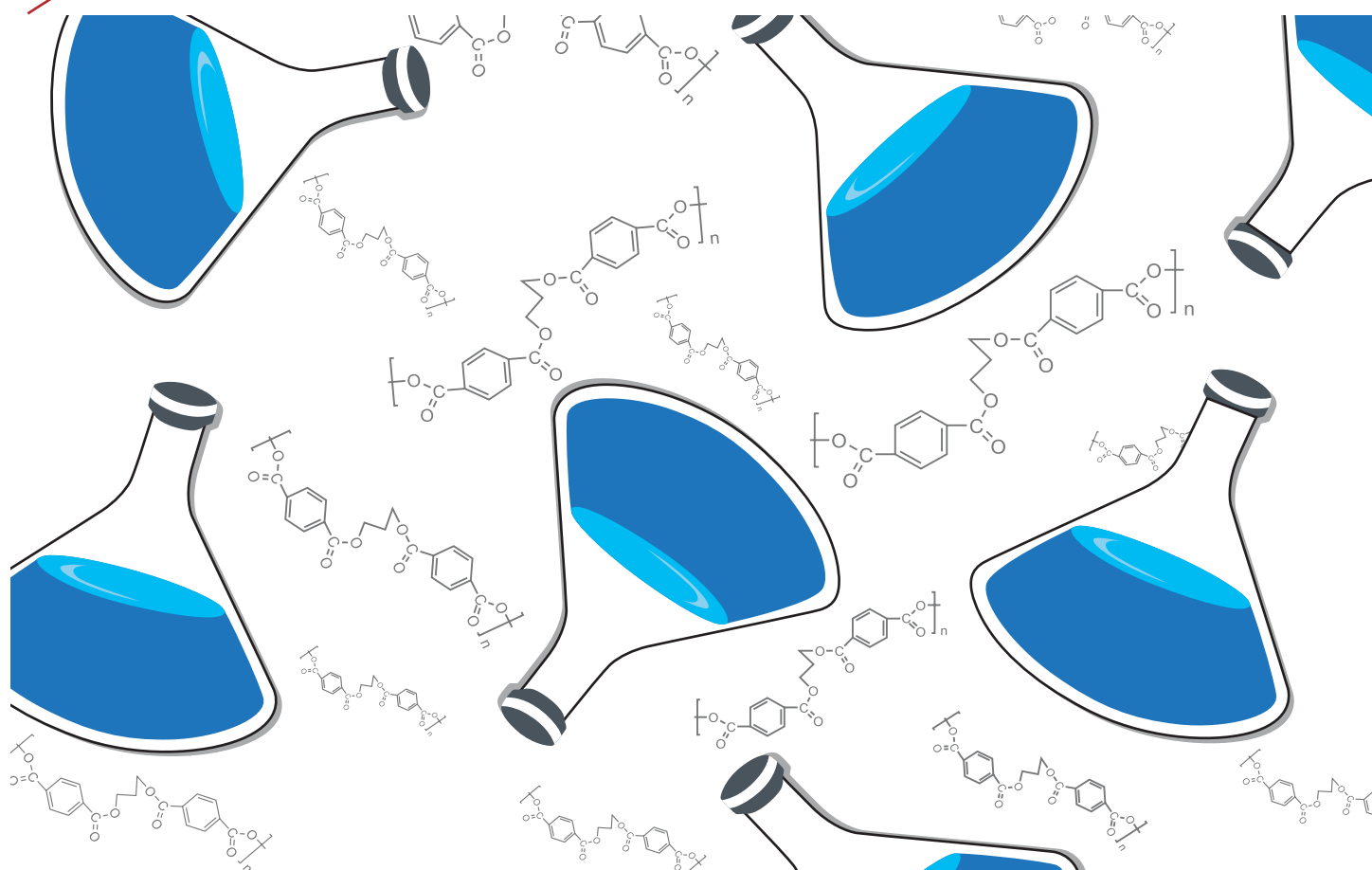


Macroocean

- Polymer, Chemistry, Science -

The polyester way



MARCOA™ For Coating ●

MARNEX™ For Adhesive ●

NOVOCT™ Water Based ●

CRYSMELT™ Hot Melt ●

MULTIMOD™ Various Modified ●

创新. 应您所需 >>>
Innovate as you need

High-performance polymers
- High molecular weight polyester resin

The polyester way

Industrial solutions provider based on high-performance polyester

Industrial solutions provider

We develop industrial adhesive binder based on polyester resin. Besides high quality products and comprehensive service, we also provide sustainable industrial solutions to meet the change of market demands and serve the customers. We provide not only the qualified product but also the solutions for industry development.

About Macroocean

Macroocean is an innovative enterprise based on Human and Science. By using the power of Human and Science, we explore in the field of material science and life science, aiming to provide sustainable industry solutions.

Macroocean headquarter and R & D center are located in the Suzhou Industrial Park, and our factory is built in Changshu New Material Industrial Park.

R&D center

Our research, based on scientific brand Macroocean Lab, is committed to basic research, development of new products and technology. By deep cooperation with USTC and other universities, Macroocean is creating new platform, exploring new technology and developing new products to expand our commercial field.

Macroocean Lab is located in Suzhou Institute for Advanced Study of USTC, which has the unique scientific atmosphere and research resources.

The laboratory has built high-performance polymer research platform, functional adhesive binder technology platform and textile environment-friendly new materials technology platform.

Our Lab adheres to Macroocean principle of valuing the talent's cultivation. R&D team members are all graduated from famous universities and form a highly innovative research team.

Macroocean production base

Capacity: 18,000 MT/year



About MARCOA™, MARNEX™

--- Outstanding performance

A series of medium, high Mn, amorphous, saturated copolyester

- Good flexibility, deep drawing resistance
- Stability, weather resistance, yellowing resistance
- Wide substrate adaptability, showing strong adhesion to plastic, metal, paper and textile fibers
- Curing with isocyanates and amino resin, showing stronger adhesion and chemical resistance
- Mostly suitable to touch food, reaching FDA standards

About NOVOC™, CRYSMELT™

--- Environment protecting

NOVOC series is water-based polyester products. It can be directly applied to paint coating, ink, film pretreatment and other fields instead of solvent-based products, and reduce the use of organic solvents.

CRYSMELT series is crystalline polyester products. Different from amorphous, it no needs organic solvents when using. It reduces VOC emissions, and is environmentally friendly.



About MULTIMOD™

--- Modified development

MULTIMOD is a series of customized modified products based on the different needs of customers.

We fully integrate the performance advantages of both polyester and other resins by grafting, hybridization and other modification methods. The products have more unique and diverse features, and can meet personality demands of customers.

- LM series low molecular weight polyester
- P series polyester polyols for PUR
- APT series adhesion promoters
- SMP series high-performance modified polyester





About polyester resin

The polyester resin is a kind of polymer compound produced by the reaction between dihydric alcohols and dibasic acids or polyhydric alcohols and polybasic acid.

The products we provide:

Polyester Resin

MARCOA™ For coating

MARNEX™ For adhesive

NOVOC™ Water based resin

CRYSMELT™ Hot melt resin

MULTIMOD™ Modified resin

Unique of product

During the synthesis of polyester, we add functional monomer and optimize the production technology to make our products with higher performance and broader versatility.

We can provide linear products with excellent flexibility, and branched products with outstanding chemical resistance and hardness. We can provide solvent-based, water-based and hot melt type products to meet the demand of different industrial applications.

Customized development

Based on the high-performance polymer research platform, Macrocean can provide customized high-performance polyester solutions. This is our technical characteristics. We keep up with market trends, deep understand customer's need and develop diversified, functional products to meet the different needs of customers.

■ Outstanding performance

Flexibility, high adhesion, yellowing resistance, aging resistance, weatherability

We meet your unique needs for high performance.

■ Environment-friendly products

Water-based, hot-melt, low-VOC, UV-curing.....

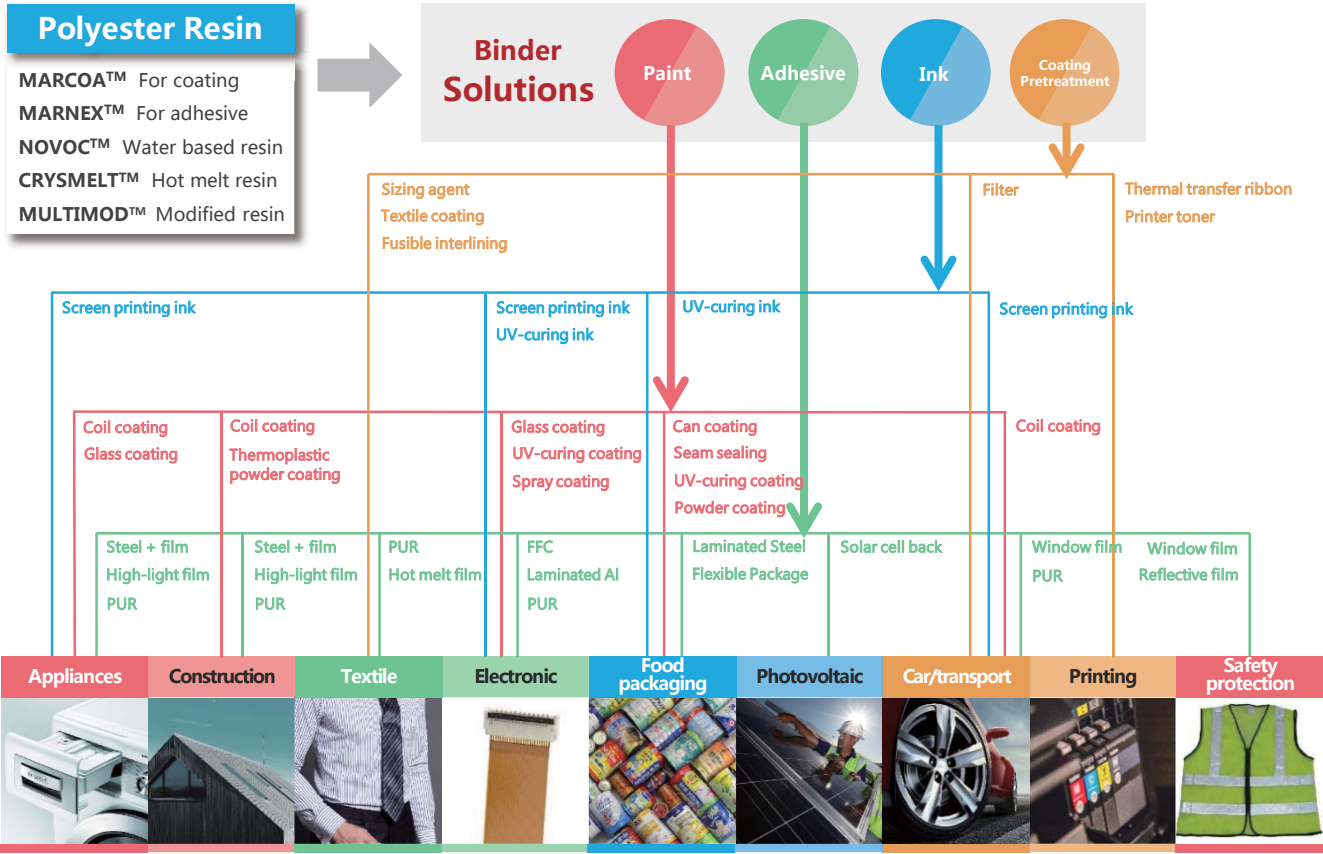
We use more green thinking to cooperate with customers to upgrade products.

■ A variety of options

Different molecular weight / Tg / crystallinity, linear or branched, terminal hydroxyl or carboxyl, diverse formula selection and functional modification

We customize comprehensive solutions for you.





创新. 应您所需 >>>
Innovate as you need

Coil Coating, or pre-coated coil is a kind of organic material / metal composite plate, which is firstly coated to form a dense polymer film on the surface and then to be machined. The pre-coated technology by using continuous and automatic coating technique improves coating efficiency and helps customers save cost and reduce pollution.



Applications

- Household appliances (white & small appliances)
- Construction (doors, sandwich panels, ceilings, roofs)
- Interior decoration (metal furniture, cabinets, lighting equipment)
- Transportation (Automotive)



Features

- Strong adhesion to metal substrates, good flexibility
- Corrosion resistance, good machinability
- Good adhesion to primer, good weather resistance
- High hardness, high gloss, scratch resistance

Flexibility, machinability

Coil coating, made from MARCOA products, is suitable for preparing PCM which needs good flexibility, bending resistance, machinability and corrosion resistance. It is mainly used in appliances plates, lateral plate material of refrigerators, washing machines.

For example, high machinability (OT) requirement of microwave oven shell, corrosion resistance requirement of washing machine, and scratch resistance, stain resistance, surface hardness requirements of refrigerator lateral plate.

Can coating, or iron printing coating is a kind of metal packaging coating which can also be used in the pre-coating technology. The substrate (tin or aluminum plate) is firstly rolled by this coating, cured and then shaped to various cans or other iron printing packages.



Applications

- Food can (three-piece can)
- Industrial can (three-piece can)
- Beer and beverage can
- Pencil boxes, biscuit boxes, plastic pipes
- Screw cap, bottle caps, easy open end (EOE)
- Metal tubes and other metal packaging

Features

- Good adhesion to metal, good flexibility, deep drawing resistance
- Good adhesion to primer, high hardness, high transparency
- Good flexibility (deep drawing, double deep drawing, screw cap)
- Excellent adhesion (free from color primer), boiling resistance, high hardness/anti-blocking, good re-coated performance
- Resistance to yellowing even after overbaked, tasteless, free from BADGE and DEHP, and most reaching FDA standard



Free from BADGE, safe

Currently, the internal coating of most food can is made of epoxy phenolic resin polymer products based on BADGE or BFDGE. Because of its potential mutagenicity, genotoxicity and anti-androgen effect, the EU has carried out relevant regulations to limit the specific migration limit (SML) of these compounds.

The internal coating, made from UNIPOL produces , is free from BADGE, DEHP, PVC, and has good acid resistance, corrosion resistance, flexibility, which can be used in pre-coated technology.

Glass substrate, as a chemically stable inorganic material, has smooth and hard surface. It results in weak bonding with most common synthetic resin. The organic coating adhesion to the glass substrate is easy to peel or serious decline in adhesion after boiled. Marcoa™ G series is designed to improve the polyesters' adhesion to glass substrates .



Applications

- Appliances glass panel
- 3C products (mobile phone, tablet PC panel)
- Building decoration (furniture, lighting, etc.)
- Transportation (Automotive Glass)
- Other printing coating on flat or tempered glass substrate

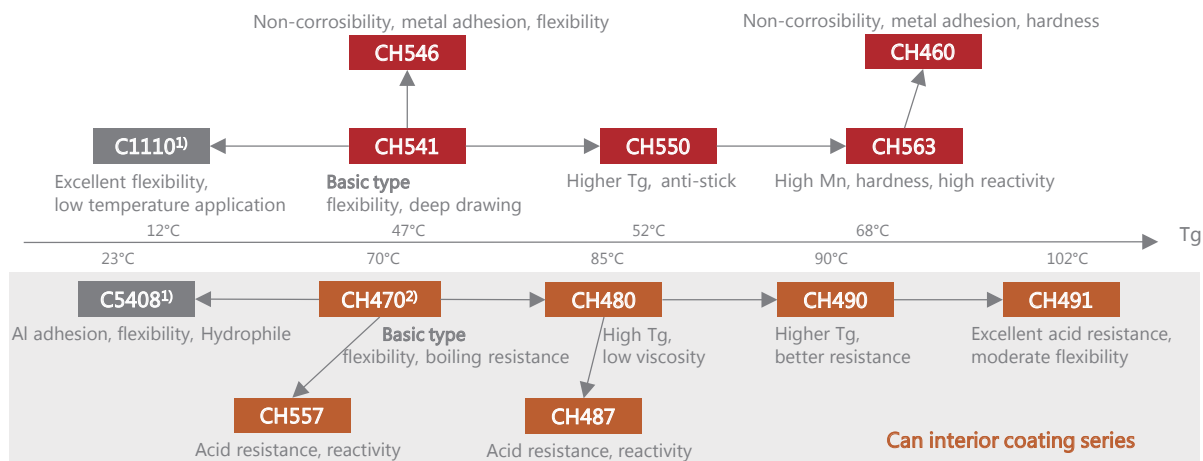
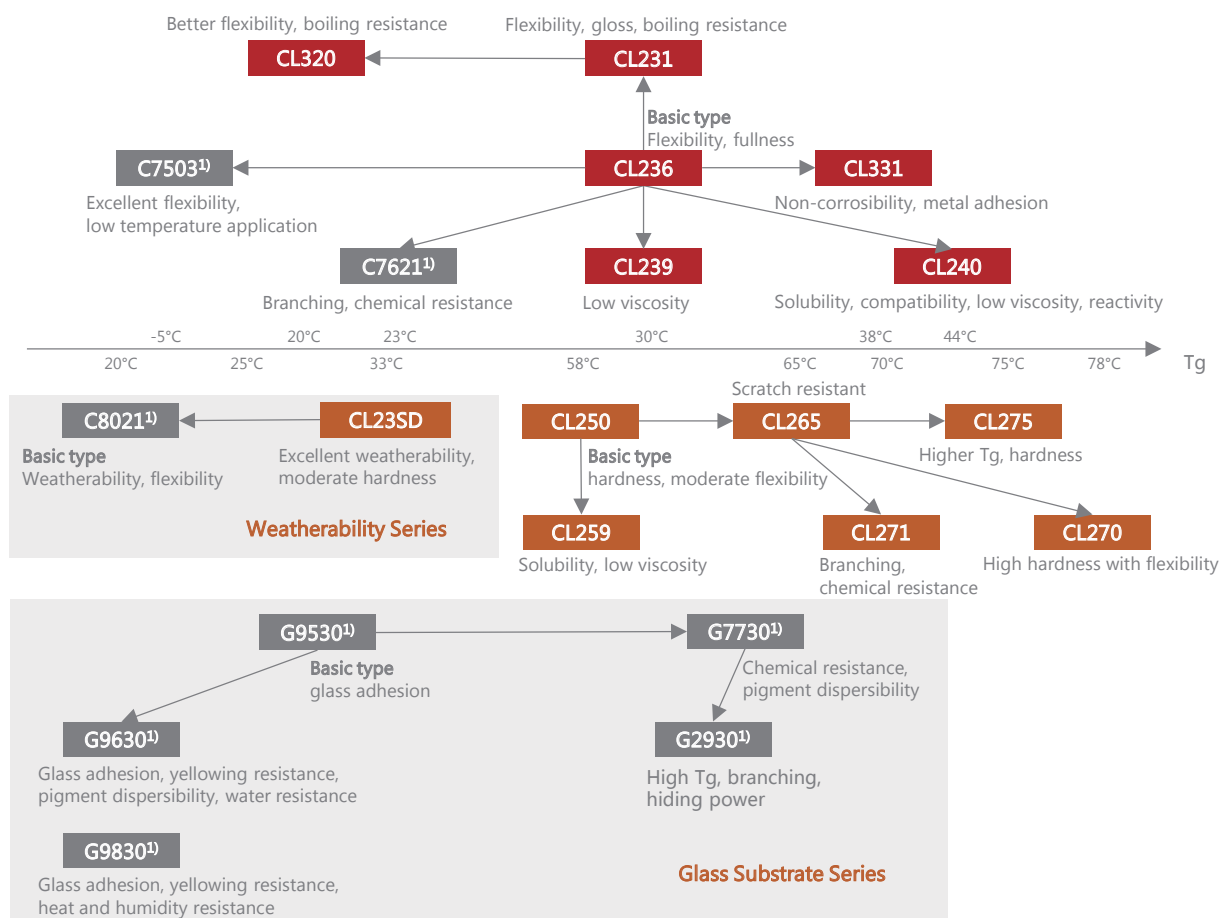


Features

- Excellent adhesion to glass substrate
- Outstanding acid and base resistance, solvent resistance
- High hiding power, high gloss and bright color
- Resistance to nail scratches, good scratch resistance
- High temperature resistance, yellowing resistance
- Good compatibility with paste, silver
- Liquid supply, low odor, free from heavy metal, environment protecting

Excellent adhesion to glass substrate

Products of Marcoa™ G series show excellent adhesion to glass substrates. After curing with amino resins, isocyanates and other crosslinkers at high temperature, high bond strength can be obtained, and the strength is kept after boiled(concluded by internal test data). In addition, the glass ink/coating with this series products show good performance in yellowing resistance, high temperature and humidity resistance and aging, etc.

High Molecular Weight– CH Series**Medium Molecular Weight – CL, G Series**

1) Only supply in solution; 2) Only contact with non-alcohol foods

Model	Form	Structure ¹⁾	Molecular weight(Mn) ²⁾	Solid content(%)	T _g (°C) ³⁾	OH value(mg KOH/g) ⁴⁾	Acid value(mg KOH/g) ⁵⁾	Appliance primer	Appliance finishing	Aluminum coil primer	Interior architecture	Exterior architecture	Can white coating	Deep drawing can white coating	Can varnish	Interior can coating	Al cap & screw-cap coating	3C paint ⁶⁾
High Mn																		
MARCOA CH																		
CH460	Pellet	L	14,000	100	68	7~11	0~3	◆										◆
CH563	Pellet	B	20,000	100	65	3~6	6~10	◆								◆		
CH550	Pellet	L	18,000	100	52	4~8	0~3	◆		◆				◆				
CH541	Pellet	L	16,000	100	47	4~8	0~3	◆		◆	◆		◆	◆		◇	◆	◆
CH546	Pellet	L	16,000	100	47	4~8	0~3	◆			◆							◆
CH491	Pellet	L	12,000	100	102	2~4	0~3									◆		
CH490	Pellet	L	15,000	100	95	4~8	0~3									◆		
CH487	Pellet	L	15,000	100	82	4~8	2~6									◆		
CH480	Pellet	L	12,000	100	84	4~8	0~3									◆		◆
CH470	Pellet	L	17,000	100	70	4~8	0~3							◆		◆		
CH557	Pellet	L	21,000	100	55	4~8	2~6									◆		
Low & Medium Mn																		
MARCOA CL																		
CL320	Lump	L	7,000	100	20	16~22	0~3	◆	◆	◆								
CL231	Lump	L	6,000	100	30	18~24	0~3		◆	◆		◆	◆	◆	◆		◆	
CL236	Lump	L	6,000	100	30	18~24	0~3		◆	◆		◆	◆	◆	◆		◆	
CL239	Lump	L	6,000	100	30	18~24	0~3		◆	◆	◆		◆					
CL331	Lump	B	6,000	100	44	12~16	2~6		◆	◆	◆		◆					
CL240	Lump	B	9,000	100	38	12~16	1~5											◆
CL275	Lump	L	7,000	100	75	16~22	0~3		◆	◆					◆			
CL270	Lump	L	6,000	100	75	16~20	0~3		◆	◆					◆			
CL271	Lump	B	4,500	100	70	40~48	2~5									◆		
CL265	Lump	L	5,000	100	65	18~24	0~3		◆				◆	◆			◆	
CL250	Lump	L	5,000	100	58	18~24	0~3		◆				◆	◆			◆	
CL259	Lump	L	5,000	100	58	18~24	0~3		◆				◆	◆			◆	
CL23SD	Lump	B	6,000	100	32	28~34	0~3					◆						

Model	Form	Structure	Molecular weight(Mn) ²⁾	Solid content(%)	Viscosity(Pa.s) ⁷⁾	Tg(°C)	OH value(mg KOH/g)	Acid value(mg KOH/g)	Appliance primer	Appliance finishing	Aluminum coil primer	Interior architecture	Exterior architecture	Can white coating	Deep drawing can white coating	Can varnish	Interior can coating	Al cap & screw-cap coating	3C paint
Solution product																			
High Mn																			
C1110	Solution	B	20,000	40	4.0~6.0	12	6~10	0~3	◇		◆								
C1141	Solution	L	16,000	40	3.0~4.0	47	4~8	0~3	◆		◆	◆		◆	◆		◇	◆	
C5408	Solution	L	13,000	50	3.5~4.5	23	12~16	0~3			◆						◆		
Medium Mn																			
C8021	Solution	L	6,000	50	3.0~5.5	20	18~24	0~3					◆						
C7503	Solution	L	6,000	60	4.5~6.5	-3	18~22	1~4	◆		◆		◆						
C1230	Solution	L	7,000	50	4.5~6.5	20	16~22	0~3	◆	◆	◆								
C7621	Solution	B	6,000	60	4.5~6.5	23	40~48	2~5									◆		
C1223	Solution	L	6,000	55	3.0~5.5	30	18~24	0~3		◆	◆		◆	◆	◆	◆		◆	
C1226	Solution	L	6,000	55	3.5~5.5	30	18~24	0~3		◆	◆		◆	◆	◆	◆		◆	

Model	Form	Molecular weight(Mn)	Solid content(%)	Viscosity(Pa.s)	Tg(°C)	OH value(mg KOH/g)	Color scale ⁸⁾	Solution system	Features
Glass coating/ink									
MARCOA G									
G2930	Solution	3,000	55	6.0~7.0	60	50~60	<3	DBE,150#	High Tg, branching, hiding power
G7730	Solution	5,000	50	6.5~8.5	62	18~24	<3	DBE,150#	Glass adhesion, chemical resistance
G9530	Solution	5,000	55	5.0~7.0	30	14~20	<3	DBE,150#	Basic type, glass adhesion
G9630	Solution	2,500	65	5.5~7.5	20	70~90	<3	BCS,150#	Glass adhesion, yellowing&water resistance
G9830	Solution	3,000	65	6.0~8.0	20	60~80	<3	BCS,150#	Glass adhesion, yellowing&water resistance

About the notes, please see page 13.

**Applications**

- Flexible flat cable (FFC)
- Flexible copper clad laminate (FCCL)
- Solar battery back
- Steel peritoneal
- Reflective material
- Flexible Packaging
- Foil coating
- Heat sealing lacquer
- Screen printing ink
- Adhesive interlining
- Auto filter

**Features**

- Excellent adhesion to substrates, such as PET , copper, steel, aluminum and PVC film
- Good durability, after thousands of bending, still maintaining good flexibility and adhesion strength
- Curing with isocyanates and amino resin, showing stronger adhesion and chemical resistance
- Good yellowing resistance
- Good machinability
- Water-based and hot melt products, environment-friendly

**Flexibility, adhesion**

Because of its linear structure and high molecular weight, our products show outstanding adhesion and flexibility to make adhesive. This adhesive can be used in the composite of plastic film and plastic film or plastic film and metal because it has good adhesion, boiling resistance, deep drawing resistance, meets the requirement of anti-blocking and long service life.

Model	Form	Structure ¹⁾	Molecular weight(Mn) ²⁾	Tg(°C) ³⁾	OH value(mg KOH/g) ⁴⁾	Acid value(mg KOH/g) ⁵⁾	Adhesive for PET	Adhesive for metal/Al	Heat sealing lacquer	Mirror-like silver coating	Screen printing ink	PET adhesion	Metal adhesion	Aluminum adhesion	Obdurability	Ductility	Flexibility	Heat and wet resistance	Chemical resistance	Weather resistance	Halogen-free flame retardance	Elasticity / high modulus
High Tg																						
MARNEX AL																						
AL090M	Sheet/Strip	L	42,000	-15	2~6	0~3	◆				◆	◆		◆		◆	◆					
AL088M	Sheet/Strip	L	36,000	-12	2~6	0~3	◆				◆	◆		◆		◆	◆					
AL177	Sheet/Strip	L	25,000	12	2~6	0~3	◆				◆	◆		◆		◆						
AL172	Sheet/Strip	B	33,000	15	2~6	0~3	◆				◆	◆		◆		◆	◇					
AL171	Sheet/Strip	L	28,000	18	2~6	0~3	◆				◆	◆		◆		◆	◇					
AL072	Sheet/Strip	L	26,000	8	3~7	0~3	◆				◆	◆		◆		◆	◆					
AL070	Sheet/Strip	L	24,000	7	4~8	0~3	◆				◆	◆		◆			◆					
AL051	Sheet/Strip	L	23,000	7	4~8	0~3	◆				◆	◆		◆			◇					
AL150	Sheet/Strip	L	21,000	14	4~8	0~3	◆				◆	◆		◆			◆					
AL261	Sheet/Strip	B	20,000	20	2~6	2~6															◆	
AL260	Sheet/Strip	B	20,000	20	2~6	1~4	◆				◆	◆		◆	◇							
AL160	Sheet/Strip	B	20,000	12	6~10	0~3	◆				◆	◆		◆								
AL050	Sheet/Strip	B	19,000	7	9~13	0~3	◆				◆	◆		◆			◆					
AL250	Sheet/Strip	L	17,000	24	1~5	1~5															◆	
AL048	Sheet/Strip	L	16,000	6	4~8	0~3	◆				◆	◆		◆								
AL041	Sheet/Strip	B	15,000	5	8~12	4~8		◆					◆					◆	◆			
AL05SD	Sheet/Strip	L	15,000	8	6~12	0~3	◆													◆		
AL240	Sheet/Strip	B	14,000	27	8~14	2~8																
AL147	Sheet/Strip	B	14,000	10	9~13	4~6													◆			
AL040M	Sheet/Strip	L	11,000	-20	8~14	0~3	◆				◆	◆		◆								
AL330	Sheet/Strip	B	11,000	33	12~18	2~6		◆					◆						◆			
AL030	Sheet/Strip	L	9,000	4	16~22	0~3		◆					◆						◆			
AL046	Sheet/Strip	B	8,000	5	10~16	3~7	◆											◆	◆			
AL120	Sheet/Strip	L	7,000	15	12~18	0~3		◆											◆			

Model	Form	Structure	Molecular weight(Mn)	Tg(°C)	OH value(mg KOH/g)	Acid value(mg KOH/g)	Adhesive for PET	Adhesive for metal/Al	Heat sealing lacquer	Mirror-like silver coating	Screen printing ink	PET adhesion	Metal adhesion	Aluminum adhesion	Obdurability	Ductility	Flexibility	Heat and wet resistance	Chemical resistance	Weather resistance	Halogen-free flame retardance	Elasticity / high modulus
High Tg																						
MARNEX AH																						
AH860	Pellet	L	23,000	82	1~5	0~3			◆		◆				◆							
AH780	Pellet	L	35,000	70	1~5	0~3	◆			◆	◆	◆			◆							
AH760	Pellet	L	22,000	70	4~8	0~3		◆	◆				◆	◆	◆				◆			
AH750	Pellet	L	23,000	70	2~6	0~3	◆				◆	◆			◆							
AH661	Pellet	L	23,000	68	2~6	0~3	◆				◆	◆			◆							
AH660	Pellet	L	21,000	68	2~6	0~3	◆				◆	◆			◆							
AH651	Pellet	L	17,000	68	4~8	0~3	◆				◆	◆		◆								
AH640	Pellet	B	12,000	60	6~10	0~3	◆				◆	◆										
AH540	Pellet	B	15,000	57	8~12	4~8	◆					◆	◆	◆				◆	◇		◆	
AH546	Pellet	B	15,000	57	8~12	4~8	◆					◆	◆	◆				◆				◆
AH560	Pellet	L	20,000	53	4~8	0~3			◆					◆	◆							
AH441	Pellet	B	12,000	40	4~8	6~10	◆	◆				◆	◆	◆				◆				◆

- 1) L-linear structure B-branched structure
- 2) Mn-number average molecular weight
- 3) Glass transition temperature (Tg)
Use Differential Scanning Calorimeter (DSC) test, heating rate 10 °C/ min.
- 4) Hydroxyl value
The mass (mg) of KOH, containing same molar of hydroxyl group with 1g of the sample.
- 5) Acid value
The mass (mg) of KOH, neutralizing 1g of the sample.
- 6) 3C
Computer、Communication & Consumer Electronic
- 7) Solvent system
MARCOA and MARNEX products are suitable for a variety of ketones, esters and ethers organic solvents, usually together with aromatic hydrocarbon co-solvent.
The viscosity measurement solution system of MARCOA C series products is DBE/150 # aromatic solvents(23 °C).
The viscosity measurement solution system of other series is the solvent system (23 °C) indicated in the table.
According to demand, MARCOA C series and G series products have a variety of solvent systems for customer to choose.
- 8) Color Scale
Use the Gardner color scale.
- 9) Melting Point
Use differential scanning calorimeter (DCS), the rate of temperature rise is 20 °C / min.
- 10) Melt Index
At a given temperature and pressure (2160 g), the product is melted into a fluid.
Measuring the mass (g) of product flowing through a 2.1 mm diameter round tube in 10 min.
- 11) Water tolerance
Use DMEA to adjust PH value: 8 ~ 9.
- 12) ◇can be used ◆recommended

NOVOC series is environment-friendly water-based polyester resin. It is developed to meet the environment protecting demand of customers. It can be directly used in coating, ink and other areas instead of solvent-based products to reduce VOC emissions.



WS series

- Anionic, stable dispersion in water-based systems, PH value and viscosity stability
- The performance is same with solvent-based polyester, high adhesion, excellent flexibility
- Good water resistance, heat resistance and durability

WP series

- Amine-neutralization type, the resin can be solved in water by neutralizing terminal carboxyl with organic amine
- High solid content, good film formation
- Stronger adhesion after curing with isocyanate and amino resin
- Good hardness, gloss and fullness

Applications

- Water-based metal paint, wood coatings, industrial paint
- Water-based automotive coatings
- Water-based screen printing inks
- Film pretreatment coating

Product Index

	Features	Form	Solvent	Mn ²⁾	Tg ³⁾	OH value ⁴⁾	Acid value ⁵⁾
Water based (Anionic)					°C	KOH mg/g	KOH mg/g
NOVOC WS							
WS250	High reactivity, easy curing	Lump	Water	5,000	69	10~13	31~35
WS350	Good solubility	Pellet	Water	10,000	57	4~8	4~8
WS440	PET adhesion, soft	Pellet	Water	12,000	44	4~8	3~6
WS471	Hardness, heat resistance	Pellet	Alcohol+water	10,000	70	6~12	<3
WS451	Heat resistance, anti-stick	Pellet	Alcohol+water	12,000	58	4~8	<3
WS441	PET adhesion, adhesives	Pellet	Alcohol+water	12,000	45	4~8	<3
WS114-30	PET adhesion, soft	30% solution	Ethanol:water=1:2	12,000	15	3~6	<3
WS115-30	PET adhesion, soft	30% solution	Ethanol:water=1:2	18,000	12	3~6	<3

	Features	Form	Solvent	Mn ²⁾	Color ⁸⁾	Viscosity ⁷⁾	Tg	OH value	Acid value	Water tolerance ¹¹⁾
Water based (Amine-neutralization)						Pa.s(23℃)	°C	KOH mg/g	KOH mg/g	
WP										
WP250-60	Hardness, gloss	60%Solution	BCS	5,000	<3	5~7	56	20~30	15~25	water:BCS=1:1
WP220-60	Metal adhesion, flexibility	60%Solution	BCS	5,000	<3	5~7	35	20~30	15~25	water:BCS=1:1
WP120-70	High solid&low viscosity	60%Solution	BCS	3,000	<3	3~5	27	30~40	20~30	water:BCS=1:1

About the notes, please see page 13.

CRYSMELT is thermoplastic crystalline polyester resin, which can be used as hot melt adhesive in the application of textile and garment liner coating and none textile composite and also application in automotive interior decoration, electronics, decoration and sports due to its excellent adhesion to plastic, film, metal, paper and other substrates and its good flexibility.



HS series

- High crystalline polyester, outstanding acid and base resistance, solvent resistance
- Excellent adhesion to many kinds of substrates (metal, textile, paper, leather, etc.), substrate without pretreatment
- Short open time, easy to industrial application
- Safe, food package

HT series

- Partially crystalline, low crystalline polyester
- Partially dissolved in organic solvents, can be applied in solution
- Particularly outstanding adhesion to PET substrates

Product Index

Hot melt		°C	°C	g/min	°C		
CRYSMELT HS							
HS260	Pellet	25000	23	170	40	190	High Tm, heat resistance, adhesion to metal /plastic, high crystallinity, FDA standard Weld seam sealing Filter
HS270	Pellet	28000	22	155	25	190	Chemical resistance, adhesion to metal/plastic, FDA standard (21 CFR 175.300) Weld seam sealing Filter
HS250	Pellet	18000	-3	124	82	150	Long open time, water resistance, adhesion to textile and non-woven fabrics Fusible interlining Mark
HS370	Pellet	29000	16	130	20	160	Low crystalline , chemical and water resistance, adhesion to textile/non-woven Fusible interlining Mark
HS760	Pellet	27000	14	171	55	190	Fast crystallization rate, short open time, soft, good flow ability, FDA standard Weld seam sealing Filter
HS761	Pellet	25000	27	170	55	190	FDA standard (21 CFR 175.300) Weld seam sealing Filter
HS650	Pellet	20000	27	163	54	190	Long open time, hardness, water resistance Hot melt film
HS460	Pellet	21000	18	145	80	190	Long open time, PET adhesion, good fluidity Hot melt film
HS560	Pellet	21000	23	156	80	190	Based on HS270, lower Mn, higher melt index Weld seam sealing
HS170	Pellet	20000	1.5	111	74	150	Metal & PET adhesion, solvent resistance Hot melt film
CRYSMELT HT							
HT8050	Pellet	-17	19000	87	80	160	PET adhesion, partial solvent solubility can be dissolved into solution Ink, coating Hot melt film
HT6070	Pellet	-19	30000	90	80	160	PET adhesion, can be dissolved into solution Ink, hot melt film
HT6100	Pellet	-35	48000	80	100	160	Good adhesion to PET/copper/nickel, and soft Easy tear cover

About the notes, please see page 13.

MULTIMOD is a series of polyester-based modified products. We use a variety of modification methods to improve the product performance to meet customer needs.

MULTIMOD has the following four series: LM series low molecular weight polyester, P series polyester polyols for PUR (reactive polyurethane hot melt adhesive), APT series polyester-based adhesion promoter and SMP series high-performance special modified polyester.

LM series low molecular weight polyester

It contains a series of low molecular weight polyester with specially designed structures. Low molecular weight and plenty of cross-linking groups make it be wide used in coatings, inks and adhesives to promote adhesion. At the same time, as LM series products are all solid with good solubility, its application range is further expended.

	Mn ²⁾	Tg ³⁾	OH value ⁴⁾	Acid value ⁵⁾	Features
Low molecular weight polyester	°C	KOH mg/g	KOH mg/g		
MULTIMOD LM					
LM610	2,500	67	45~55	0~3	Linear, hardness, water&chemical resistance
LM512	3,000	46	45~55	0~3	Linear, solubility, compatibility, adhesion
LM511	3,000	58	50~60	0~3	High branching, high reactivity, pigment dispersibility,
LM810	2,000	25	80~90	3~7	High branching, low Tg, high hydroxyl value, reactivity

P series polyester polyols for PUR

It contains a series of medium and low molecular weight, hydroxyl-terminated polyester polyols for single-component reactive hot melt adhesives and sealants such as PUR hot melt adhesives.

PUR is solvent-free environment-friendly products. Because of its hot-melt feature and strong initial viscosity, after moisture curing, PUR shows excellent adhesion strength and durability.

P1000 series is amorphous, liquid products; P2000 series is amorphous, solid products; P3000 series is crystalline, solid products.

Features

- Single-component type, easy to apply
- Good compatibility, easy to mixed use
- Excellent adhesion to polar/non-polar substrates
- Low application temperature, heat resistance
- Short opening time
- High initial strength

Applications

- Automotive interior and windows
- Building exterior coating, edge bonding
- Woodworking adhesive
- Electronic products
- Textile field

	Mn	Type	Form	Tg	OH value	Acid value	Soften point	Tm ⁹⁾	Melt viscosity	
Polyester polyols				°C	KOH mg/g	KOH mg/g	°C	°C	Pa.s	温度(°C)
MULTIMOD P										
P1050	2,000	Amorphous	Liquid	-	52~58	0~3	-	-	3.5	80
P1030	3,500	Amorphous	Liquid	-15	25~35	0~3	-	-	11	80
P2040	2,000	Amorphous	Solid	10	36~42	0~3	55	-	1	130
P3050	2,000	Crystalline	Solid	-	50~60	0~3	53	60	0.6	80
P3020	4,500	Crystalline	Solid	-	22~28	0~3	56	63	5	80
P3030	3,500	Crystalline	Solid	-	18~14	0~3	70	78	2.2	80
P3031	3,500	Crystalline	Solid	-	25~35	0~3	65	75	2	80

APT series adhesion promoters

It contains a series of polyester-based adhesion promoters. It can improve the adhesion to substrates or coatings of many coating, ink and adhesive systems.

	Mn	Form	Color ⁸⁾	Viscosity	Tg	OH value	Acid value	Features	Applications
Polyester adhesion promoter				Pa.s(23°C)	°C	KOH mg/g	KOH mg/g		
MULTIMOD APT									
APT-W1	3500	60% Solution	<3	0.4~0.6	23	22~28	20~26	Provide reactive hydroxyl&carboxyl, improve film flexibility and adhesion to metal/plastic	Coil/can coating, Printing ink
APT-H1	2500	Solid	-	-	70	18~24	10~16	Provide reactive hydroxyl&carboxyl, improve adhesion of alkyds/acrylics to metal/plastic	Industrial coating Wood coating Printing ink
APT-F1	800	100% Liquid	<3	6.0~8.0	-	195~210	0~3	Metal adhesion, high cross-linking, water&heat resistance, high solid content	Metal decorative paint Primer for car
APT-X1	800	100% Liquid	<3	7.0~9.0	-	40~50	40~50	Improve adhesion to metal such as steel and aluminum plates, improve water resistance	Printing ink Metal coating

SMP series high-performance modified polyester

It contains a series of special modified resins based on the molecular skeleton of polyester structure. We fully integrate the performance advantages of both polyester and other resins by grafting, hybridization and other modification methods. We can also provide customized development service to meet customer's different demand.

■ **SMP V series** UV-curing modified polyester

Features: Low shrinkage, flexibility, improve the adhesion with the primer layer

■ **SMP A series** Acrylic modified polyester

Features: Acrylic modified to improve the compatibility with acrylic resin, good pigment wettability

■ **SMP E series** epoxy grafted polyester

Features: Grafted epoxy groups; after curing with phenolic resin, the coating shows high crosslinking density and high resistance, while maintaining moderate flexibility.

	Mn	Form	Solution	Color	Tg	OH value	Acid value	Applications
Special modified polyester					°C	KOH mg/g	KOH mg/g	
MULTIMOD SMP								
V510	16,000	Solid	-	-	15	10~16	<2	UV coating, UV ink, UV adhesive
V403	13,000	Solid	-	-	5	8~14	<2	UV coating, UV ink, UV adhesive
V201	6,000	Solid	-	<3	-8	26~32	<2	UV coating, UV ink, UV adhesive
V122	3,000	Solid	-	<3	-20	40~46	<2	UV coating, UV ink, UV adhesive
A230	6,000	50%Liquid	Xylene/150#	<5	30	17~23	22~28	Screen printing ink, industrial paint
E270	7,000	50%Liquid	Xylene/150#	<5	70	18~24	2~6	BPA-free can interior coating
E320	10,000	50%Liquid	Xylene/150#	<5	20	12~18	2~6	BPA-free can interior coating

About the notes, please see page 13.



Technology Innovation

Our research is based on our customers' demand and we remain strong competitiveness through continuous investment in talent, product development and technology innovation. We are using innovative thinking and ideas to solve industrial problems and offer solutions to promote industrial development.

Quality Assurance

Stability of product quality is the life of Macrocean. In order to provide our customers qualified and stable products, we use automatic controlled equipment to guarantee our processes and standardized management.

Applications

Our high molecular weight saturated polyester resin products are developed according to different market applications and customer demands.

The key market of our products includes household appliances, transportation, construction, electrical & electronics assembly, package, textile, industrial adhesives, photovoltaics etc.

Supply form

We can provide solvent-based, water-based and hot-melt type products and also provide products in different forms such as pellet, flake, sheet, powder and solution.

聚酯树脂解决方案

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