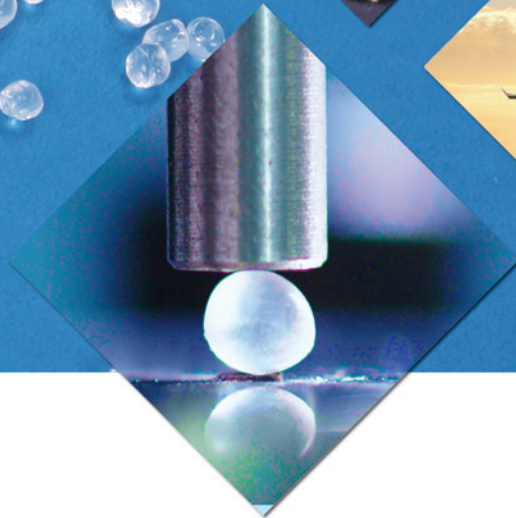




长裕集团
— CHANGYU GROUP —

**Manufacturer of high performance
special polyamide products**



Shandong Guangyin New Materials Co., Ltd.

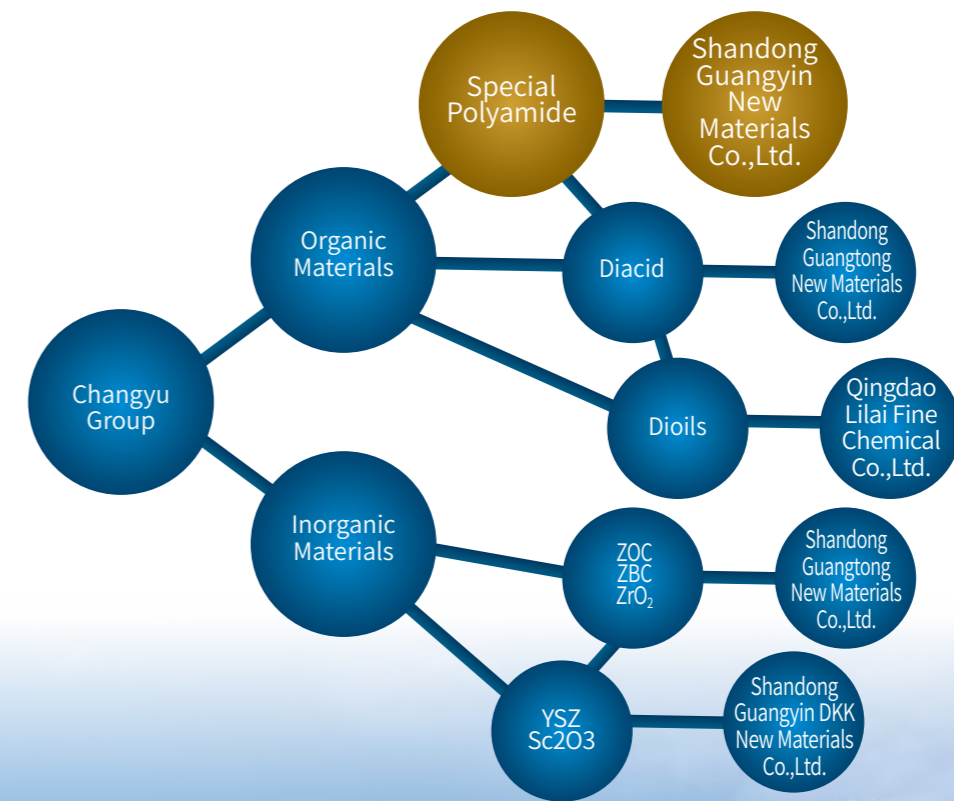
— www.changyuintl.com —

Company introduction

In 2010 , Shandong Guangyin New Materials Co., Ltd. was established in Shandong Zibo High-tech Development Zone, It is affiliated to Changyu Group which is mainly engaged in high-advanced new materials .

Relying on the industrial advantages of the group's bio-fermented dibasic acid, Guangyin expands along special polyamide industry chain. Its main products includes many series such as long carbon chain polyamide, transparent polyamide , semi-aromatic polyamide and polyamide elastomer.Guangyin has an annual polymerized production capacity of 20,000 tons,It is the most complete variety and professional supplier of special polyamide products in China .

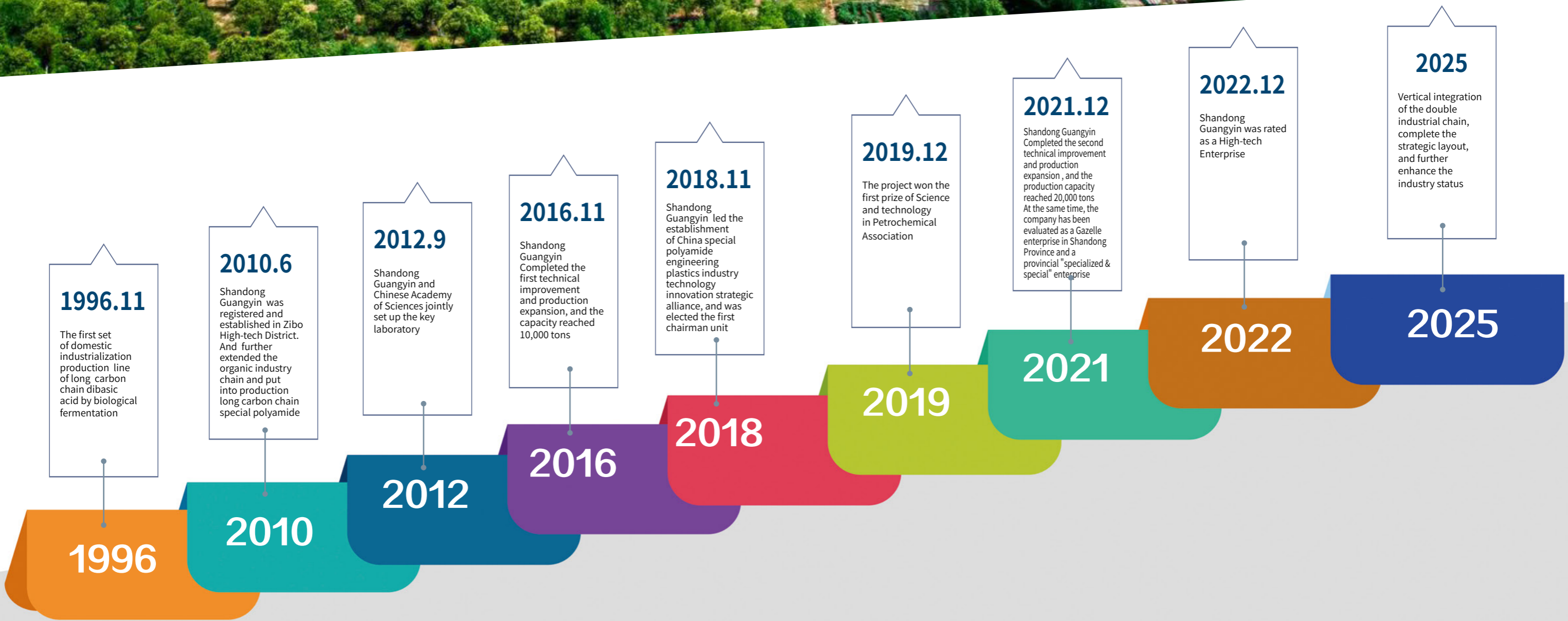
As a leading company in the manufacture of special polyamide, Guangyin has advanced polymerization technology and rich experiences to ensure stable quality and provide customers with customized products. Products are widely used in automobiles, electronic appliances, mechanical manufacturing, communications, shoe materials, packaging, smart equipment and medical fields, and products sells well in China, Europe, America, Japan, South Korea, Southeast Asia and other markets. Products Researching and development continues to extend to the direction of leading technology and high-end industry.



20000⁺	6⁺+10⁺	70⁺	30⁺
Capacity	Specified production	Patent for invention	Overseas Market



DEVELOPMENT HISTORY



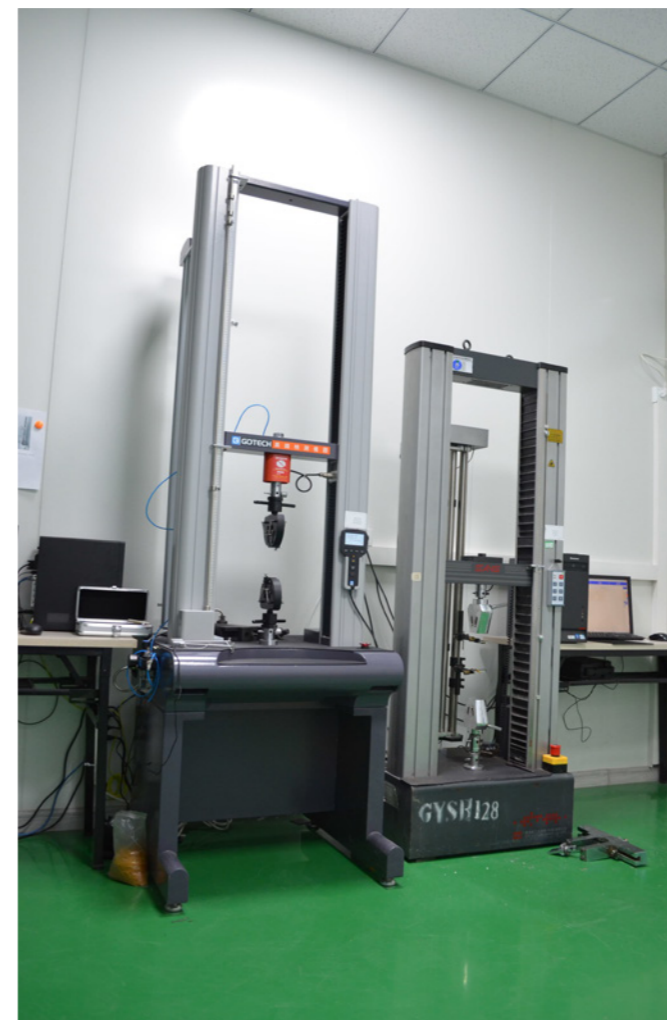
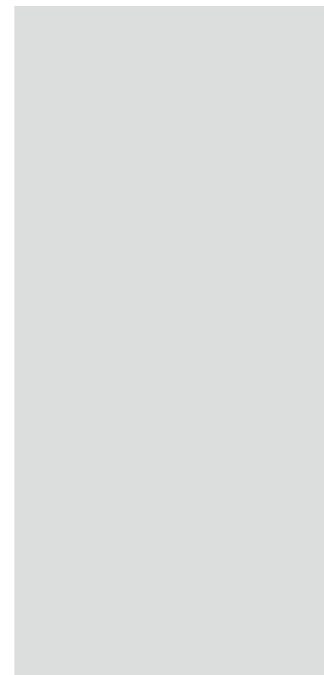
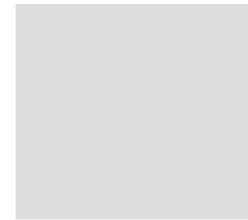
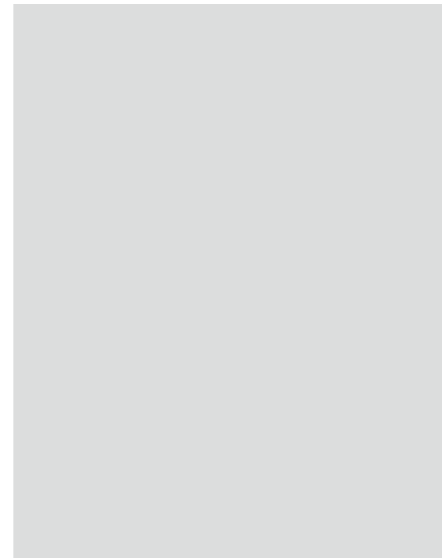
Enterprise Honors

- ★ Key Lab of the Chinese Academy of Sciences
- ★ Chairman Unit of high performance Polyamide technological innovation alliance
- ★ Special Materials Mobilization Center
- ★ Shandong Province High-end Brand Cultivation Enterprises
- ★ Top 50 Enterprises in Zibo City
- ★ Specialized & Special New Enterprises of Shandong Province
- ★ Shandong Famous Brand
- ★ New High-tech Enterprise
- ★ Polyamide Technology First Prize of Science and Technology in Petrochemical Association



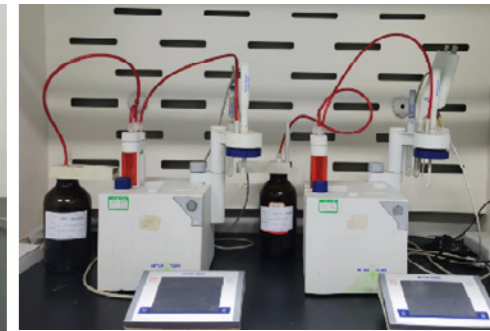
Production & Quality Management

Lean production, High level of automation,
Quality-oriented, Safety and environmental protection Priority



Scientific Research&Innovation

Continue to develop strong R & D team platform , building a number of multi-dimensional cross and multi-level symbiosis research and development platforms, and the Industry-university-research-application platform by deep cooperation



PRODUCT LINE | Polymerization

LONG CARBON CHAIN POLYAMIDE

PA610 PA612 PA1010 PA1012 FC1502 A1504

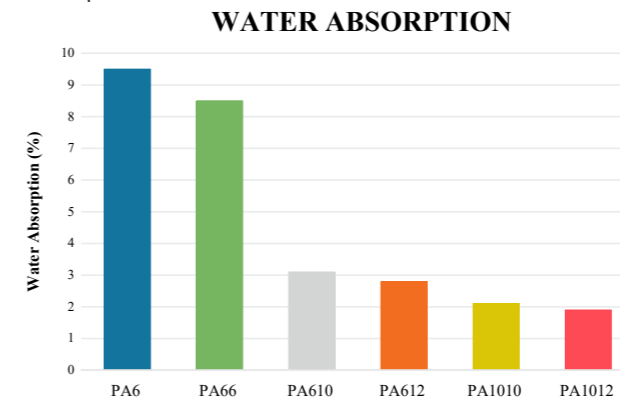
Guangyin's long carbon chain polyamide is produced by the condensation of linear aliphatic diamines and linear aliphatic diacids. Both sebacic acid and decanediamine are obtained from castor oil which is a renewable biological raw material, through a multi-step chemical process. PA610 is about 63% based on renewable bio-based raw materials, PA1010 is almost 100% based on renewable bio-based raw materials, and PA1012 is about 42% based on renewable bio-based raw materials.

Property		Unit	Method	PA610	PA612	PA1010	PA1012	FC1502	A1504
Physical Properties	Water absorption	%	ISO 62	3.1	2.8	2.1	1.9	3.2	2.9
	Density	g/cm ³	ISO 1183	1.075	1.065	1.040	1.030	1.075	1.065
Mechanical Properties	Tensile strength	MPa	ISO 527	60.0	60.0	65.0	50.0	60.0	60.0
	Strain at break	%	ISO 527	> 50	> 50	> 50	> 50	> 50	> 50
	Tensile modulus	MPa	ISO 527	2200	2200	2000	1400	2000	2000
	Charpy impact strength, 23°C	KJ/m ²	ISO 179	NB	NB	NB	NB	NB	NB
	Charpy impact strength, -30°C	KJ/m ²	ISO 179	NB	NB	NB	NB	NB	NB
	Charpy notched impact strength, 23°C	KJ/m ²	ISO 179	4.5	4.5	6.0	10.0	4.5	4.5
	Charpy notched impact strength, -30°C	KJ/m ²	ISO 179	4.5	4.5	6.0	10.0	4.5	4.5
Thermal Properties	Melting range	°C	ISO 3146	220-230	210-220	200-210	185-195	210-220	195-205
	Temp. of deflection under load, 0.45MPa	°C	ISO 75	155	145	135	120	145	135
	Temp. of deflection under load, 1.80MPa	°C	ISO 75	55	55	50	45	50	45

FEATURES:

- Low water absorption, excellent dimensional stability
- Lower density, lightweight
- Excellent chemical resistance, weather resistance, and hydrolysis resistance
- Good thermal stability and low temperature resistance
- Different viscosity specifications for different processing methods such as injection molding, modified extrusion, pipe extrusion, film or blow molding

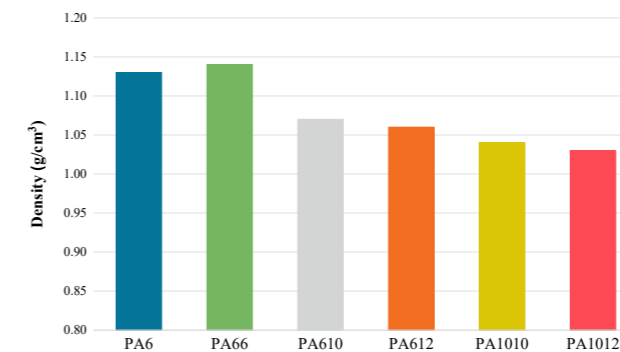
23°C Saturated water absorption



Low water absorption, excellent dimensional stability

The water absorption of polyamide is largely determined by the concentration of amide group. Long carbon chain polyamide has lower water absorption and excellent dimensional stability

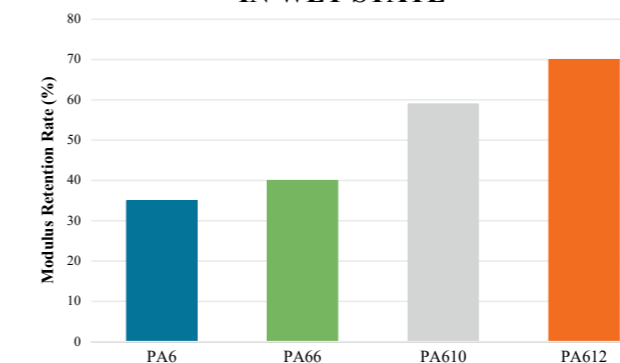
DENSITY



Lower density, lightweight

Long carbon chain polyamide has low density and meet the requirement of lightweight.

MODULUS RETENTION RATE IN WET STATE



Excellent wet mechanical properties

With good wet modulus retention, it can be used in fields requiring high wet performance



PRODUCT LINE | Polymerization

TRANSPARENT POLYAMIDE

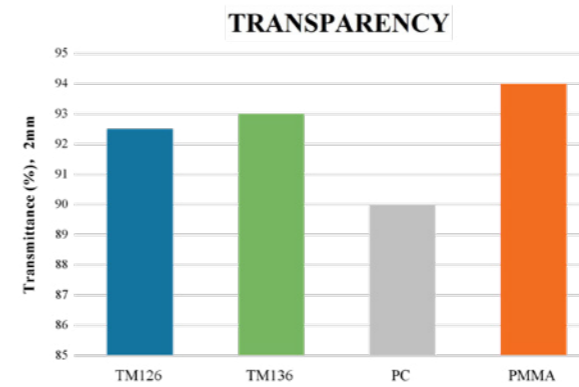
TM126 TM136 TM128 TM156 T1205

Guangyin's transparent polyamide is produced by the condensation of aliphatic cyclic diamines or linear aliphatic diacids, and is a polyamide with amorphous structure and microcrystalline structure. It is supplied in pellet form and is suitable for various processing methods such as injection molding, extrusion, blow molding, etc. About 47% of TM128 is based on renewable bio-based raw materials.

Property		Unit	Method	TM126	TM136	TM128	TM156	T1205
Physical Properties	Density	g/cm ³	ISO 1183	1.025	1.000	1.030	1.050	1.050
	Tensile strength	MPa	ISO 527	60.0	62.0	60.0	65.0	73.0
Mechanical Properties	Strain at break	%	ISO 527	>50	>50	>50	>50	>50
	Tensile modulus	MPa	ISO 527	1500	1600	1700	1800	2000
	Charpy impact strength, 23°C	KJ/m ²	ISO 179	NB	NB	NB	NB	NB
	Charpy impact strength, -30°C	KJ/m ²	ISO 179	NB	NB	NB	NB	NB
	Charpy notched impact strength, 23°C	KJ/m ²	ISO 179	11.0	9.0	11.0	7.0	7.0
	Charpy notched impact strength, -30°C	KJ/m ²	ISO 179	10.0	8.0	10.0	6.0	6.0
Thermal Properties	Melting range	°C	ISO 3146	170-200	180-210	170-200	180-200	180-210
	Temp. of deflection under load, 0.45MPa	°C	ISO 75	120	135	120	135	140
	Temp. of deflection under load, 1.80MPa	°C	ISO 75	100	115	100	115	120

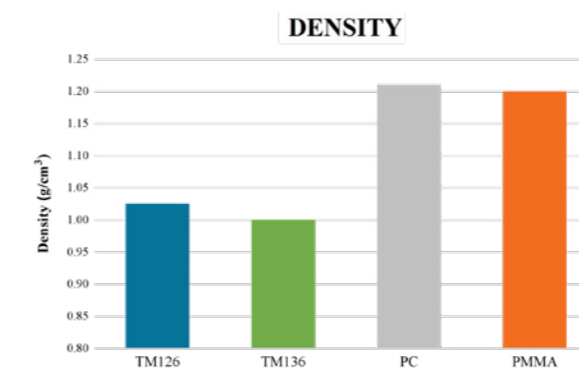
FEATURES:

- High transparency
- Excellent memory resilience
- High strength, high toughness
- Excellent dimensional stability
- Lower density
- Excellent chemical and weather resistance



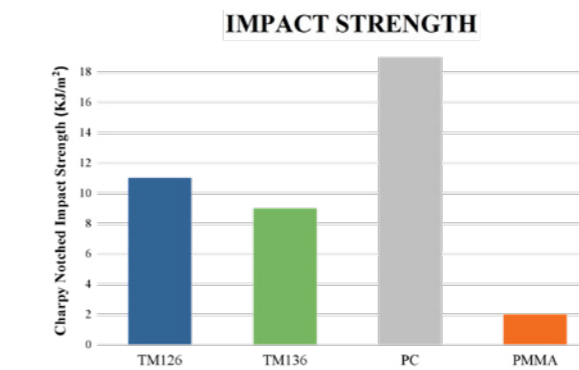
High transparency

Transparent nylon has outstanding transparency, suitable for the field of optical characteristics requirements



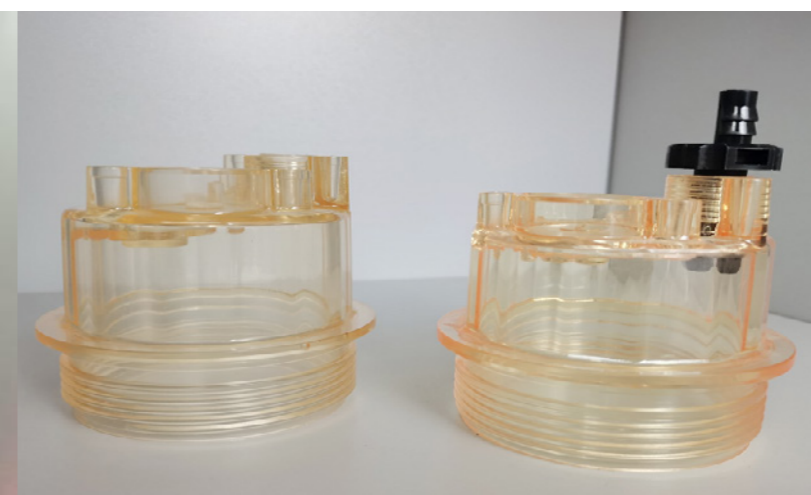
Lightest transparent material

Compared with other transparent materials, it has significantly low density, also it is the lightest transparent material available



Excellent impact performance

With excellent strength, it can meet the requirements of transparent materials with high strength



PRODUCT LINE | Polymerization

SEMI-AROMATIC POLYAMIDE

PA6I PA6I/6T TK120

Guangyin's semi-aromatic polyamide is a polyamide material containing an aromatic ring in the diamine or diacid in the raw material monomer, and is supplied in the form of pellets. Due to the existence of the aromatic ring structure, the material has unique and excellent properties, and the excellent performance provided by Guangyin semi-aromatic polyamide is convincing in every detail. It is widely used in the fields of injection molding modification and food packaging, it also significantly expands the application scope of metal substitution.

Property		Unit	Method	PA6I	PA6I/6T	TK120
Physical Properties	Density	g/cm ³	ISO 1183	1.185	1.185	1.200
	Tensile strength	MPa	ISO 527	95.0	90.0	100.0
Mechanical Properties	Tensile modulus	MPa	ISO 527	3100	3000	3800
	Flexural strength	MPa	ISO 178	100.0	95.0	120.0
	Flexural modulus	MPa	ISO 178	3000	2900	3700
	Charpy notched impact strength, 23°C	KJ/m ²	ISO 179	6.0	8.0	3.0
	Charpy notched impact strength, -30°C	KJ/m ²	ISO 179	6.0	7.0	3.0
Thermal Properties	Melting range	°C	ISO 3146	150-170	160-180	230-240
	Glass transition temperature	°C	ISO 11357	128	130	85

FEATURES:

- High rigidity, high strength
- Low warpage
- Low density and water absorption
- Good dimensional stability
- Good chemical resistance
- High flow and high barrier properties
- Good surface finish

PRODUCT LINE | Polymerization

PA66 COPOLYMERIZED POLYAMIDE

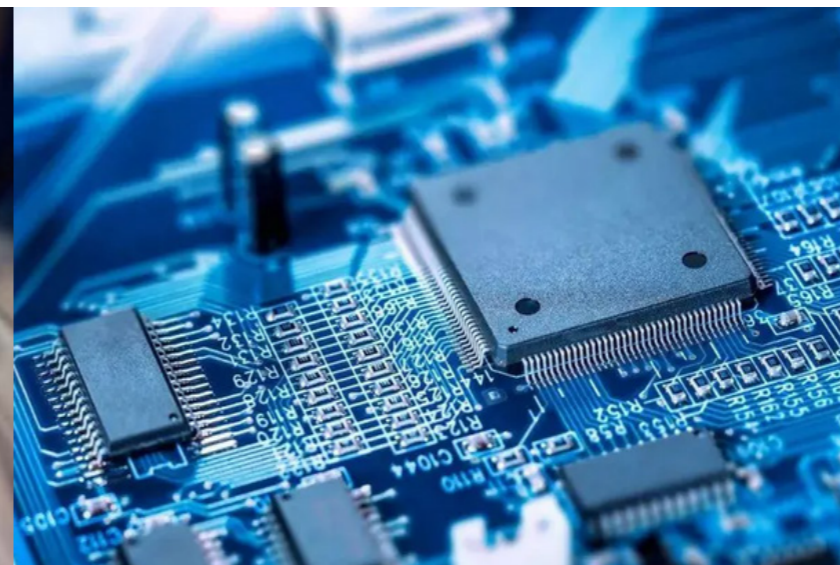
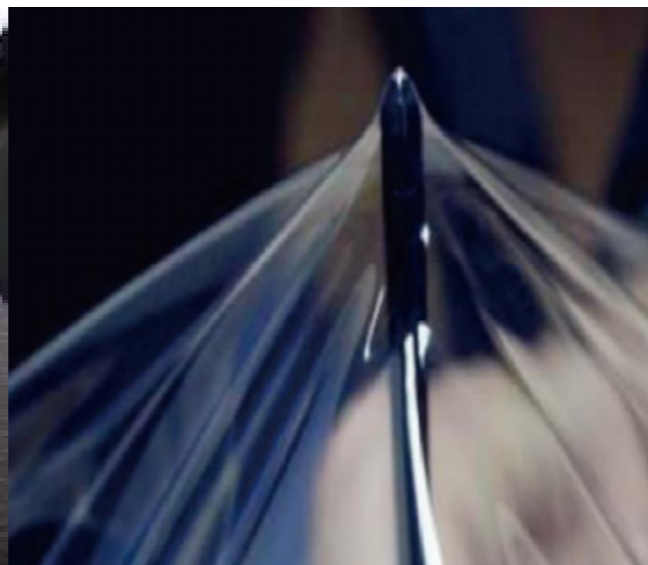
C1504T、C1502、C1203

The series of PA66 co-polymerized polyamide was introduced a special third monomer into PA66 to give the material some special properties. C1502 retains the properties of PA66 while exhibiting excellent processability, toughness, and other properties. C1504T has higher dimensional stability, temperature resistance, and long-term aging resistance compared to PA66. C1203 has higher strength and dimensional stability compared to PA66.

Property		Unit	Method	C1504T	C1502	C1203
Physical Properties	Density	g/cm ³	ISO 1183	1.145	1.130	1.120
	Tensile strength	MPa	ISO 527	72.0	75.0	84.0
Mechanical Properties	Tensile modulus	MPa	ISO 527	2700	2900	3100
	Flexural modulus	MPa	ISO 178	2400	2500	2700
	Charpy notched impact strength, 23°C	KJ/m ²	ISO 179	6.0	6.0	5.0
	Charpy notched impact strength, -30°C	KJ/m ²	ISO 179	5.0	4.0	5.0
Thermal Properties	Melting range	°C	ISO 3146	260-270	240-250	225-235

FEATURES:

- Excellent mechanical properties
- Good thermal stability
- Excellent processing performance
- Different viscosity specifications for different processing methods such as injection molding, modified extrusion.



PRODUCT LINE | Polymerization

THERMOPLASTIC POLYAMIDE ELASTOMER

TPA1012 TPA610

Guangyin's TPA is a copolymer with polyamide as the hard segment and polyether or polyester as the soft segment. The hard segment acts as a physical cross-linking point to provide material rigidity, and the soft segment provides material flexibility. The structure gives the material excellent elasticity. Due to its unique chemical structure, thermoplastic polyamide elastomers have the most eclectic properties of thermoplastic elastomers.

Property		Unit	Method	BM175D	BM170D	BM160D	BM270D	BM340D
Physical Properties	Density	g/cm ³	ISO 1183	1.035	1.040	1.060	1.025	1.025
	Shore D hardness	-	ISO 868	70±2	65±2	60±2	65±2	43±2
Mechanical Properties	Tensile strength	MPa	ISO 527	58.0	60.0	45.0	55.0	30.0
	Strain at break	%	ISO 527	>300	>300	>400	>300	>500
	Flexural strength	MPa	ISO 178	28.0	15.0	10.0	30.0	5.0
	Flexural modulus	MPa	ISO 178	700	400	200	800	90
	Charpy impact strength, 23°C	KJ/m ²	ISO 179	NB	NB	NB	NB	NB
	Charpy impact strength, -30°C	KJ/m ²	ISO 179	NB	NB	NB	NB	NB
	Charpy notched impact strength, 23°C	KJ/m ²	ISO 179	20.0	NB	NB	20.0	NB
Thermal Properties	Charpy notched impact strength, -30°C	KJ/m ²	ISO 179	10.0	15.0	NB	16.0	NB
	Melting range	°C	ISO 3146	185-195	185-195	180-190	185-195	140-150

FEATURES:

- Low density, low water absorption
- Excellent flexibility and elasticity
- Excellent low temperature resistance
- Good mechanical properties and fatigue resistance
- Customizable hardness range

PRODUCT LINE | Pipe products

POLYAMIDE TUBING MATERIALS

Automotive and Transportation

Guangyin's Polyamide tubing materials can be used in Air brake tubing, Hydraulic tubing, Automotive fuel line system, Metal coating and etc. The modified Polyamide mainly based self-produced PA1012、PA1012A、PA612 and etc.

Property		Unit	Method	BEX1115N	BEX117B	BHX121B	BEX168N	BEX201N
Mechanical properties	Tensile modulus	MPa	ISO527	450	450	1400	450	400
	Elongation at break	%	ISO527	> 50	> 50	> 50	> 50	> 50
	Charpy notched impact strength, 23°C	KJ/m ²	ISO179	N	N	8	N	N
	Charpy notched impact strength, -30°C	KJ/m ²	ISO179	4.0	4.0	4.0	4.0	5.0
Shore D			ISO868	67	67	74	66	66
Other properties	Melting point	°C	ISO11357	181	181	185	181	189
	Density	Kg/m ³	ISO1183	1030	1030	1040	1030	1030
	HDT(0.45MPa)	°C	ISO 75	106	106	110	101	108
	Color	-	-	Natural	Black	Black	Semi-transparent	Semi-transparent

FEATURES:

- High Flexibility
- Cold Impact Resistance
- Light and Heat stability
- Resistance to zinc chloride
- Low permeability to gasohol
- Customizable product specifications



PRODUCT LINE | Pipe products

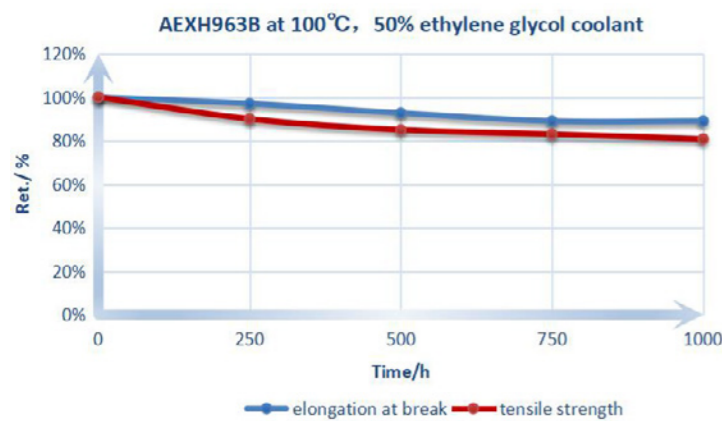
POLYAMIDE TUBING MATERIALS

New Energy Thermal Management System

Guangyin's Polyamide tubing materials can be used in Cooling lines for New Energy Thermal Management System, the modified Polyamide mainly based self-produced long carbon chain Polyamide resin.

	Property	Unit	Method	AEXH963B
Mechanical properties	Tensile modulus	MPa	ISO527	600
	Elongation at break	%	ISO527	> 50
	Charpy notched impact strength, 23°C	KJ/m ²	ISO179	N
	Charpy notched impact strength, -30°C	KJ/m ²	ISO179	11.0
	Shore D		ISO868	65
Other properties	Melting point	°C	ISO11357	215
	Density	Kg/m ³	ISO1183	1060
	HDT(0.45MPa)	°C	ISO 75	105
	Color	-	-	Black

Coolant aging curve



FEATURES:

- Hydrolysis resistance and Temperature resistance
- High Flexibility
- Cold Impact Resistance
- Chemical Resistance
- Customizable product specifications

Fiberglass Reinforced Polyamide

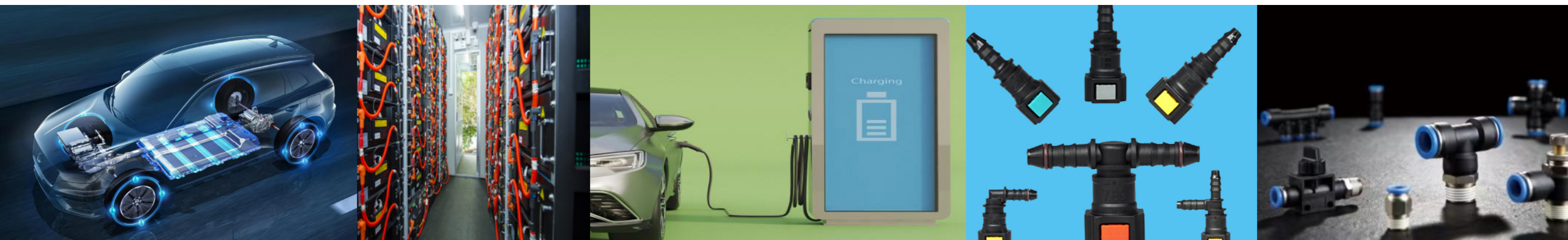
Quick Connectors

Guangyin's fiberglass reinforced Polyamide can be used in quick connectors for single and multi-layer fuel lines or cooling lines and etc., the reinforced Polyamide mainly based self-produced long carbon chain Polyamide resin.

	property	Unit	Method	BIX931GF30B	
Mechanical properties	Tensile modulus	MPa	ISO527	7000	
	Elongation at break	%	ISO527	4	
	Charpy notched impact strength, 23°C	KJ/m ²	ISO179	20.0	
	Charpy notched impact strength, -30°C	KJ/m ²	ISO179	15.0	
	Melting point	°C	ISO11357	191	
	Other properties	Density	Kg/m ³	ISO1183	1280
HDT(0.45MPa)		°C	ISO 75	180	
Shrinkage		in flow direction	%	ISO 294	0.3
		in transverse direction			0.5
Color		-	-	-	Black

FEATURES:

- High Strength
- Hydrolysis Resistance
- Excellent dimensional stability
- Customizable product specifications



Enterprise Culture

Culture is the spiritual pillar of enterprise's long-term development and the source of the power of the enterprise's foundation, The company has formed a set of mature corporate culture concept system.

Enterprise Mission

To Built Tomorrow With Materials

Enterprise Vision

To become a world-renowned and venerable supplier of advanced materials

Enterprise Values

To pursuit Innovations and excellence,Hard Work, Teamwork, Achieve customer's success



Market

Products sell well in China, Europe, America, Japan and South Korea, Southeast Asia and the Middle East, providing professional service for domestic and overseas well-known enterprises





- ▶ Website: www.changyuintl.com
- ▶ Email: sales@changyuintl.com
- ▶ Tel: +86-533-6280432
- ▶ Fax: +86-533-6280431
- ▶ Factory Address: No. 49 , Minxiang Road, Zibo High-tech District, Shandong Province, China.
- ▶ International Department Address: No. 27 , London Road , Free Trade Zone, Qingdao City, Shandong Province, China.
- ▶ Shanghai Incubator Centre Address: Room508 , Building A , No. 2399 , Zhongchongzhi Road, Shanghai Pudong New District, Shanghai, China.