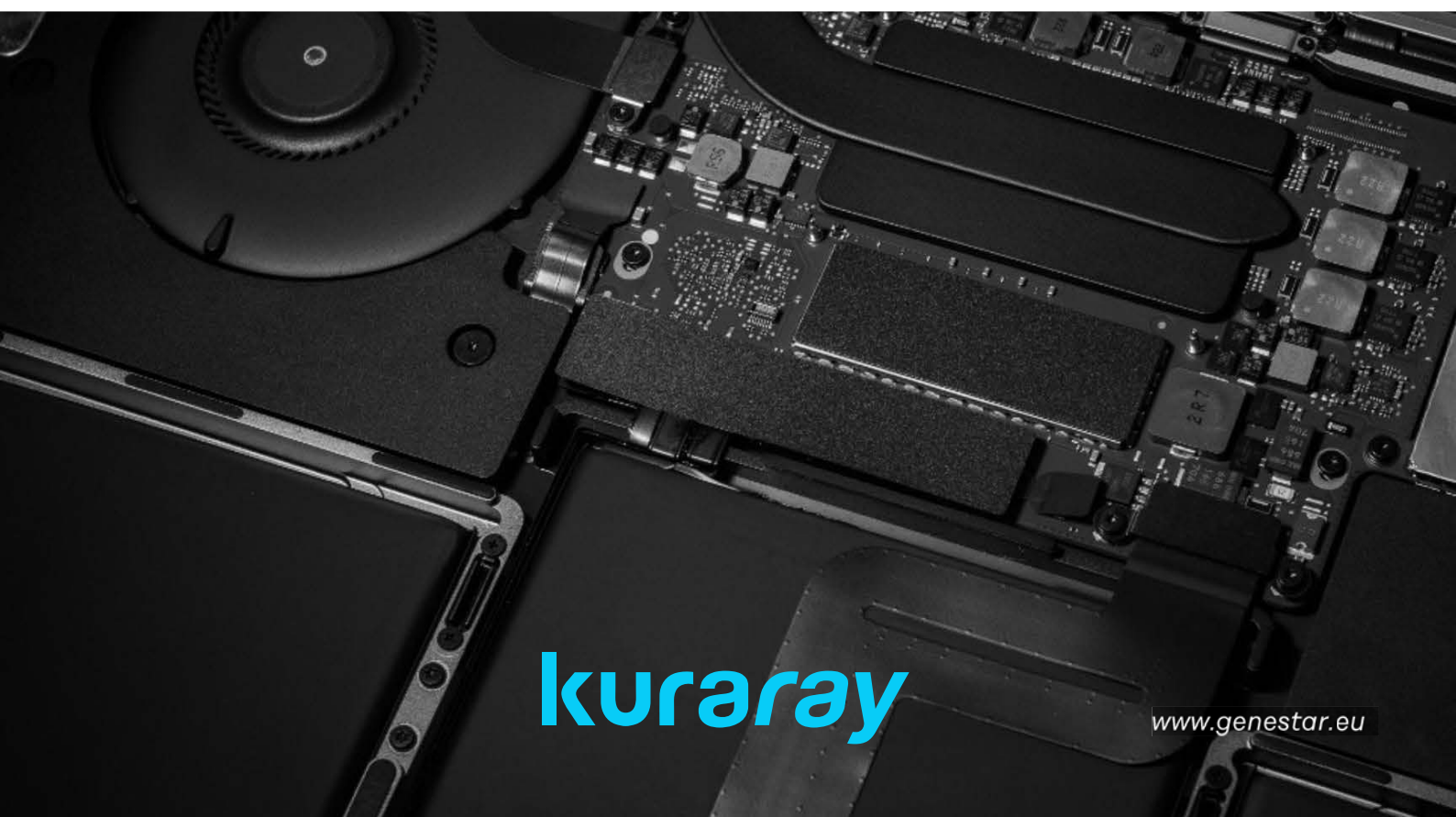


Genestar™

*the balanced polyamide
for demanding E&E applications*

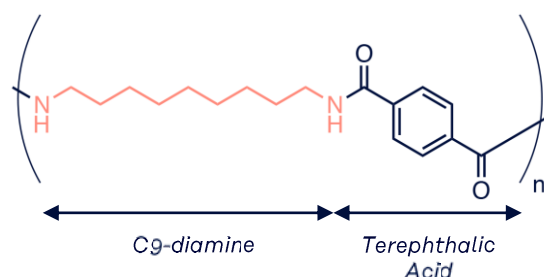


kuraray

www.genestar.eu

Introduction of PA9T

GENESTAR™ (PA9T) is a proprietary polyamide resin developed by Kuraray. This thermoplastic resin is a very well balanced long chain polyphthalamide (PPA) that combines a low water absorption, a high degree of crystallinity and a high melting point. These properties make Genestar extremely suited for SMT-applications.

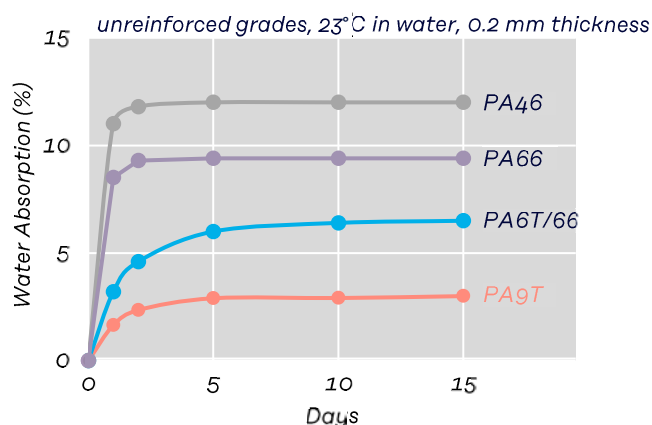


Main advantages

GENESTAR™'s properties derive from its unique C9-diamine monomer. The main advantages of GENESTAR™ are:

- Low water absorption
- Superior dimensional stability
- JEDEC MSL1 blister resistance
- CTI > 600 V (PLC class 0)
- Good processability
- Low outgas
- HB, Halogen-free v0 and halogen-based v0 available

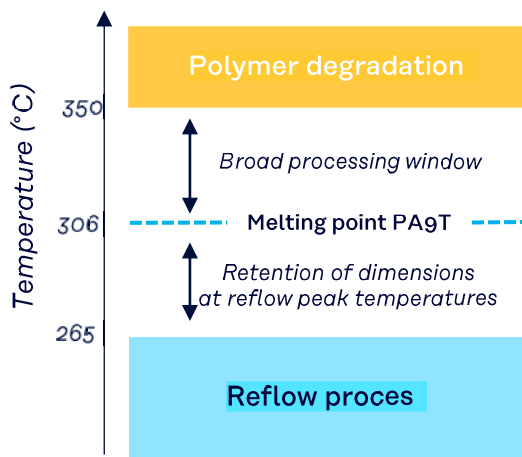
Water absorption



Born for demanding SMT applications

High HDT combined with a good processing window

With its high crystallinity and melting point of 306°C, GENESTAR is well suited for the SMT-process. The melting point of 306°C ensures retention of its dimensions at reflow peak temperatures while the melt processing at 320-335°C is low enough to avoid degradation.



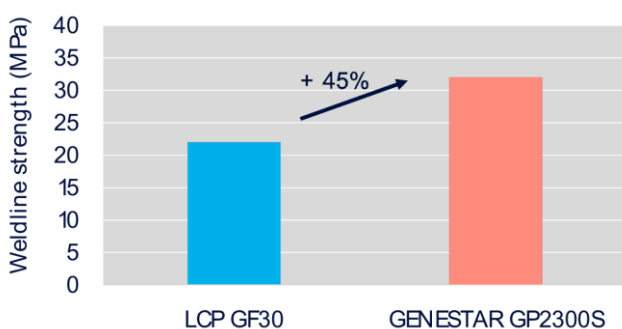
JDEC MSL 1 Blister resistance

Thanks to GENESTAR's unique C9-chemistry and consequent low water absorption, PA9T has an intrinsic JDEC MSL 1 rating for its complete grade portfolio. This high blister resistance enables storage without special packaging for an unlimited time with a minimal risk for blisters when subjected to a SMT-process.

	Peak temperature (°C)				
	230	240	250	260	265
PA9T	✓	✓	✓	✓	✓
PA10T	✓	✓	✓	✗	✗
PA4T	✓	✓	✗	✗	✗
PA6T/66	✓	✗	✗	✗	✗
PA46	✗	✗	✗	✗	✗

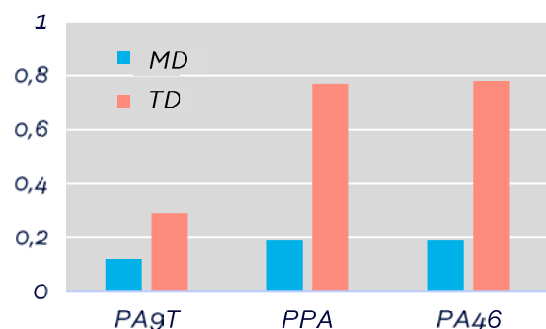
Weld-line strength

GENESTAR™ PA9T's mechanical properties offer a considerable advantage over LCP. Knowing that a part is only as strong as its weakest point, strength and elongation of weldlines are of utmost importance. PA9T's more ductile behaviour versus LCP offers designers a valuable alternative including the possibility for snap-fits without compromising on blister resistance.



Dimensional stability

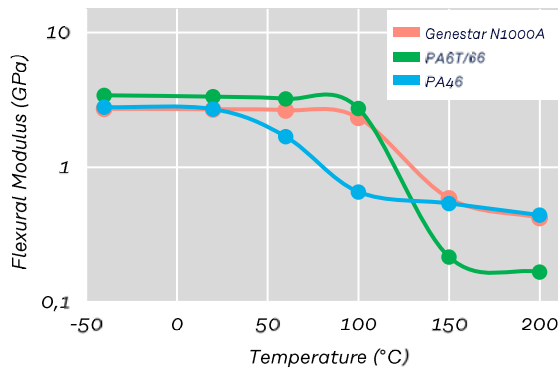
When designing small parts with high requirements on tolerances, keeping the dimensions after moulding is important. Thanks to PA9T's low water absorption and consequent small dimensional changes, designing such parts is facilitated and the reliability is increased versus other PPA's.



Beyond reflow

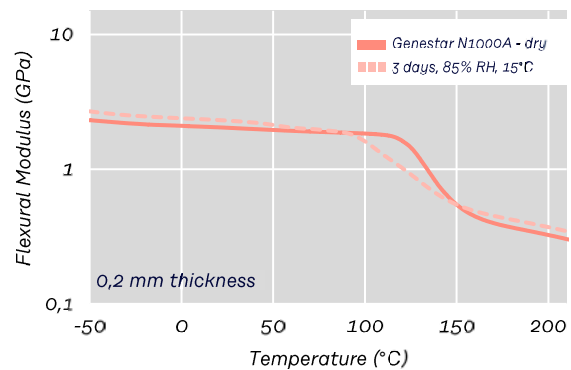
High mechanical properties at elevated temperature

PA9T combines a high T_g (125°C) with a high degree of crystallinity. This combination of properties, which cannot be found in other polyamides, makes GENESTAR™ an excellent choice for applications that require good mechanical properties at elevated temperatures.



Performance in humid environments

A common drawback of most high heat performant polyamides is the deterioration of its good initial properties because of water absorption. Due to GENESTAR PA9T's more hydrophobic structure and its resulting low water absorption compared to other high performance polyamides, PA9T exhibits a better retention of dimensional and mechanical properties.!



Excellent chemical resistance

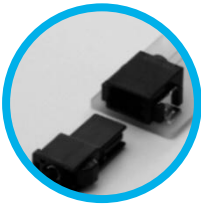
	Retention of tensile strength (%)*				
	PA9T	PA6T	PA46	PA66	PPS
Gasoline	86	86	71	86	98
Engine oil	89	88	67	81	97
Methanol	72	35	54	39	98
Water (80°C)	90	63	40	44	96
H ₂ SO ₄ (10% aq.)	81	52	42	39	82
NaOH (50% aq.)	85	62	59	71	92
CaCl ₂ (50% aq.)	92	64	52	73	97

* After immersion, 7 days, 23°C, sample thickness = 0.2 mm

GENESTAR™'s high crystallinity combined with its low water absorption results in an excellent chemical resistance. GENESTAR™ is thus also suited for applications in harsh chemical environments.

Application examples

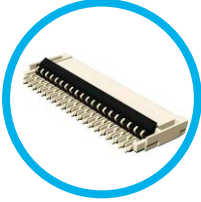
Connectors



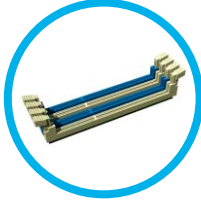
Coaxial Connector



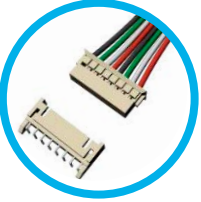
USB connector



Board to Board Connector



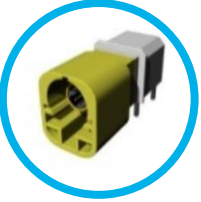
Memory Socket



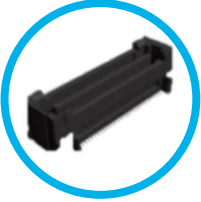
Wire to Board Connector



HDMI Connector

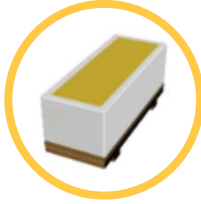


Fakra connector



FPC Connector

LED reflectors

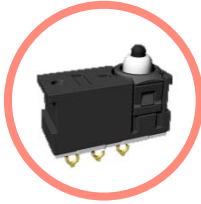


LED Reflector for Navigation

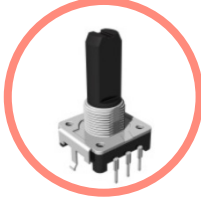


LED Reflector for interior light

Switches



Switch



Encoder

Others



Capacitor Foot Spacer



Relay Housing



Camera Module

Grade portfolio

LED and CMOS grades

	Unit	standard	LED Grade						CMOS Grade		
			TA112	TA105	TA115	R480G	R270D	R180J	LA121	LC122	
			PA9T	PA9T	PA9T	PA9C	PA9C	PA9C	standard	dimensional stability	
filler content	%	-	15	0	10	0	15	10	35	50	
Reflectivity											
As molded	°C	%	0.5mmt	97	99	98	99	98	98	-	-
Heat aging -170	, 5hrs	%	0.5mmt	93	97	96	94	93	94	-	-
UV light aging - UV light, 24hrs		%	0.5mmt	83	92	92	98	96	98	-	-
Physical properties											
density	g/cm ³	—	1.48	1.61	1.74	1.54	1.68	1.69	1.44	1.62	
Flammability	—	UL94	HB	HB	HB	HB	HB	HB	HB	HB	
Mechanical properties											
Tensile strength	MPa	ISO527	83	61	61	69	47	50	97	83	
Tensile elongation	%	ISO527	1.4	1.6	0.9	2.1	0.8	0.9	1.4	0.6	
Flexural strength	MPa	ISO178	143	107	116	104	102	100	163	150	
Flexural modulus	GPa	ISO178	6.2	4.3	6.5	3.8	6.2	5.4	8.6	15.0	
Charpy impact test (notched)	kJ/m ²	179/1eA	1.8	2.0	1.9	1.9	1.9	-	1.8	1.8	
Molding properties											
Bar-flow length ¹	mm	—	44	53	48	60 ²	56 ²	59 ²	63	40	
Molding shrinkage - parallel	%	ISO294-4	0.5	1.2	0.8	1.4	0.8	0.9	0.5	0.2	
Molding shrinkage - normal	%	ISO294-4	1.0	1.2	0.9	1.5	1.1	1.2	1.0	0.8	



E&E grades

Property	Standard*	Unit	HB grade			Halogen based FR V-0 grades			Halogen free V-0			
			G1300H	G1300A	G1350H	GN2330	GN2450	GW2458HF	GP2300S	GP2300F	GP2300T	GP2450NH2
			standard	toughness	standard	standard	strength	warpage	standard	high flow	toughness	standard
Filler content		%	30	30	35	30	45	45	30	30	30	45
Physical properties												
density	ISO 1183	g/cm ³	1.37	1.37	1.40	1.62	1.73	1.73	1.42	1.40	1.40	1.53
Water absorption (in water, 24h)	ISO 62	%	0.19	0.19	0.16	0.13	0.10	0.08	0.10	0.12	0.12	0.10
Mechanical properties												
Tensile strength	ISO 527	MPa	150	183	167	186	198	145	120	105	127	146
Tensile elongation at break	ISO 527	%	1.9	2.4	1.9	2.0	1.7	1.2	1.8	1.6	2.4	1.5
Tensile modulus	ISO 527	GPa	9.5	9.1	11.1	12.3	16.8	16.2	10.6	9.5	9.7	15.1
Flexural strength	ISO 178	GPa	214	253	238	260	284	256	190	170	193	220
Flexural modulus	ISO 178	GPa	9.0	9.1	10.2	11.5	15.4	15.6	9.8	9.6	9.3	13.9
Weld line strength	Ref. ISO 178	MPa	40	88	46	56	53	33	32	27	49	30
Charpy impact test (notched)	ISO 179/1eA	kJ/m ²	11.2	10.0	11.8	11.2	13.9	16.8	7.2	8.9	7.5	9.3
Thermal properties												
DTUL (1.82 MPa)	ISO 75Af	°C	285	270	285	275	285	285	274	270	269	280
Glass transition temperature	ISO 11357-2	°C	125	125	125	125	125	125	125	125	125	125
Melting point	ISO 11357-3	°C	306	300	306	306	306	306	306	306	306	306
Molding properties												
Mold shrinkage – parallel	ISO 294-4	%	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2
Mold shrinkage – normal	ISO 294-4	%	1.0	0.9	0.9	0.8	0.6	0.5	0.9	1.0	1.0	0.7
Bar-flow length at 0.5 mm	750 kgf, 320°C	mm	53	33	53	55	37	71	50	77	46	55
Flammability												
Flame rating	UL94	Class	HB	HB	HB	V-0	V-0	V-0	V-0	V-0	V-0	V-0
	UL94	thickness	0.8	0.8	0.75, 3.0	0.75, 1.5, 3.0	0.75, 1.5, 3.0	0.75, 1.5, 3.0	0.15 - 3.0	0.15, 0.4-0.44	0.15, 0.4-0.44	0.15, 0.4-0.44
	UL94	color	ALL	NC, BK	NC, BK	ALL	ALL	ALL	ALL	ALL	ALL	ALL
GWFI (t = 0.15, 0.40, 0.75, 1.5, 3.0 mm)	IEC 60695-2 10-13	°C	-	-	-	960, 960, 960, 960	960, 960, 960, 960	960, 960, 960, 960	960, 960, 960, 960	960, 960, 960, 960	960, 960, 960, 960	960, 930, 960
GWIT (t = 0.15, 0.40, 0.75, 1.5, 3.0 mm)	IEC 60695-2 10-13	°C	-	-	-	900, 930, 960	930, 960	900, 930, 930	775, 775, 775, 500	825, 800, 775, 800	825, 800, 775, 800	750, 750, 825
Electrical properties												
Dielectric strength	IEC 60243-1	kV/mm	28	-	26	30	34	17	34	-	-	33
Tracking resistance (CTI)	UL74EA	PLC	0	0	0	1	0	0	0	0	0	0
Inclined Plane Tracking (IPT)	UL74EA	kV	-	-	-	-	-	-	1.5	-	-	1.5
HWI (0.15, 0.4, 0.75, 1.5, 3.0mm)	UL74EA	PLC	-	-	-	0, 0, 0	-	0, 0, 0	4, 4, 4, 4, 0	2, 2, 0, 0	2, 2, 0, 0	0, 0, 3, 0
HAI (0.15, 0.4, 0.75, 1.5, 3.0mm)	UL74EA	PLC	-	-	-	0, 0, 0	-	0, 0, 0	0, 0, 0, 0	0, 0, 0, 0	0, 0, 0, 0	0, 0, 3, 0
Dielectric loss tangent (1 MHz)	JIS C2138	-	-	-	-	-	-	-	0.0101	0.0102	0.0116	0.0134
Dielectric loss tangent (1 GHz)	ASTM D2520	-	0.009	-	0.009	0.01	0.01	0.01	0.0091	0.0089	0.0095	0.0086
Dielectric loss tangent (10 GHz)	ASTM D2520	-	-	-	-	-	-	-	0.0082	0.0082	0.0084	0.0088

*'Halogen-free' follows the standards that Br is less than 900ppm, Cl is less than 900ppm and the total of halogen amount (Br and Cl) is less than 1500ppm.

*As reference

For more detailed information, feel free to contact us.

Japan

*Kuraray Co., Ltd.
Tokiwabashi Tower, 2-6-4, Otemachi,
Chiyoda-ku, Tokyo 100-0004, Japan
Tel + 81 03 6701 1659
Email: genestar.jp@kuraray.com*

Europe

*EVAL Europe N.V.
Haven 1087, Keetberglaan 1B
B-9120 Melsele Belgium
Tel +32 3 250 9766
Email: genestar.eu@kuraray.com*

North Americas

*Kuraray America, Inc.
39555 Orchard Hill Place Suite362
Novi, MI 48375 Novi5
Tel +1 800 423 9762
Email: genestar.us@kuraray.com*

South Americas

*Kuraray South America Ltda.
Av. Paulista, 1636 – Condomínio Paulista
Corporate, sala 405 – Bela Vista, CEP
01310-200 – São Paulo – SP – Brasil
Tel +55 11 2615 3531
Email: genestar.sa@kuraray.com*

China

*Kuraray Trading (Shanghai) Co., Ltd.
Unit 2106, 2 Grand Gateway, 3 Hongqiao
Road,
Xu Hui District, Shanghai, 200030, China
Tel +86 21 6407 9182
Email: genestar.cn@kuraray.com*

Korea

*Kuraray Trading Co., Ltd
11F Press Center, 124 Sejong-daero
Jung-gu, Seoul, 04520, KOREA
Tel +82 2 732 5637
Email: genestar.kr@kuraray.com*

Asia Pacific

*Kuraray Asia Pacific Pte. Ltd.
250 North Bridge Road, #10-01/02
Raffles City Tower, Singapore 179101
Tel +65 6337 4123
Email: genestar.sg@kuraray.com*

India

*Kuraray India Private Limited
Prius Platinum, 2nd floor B wing, Rear side, D3
district centre, Saket New Delhi-110017, India
Tel +91 11 4090 4400
Email: genestar.in@kuraray.com*

www.genestar.eu

kuraray