TITAN PROPERTIES GUIDE

Titacon®

Titalon®

Best perfomance and cost for engineering plastics compounds

Special Enginnering Plastic Compounds

ISO 9001 IATF 16949 ISO 14001 UL認證部份規格

TITAN PLASTICS COMPOUNDS CO., LTD.

工程塑膠特殊複合材料製造商
Special engineering plastic compounds

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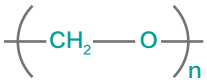
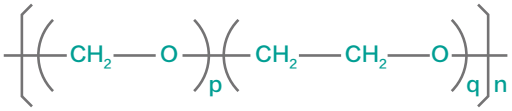
Polyacetal (POM) Introduction

Polyacetal (POM)-also known as acetal or polyoxymethylene. From structure of polyacetal, it can be divided into homopolymer and copolymer. The homopolymer is essentially a polyoxymethylene molecular chain made from formaldehyde, while the copolymer is produced from trioxane or other comonomers. The homopolymer has slightly higher short-term mechanical properties and melts at a higher temperature, while the copolymer has higher continuous use temperature, greater alkali resistance and is less affected by long-term exposure to moisture at an elevated temperature. Their chemical structure are as followings:



Homopolymer



Copolymer

Polyacetal (POM) Characteristics

Polyacetal is a highly crystalline, high performance engineering polymer that displays a broad range of properties, among the most notable being low coefficient of friction, excellent wear resistance, high modulus, and resistance to many solvents and automotive fuels. Basic mechanical properties include high strength and stiffness coupled with good impact strength. Low moisture absorption results in excellent dimensional stability and makes POM an excellent candidate for parts that must exhibit tight tolerances in moist environments.

Polyacetal (POM) Products Application

Industrial: Gears, bearings, convey belts, pipe fittings and hand tools.
Electrics: Gears of OA machine, appliance parts, camera parts.
Consumer Products: Clock gears, zipper, parts of baby cart, plumbing parts.
Automotive: Fuel pump module, buckle, windowscreen wiper parts, meter components, driving gears.
Sports: Bicycle, parts of bodybuilding equipment.

Polyacetal (POM) Molding Conditions

* For colored or reinforce resins, please consult with Titan Plastics Compounds Co., ltd.

Predrying:	80-90℃ 3-4 hrs
Merterial melt temperature:	180-210℃
Mold temperature:	>50℃
Injection speed:	0.5-3m/min
Injection pressure:	49-98Mpa
Screw rotation:	50-150rpm

Resin temperature:

Copolymer: Optimum 180-210℃ Maximum 230℃
Homopolymer: Optimum 190-200℃ , Maximum 210℃

Maximum cylinder residence time (non-reinforced non-colored resin):

50 min. at 190℃
40 min. at 200℃
30 min. at 210℃

POM工程塑膠複合材料
The best choice for POM compounds

強化、填充、耐磨擦、抗靜電、導電等級

項目 Grade name	單位 Unit	ISO 測試方法 ISO Testing method	玻璃纖維強化 Glass Fiber							玻璃珠填充 Glass Beads		
			GF910	GF915	GF920	GF925	GF930	GF520	GF525	GB910L	GB915	GB920
特點 Characteristics	-	-	10% Glass Fiber 高強度 high strength	15% Glass Fiber 高強度 high strength	20% Glass Fiber 高強度 high strength	25% Glass Fiber 高強度 high strength	30% Glass Fiber 高強度 high strength	20% Glass Fiber 高強度 單聚 Homo-polymer	25% Glass Fiber 高強度 單聚 Homo-polymer	10% Glass Beads 低翹曲 潤滑性 low warp lubricated	15% Glass Beads 低翹曲 low warp	20% Glass Beads 低翹曲 low warp
比重 Specific gravity	g/cm^3	1183	1.48	1.51	1.54	1.59	1.62	1.55	1.59	1.48	1.52	1.56
拉伸強度 Tensile strength	MPa	527-1,2	88	105	120	135	145	125	140	52	50	48
拉伸率 Tensile elongation	%	527-1,2	3	3	3	3	2	3	3	35	20	20
彎曲強度 Flexural strength	MPa	178	125	150	180	200	210	180	190	82	80	77
彎曲模數 Flexural modulus	MPa	178	4,250	5,200	6,400	7,500	9,700	7,500	8,400	3,000	2,950	2,920
衝擊強度 (缺口) Charpy(notched)	kJ/m^2	179/1eA	5	6	8	9	11	7	10	5	4	4
熱變形溫度 DTUL(1.8Mpa)	℃	75-1,2	150	153	158	160	163	155	170	100	105	107
體積阻抗 Volume resistivity	Ω.cm	IEC 60093	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14
表面阻抗 Surface resistivity	Ω	IEC 60093	10E15	10E15	10E15	10E15	10E15	10E15	10E15	10E15	10E15	10E15
耐燃性 Flammability	-	UL 94	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB
模收縮 Mold shrinkage	%	50×70×3 mmt	0.9-1.3	0.8-1.2	0.7-1.1	0.6-1.0	0.5-0.9	0.7-1.1	0.6-1.0	1.3-1.9	1.2-1.6	1.3-1.5

	礦物填充 Mineral		永久抗靜電 Anti-static / conductive			碳纖維強化 Carbon Fiber		抗 UV Weather Resistant		耐磨耗 Wear resistance	
GB925	TR905	TR720	ST915	EX910	NC710	CF910	CF920	UV900	GF925UV	KG920	MS902
25% Glass Beads	5% Mineral	15% Mineral		Carbon Powder	Carbon nanotube	10% Carbon Fiber	20% Carbon Fiber		25% Glass Fiber	20% Whisker	2.5% MoS2
低翹曲 low warp	低翹曲 low warp	低翹曲 low warp	抗靜電 可染色 permanent anti-static colorable	抗靜電 anti-static carbon black	抗靜電 潔淨度 anti-static high cleanness	高剛性 耐磨導電 high strength conductive	高剛性 耐磨導電 high strength conductive	耐候性 weather resistance	高強度 耐候性 high strength weather resistance	高剛性 耐磨耗 High stiffness Wear resistance	高滑動 wear resistance
1.59	1.44	1.53	1.40	1.48	1.4	1.44	1.47	1.41	1.59	1.59	1.44
45	62	59	45	45	45	110	140	62	110	60	60
20	12	10	25	20	8	2	2.5	35	2.5	11	25
75	90	96	60	70	68	155	200	87	170	100	87
3,100	3,000	3,500	1,300	1,750	2,100	7,500	12,000	2,500	6,500	3,800	2,500
3	6	3	8	5	3	4	6	10	7	4	11
110	108	125	95	95	89	160	163	95	158	125	110
10E14	10E14	10E14	10E9	10E5	10E4	10E3	10E3	10E14	10E14	10E14	10E14
10E15	10E15	10E15	10E9	10E5	10E4	10E4	10E3	10E15	10E15	10E15	10E14
HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB
1.2-1.4	1.8-2.0	1.5-1.7	1.8-2.2	1.6-2.0	1.6-2.0	0.5-1.0	0.3-0.8	1.8-2.1	0.6-0.9	1.0-1.6	1.8-2.0

1. 以上數值為材料的代表性測試值、並非該規格材料的最低值。
2. 有關本公司材料的安全使用，請參考所用材料、品級相對應的製品安全數據表 [MSDS]。

耐氣候、抗 UV、耐磨擦、耐磨耗、耐衝擊等級

項目 Grade name	單位 Unit	ISO 測試方法 ISO Testing method	耐磨耗 Wear resistance								
			MS904	EW901	CW901	NW901	OL900	CL500	SI902	TF905	TF910
特點 Characteristics	-	-	4% MoS2 高滑動 wear resistance	潤滑性 低噪音 Low noise Lubricity	潤滑性 低噪音 Low noise Lubricity	潤滑性 低噪音 Low noise Lubricity	潤滑性 Lubricity	潤滑性 單聚 Homo-polymer Lubricity	2% Silicone 潤滑性 滑動性 Lubricity	5% PTFE 耐磨耗 wear resistance	10% PTFE 耐磨耗 wear resistance
比重 Specific gravity	g/cm³	1183	1.45	1.37	1.42	1.36	1.39	1.38	1.40	1.43	1.46
拉伸強度 Tensile strength	MPa	527-1,2	61	55	50	52	45	60	57	58	54
拉伸率 Tensile elongation	%	527-1,2	20	25	20	30	30	25	40	24	20
彎曲強度 Flexural strength	MPa	178	90	75	75	73	60	80	76	80	75
彎曲模數 Flexural modulus	MPa	178	2,550	2,350	2,700	2,200	1,800	2,650	2,200	2,350	2,200
衝擊強度 (缺口) Charpy(notched)	kJ/m²	179/1eA	10	5.5	5	7.5	6	9	10	7.5	6
熱變形溫度 DTUL(1.8Mpa)	℃	75-1,2	110	80	80	85	90	95	80	90	82
體積阻抗 Volume resistivity	Ω.cm	IEC 60093	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14
表面阻抗 Surface resistivity	Ω	IEC 60093	10E15	10E14	10E14	10E15	10E14	10E14	10E15	10E14	10E14
耐燃性 Flammability	-	UL 94	HB	HB	HB	HB	HB	HB	HB	HB	HB
模收縮 Mold shrinkage	%	50×70×3 mmt	1.8-2.0	2.0-2.2	1.6-2.0	2.0-2.2	1.6-2.0	1.6-2.0	1.8-2.2	1.8-2.0	1.8-2.0

						耐衝擊 High Impact / Tough				
TF920	GF920TF10	TF502	TF410	TF420	TF918K7	TX910	TX915	TX920	TX925	TX940
20% PTFE	PTFE Glass Fiber	2% PTFE	10% PTFE	20% PTFE	PTFE Aramid Fiber					
耐磨耗 wear resistance	耐磨耗 高強度 high strength	耐磨耗 單聚 Homo-polymer	耐磨耗 單聚 Homo-polymer	耐磨耗 單聚 homopolymer	高剛性 耐磨耗 wear resistance	柔韌性 high impact toughness	柔韌性 high impact toughness	柔韌性 低溫耐衝 low temperature impact toughness	柔韌性 低溫耐衝 low temperature impact toughness	柔韌性 低溫耐衝 low temperature impact toughness
1.52	1.60	1.42	1.46	1.52	1.50	1.38	1.37	1.35	1.34	1.32
49	115	70	62	55	57	50	43	40	36	30
15	3	20	16	13	12	45	60	90	90	100
68	170	95	90	80	80	65	52	50	45	30
2,000	6500	3,000	2,850	2,700	2,700	1,700	1,600	1,450	1,250	850
5	8	8.5	6.5	6	7	12	13	15	18	30
80	140	95	90	85	80	87	78	75	75	70
10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14
10E14	10E15	10E14	10E14	10E14	10E15	10E14	10E14	10E14	10E14	10E14
HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB
1.6-2.0	0.6-1.0	1.8-2.0	1.8-2.2	1.8-2.0	1.4-1.8	1.8-2.0	1.8-2.0	1.6-2.0	1.6-2.0	1.4-1.8

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PA6 (Nylon6)

PA6 Characteristics:	PA6 Processing Conditions:
(1) Good impact, tougher than PA66	(1) Drying:80℃ x3~4hrs
(2) Chemical resistance to hydrocarbon	(2) Injection temperature:230℃ ~275℃
(3) Excellent surface finish even when reinforced	(3) Mold temperature:70℃ ~110℃
(4) High water absorption than PA66	

PA6 Product Application：

Nylon 6 is a tough, abrasion-resistant and lightweight material. It has improved surface appearance, creep resistance, and processability compared to nylon 66. It is suitable to mold into bearing or tools requiring good impact strength. The toughness PA6 is better than POM, but its stiffness and toughness can not compete with PC(polycarbonate). Nylon 6 is easy to absorb moisture. And its impact strength and general energy absorbing characteristic will increase significantly when it absorbs moisture. For Glass Fiber reinforced grades, it can be used in high temperature up to 200℃ , so it can be a good candidate for industrial tools.

PA66 (Nylon66)

PA66 Characteristics:	PA66 Processing Conditions:
(1) Good strength and stiffness	(1) Drying:80℃ x3~4 hrs or 110~120℃ x2~3 hrs
(2) Chemical resistance to hydrocarbon	(2) Injection temperature:265℃ ~295℃
(3) Excellent wear resistance and lubricity	(3) Mold temperature:70℃ ~110℃
(4) Heat resistance higher than PA6	(4) Screw revolution:50~70 rpm, back pressure:0~5 kg/cm^2
(5) Easy to molding with wide process window	(5) Injection pressure:700~1300 kg/cm^2, injection speed 50~70%

PA 66 Product Application

Nylon 66 allows it to be used in almost any application that requires high physical strength, ductility, heat resistance and chemical resistance. Therefore, Nylon 66 is one of the most versatile engineering thermoplastics. It is also an outstanding candidate for metal replacement applications. The use of internal lubricants in Nylon 66 significantly improves on the ready excellent wear resistance and friction properties. Thus it is to be used widely in industrial parts requiring wear resistance.

PA12 (Nylon12)

PA12 Characteristics:	PA12 Processing Conditions:
(1) Low water absorption, stable dimension	(1) Drying:80℃ x3~4hrs
(2) Balanced mechanical properties in low temperature	(2) Injection temperature:190℃ ~220℃
(3) Wear resistance, excellent impact, weather resistance and lubricity	(3) Mold temperature:80℃
(4) Good chemical resistance	(4) Injection pressure:600~1000kg/ cm^2
(5) Ability to accept high loading of fillers	

PA12 Product Application：

Nylon 12 has an outstanding chemical resistance, excellent durability as well as wide range of flexibility. It is widely used in automible field such as horse, tube, connector holder and fuel parts. Due to its low wate absorption, dimensional stability and wear resistance, it is also used as the material for industrial parts requiring high performance.

PA46 (Nylon46)

PA46 Characteristics:	PA46 Processing Conditions:
(1) Excellent mechanical properties in high temperature environment	(1) Drying:80℃ x3~4 hrs
(2) Good chemical resistance	(2) Injection temperature:300℃ ~320℃
(3) Outstanding wear and abrasion resistance for moving parts	(3) Mold temperature:80℃ ~150℃
(4) Excellent chemical resistance and low flash	(4) Injection speed:fast velocity
(5) Cycle time is faster than PPS, PA6T and PCT due to high crystal	
(6) Replacement of thermoset and high cost plastics	

PA46 Product Application：

Automotive:transmission components, timing system, gear, lamp fittings and electrical parts.
Electrics:connectors and PCB mounted components.
Industrial:parts required heat resistance, vibrations and impact
Motorcycle:oil pump gears, balancer gears, sprockets, CVT-weight rollers, spacers, timing parts and electrical components

尼龍 (PA) (Nylon) 6

項目 Grade name	單位 Unit	ISO 測試方法 ISO Testing method	玻璃纖維強化 Glass Fiber						
			1100GF	1150GF	1200GF	1300GF	1400GF	1450GF	1500GF
特點 Characteristics	–	–	PA6 10% Glass Fiber 高強度 high strength	PA6 15% Glass Fiber 高強度 high strength	PA6 20% Glass Fiber 高強度 high strength	PA6 30% Glass Fiber 高強度 high strength	PA6 40% Glass Fiber 高強度 high strength	PA6 45% Glass Fiber 高強度 high strength	PA6 50% Glass Fiber 高強度 high strength
比重 Specific gravity	g/cm^3	1183	1.20	1.25	1.30	1.38	1.45	1.5	1.57
拉伸強度 Tensile strength	MPa	527-1,2	100	105	140	155	190	205	215
拉伸率 Tensile elongation	%	527-1,2	3	3	3	3	4	4	4
彎曲強度 Flexural strength	MPa	178	150	160	208	235	290	305	325
彎曲模数 Flexural modulus	MPa	178	4,100	5,200	6,300	7,500	10,500	11,500	13,000
衝擊強度 (缺口) Charpy(notched)	kJ/m^2	179/1eA	5	6	9	12	16	17	18
熱變形溫度 DTUL(1.8Mpa)	℃	75-1,2	170	180	190	204	210	210	210
體積阻抗 Volume resistivity	Ω.cm	IEC 60093	10E13	10E13	10E13	10E13	10E13	10E13	10E13
表面阻抗 Surface resistivity	Ω	IEC 60093	10E14	10E14	10E14	10E14	10E14	10E14	10E14
耐燃性 Flammability	–	UL 94	HB	HB	HB	HB	HB	HB	HB
模收縮 Mold shrinkage	%	50×70×3 mmt	0.4-0.8	0.4-0.7	0.3-0.7	0.2-0.6	0.2-0.6	0.2-0.5	0.2-0.5

	超韌級 High toughness			玻璃纖維強化 耐衝擊 High strength impact			低翹曲 Low warp		
1504AN	1100ST	1200ST	1340ST	1200GFT	1300GFT	1450GFT	1300GB	1200TC	1300TC
PA6 60% Glass Fiber	PA6 10% POE	PA6 20% POE	PA6 34% POE	PA6 20% Glass Fiber	PA6 30% Glass Fiber	PA6 45% Glass Fiber	PA6 30% Glass Beads	PA6 20% Mineral	PA6 30% Mineral
高強度 high strength	耐衝擊 high toughness impact	耐衝擊 high toughness impact	耐衝擊 high toughness impact	高強度 耐衝擊 High strength impact	高強度 耐衝擊 High strength impact	高強度 耐衝擊 High strength impact	低翹曲 耐刮性 Low warp Anti scratch	低翹曲 Low warp	低翹曲 Low warp
1.69	1.11	1.08	1.05	1.25	1.30	1.45	1.36	1.31	1.34
230	55	45	35	110	120	150	70	60	55
4	50	65	100	2	5	4	15	6	7
340	70	55	40	160	170	220	120	90	95
14,000	1,920	1,720	950	4,800	6,500	9,000	4,000	3,000	4,500
16	25	60	NB	15	30	25	4.5	7	6
210	60	55	55	170	190	190	90	80	90
10E13	10E14	10E14	10E14	10E13	10E13	10E13	10E13	10E13	10E13
10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14
HB	HB	HB	HB	HB	HB	HB	HB	HB	HB
0.2-0.4	1.3-1.8	1.4-1.8	1.4-1.8	0.4-0.8	0.3-0.7	0.2-0.6	0.6-1.0	0.9-1.2	0.8-1.1

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尼龍 (PA) (Nylon) 6

項目 Grade name	單位 Unit	ISO 測試方法 ISO Testing method	碳纖維強化 Carbon Fiber			超高強度、強韌性 High strength impact			
			1100CF	1200CF	1300CF	1150HS	1300HS	1400HS	1300HST
特點 Characteristics	–	–	PA6 10% Carbon Fiber 高剛性 導電性 high strength conductive	PA6 20% Carbon Fiber 高剛性 導電性 high strength conductive	PA6 30% Carbon Fiber 高剛性 導電性 high strength conductive	PA6 15% Class Fiber 高強度 High strength	PA6 30% Class Fiber 高強度 High strength	PA6 40% Class Fiber 高強度 High strength	PA6 30% Class Fiber 高強韌 耐衝擊 High strength impact
比重 Specific gravity	g/cm^3	1183	1.17	1.22	1.27	1.25	1.30	1.45	1.30
拉伸強度 Tensile strength	MPa	527-1,2	160	200	220	130	180	210	160
拉伸率 Tensile elongation	%	527-1,2	3	3	3	4	5	4	5
彎曲強度 Flexural strength	MPa	178	220	260	320	195	275	315	250
彎曲模数 Flexural modulus	MPa	178	5,500	12,000	18,000	5200	9000	13000	8200
衝擊強度 (缺口) Charpy(notched)	kJ/m^2	179/1eA	6	8	11	6	14	18	22
熱變形溫度 DTUL(1.8Mpa)	℃	75-1,2	195	210	210	180	205	210	190
體積阻抗 Volume resistivity	Ω.cm	IEC 60093	10E4	10E4	10E4	10E13	10E13	10E13	10E13
表面阻抗 Surface resistivity	Ω	IEC 60093	10E5	10E5	10E5	10E14	10E14	10E14	10E14
耐燃性 Flammability	–	UL 94	HB	HB	HB	HB	HB	HB	HB
模收縮 Mold shrinkage	%	50X70X3 mmt	0.3-0.7	0.2-0.6	0.2-0.5	0.4-0.7	0.2-0.6	0.2-0.6	0.3-0.7

尼龍 (PA) (Nylon) 66

		玻璃纖維強化 Glass Fiber							超韌級 High Toughness	高強度 耐衝擊 High Strength Impact
1400HST	1500HST	2150GF	2330GF	2133GF	2330FR-G	2330AGF	2430AGF	2500AGF	2200STS-2	2133GFT
PA6 40% Class Fiber	PA6 50% Class Fiber	PA66 15% Glass Fiber	PA66 33% Glass Fiber	PA66 33% Glass Fiber	PA66 33% Glass Fiber	PA66 33% Glass Fiber	PA66 43% Glass Fiber	PA66 50% Glass Fiber	PA66 20% POE	PA66 33% Glass Fiber
高強韌 耐衝擊 High strength impact	高強韌 耐衝擊 High strength impact	高強度 High strength	高強度 High strength	高強度 High strength	高強度 無鹵阻燃 Flame retardant	高強度 良表面 high strength good surface	高強度 High strength	高強度 良表面 high strength good surface	耐衝擊 High toughness	高強度 耐衝擊 High strength impact
1.40	1.53	1.24	1.39	1.39	1.38	1.39	1.48	1.56	1.08	1.39
162	195	130	180	175	140	180	200	225	50	130
5	5	3	2.5	3	2	2.5	2	3	40	5
252	310	200	265	260	210	270	300	330	65	200
9600	13100	5,500	9200	8,800	8,500	9,000	12,000	13,500	1,600	7,000
33	23	10	11	13	10	11	17	17	NB	21
190	200	230	240	210	200	230	240	240	60	190
10E13	10E13	10E13	10E13	10E13	10E13	10E13	10E13	10E13	10E15	10E13
10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14
HB	HB	HB	HB	HB	V0	HB	HB	HB	HB	HB
0.2-0.6	0.2-0.5	0.3-0.7	0.2-0.6	0.2-0.6	0.2-0.6	0.2-0.5	0.2-0.5	0.2-0.4	1.2-1.6	0.3-0.7

1. 以上數值為材料的代表性測試值、並非該規格材料的最低值。
2. 有關本公司材料的安全使用，請參考所用材料、品級相對應的製品安全數據表 [MSDS]。

尼龍 (PA) (Nylon) 66

項目 Grade name	單位 Unit	ISO 測試方法 ISO Testing method	碳纖維強化 Carbon Fiber						
			2150CF	2200CF	2300CF	2400CF	2158GCF	2182TFS	2305TF
特點 Characteristics	–	–	PA66 15% Carbon Fiber	PA66 20% Carbon Fiber	PA66 30% Carbon Fiber	PA66 40% Carbon Fiber	PA66 Carbon Fiber Glass Bead	PA66 18% PTFE	PA66 Glass Fiber PTFE
			高剛性 導電性 Strength conductive	高剛性 導電性 Strength conductive	高剛性 導電性 Strength conductive	高剛性 導電性 Strength conductive	高剛性 耐磨耗 Strength conductive	高滑動 耐磨耗 High sliding wear resistance	高強度 耐磨耗 Strength wear resistance
比重 Specific gravity	g/cm^3	1183	1.20	1.22	1.27	1.31	1.30	1.27	1.42
拉伸強度 Tensile strength	MPa	527-1,2	190	220	240	250	155	58	165
拉伸率 Tensile elongation	%	527-1,2	3	3	3	2	3	5	3
彎曲強度 Flexural strength	MPa	178	250	300	340	370	210	90	255
彎曲模数 Flexural modulus	MPa	178	10000	12700	19000	26000	8000	1,950	8,500
衝擊強度 (缺口) Charpy(notched)	kJ/m^2	179/1eA	6	9	11	10	4	5	11
熱變形溫度 DTUL(1.8Mpa)	℃	75-1,2	235	240	245	245	200	104	240
體積阻抗 Volume resistivity	Ω.cm	IEC 60093	10E4	10E4	10E4	10E4	10E5	10E13	10E13
表面阻抗 Surface resistivity	Ω	IEC 60093	10E5	10E5	10E5	10E5	10E6	10E14	10E14
耐燃性 Flammability	–	UL 94	HB	HB	HB	HB	HB	HB	HB
模收縮 Mold shrinkage	%	50X70X3 mmt	0.2-0.6	0.2-0.6	0.2-0.5	0.1-0.4	0.2-0.6	1.5-2.0	0.2-0.5

耐磨耗 Wear resistance									低翹曲 Low warp
2300TF	2320TF	2150TF N180	2150	2320	2115AF	2200MS	2330GMS	2102GBM	2300GB
PA66 Glass Fiber PTFE	PA66 Glass Fiber PTFE	PA66 Glass Fiber PTFE	PA66 Glass Beads PTFE	PA66 Glass Beads PTFE	PA66 Aramid Fiber PTFE	PA66 2.5% MoS2	PA66 Glass Fiber MoS2	PA66 Glass Fiber Glass Beads MoS2	PA66 30% Glass Beads
高強度 耐磨耗 Strength wear resistance	高強度 耐磨耗 Strength wear resistance	良表面 耐磨耗 Wear resistance	低翹曲 耐磨耗 Low warp Wear resistance	低翹曲 耐磨耗 Low warp Wear resistance	耐磨耗 wear resistance	耐磨耗 wear resistance	高強度 耐磨耗 Strength wear resistance	低翹曲 耐磨耗 Wear resistance	低翹曲 Low warp
1.48	1.5	1.26	1.40	1.50	1.26	1.16	1.4	1.16	1.36
160	145	110	65	60	67	85	180	100	80
3	3	5	5	4	10	5	4	2	4
245	220	170	105	90	100	115	270	160	130
8300	7800	4900	3000	3300	2,650	3,000	9,100	4,700	4,000
11	13	6	3	4	3	5	9	5	3
240	235	230	75	76	100	100	240	160	115
10E13	10E13	10E13	10E13	10E13	10E13	10E13	10E13	10E13	10E13
10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14	10E14
HB	HB	HB	HB	HB	HB	HB	HB	HB	HB
0.2-0.5	0.2-0.5	0.3-0.7	1.3-1.7	1.0-1.3	1.5-1.8	1.6-2.0	0.2-0.6	1.3-1.7	1.0-1.4

1. 以上數值為材料的代表性測試值、並非該規格材料的最低值。
2. 有關本公司材料的安全使用，請參考所用材料、品級相對應的製品安全數據表 [MSDS]。

尼龍 (PA) (Nylon) 66

項目 Grade name	單位 Unit	ISO 測試方法 ISO Testing method	超高強度、強韌性 High Strength impact				
			2330HS	2133HS	2300HS-FR	2400AHS	2600XHS
特點 Characteristics	–	–	PA66 33% Glass Fiber	PA66 33% Glass Fiber	PA66 30% Glass Fiber	PA66 40% Glass Fiber	PA66 60% Glass Fiber
			高強度 high strength	高強度 high strength	高強度 無鹵阻燃 high strength Flame retardant	高強度 良表面 high strength good surface	高強度 低吸濕 High strength Low moisture Absorption
比重 Specific gravity	g/cm^3	1183	1.39	1.39	1.38	1.47	1.70
拉伸強度 Tensile strength	MPa	527-1,2	185	182	150	215	265
拉伸率 Tensile elongation	%	527-1,2	5	5	2	4	3
彎曲強度 Flexural strength	MPa	178	280	275	240	310	390
彎曲模数 Flexural modulus	MPa	178	9400	9200	9000	12000	20000
衝擊強度 (缺口) Charpy(notched)	kJ/m^2	179/1eA	16	17	12	16	14
熱變形溫度 DTUL(1.8Mpa)	℃	75-1,2	240	210	200	240	240
體積阻抗 Volume resistivity	Ω.cm	IEC 60093	10E13	10E13	10E13	10E13	10E13
表面阻抗 Surface resistivity	Ω	IEC 60093	10E14	10E14	10E14	10E14	10E14
耐燃性 Flammability	–	UL 94	HB	HB	V0	HB	HB
模收縮 Mold shrinkage	%	50X70X3 mmt	0.2-0.6	0.2-0.6	0.2-0.6	0.2-0.5	0.1-0.4

尼龍 (PA) (Nylon) 12

			玻璃纖維強化 Glass Fiber			碳纖維強化 Carbon Fiber	
2133HST	2400HST	2500XHST	3300GF	3315TF	3225AF	3150CF	3300CF
PA66 33% Glass Fiber	PA66 40% Glass Fiber	PA66 50% Glass Fiber	PA12 30% Glass Fiber	PA12 Glass Fiber PTFE	PA12 Aramid Fiber Glass Fiber PTFE	PA12 15% Carbon Fiber	PA12 30% Carbon Fiber
高強韌 高韌性 High strength impact	高強韌 高韌性 High strength impact	高強韌 低吸濕 High strength Low moisture Absorption	高強度 尺寸安定 Strength Dimensional Accuracy	高強度 耐磨耗 Strength wear resistance	高強度 耐磨耗 Strength wear resistance	高剛性 耐磨耗 Strength wear resistance	高剛性 耐磨耗 Strength wear resistance
1.37	1.42	1.55	1.23	1.30	1.15	1.13	1.15
150	160	220	105	90	75	115	160
6	5	3	5	5	6	5	5
230	235	330	155	140	105	150	240
7850	9100	14000	5,000	5,000	3,000	6,000	12,000
25	30	18	21	19	16	16	22
200	200	210	160	155	100	145	160
10E13	10E13	10E13	10E13	10E13	10E13	10E4	10E4
10E14	10E14	10E14	10E14	10E14	10E14	10E5	10E5
HB	HB	HB	HB	HB	HB	HB	HB
0.3-0.7	0.3-0.6	0.2-0.5	0.3-0.6	0.2-0.5	0.7-1.2	0.3-0.8	0.2-0.4

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2. 有關本公司材料的安全使用，請參考所用材料、品級相對應的製品安全數據表 [MSDS]。

尼龍 (PA) (Nylon) 46

項目 Grade nama	單位 Unit	ISO 測試方法 ISO Testing method	玻璃纖維強化 Glass Fiber			
			4300GF	4500GF	4315TF	4010TF
特性 Characteristics	–	–	PA46 30% Glass Fiber 高強度 high strength	PA46 30% Glass Fiber 高強度 high strength	Glass Fiber PTFE 高強度 耐磨耗 Strength wear resistance	PA46 10% PTFE 耐磨耗 wear resistance
比重 Specific gravity	g/cm^3	1183	1.36	1.62	1.4	1.2
拉伸強度 Tensile strength	MPa	527-1,2	185	225	170	85
拉伸率 Tensile elongation	%	527-1,2	4	3	2	10
彎曲強度 Flexural strength	MPa	178	260	330	235	110
彎曲模数 Flexural modulus	MPa	178	8,200	13,500	8000	2,500
衝擊強度 (缺口) Charpy impact strength(notched)	KJ/m^2	179/1eA	7	13	10	4
熱變形溫度 (1.8MPa) Heat deflection Temperature(1.8MPa)	℃	75-1,2	280	280	280	1800
耐燃性 Flammability	–	UL94	HB	HB	HB	HB
體積阻抗 Volume resistivity	Ω	IEC 60093	10E13	10E13	10E13	10E13
表面阻抗 Surface resistivity	Ω	IEC 60093	10E14	10E14	10E14	10E14
模收縮 Mold shrinkage	%	50X70X3 mmt	0.5-0.8	0.3-0.7	0.3-0.7	1.4-2.0

尼龍 (PA) (Nylon) 6T

耐磨耗 Wear resistance					纖維強化 Fiber		
4015TF	4182TFS	4150CF	4115CF	4715AF	H700GF	H900GF	H600CF
PA46 15% PTFE	PA46 PTFE Silicone	PA46 15% Carbon Fiber	PA46 Carbon Fiber PTFE	PA46 Aramid Fiber PTFE	PA6T 40% Glass Fiber	PA6T 45% Glass Fiber	PA6T 30% Carbon Fiber
耐磨耗 wear resistance	耐磨耗 wear resistance	高剛性 耐磨耗 Strength wear resistance	高耐磨耗 wear resistance	高耐磨耗 wear resistance	耐高溫 高強度 High temperature toleration High strength	耐高溫 高強度 High temperature toleration High strength	耐高溫 高剛性 High strength Electron conductive
1.25	1.26	1.22	1.26	1.25	1.42	1.53	1.31
80	70	200	75	65	190	210	250
10	10	2	6	6	2	3	1
105	90	270	110	90	275	300	375
2,500	2,200	10,100	3200	2,400	11,000	13,100	23,000
4	4	5	4	4	10	9	7
180	175	280	220	190	265	280	280
HB	HB	HB	HB	HB	HB	HB	HB
10E13	10E13	10E4	10E12	10E13	10E13	10E13	10E4
10E14	10E14	10E5	10E12	10E14	10E14	10E14	10E5
1.2-2.0	1.0-1.8	0.6-1.0	0.8-1.2	1.5-2.0	0.2-0.8	0.6-0.6	0.1-0.6

1. 以上數值為材料的代表性測試值、並非該規格材料的最低值。
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高性能特殊尼龍複合材料（低吸濕尼龍系列）– 物性表

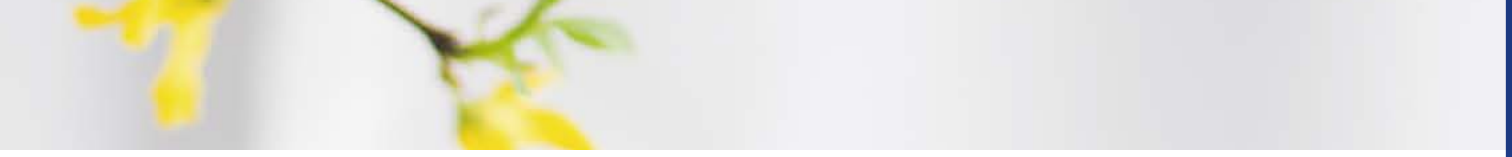
項目 Grade name	單位 Unit	ISO 測試方法 ISO Testing method	低吸濕尼龍 PAMXD6					
			X600GF	X800GT	XA00GF	XB00GF	X550GT	X600CF
特性 Characteristics	–	–	30% Glass Fiber 高強度 尺寸安定 High strength Low moisture absorption	40% Glass Fiber 高強度 尺寸安定 High strength Low moisture absorption	50% Glass Fiber 高強度 尺寸安定 High strength Low moisture absorption	60% Glass Fiber 高強度 尺寸安定 High strength Low moisture absorption	Mineral Glass Fiber 低翹曲 尺寸安定 High strength Lower warpage	30% Carbon Fiber 高剛性 尺寸安定 High strength Electron conductive
比重 specific gravity	g/cm^3	1183	1.43	1.55	1.65	1.76	1.72	1.35
拉伸強度 Tensile strength	MPa	527–1,2	175	210	240	255	180	225
拉伸率 Tensile Elongation	%	527–1,2	2	2	3	2	2	1
彎曲強度 Flexural strength	MPa	178	250	310	365	390	280	350
彎曲模數 Flexural modulus	MPa	178	10,500	12,000	16,200	18,000	14,500	23,000
衝擊強度（缺口） Charpy impact strength (notched)	KJ/m^2	179/1eA	6	10	10	10	6	5
熱變形溫度 (1.8MPa) Heat Deflection Temperature (1.8mpa)	℃	75–1,2	225	230	230	230	230	230
耐燃性 Flammability	–	UL94	HB	HB	HB	HB	HB	HB
體積阻抗 Volume resistivity	Ω	IEC 60093	10E13	10E13	10E13	10E13	10E13	10E4
表面阻抗 Surface resistivity	Ω	IEC 60093	10E14	10E14	10E14	10E14	10E14	10E5
模收縮 Mold shrinkage	%	50X70X3 mmt	0.2–0.5	0.1–0.5	0.1–0.4	0.1–0.4	0.1–0.5	0.1–0.4

	低吸濕尼龍 PA66/PAMXD6				高導熱尼龍 PA6、PA66			
X800CF	2300XGF	2400XGF	2500XGF	2600XGF	1C00MGT	1C00MGT-S8	2C00MGT-S8	1C00MGT-T8
40% Carbon Fiber	30% Glass Fiber	40% Glass Fiber	50% Glass Fiber	60% Glass Fiber		Glass Fiber	Glass Fiber	Carbon Fibe
高剛性 尺寸安定 High strength Electron conductive	高剛性 低吸濕 High strength Low moisture absorption	高剛性 低吸濕 High strength Low moisture absorption	高剛性 低吸濕 High strength Low moisture absorption	高剛性 低吸濕 High strength Low moisture absorption	導熱係數 1-2 W/m K High thermal conductive	導熱係數 2-3 W/m K High thermal conductive	導熱係數 2-3 W/m K High thermal conductive	導熱係數 4-5 W/m K High thermal conductive
1.41	1.38	1.50	1.58	1.70	1.55	1.53	1.54	1.60
250	175	220	240	255	52	110	112	80
1	2	2	3	2	2	2	2	1
380	275	320	360	400	85	140	142	110
26,000	9,500	12,000	15,200	18,000	8000	12500	13000	14500
7	10	10	11	13	2	6	5	4
230	230	230	230	240	90	170	175	150
HB	HB	HB	HB	HB	HB	V0	V0	V0
10E4	10E13	10E13	10E13	10E13	10E7	10E5	10E5	10E4
10E5	10E14	10E14	10E14	10E14	10E8	10E6	10E6	10E5
0.1-0.4	0.2-0.5	0.1-0.5	0.1-0.4	0.1-0.4	0.7-1.1	0.3-0.7	0.3-0.7	0.4-0.8

1. 以上數值為材料的代表性測試值、並非該規格材料的最低值。
2. 有關本公司材料的安全使用，請參考所用材料、品級相對應的製品安全數據表 [MSDS]。

高階特殊複合材料及其他工程塑膠

項目 Grade name	單位 Unit	ISO 測試方法	PEEK			PEI			
			K100NC	K300CF	K220KG	9400GF	9600GF	9200CF	9400CF
			Carbon nanotube	15% Carbon Fiber	Whisker	20% Glass Fiber	30% Glass Fiber	10% Carbon Fiber	20% Carbon Fiber
特性 Characteristics	-	-	抗靜電 潔淨度 high cleanness permanent anti-static	高剛性 耐磨導電 high strength conductive	高剛性 耐磨耗 wear resistance	高強度 high strength	高強度 high strength	高剛性 導電 high strength conductive	高剛性 導電 high strength conductive
比重 specific gravity	g/cm^3	1183	1.32	1.36	1.45	1.41	1.5	1.3	1.35
拉伸強度 Tensile strength	MPa	527-1,2	100	200	85	148	165	150	170
拉伸率 Tensile Elongation	%	527-1,2	4	2	5	3	2	1	2
彎曲強度 Flexural strength	MPa	178	160	295	136	210	230	210	215
彎曲模数 Flexural modulus	MPa	178	4100	13000	4100	8,500	11,000	8,500	12,000
衝擊強度 (缺口) Charpy impact strength (notched)	KJ/m^2	179/1eA	3	6	7	7	10	4	4
熱變形溫度 (1.8MPa) Heat Deflection Temperature (1.8mpa)	℃	75-1,2	155	310	170	208	208	210	210
體積阻抗 Volume resistivity	Ω	IEC 60093	10E4	10E4	10E13	10E14	10E14	10E5	10E4
表面阻抗 Surface resistivity	Ω	IEC 60093	10E5	10E5	10E14	10E14	10E14	10E5	10E5
耐燃性 Flammability	-	UL 94	V0	V0	V0	V0	V0	V0	V0
模收縮 Mold shrinkage	%	50×70×3 mmt	1.4-1.8	0.3-0.7	1.3-1.6	0.2-0.4	0.1-0.3	0.2-0.4	0.1-0.3



		PPS			PC					
9600CF	9400NC	7400CF	7600CF	7220TF	5100GF	5200GF	5300GF	5100CF	5150CF	5200CF
30% Carbon Fiber	Carbon nanotube	20% Carbon Fiber	30% Carbon Fiber	PTFE Glass Fiber	10% Glass Fiber	20% Glass Fiber	30% Glass Fiber	10% Carbon Fiber	15% Carbon Fiber	20% Carbon Fiber
高剛性 導電 high strength conductive	抗靜電 潔淨度 high cleanness permanent anti-static	高剛性 導電 high strength conductive	高剛性 導電 high strength conductive	高強度 耐磨耗 wear resistance	高強度 high strength	高強度 high strength	高強度 high strength	高剛性 high strength conductive	高剛性 導電 high strength conductive	高剛性 導電 high strength conductive
1.39	1.27	1.4	1.45	1.48	1.27	1.33	1.43	1.24	1.26	1.28
180	120	175	190	78	80	110	125	125	145	150
1	9	1	1	1	6	4	3	3	3	2
240	165	242	180	125	138	170	200	170	190	200
15000	3600	15,000	20,000	6,200	3800	5600	7500	7000	9800	11000
5	3	5	5	4	6	13	14	9	10	10
210	200	260	265	230	135	140	140	135	140	140
10E4	10E7	10E4	10E4	10E14	10E14	10E14	10E14	10E5	10E4	10E4
10E4	10E8	10E5	10E4	10E15	10E14	10E14	10E14	10E6	10E5	10E5
V0	V0	V0	V0	V0	HB	HB	HB	HB	HB	HB
0.1-0.3	0.4-0.8	0.1-0.3	0.1-0.3	0.2-0.4	0.5-0.8	0.3-0.6	0.1-0.4	0.2-0.5	0.1-0.4	0.1-0.4

1. 以上數值為材料的代表性測試值、並非該規格材料的最低值。
2. 有關本公司材料的安全使用，請參考所用材料、品級相對應的製品安全數據表 [MSDS]。

泛用塑膠及其它特殊複合材料
The best choice for other compounds

PC / ABS / PMMA / PP

項目 Grade name	單位 Unit	ISO 測試方法	PC						
			5100TFS	5150TF	5100NC	5030AS	A116ST	A030AS	A200AS
特性 Characteristics	–	–	PTFE Silicon 耐磨耗 wear resistance	Glass Fiber PTFE 高強度 耐磨耗 high strength wear resistance	Carbon nanotube 抗靜電 潔淨度 high cleanness permanent anti-static	永久抗靜電 可染色 Permanent anti-static	ABS/PA 耐衝擊 易塗層 High impact good surface	永久抗靜電 可染色 Permanent anti-static	透明 永久抗靜電 Transparent Permanent anti-static
比重 specific gravity	g/cm³	1183	1.22	1.42	1.2	1.2	1.07	1.06	1.06
拉伸強度 Tensile strength	MPa	527-1,2	58	75	62	50	35	45	37
拉伸率 Tensile Elongation	%	527-1,2	20	3	30	30	100	25	20
彎曲強度 Flexural strength	MPa	178	85	120	95	70	45	65	50
彎曲模數 Flexural modulus	MPa	178	2100	4300	2500	2000	1100	2200	2100
衝擊強度 (缺口) Charpy impact strength (notched)	KJ/m²	179/1eA	11	12	30	19	60	15	12
熱變形溫度 (1.8MPa) Heat Deflection Temperature (1.8mpa)	℃	75-1,2	120	125	120	90	67	80	80
體積阻抗 Volume resistivity	Ω	IEC 60093	10E14	10E14	10E5	10E10	10E14	10E10	10E9
表面阻抗 Surface resistivity	Ω	IEC 60093	10E14	10E14	10E5	10E10	10E14	10E10	10E10
耐燃性 Flammability	–	UL 94	HB	HB	HB	HB	HB	HB	HB
模收縮 Mold shrinkage	%	50 × 70 × 3 mmt	0.8-1.1	0.6-0.9	0.7-1.0	0.9-1.2	0.6-1.0	0.6-1.0	0.6-1.0

ABS				PMMA	PP					
A400GF	A600GF	A200CF	A400CF	P600AS	6600GF	6800GF	6A00GF	6200CF	6300CF	6400CF
20% Glass Fiber	30% Glass Fiber	10% Carbon Fiber	20% Carbon Fiber		30% Glass Fiber	40% Glass Fiber	50% Glass Fiber	10% Carbon Fiber	15% Carbon Fiber	20% Carbon Fiber
高強度 high strength	高強度 high strength	高剛性 high strength conductive	高剛性 導電 high strength conductive	高透明 永久抗靜電 Transparent Permanent anti-static	高強度 high strength	高強度 high strength	高強度 high strength	高剛性 high strength conductive	高剛性 導電 high strength conductive	高剛性 導電 high strength conductive
1.19	1.26	1.09	1.13	1.14	1.12	1.21	1.33	0.98	1.04	1.06
75	90	95	115	48	85	100	115	60	70	75
2	2	2	1	5	5	2	2	2	2	2
115	130	125	158	65	120	140	175	70	75	80
5500	7400	7200	11000	1850	5100	6900	9500	3800	4800	5000
7	6	6	7	2	10	10	14	5	4	4
95	100	98	98	80	140	150	150	120	128	135
10E14	10E14	10E4	10E4	10E8	10E14	10E14	10E14	10E5	10E4	10E4
10E14	10E14	10E5	10E4	10E9	10E14	10E14	10E14	10E5	10E5	10E5
HB	HB	HB	HB	HB	HB	HB	HB	HB	HB	HB
0.2-0.4	0.1-0.3	0.2-0.4	0.1-0.3	0.8-1.3	0.3-0.6	0.2-0.5	0.1-0.4	0.6-0.9	0.5-0.8	0.4-0.7

1. 以上數值為材料的代表性測試值、並非該規格材料的最低值。
2. 有關本公司材料的安全使用，請參考所用材料、品級相對應的製品安全數據表 [MSDS]。

Special Engineering Plastic Compounds

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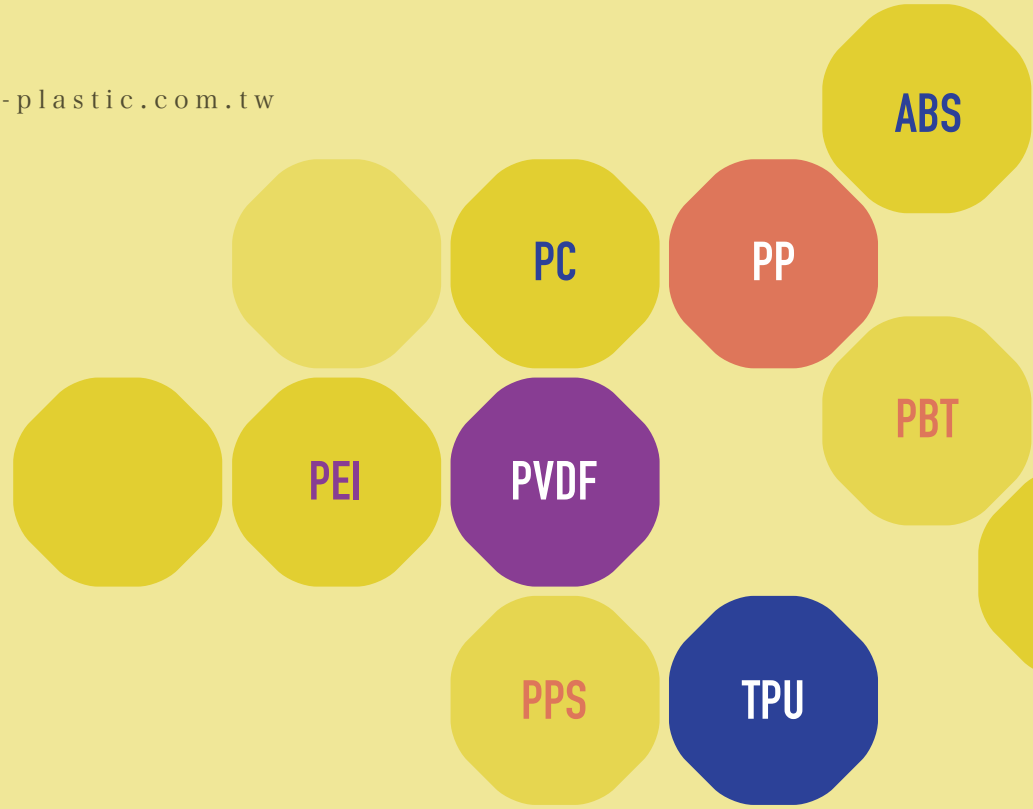

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