

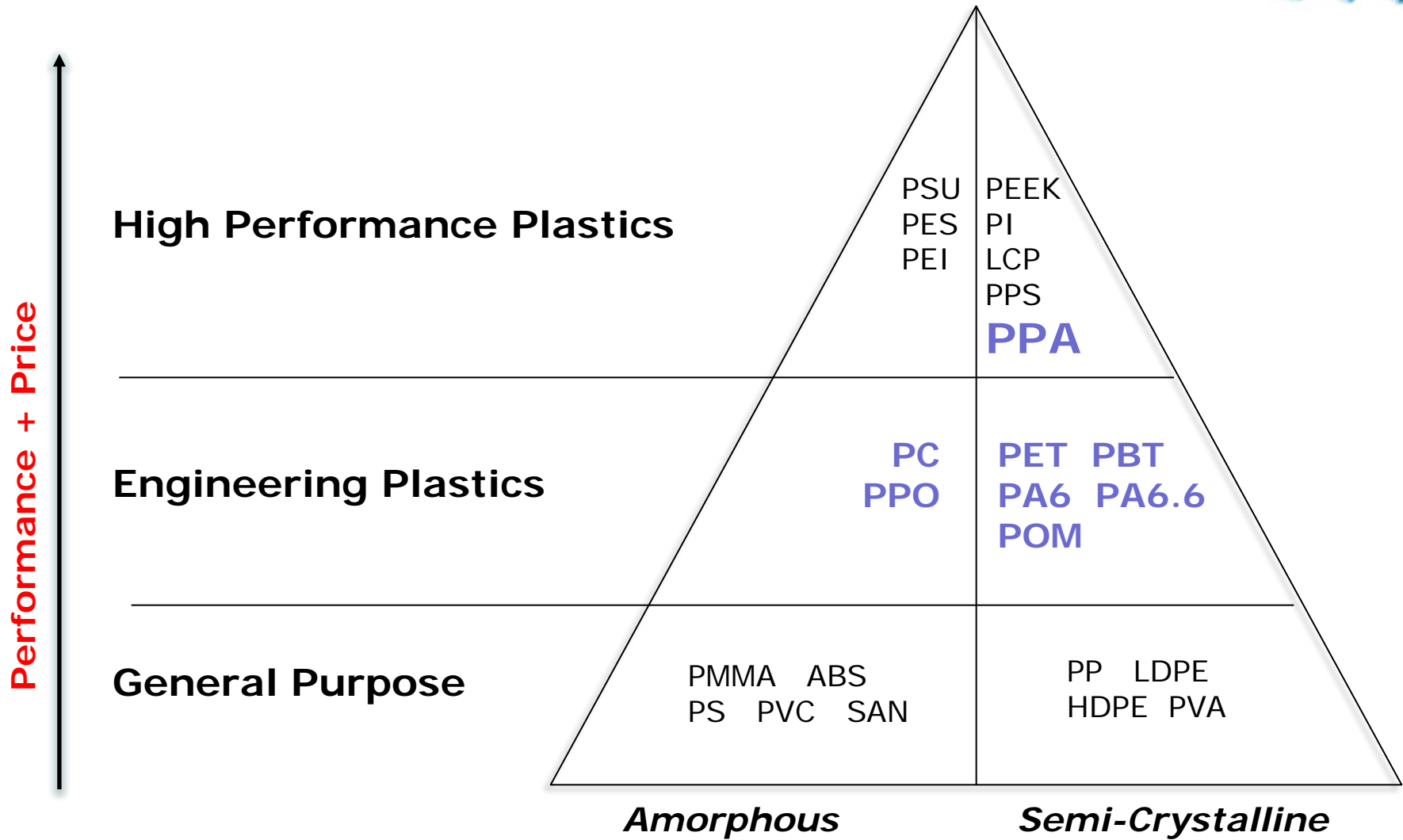


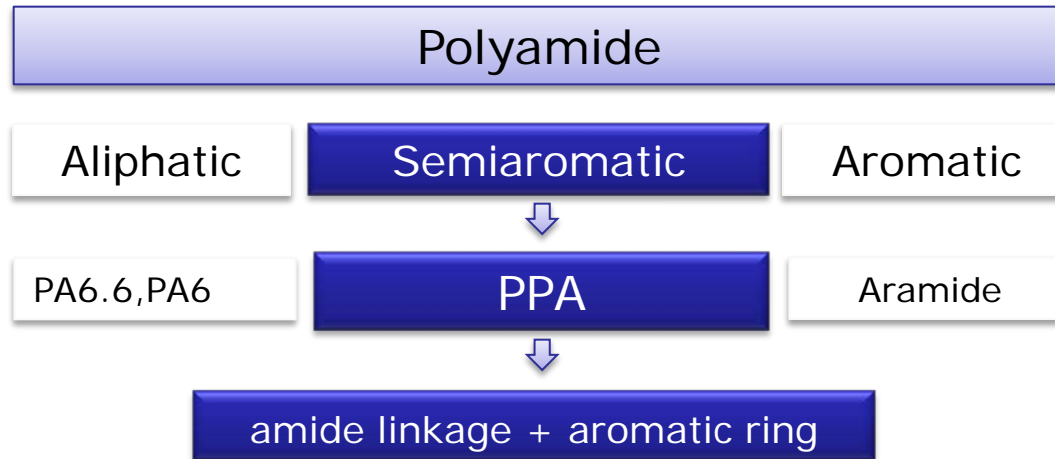
Tecomid® HT

PPA compounds

(polyphthalamide)

Plastics





- ◆ Aromatic ring helps to;
 - ✓ increase T_g & T_m
 - ✓ increase thermal stability
 - ✓ reduce water absorption
 - ✓ increase chemical resistance
- ◆ Almost all aromatic content is mainly;
 - terephthalic acid (TPA) and/or,
 - isophthalic acid (IPA)

PPA - Chemistry



◆ Various types of semiaromatic PPA available;

		Tecomid	Vestamid	Zytel				Grivory		Amodel			Arlen	Ultramid	Stanyl
		HT	HTplus	HTN51	HTN52	HTN53	HTN54	HT1	HT2	1000	4000	6000		T	
Chemistry	-	6T/6I/66	6T/6I/66	6T/DT	6T/66			6T/6I	6T/66	6T/6I/66	6T/6I	6T/66	6T	6/6T	4.6
Tm	°C	315	315	300	310	260	300	325	310	315	330	310	320	295	295
Tg	°C	125	125	140	90	80			90	125	100	90	85	105	80
Note						not PPA	(51+52)-I								not PPA

High Tm/Tg

⇒ Better high T resistance

High Tg

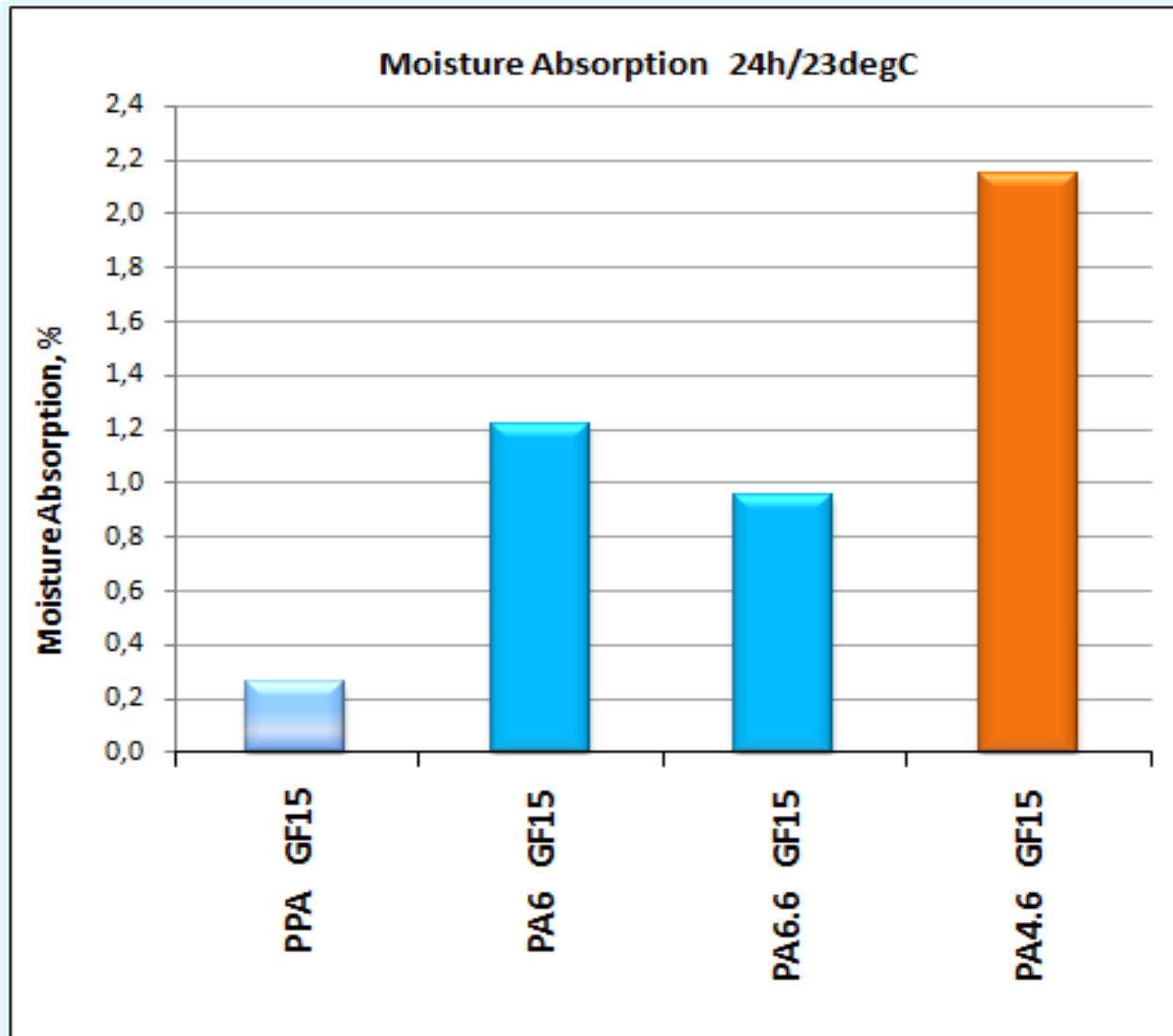
⇒ Needs higher mold T for optimum crystallization

Tecomid[®]HT Key Properties

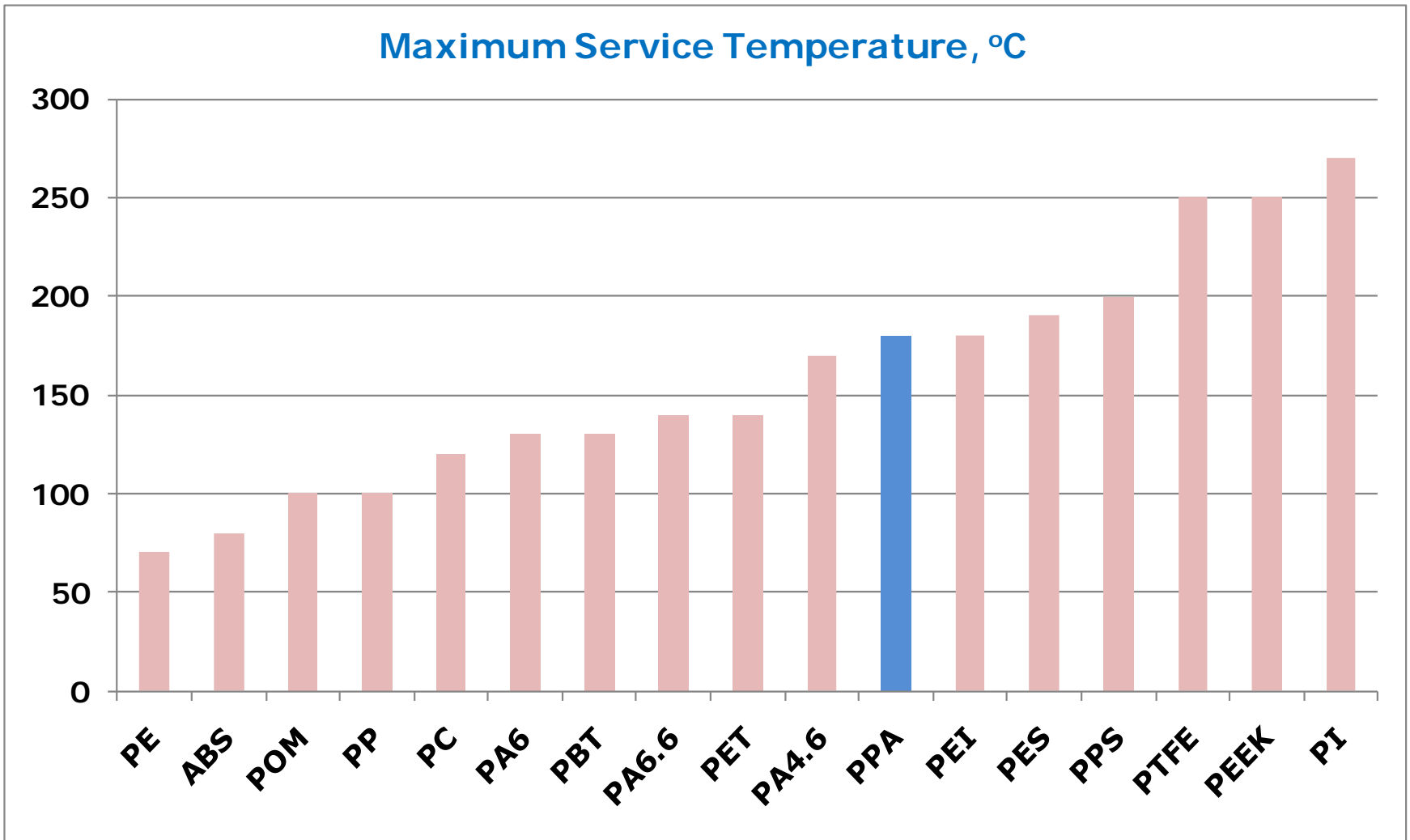


- ◆ Lower moisture absorption (compared to PA6, PA6.6, PA4.6)
- ◆ Low effect of moisture
 - ◆ Retention of mechanical properties
 - ◆ Dimensional stability
- ◆ Excellent high temperature properties
 - ◆ HDT/1.8MPa upto 290°C
 - ◆ Continuous use temperature upto 180°C
 - ◆ Continuous hydrolysis resistance upto 150°C
- ◆ Very high mechanical strength
 - ◆ Tensile strength upto 275 MPa
 - ◆ Tensile modulus upto 25000 MPa
- ◆ Good flammability characteristics
 - ◆ halogen & red phosphorus free flame retardancy
- ◆ Chemical resistance
- ◆ Dimensional stability

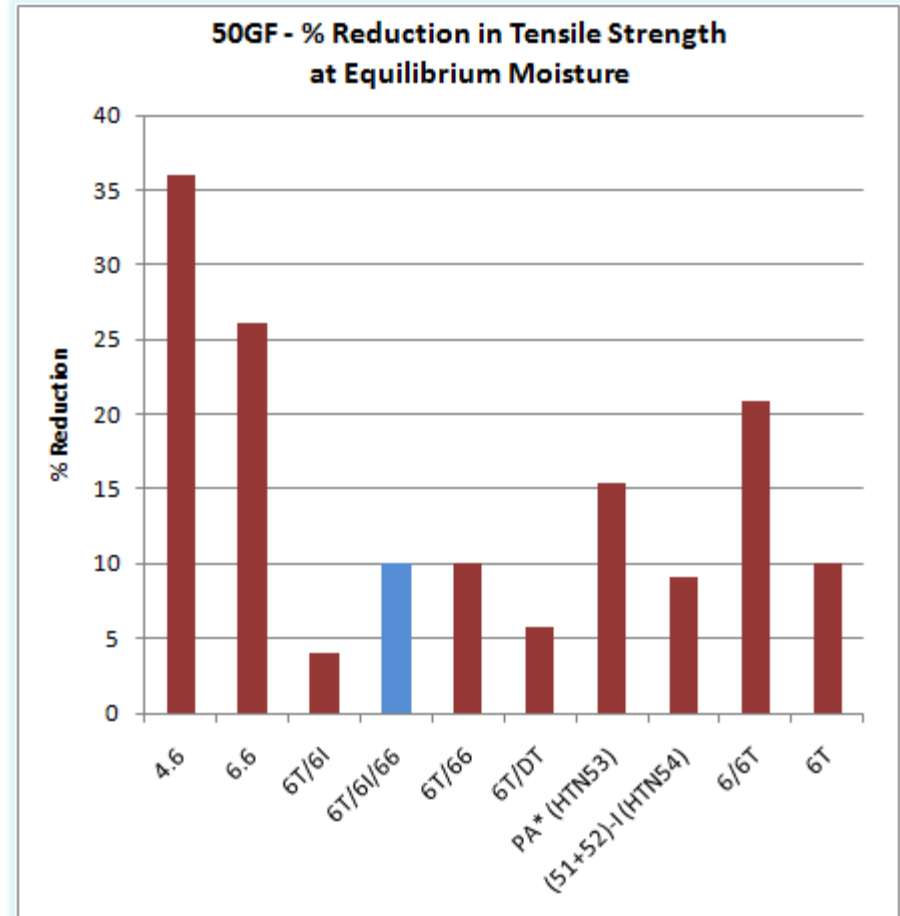
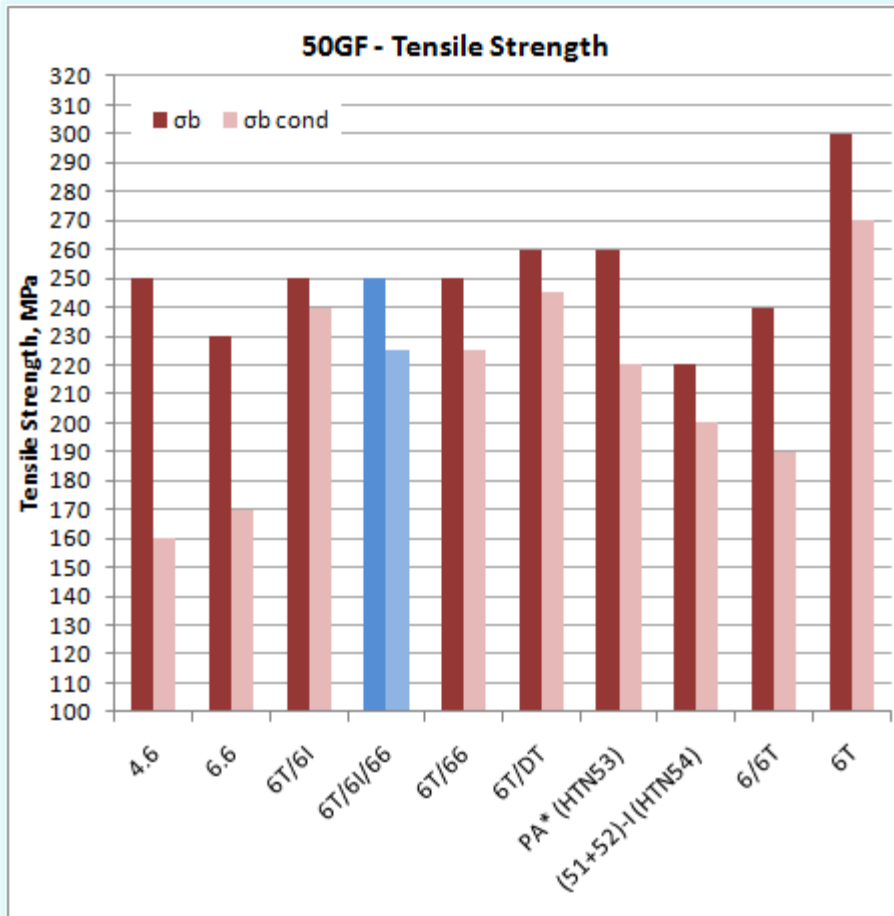
Tecomid® HT Moisture Absorption



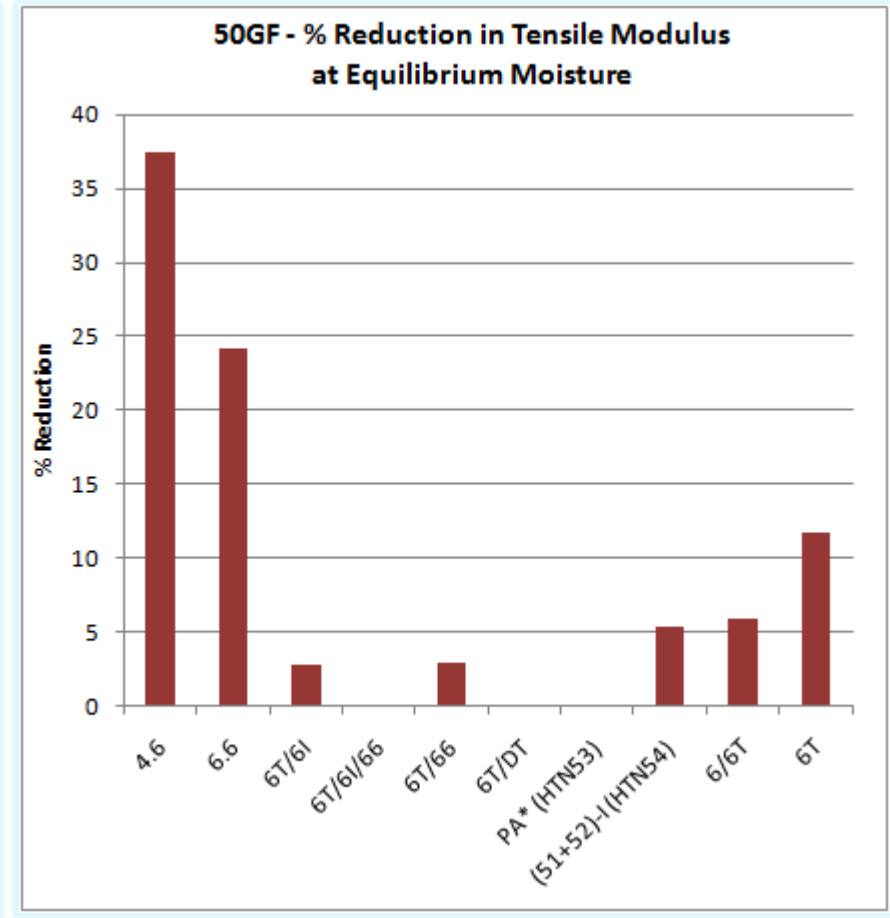
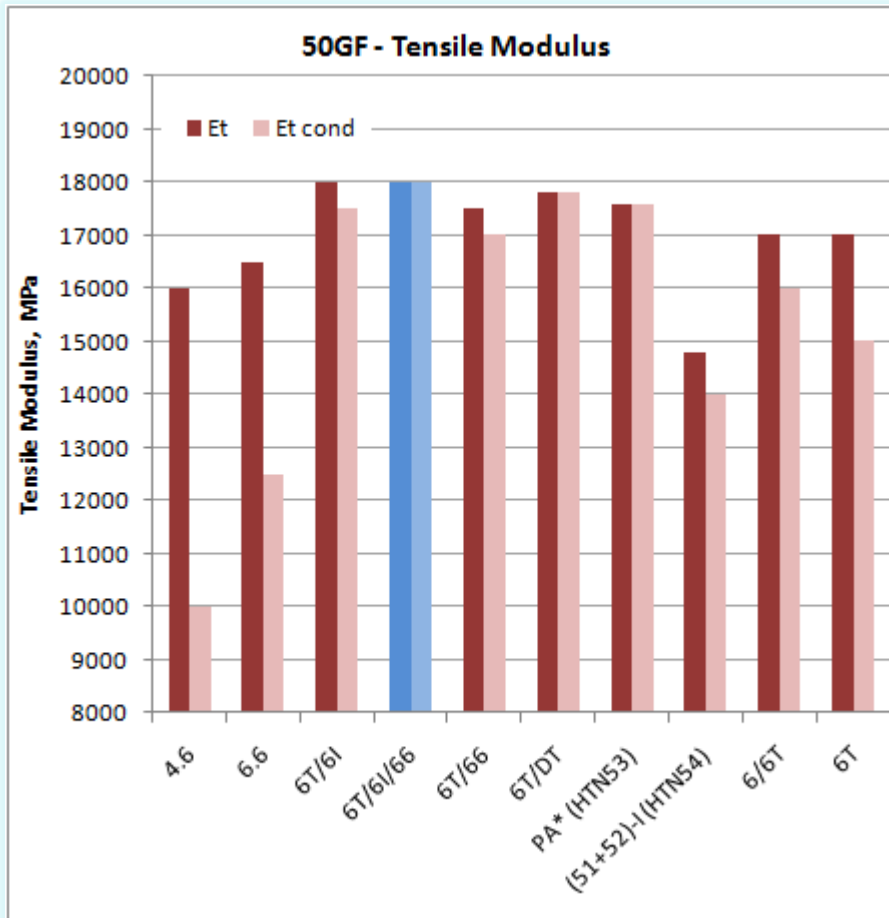
Tecomid® HT Use Temperature



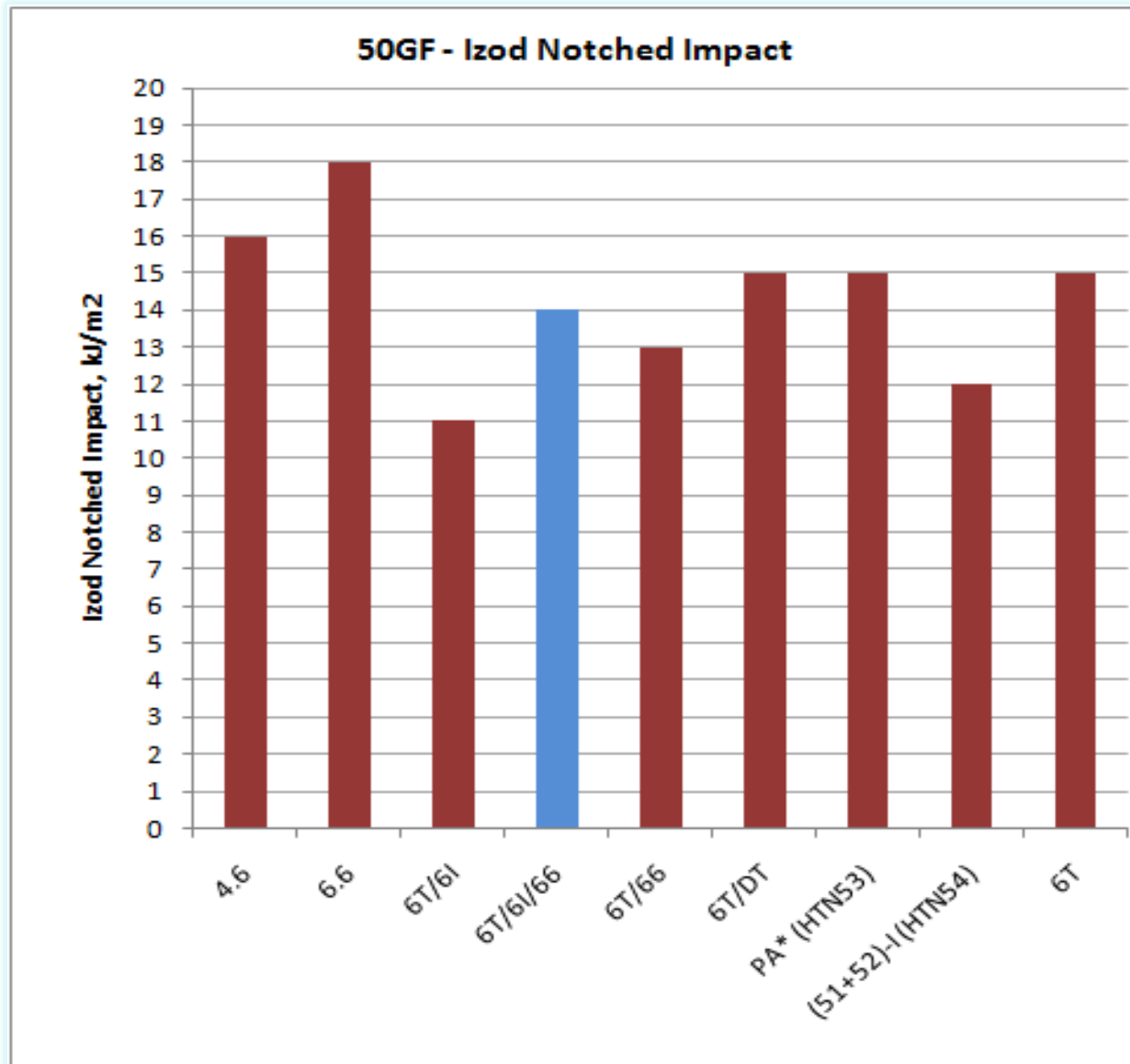
Comparison of Various High T PA's



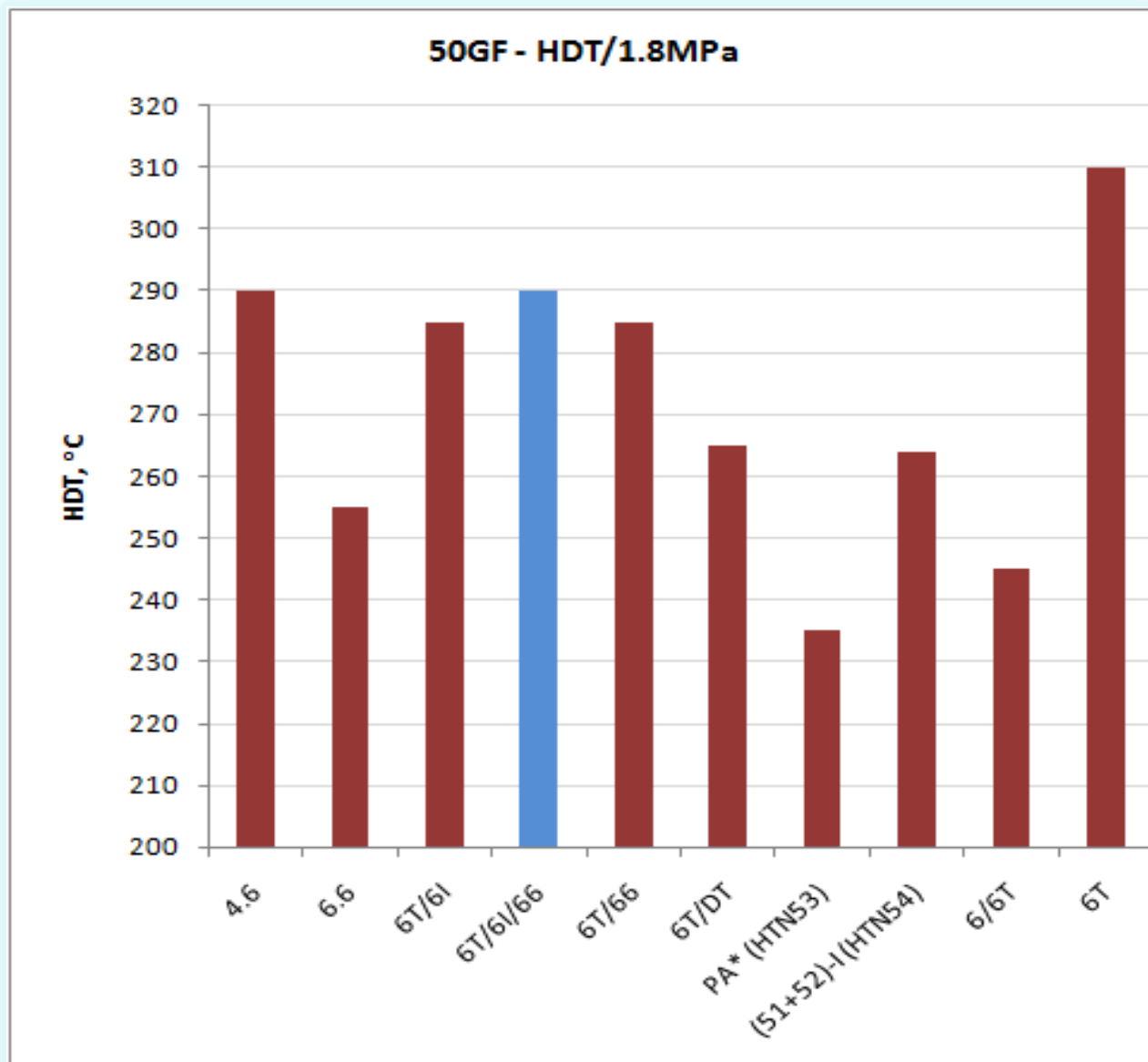
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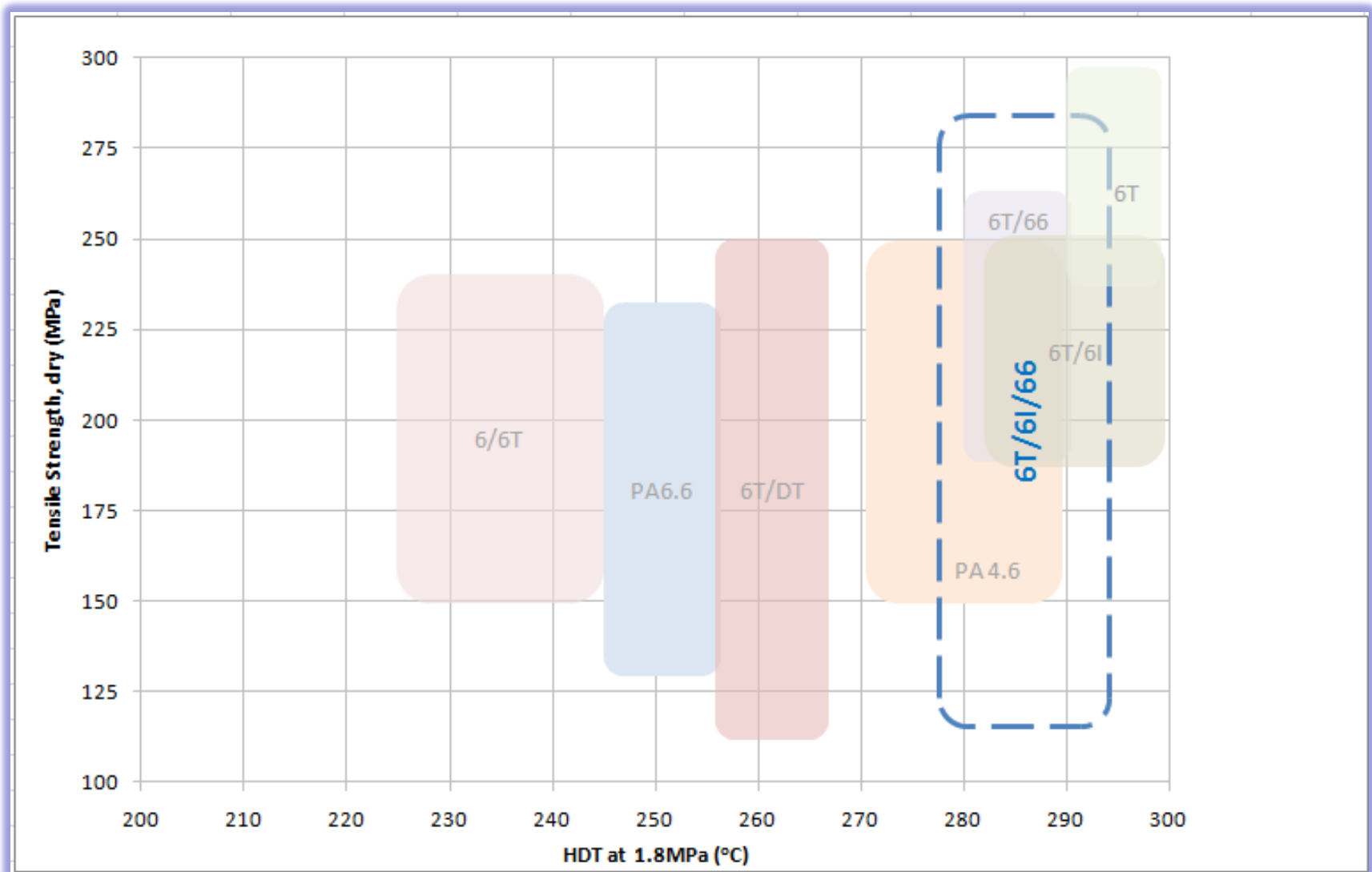
Comparison of Various High T PA's



Comparison of Various High T PA's



Comparison of Various High T PA's



Comparison with Other High T Polymers



Strengths

Weaknesses

	PPA	PA4.6	LCP	PPS
Strengths	<p>Lower moisture absorption than PA4.6</p> <p>Better chemical resistance than PA4.6</p> <p>Very good heat stability</p>	<p>Good flow</p> <p>Low mold temperature</p>	<p>Good flow</p> <p>Low warpage</p> <p>Low mold temperature</p> <p>Flame retardancy</p> <p>No moisture uptake</p>	<p>Chemical resistance</p> <p>Very low moisture uptake</p> <p>Flame retardancy</p> <p>Very good heat stability</p>
Weaknesses	<p>High mold temperature</p> <p>More moisture absorption than PPS, LCP</p>	<p>Extremely high moisture absorption</p> <p>Dimensional stability</p>	<p>High cost</p> <p>Low toughness</p>	<p>High mold temperature</p> <p>Poor processing</p> <p>Low toughness</p> <p>High cost</p>

Standard Product Portfolio



Code	Explanation
NT40 NL	PPA, unfilled
NT40 NL MB	PPA, impact modified, heat stabilized
NT40 MR40 NL HS	PPA, 40% mineral reinforced, heat stabilized
NT40 GR15 NL HS	PPA, 15% glass fiber reinforced, heat stabilized
NT40 GR30 NL HS	PPA, 30% glass fiber reinforced, heat stabilized
NT40 GR50 NL HS	PPA, 50% glass fiber reinforced, heat stabilized
NT40 GR60 NL HS	PPA, 60% glass fiber reinforced, heat stabilized
NT40 CR30 BK111 HS	PPA, 30% carbon fiber reinforced, heat stabilized
NT40 NL XA60	PPA, unfilled, flame retardant - halogen & red phosphorus free, heat stabilized
NT40 GR30 NL XA60	PPA, 30% glass fiber reinforced, flame retardant - halogen & red phosphorus free, heat stabilized

Tecomid® HT Potential Applications



◆ Automotive

- ◆ engine cooling
- ◆ structural componens
- ◆ fuel handling
- ◆ oil handling
- ◆ electrics (coils, high V housings, connectors)
- ◆ electronics (sensors, switched, etc)

◆ Electrical / Electronic

- ◆ connectors
- ◆ circuit breakers
- ◆ coil formers
- ◆ motor insulators
- ◆ switched, relays
- ◆ high T assembly components

◆ Other

- ◆ pump housing & impeller
- ◆ gear housings
- ◆ oven fans
- ◆ boiler manifolds
- ◆ high T valves and fittings



Tecomid® HT Processing



- ◆ Can be processed in all standard injection molding
- ◆ Mold temperature is the key processing item

- ◆ Pre-drying : 120 °C // 4 hours
- ◆ Processing Temperature : 320 – 340 °C
- ◆ Maximum Melt Temperature : 350 °C
- ◆ Feed Throat Temperature : 60 – 80 °C
- ◆ *Mold Temperature/unfilled* : 70 – 90 °C
- ◆ *Mold Temperature/reinforced* : 140 – 180 °C
- ◆ Hold Pressure : 40 – 80 MPa

Tecomid® HT Processing



- ◆ Maximum quality is obtained by sufficient crystallinity;
 - ◆ good surface quality
 - ◆ reduced post-shrinkage
 - ◆ best chemical resistance
 - ◆ high stiffness and strength
- ◆ Sufficient crystallinity is achieved by high mold temperature
- ◆ Reinforced PPA must be molded above its Tg temperature

