



Introduction of Wanhua Chemical Wanamid™ PA12

Product introduction of PA12

□ Nylon12 is a representative product of long chain nylon, which is prepared by ring opening polymerization of laurolactam or self condensation of amino dodecanoic acid.

□ Nylon 12 has the following advantages: low water absorption, good dimensional stability, good low temperature performance, low density, low friction coefficient, oil and solvent resistance, good dielectric properties, good toughness, etc.

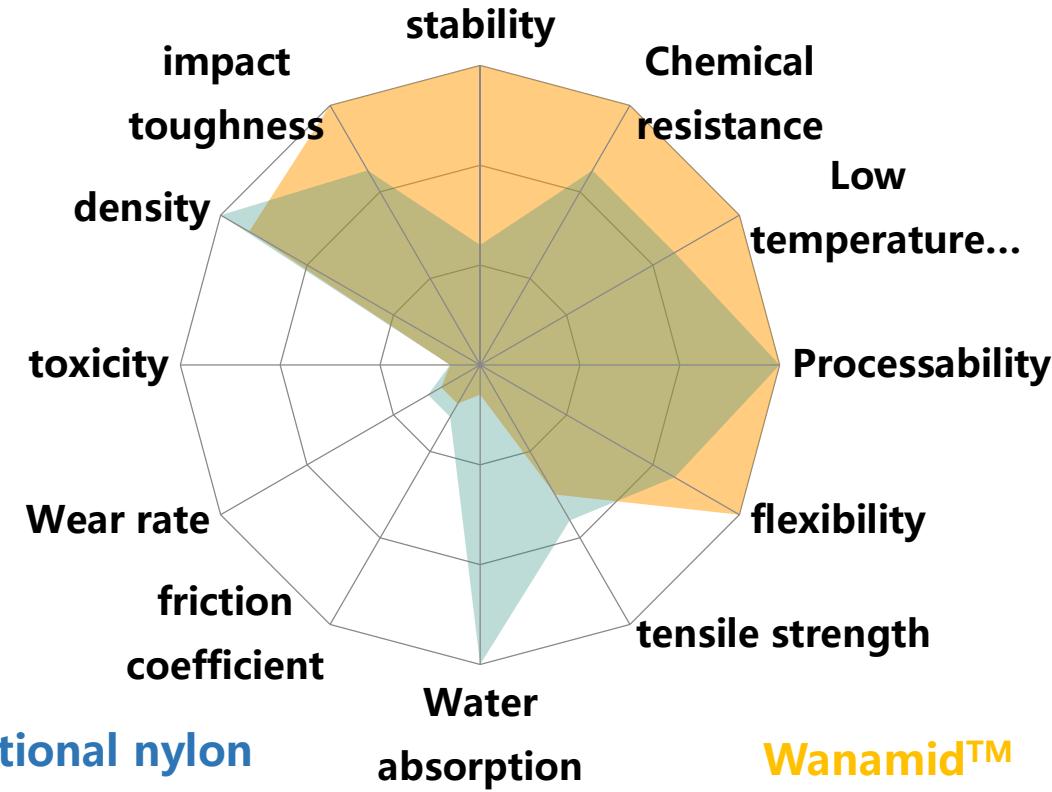
□ Wanhua Wanamid™ PA12:

ring opening polymerization of laurolactam



Conventional nylon

Comparison between Wanamid™ and conventional nylon dimensional stability



Wanamid™



Automobile pipeline

- Fuel system piping
- Cooling line of power battery
- Hydraulic and pneumatic piping
- Fast connection-peg
- electric cable sheath
- Optical cable sheath connector



Cable



Oil and gas pipeline

- Medium and low pressure pipeline
- High pressure pipeline lining
- Anticorrosive coating of pipeline



Consumer electronics

- 5G antenna oscillator
- Mobile phone, electronic
- Printer magnetic roller



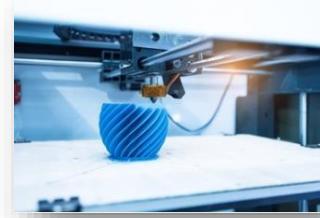
Sports & Leisure

- Soccer shoes
- Oars
- Ski
- Golf club



Water contact

- water tap
- Water meter
- Filter housing
- Coffee machine



3D Printing

- Buckle parts
- Friction fixings
- fixture

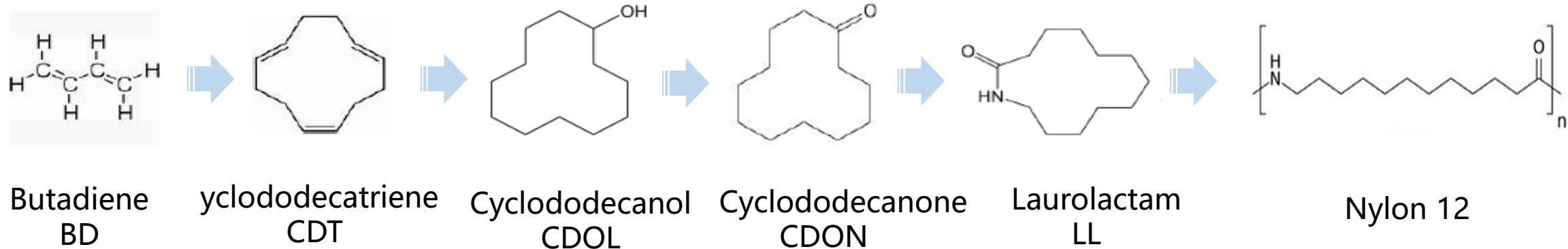


Powder coating

- Dishwasher basket
- Other industrial products

- Wanhua owns independent intellectual property rights of PA12 and the whole industry chain. It will produces 62, 000 tons (CDT), 50, 000 tons (CDON), 42, 000 tons (LL) and 40, 000 tons PA12 per year;
- The whole industrial chain will be industrialized in 2022 H1.

Product of Wanhua PA12 Industrial Chain



【LL introduction】

The monomer of PA12, white, melting point 153 °C, slightly soluble in water, easily soluble in ethanol, ether, chloroform and other organic solvents, can synthesize PA12 by ring opening polymerization.

【Product characteristics】

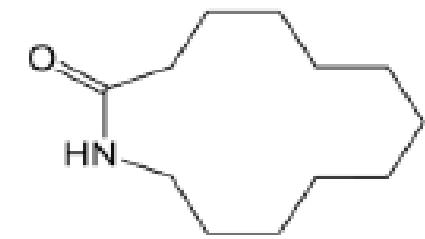
The long carbon chain structure can give nylon products lower water absorption, better chemical resistance, low temperature resistance, salt-fog resistance and dimensional stability.

【Downstream applications】

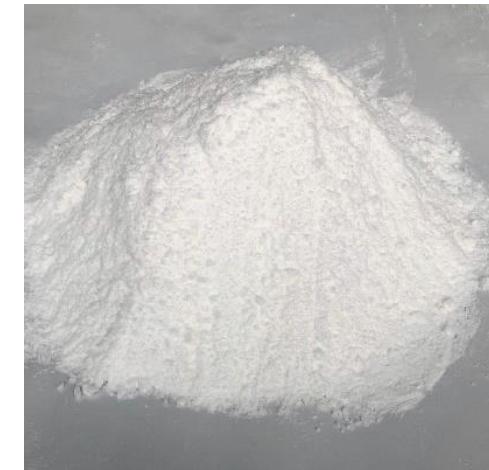
In addition to produce PA12, it can also be used to produce copolyamide hot melt adhesive, such as terpolymer PA6 / 66 / 12, and used in bonding for garment lining, automobile, photovoltaic, etc.

【Product index】

Index	Purity/wt%	transmissivity/%	Sodium ion/ppm
Industrialization	≥99.9	≥95	≤20
Pilot	99.9	95-96	3-15



十二内酰胺
Laurolactam

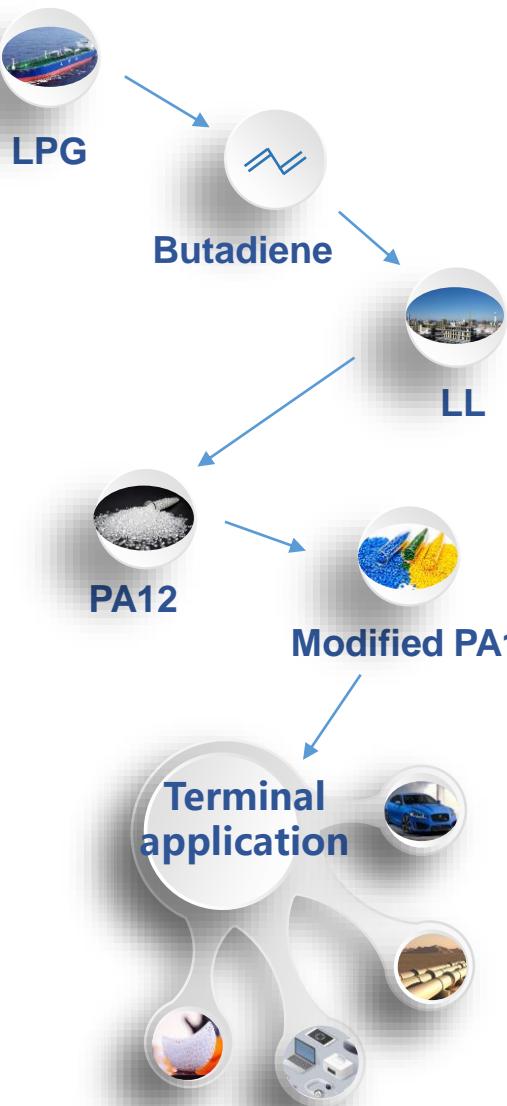


Wanhua Wanamid™ PA12 basic resin-Performance Indicators



- PA12 pure resin can be divided into the grade of low, medium and high viscosity.
- The physical properties of Wanhua Wanamid™ PA12 completely reach or exceed the competitive product level.

Indicators	Low viscosity		Medium viscosity		High viscosity	
	Wanhua L1000	Evonik L1670	Wanhua L2000	Evonik L1940	Wanhua L3000	Evonik L2140
Elongation at break (%)	>100	>100	>100	>100	>100	>100
Yield stress (MPa)	45	43	43	42	42	42
Tensile modulus (MPa)	1400	1400	1400	1400	1400	1400
Bending strength (MPa)	60	56	55	55	55	54
Charpy impact strength (Unnotch, kJ/m²)	NB (23°C) NB (-30°C)	NB (23°C) NB (-30°C)	NB (23°C) NB (-30°C)	NB (23°C) NB (-30°C)	NB (23°C) NB (-30°C)	NB (23°C) NB (-30°C)
Charpy impact strength (notch, kJ/m²)	4.5C (23°C) 4.5C (-30°C)	4.0C (23°C) 4.0C (-30°C)	6C (23°C) 6C (-30°C)	5C (23°C) 5C (-30°C)	14C (23°C) 7C (-30°C)	13C (23°C) 7C (-30°C)
Melting point (DSC, °C)	178	178	178	178	178	178
MVR (235°C, 2.16kg)	115	110	13	14	3	4
Monomer content (wt, %)	0.15	0.25	0.16	0.5	0.19	0.3



- PA12 can be used in automobile, electronic appliances, consumer goods and other fields after blending modification.

PA12 Base Resin



Blending modification

- Plasticized PA12
- Glass fiber reinforced PA12
- Carbon fiber reinforced PA12
- Flame retardant PA12

Terminal application





创新成就卓越 INNOVATION CREATES EXCELLENCE

