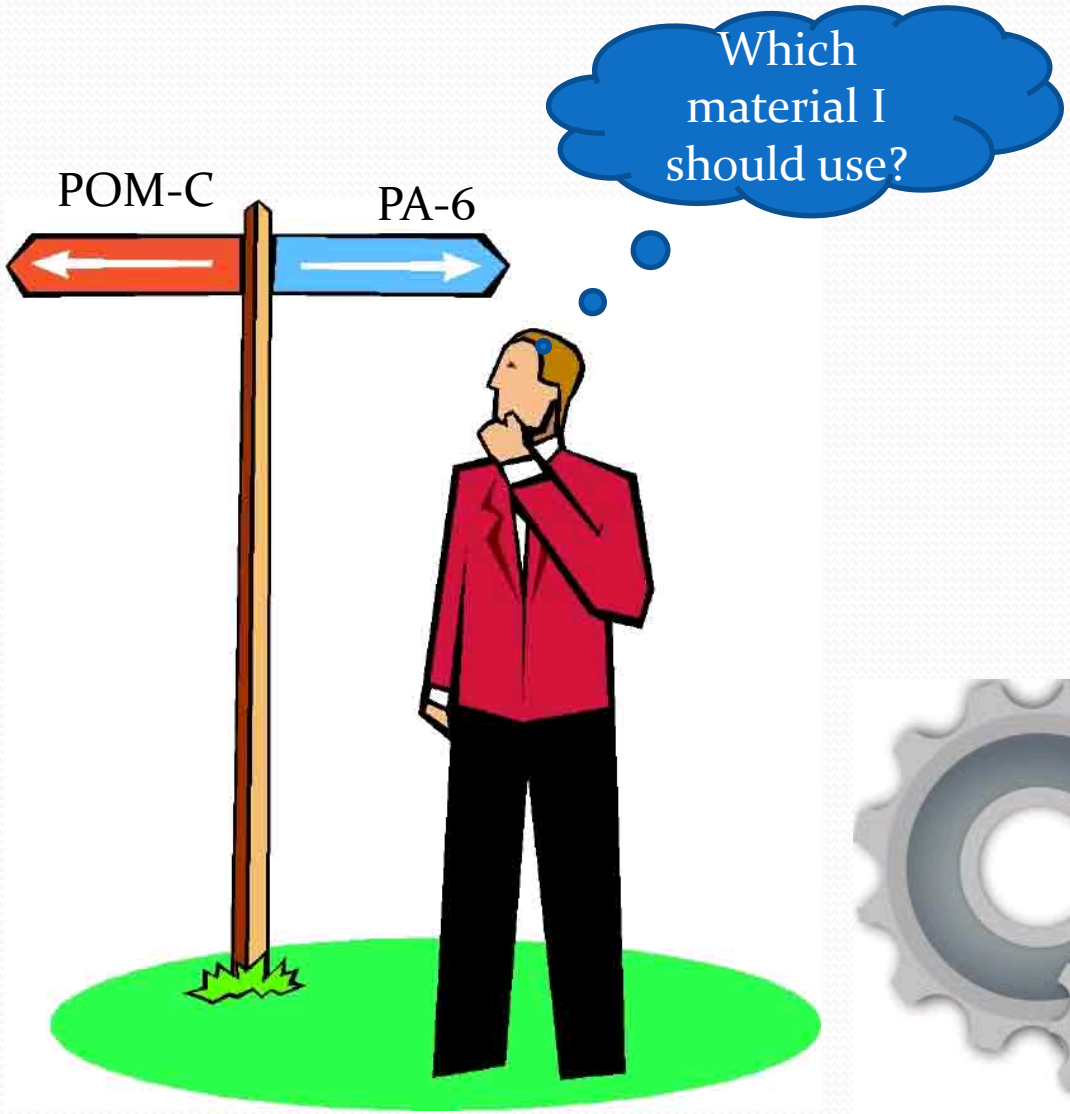
POM-C vs. PA6

sugison plastics



POM-C and PA 6 (Nylon®) History

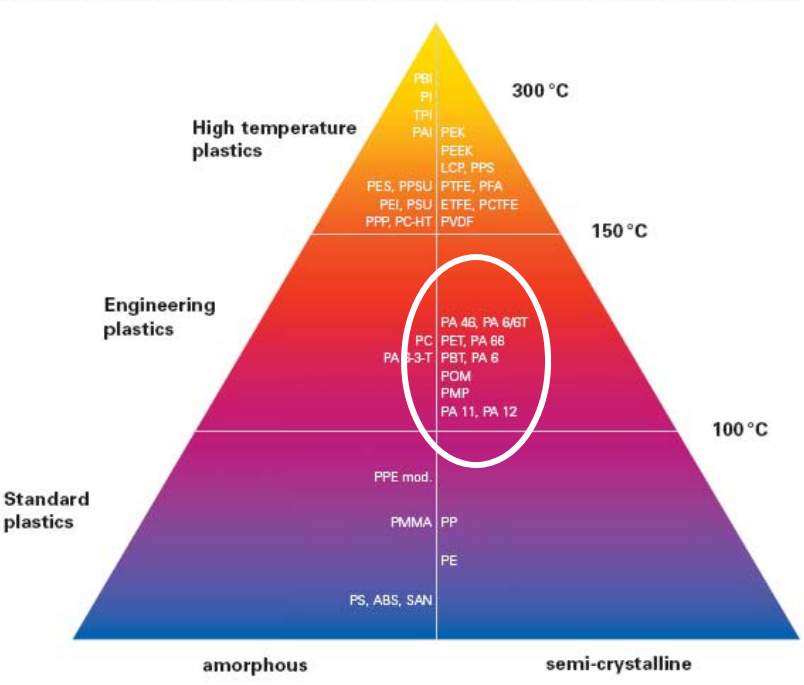


Fig.1. Thermoplastic Pyramid

In thermoplastic pyramid, POM-C and PA 6 are classified as engineering plastics, that exhibit good mechanical properties and good chemical resistance. POM-C (Acetal Copolymer) and Polyamide (PA6/Nylon) are thermoplastic that most used in engineering application as gear wheels, bearing, bushing, etc.

PA 6.0 is a generic designation for a family of synthetic polymers known generically as polyamides, first produced on February 28, 1935, by Wallace Carothers at DuPont's research facility at the DuPont Experimental Station. Nylon is one of the most commonly used polymers.

Polyoxymethylene (POM), also known as acetal is an engineering thermoplastic used in precision parts that require high stiffness, low friction and excellent dimensional stability. It was discovered by Hermann Staudinger a German chemist at 1952.

POM-C & PA 6 Properties

			POM-C	PA 6 trocken / kond.
			natur natural naturel	natur natural naturel
I. Physical Properties				
1. Specific gravity (ρ)	ISO 1183	g/cm³	1,39	1,13
2. Water absorption	ISO 62	%	0,2	3 / 9,5
3. Chemical resistance		-		
4. Max. permissible service temperature (no stronger mech. stress involved)				
upper temperature limit	-	°C	100	100
lower temperature limit	-	°C	-	-40
II. Mechanical Properties				
1. Tensile strength at yield (σ_S)	ISO 527	MPa	63	85 / 60
2. Elongation at yield (ε_S)	ISO 527	%	10	-
3. Tensile strength at break (σ_R)	ISO 527	MPa	-	-
4. Elongation at break (ε_R)	ISO 527	%	31	≥ 50
5. Impact strength (a_n)	ISO 179	kJ/m²	o.B.	o.B.
6. Notch impact strength (a_k)	ISO 179	kJ/m²	6	- / -
7. Ball indentation hardn. (H_k) /Rockwell	ISO 2039	MPa	125	160 / 70
8. Shore-D	DIN 53505	-	-	-
9. Flexural strength ($\sigma_{B\,3,5\%}$)	ISO 178	MPa	-	-
10. Modulus of elasticity (E_t)	ISO 527	MPa	2600	3000/1800
III. Thermal Properties				
1. Vicat softening temp. VST/B/50	ISO 306	°C	150	-
VST/A/50		°C	-	204
2. Heat deflection temperature HDT/B	ISO 75	°C	-	190
HDT/A		°C	95	75
3. Coef. of linear therm. expansion (α)	DIN 53752	$K^{-1} \times 10^{-4}$	1,2	0,8
4. Thermal conductivity at 20 °C (λ)	DIN 52612	W/(m x K)	-	0,23
V. Additional Data				
1. Bondability			-	+
2. Physiological indifference according [5]	EEC 90/128		+	+
	FDA		+	+
3. Friction coefficient	DIN 53375		0,35	0,38-0,45

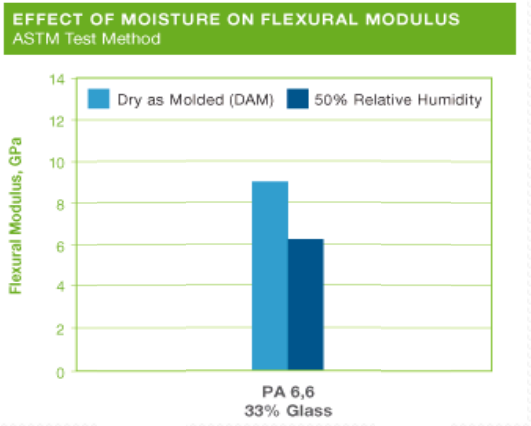
PA 6 (Nylon) Dimension Instability

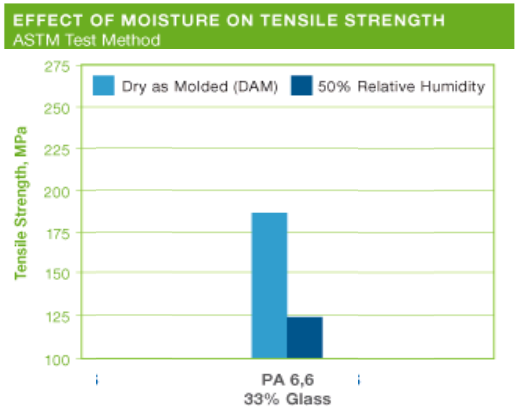
In the beginning PA6 (Nylon) is a thermoplastic the longest known and used by many engineers.

Water absorption rate of nylon : 9.5 % (causing a loss of dimensional stability and strength at temperatures above 60 Celsius). The nylon begins to degrade and can be attacked by acids and bases.

Nylon also brittle in the presence to oxygen, and Nylon do not perform well in hot, moist gas service, humid environment engineering application.

Even after Nylon adhere with 30% glass fibers, it still tend to change their shape in service by swelling or distorting.





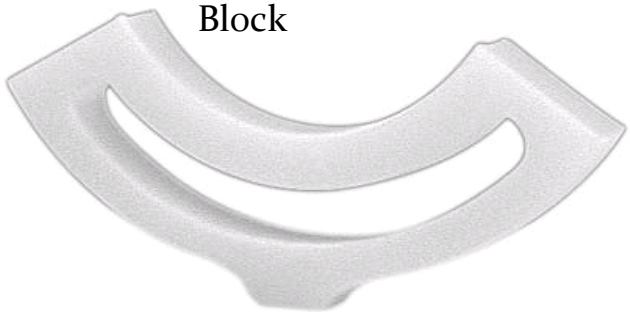
* Source: www.solvayplastics.com

POM-C Dimensional Stability

POM-C (acetal resin) is a highly versatile engineering plastic with metal-like properties, it is offers an excellent balance of desirable properties that bridge the gap between metals and ordinary plastics. . Its main characteristics are low coefficient of friction, wear resistant and high surface hardness. POM-C also resistant towards alkalis, gasoline, alcohol and lubricants.

POM-C have a low water absorption rate (0.2 %), its physical properties remain constant in a variety of environments. Low moisture absorption results in excellent dimensional stability for close-tolerance machined parts. In high moisture or submerged applications, POM-C bearings outperform nylon 4 to 1. This is means that POM-C has an excellent dimensional stability compared to PA.6, especially using in high humidity weather like Indonesian weather.

Bushing Block



Guider Cam

Outdoor Camera Case

POM-C Dimensional Stability

POM-C also does not have microporosity which can degrade material during continuous stress resulting in stress crack. Stress cracks will degrade mechanical strength, e.g. elasticity and tensile strength, and may result in material's failure. POM-C has a low molecular stress level, so POM-C is ideally suited for close tolerance mechanical parts and electrical insulators which require strength and stiffness. It also offers resistance to a wide range of chemicals including many solvents.

Now day, in engineering field POM-C known as PA 6 (Nylon) substitute for application that demanding high precision and excellent dimensional stability.

Tooth Gear

Guide roller for in lift system

Bushing

Bike Tire Levers

sugison plastics

THANK YOU

www.sugison.com