5.000 / 20.000 h	-	-	-	°C	85/70	85/70	105/90	105/90	120/105	105/90
inflammability - index of oxygen :	-	4589	D 2863	%	25	25	25	25	25	25
- method UI 94 (tk 3,0 mm)	-	-	(94)	-	V-2	V-2	V-2	V-2	V-2	V-2
Electrical property to 23 °C										
Dielectric rigidity	53481 /	(243)	D 149	kV/mm	25	25	25	24	25	25
	(0303 T2)	(243)	D 149	kV/mm	16	16	17	16	17	17
Volume Resistivity	53482 /	(93)	D 257	Ohm.cm	10^{15}	10^{15}	10^{15}	10^{14}	10^{15}	10^{15}
	(0303 T3)	(93)	D 257	Ohm.cm	10^{13}	10^{13}	10^{13}	10^{12}	10^{13}	10^{13}
Surface resistivity	53482 /	(93)	D 257	Ohm.cm	10^{15}	10^{15}	10^{15}	10^{14}	10^{15}	10^{15}
	(0303 T3)	(93)	D 257	Ohm.cm	10^{14}	10^{14}	10^{13}	10^{12}	10^{13}	10^{13}
Constant dielectric - to 50 HZ	53483 /	(250)	D 150	-	3,9	3,9	3,6	3,6	3,6	3,6
	(0303 T4)	(250)	D 150	-	7,4	7,4	6,6	6,6	6,6	6,6
- to 1 MHZ	53483 /	(250)	D 150	-	3,3	3,3	3,2	3,2	3,2	3,2
	(0303 T4)	(250)	D 150	-	3,8	3,8	3,7	3,7	3,7	3,7
Factor of dissipation δ - to 50 HZ	53483 /	(250)	D 150	-	0,019	0,019	0,012	0,012	0,012	0,012
	(0303 T4)	(250)	D 150	-	0,13	0,13	0,14	0,14	0,14	0,14
- to 1 MHZ	53483 /	(250)	D 150	-	0,021	0,021	0,016	0,016	0,016	0,016
	(0303 T4)	(250)	D 150	-	0,06	0,06	0,05	0,05	0,05	0,05
Comparative index of the creeping tides	IEC 112 /	(112)	-	-	CTI 600	CTI 600	CTI 600	CTI 600	CTI 600	CTI 600
	(0303 T1)	(112)	-	-	CTI 600	CTI 600	CTI 600	CTI 600	CTI 600	CTI 600
Other Properties - Water absorption:										
- to saturation in air at 23 °C / 50% UR	-	-	-	%	2,6	2,6	2,2	2,1	2,2	2,1
- to saturation in water at 23 °C	-	-	-	%	9,00	9,00	6,5	6,1	6,5	6,1
Chemical resistance										
Acids - weaks	-	-	-	-	B	B	B	B	B	B
- strong	-	-	-	-	C	C	C	C	C	C
Alkali - weaks	-	-	-	-	A	A	A	A	A	A
- strong	-	-	-	-	B-C	B-C	B-C	B-C	B-C	B-C
Aromatic hydrocarbons	-	-	-	-	A	A	A	A	A	A
Aliphatic hydrocarbons	-	-	-	-	A	A	A	A	A	A
Ketones, foreign	-	-	-	-	A	A	A	A	A	A
Foreign	-	-	-	-	A	A	A	A	A	A
Chlorinated solvents	-	-	-	-	B	B	B	B	B	B
Alcools	-	-	-	-	A	A	A	A	A	A
Inorganic saline solution	-	-	-	-	A	A	A	A	A	A
Hot water	-	-	-	-	B	B	B	B	B	B
External application - UV resistance	-	-	-	-	B/nero: A	B/nero: A	B	A	B	B

TONDI PIENI ESTRUSI *RODS (extruded qualities)*			NYLON 6 PA 6 E Naturale - Natural Nero - Black	NYLON 6 + MOS PA 6+MoS Nero-Black	NYLON 66 PA 66 E Naturale - Natural Nero - Black	NYLON 66 + MOS PA 66+MoS Nero-Black
	Tolleranza	Max. Lunghezza	Peso approssim.	Peso approssim.	Peso approssim.	Peso approssim.
Dia	*Tolerance*	*Lenght*	*Weight appr.*	*Weight appr.*	*Weight appr.*	*Weight appr.*
mm	mm	mm	kg/m	kg/m	kg/m	kg/m
4	+0,1/+0,5	2000/3000				
5	+0,1/+0,5	2000/3000				
6	+0,1/+0,4	2000/3000	0,037	0,037	0,037	0,037
8	+0,1/+0,5	2000/3000	0,065	0,065	0,065	0,065
10	+0,1/+0,5	2000/3000	0,099	0,099	0,099	0,099
12	+0,2/+0,7	2000/3000	0,14	0,14	0,14	0,14
15	+0,2/+0,7	2000/3000	0,223	0,223	0,223	0,223
16	+0,2/+0,7	2000/3000	0,25	0,25	0,25	0,25
18	+0,2/+0,7	2000/3000	0,31	0,31	0,31	0,31
20	+0,2/+0,7	2000/3000	0,38	0,38	0,38	0,38
22	+0,2/+0,9	2000/3000	0,47	0,47	0,47	0,47
25	+0,2/+0,9	2000/3000	0,607	0,607	0,607	0,607
28	+0,2/+0,9	2000/3000	0,756*	0,756*	0,756*	0,756*
30	+0,2/+0,9	2000/3000	0,86	0,86	0,86	0,86
32	+0,2/+1,1	2000/3000	1,02	1,02	1,02	1,02
35	+0,2/+1,1	2000/3000	1,18	1,18	1,18	1,18
40	+0,2/+1,1	2000/3000	1,53	1,53	1,53	1,53
45	+0,3/+1,3	2000/3000	1,94	1,94	1,94	1,94
50	+0,3/+1,3	2000/3000	2,38	2,38	2,38	2,38
55	+0,3/+1,3	2000/3000	2,86	2,86	2,86	2,86
60	+0,3/+1,6	2000/3000	3,43	3,43	3,43	3,43
65	+0,3/+1,6	2000/3000	4,01	4,01	4,01	4,01
70	+0,3/+1,6	2000/3000	4,64	4,64	4,64	4,64
75	+0,3/+1,6	2000/3000	5,31	5,31	5,31	5,31
80	+0,4/+2,0	2000/3000	6,09	6,09	6,09	6,09
85	+0,4/+2,0	2000/3000	6,85	6,85	6,85	6,85
90	+0,5/+2,2	2000/3000	7,69	7,69	7,69	7,69
95	+0,5/+2,2	2000/3000	8,55	8,55	8,55	8,55
100	+0,6/+2,5	2000/3000	9,51	9,51	9,51	9,51
110	+0,7/+3,0	2000/3000	11,56	11,56	11,56	11,56
120	+0,8/+3,5	2000/3000	13,8	13,8	13,8	13,8
125	+0,8/+3,5	2000/3000	14,94	14,94	14,94	14,94
130	+0,8/+3,5	2000/3000	16,13	16,13	16,13	16,13
135	+0,8/+3,5	2000/3000	17,360*	17,360*	17,360*	17,360*
140	+0,9/+3,8	2000/3000	18,71	18,71	18,71	18,71
150	+0,9/+3,8	2000/3000	21,52	21,52	21,52	21,52
160	+1,1/+5,5	2000/3000	24,49	24,49	24,49	24,49
170	+1,1/+5,5	2000/3000	27,56	27,56	27,56	27,56
175	+1,1/+5,5	2000/3000	29,320*	29,320*	29,320*	29,320*
180	+1,2/+6,0	2000/3000	30,97	30,97	30,97	30,97
190	+1,2/+6,0	2000/3000	34,41	34,41	34,41	34,41
200	+1,2/+6,0	1000/3000	39,22	39,22	39,22	39,22
220	+1,6/+6,5	1000/3000	46,15	46,15	46,15	46,15
225	+1,6/+6,5	1000/3000				
230	+1,6/+6,5	1000/3000	50,02	50,02	50,02	50,02
250	+1,6/+6,5	1000/3000	59,4	59,4	59,4	59,4
260	+1,6/+6,5	1000/3000	65,2	65,2	65,2	65,2
280	+1,6/+6,5	1000/3000	74,3	74,3	74,3	74,3
300	+1,8/+8,5	1000/3000	85,85	85,85	85,85	85,85
320	+1,8/+8,5	1000/3000	99,01	99,01	99,01	99,01
350	+1,8/+8,5	1000/3000	116,9	116,9	116,9	116,9
380	+1,8/+8,5	1000/3000	144,00	144,00	144,00	144,00
400	+1,8/+8,5	1000/3000	154,00	154,00	154,00	154,00

FOGLI E LASTRE ESTRUSE SHEETS AND PLATES extruded qualities				NYLON 6 (PA 6 E)
Spessore Thickness **mm**	**Tolleranza** Tolerance **mm**	**Lunghezza** Length **mm**	**Larghezza** Width **mm**	**Peso appross.** Weight appr. **kg/lastra** kg/sheet
8	+0,2/+0,9	2.000	1.000	20,90
10	+0,3/+1,5	2.000	1.000	26,38
12	+0,3/+1,5	2.000	1.000	32,70
15	+0,3/+1,5	2.000	1.000	40,20
20	+0,3/+1,5	2.000	1.000	52,05
25	+0,3/+1,5	2.000	1.000	64,22
30	+0,3/+2,5	2.000	1.000	76,33
35	+0,5/+2,5	2.000	1.000	91,00
40	+0,5/+2,5	2.000	1.000	103,10
50	+0,5/+3,5	2.000	1.000	127,11
60	+0,5/+3,5	2.000	1.000	151,65
70	+0,5/+3,5	2.000	1.000	178,00
80	+0,5/+3,5	2.000	1.000	202,05
90	+0,5/+3,5	2.000	1.000	224,60
100	+0,5/+3,5	2.000	1.000	250,50
110	+0,5/+5,5	2.000	1.000	290,20
120	+0,5/+5,5	2.000	1.000	315,60
130	+0,5/+5,5	2.000	1.000	344,40
140	+0,5/+5,5	2.000	1.000	367,60
150	+0,5/+5,5	2.000	1.000	421,00

Disponibilità — Availability

Tondi : Ø 8-300 mm - Lastre: Spessore 8-100 mm
Tubi: O.D. 25-300 mm

Rods: Ø 8-300 mm - Sheets/Plates: Thicknesses 8-100 mm
Tubes: O.D. 25-300 mm

Lunghezze standard : 1.000 — 3.000
Standard length : 1.000 — 3.000

cmp Plastics tecnology

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