

**ShinEtsu**

**Nissin Chemical Industry Co.,Ltd.** 日信化学工业株式会社

**SOLBIN<sup>®</sup>**

Vinyl Chloride-Vinyl Acetate Modified Resin  
氯乙烯·醋酸乙烯酯类改性树脂



## ● Copolymer resin with characteristics of vinyl chloride and vinyl acetate

利用聚氯乙烯和醋酸乙烯特性的共聚物树脂

SOLBIN is a modified resin that combines the toughness and chemical resistance of vinyl chloride, strong adhesiveness and plasticity of vinyl acetate, and other polar groups that enhance adhesivity and solubility. Due to its many outstanding characteristics, including its lack of odor or taste and high resistance to water penetration, SOLBIN has been used as a binder for magnetic cards and tapes, as a coating agent for soft drink cans and moisture-proof cellophanes, and as an essential part of various paints, inks, and adhesives.

SOLBIN是融合了氯乙烯的强韧性、抗耐性与醋酸乙烯酯的附着性、可塑性,并赋予其他极性基,使其具有出色的黏结性、溶解性的改性树脂。具有无味、无臭,耐水性好,吸水率低等出色的性质,多应用于磁带磁卡等的粘合剂、清凉饮料罐、防水胶带等的涂层剂,以及各种涂料、墨水、黏结剂等。

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## ● Characteristics of SOLBIN

SOLBIN的特征

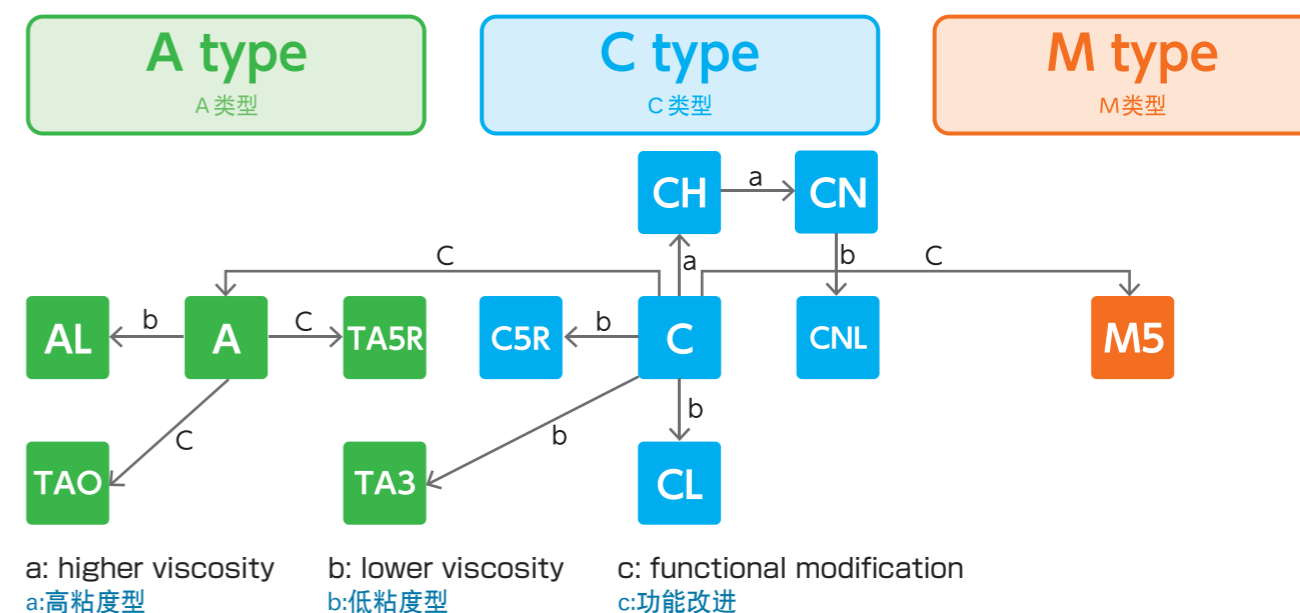
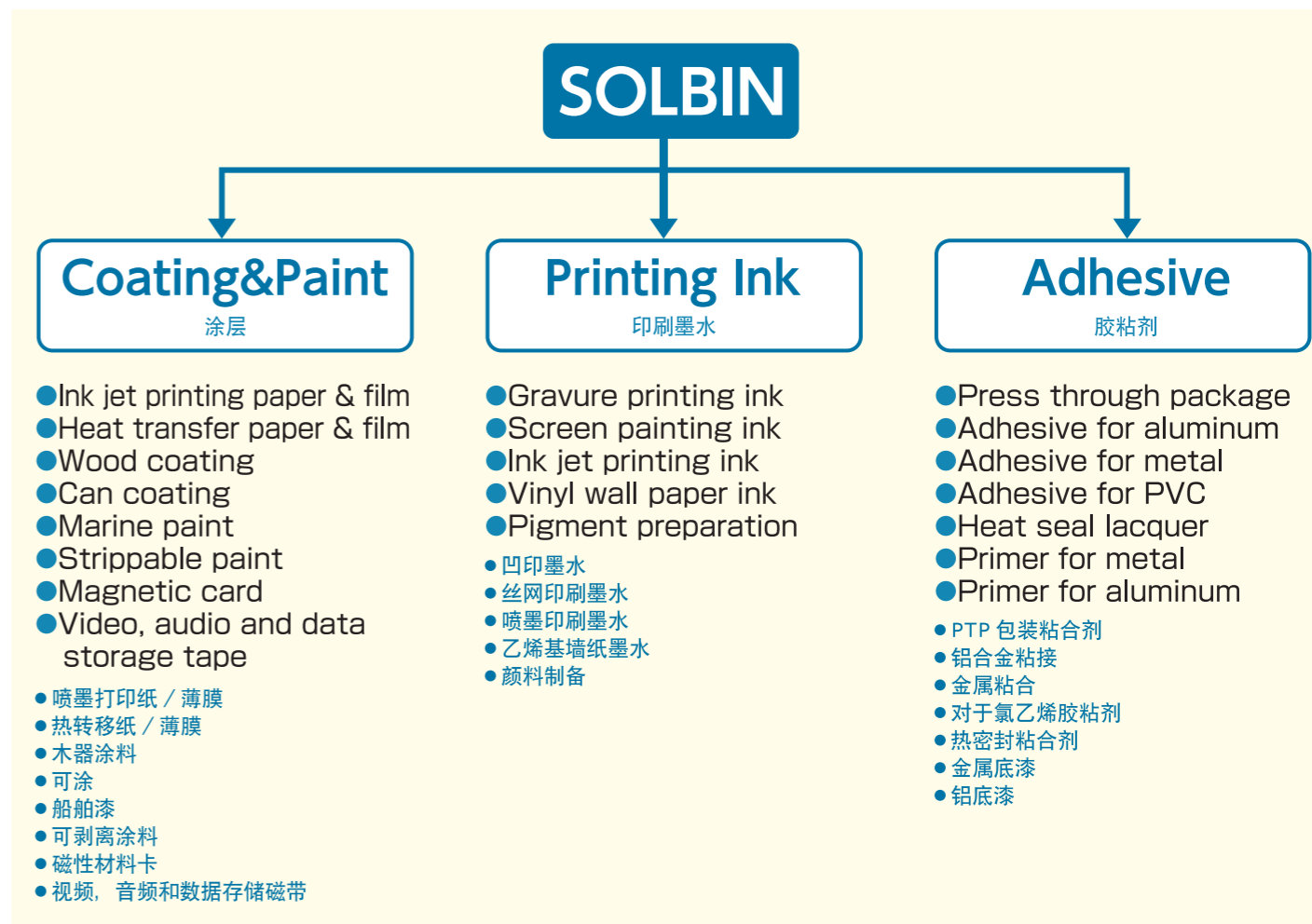
SOLBIN is a copolymer resin prepared from vinyl chloride and vinyl acetate in addition to other elements, and has the following characteristics:

SOLBIN是氯乙烯与醋酸乙烯酯等的共聚合树脂,具有以下特征:

- 1 It dissolves in organic solvents such as ketone and ester.  
遇酮、酯等有机溶剂溶解。
- 2 It forms an odorless, tasteless, and transparent film.  
无味、无臭,可形成透明涂膜。
- 3 It is highly resistant to chemicals such as acids, alkalis, and brine.  
对酸、碱、盐水,呈出色的抗耐性。
- 4 It forms a coating film highly resistant to water.  
尤其是能获得具有出色耐水性的涂膜。
- 5 Its coating films are fire-retardant and self-extinguishing.  
涂膜具难燃性,能自动阻燃。
- 6 Its coating films are thermoplastic and heat-sealable.  
涂膜具热可塑性,呈热密封性。
- 7 It is highly compatible with urethane and melamine resins.  
与聚氨酯树脂、密胺树脂有出色的相容性。
- 8 Products with hydrophilic groups favorably disperse inorganic pigments such as magnetic powder.  
含亲水基的产品能有效分散磁粉等无机颜料。
- 9 Products with hydroxyl groups react with isocyanate to form cross-links.  
含羟基的产品与异氰酸酯基发生反应,产生架桥。

## Product types

产品类型



●For coatings and adhesive processing uses

涂层·黏结加工用

Grade 产品型号	Composition (% by weight) 组成 (Wt%)			Degree of polymerization 聚合度	Average molecular weight Mnc ( $\times 10^4$ ) 分子量 <sup>(c)</sup> ( $\times 10^4$ )	Glass transition temperature (°C) T <sub>g</sub> (°C)	Viscosity (mPa·s) 粘度 (mPa·s)	K-value K值	Features 特征	Uses 用途
	VC 氯乙烯	VAc 醋酸乙烯酯	Other 其他							
C	87	13		420	3.1	70	150 <sup>(a)</sup>	48	Gas-tight and highly resistant to water 耐水性、高阻隔性 Highly resistant to chemicals 出色的抗耐性	<ul style="list-style-type: none"> <li>●Heat-seal 热密封</li> <li>●Internal beverage can coating 饮料罐内层涂层</li> <li>●Moisture-proof cellophane coating 防潮胶带涂层</li> </ul>
CL	86	14		300	2.5	70	60 <sup>(a)</sup>	41	Less viscous than grade C C的低粘度型 Highly soluble 溶解性良好	<ul style="list-style-type: none"> <li>●Rotogravure ink 照相凹版墨水</li> <li>●Silk screen ink 丝网印刷墨水</li> <li>●Top coating on galvanized color iron plate 彩钢板面漆</li> <li>●Adhesives 黏结剂</li> <li>●Processed pigments 加工颜料</li> <li>●Ink-jet ink 喷墨墨水</li> <li>●Heat transfer paper &amp; film 和热升华照片介质</li> <li>●Color master batch 颜料母料</li> </ul>
CH	86	14		650	3.8	73	700 <sup>(a)</sup>	55	More viscous than Grade C C的高粘度型 Highly transparent and resistant to heat and weather 耐热性、耐候性、透明性良好	<ul style="list-style-type: none"> <li>●Waterproofing agent for tents 帐篷防水剂</li> <li>●Strippable paint 可剥离性涂料</li> <li>●Rotogravure ink 照相凹版墨水</li> <li>●Adhesives 黏结剂</li> </ul>
CN	89	11		750	4.2	75	40 <sup>(b)</sup>	59	High viscosity, forms strong coating film 高粘度、涂膜强度大	<ul style="list-style-type: none"> <li>●Vinyl leather surface treatment 人造革表面处理</li> <li>●Rotogravure ink 照相凹版墨水</li> <li>●Strippable paint 可剥离性涂料</li> <li>●Adhesives 黏结剂</li> </ul>
CNL	90	10		200	1.2	76	30 <sup>(a)</sup>	35	Less viscous than grade CN, highly soluble CN的低粘度型 溶解性良好	<ul style="list-style-type: none"> <li>●Rotogravure ink 照相凹版墨水</li> <li>●Silk screen ink 丝网印刷墨水</li> <li>●Processed pigments 加工颜料</li> <li>●Ink-jet ink 喷墨墨水</li> </ul>
C5R	79	21		350	2.7	68	60 <sup>(a)</sup>	47	Highly soluble 溶解性良好	<ul style="list-style-type: none"> <li>●Nonwoven fabric binder 无纺布粘合剂</li> <li>●Adhesives 黏结剂</li> <li>●Ink-jet ink 喷墨墨水</li> <li>●Ink-jet printing paper &amp; film 喷墨介质</li> </ul>



●For painting and printing uses

涂料·墨水用

●For various adhesive uses

各种粘合剂

Grade 产品型号	Composition (% by weight) 组成 (Wt%)			Degree of polymerization 聚合度	Average molecular weight Mnc ( $\times 10^4$ ) 分子量 <sup>(c)</sup> ( $\times 10^4$ )	Glass transition temperature (°C) T <sub>g</sub> (°C)	Viscosity (mPa·s) 粘度 (mPa·s)	K-value K值	Features 特征	Uses 用途
	VC 氯乙烯	VAc 醋酸乙烯酯	Other 其他							
A	92	3	5 <sup>(f)</sup>	420	3	76	220 <sup>(a)</sup>	48	Compatible with urethane, alkyd, acrylic, malamine, and urea resins 与聚氨酯树脂、醇酸树脂、丙烯酸树脂、密胺树脂、尿素树脂的相容性良好	<ul style="list-style-type: none"> <li>●Rotogravure ink 照相凹版墨水</li> <li>●Heat-seal 热密封</li> <li>●Magnetic tape, magnetic card binder 磁带、磁卡粘合剂</li> <li>●Internal beverage can coating 饮料罐内层涂层</li> <li>●Galvanized color iron plate 彩钢板</li> <li>●Ship bottom paint 船底涂料</li> <li>●Processed pigments 加工颜料</li> <li>●Rotogravure ink 照相凹版墨水</li> <li>●Cap outer surface coat 护套表面涂层</li> <li>●Color master batch 颜料母料</li> </ul>
AL	93	2	5 <sup>(f)</sup>	300	2.2	76	70 <sup>(a)</sup>	41	Less viscous than grade A A的低粘度型	<ul style="list-style-type: none"> <li>●Environmentally friendly rotogravure ink 环保型照相凹版墨水</li> <li>●Floppy disk binder 磁盘粘合剂</li> </ul>
TA5R	88	1	11 <sup>(f)</sup>	300	2.8	78	130 <sup>(a)</sup>	41	Favorably disperses pigments and magnetic powders 对颜料、磁粉的分散性良好 Highly soluble in ethyl acetate 遇醋酸乙酯的溶解性良好	<ul style="list-style-type: none"> <li>●Wood paint, rotogravure ink 木工漆、照相凹版墨水</li> <li>●Magnetic tape, Magnetic card binder 磁带、磁卡粘合剂</li> <li>●Ink-jet ink 喷墨墨水</li> </ul>
TA3	83	4	13 <sup>(g)</sup>	350	2.4	65	80 <sup>(a)</sup>	45	Favorably disperses pigments and magnetic powders 对颜料、磁粉的分散性良好 More thermostable than Grade A A的热稳定性改良型 Low viscosity type 低粘度型	<ul style="list-style-type: none"> <li>●Press through package PTP包装粘合剂</li> <li>●Adhesive for aluminum 铝合金粘接</li> <li>●Adhesive for metal 金属粘接</li> <li>●Adhesive for PVC 对于氯乙烯胶粘剂</li> <li>●Heat seal lacquer 热密封粘合剂</li> <li>●Primer for metal 金属底漆</li> <li>●Primer for aluminum 铝底漆</li> </ul>
TAO	91	2	7 <sup>(f)</sup>	360	1.5	77	230 <sup>(a)</sup>	45	Favorably disperses pigments and magnetic powders 对颜料、磁粉的分散性良好	<ul style="list-style-type: none"> <li>●Magnetic tape, Magnetic card binder 磁带、磁卡粘合剂</li> <li>●Rotogravure ink 照相凹版墨水</li> </ul>
M5	85	14	1 <sup>(d)</sup>	420	3.2	70	130 <sup>(a)</sup>	48	Strongly adheres to metals, aluminum, and cellophane 黏结金属、铝、赛璐玢等的性能出色	<ul style="list-style-type: none"> <li>●Press through package PTP包装粘合剂</li> <li>●Adhesive for aluminum 铝合金粘接</li> <li>●Adhesive for metal 金属粘接</li> <li>●Adhesive for PVC 对于氯乙烯胶粘剂</li> <li>●Heat seal lacquer 热密封粘合剂</li> <li>●Primer for metal 金属底漆</li> <li>●Primer for aluminum 铝底漆</li> </ul>

Note: The values in the table are representative values, not standard values.  
a: Resin concentration; 20wt%, solvent; MIBK/toluene=1/1 / measured by Type B viscometer(25°C)  
b: Resin concentration; 10wt%, solvent; MIBK/toluene=1/1 / measured by Type B viscometer(25°C)  
c: Number-average molecular weight  
d: Dicarboxylic acid  
e: Acrylic acid  
f: Vinyl alcohol  
g: Hydroxyalkyl acrylate

(注) 上表中的数值仅是代表值,并非标准值。  
a: 树脂浓度;20wt%,溶剂;MIBK/甲苯=1/1 使用B型粘度计测量(25°C)  
b: 树脂浓度;10wt%,溶剂;MIBK/甲苯=1/1 使用B型粘度计测量(25°C)

c: 数均分子量  
d: 二羧酸  
e: 丙烯酸  
f: 乙烯醇  
g: 羟烷基丙烯酸化合物

### ① SOLBIN's representative powder properties

有代表性的SOLBIN粉末的特性

Item 项目	C	A	M5	Test method 实验方法
Particle size 粒度	100~120 $\mu$	100~120 $\mu$	100~120 $\mu$	Optical transmission particle size distribution meter 透光式粒度分布测量仪
Sieve test 筛分实验				JIS Standard sieve JIS标准筛
100 mesh pass 100目筛通过率	90%	60%	60%	100 mesh pass 149 $\mu$ * 100目筛分 149 $\mu$ *
200 mesh pass 200目筛通过率	10%	5%	10%	200 mesh pass 74 $\mu$ * 200目筛分 74 $\mu$ *
Specific gravity 真比重	1.4	1.4	1.4	
Bulk specific gravity 假比重	0.8	0.7	0.7	JIS K-6721
Repose angle 安息角	23~25°	25~28°	40~50°	
Electrification 带电性	Maximum:+1500V 最高 +1500V After 10 seconds:+400V 10秒后 +400V After 1 minute:0 1分后 0	Minimum:-1500V 最低 -1500V After 30 seconds:-1100V 30秒后 -1100V After 1 minute:-250V 1分后 -250V		STATIRON M static electricity meter(20°Cx60%RH) STATIRON M 静电测量仪(20°C x 60%RH)  *JIS Standard sieve ※JIS标准筛

### ② SOLBIN's representative film properties

有代表性的SOLBIN薄膜的特性

#### ◆ Physical properties 物理特性

Item 项目	C	A	M5	Test method 实验方法
Moisture permeability of film(g/m <sup>2</sup> -day) 薄膜的透湿性	Approx.170 约170	Approx.130 约130	Approx.180 约180	JIS Z-0208 40±0.1°C 90±2%RH 0.02-0.03mm thickness 0.02-0.03mm厚
Physical properties 物理性质				
Elongation(%) 伸长率	1~2	1~2	2~3	23±1°C 80±2%RH
Tensile strength (kg/mm <sup>2</sup> ) 抗张力	4~6	4~6	4~5	
Young's modulus (dyne/cm <sup>2</sup> ) 杨式模量	2~3×1010	2~3×1010	2~3×1010	

#### ◆ Chemical resistance 抗耐性

Test item 实验项目	Chemicals 液体种类	Immersion time 浸渍时间	C	A	M5
Acid resistance 耐酸性	10% HNO <sub>3</sub>	144 hours 144小时	Excellent 优	Excellent 优	Excellent 优
Alkali resistance 耐碱性	10% NaOH	144 hours 144小时	Excellent 优	Excellent 优	Excellent 优
Water resistance 耐水性	Pure water 纯水	144 hours 144小时	Excellent 优	Excellent 优	Excellent 优
Salt water resistance 耐盐水性	5% salt water 5% 食盐水	144 hours 144小时	Excellent 优	Excellent 优	Excellent 优
Alcohol resistance 耐酒精性	60% ethyl alcohol 60% 乙醇水	18 hours 18小时	Excellent 优	Excellent 优	Excellent 优
Hot water resistance 耐热水性	Pure water 77°C 纯水 77°C	45 minutes 45分	Excellent 优	Slightly whitened 微白	Slightly whitened 微白

### ③ Organic solvents used in SOLBIN

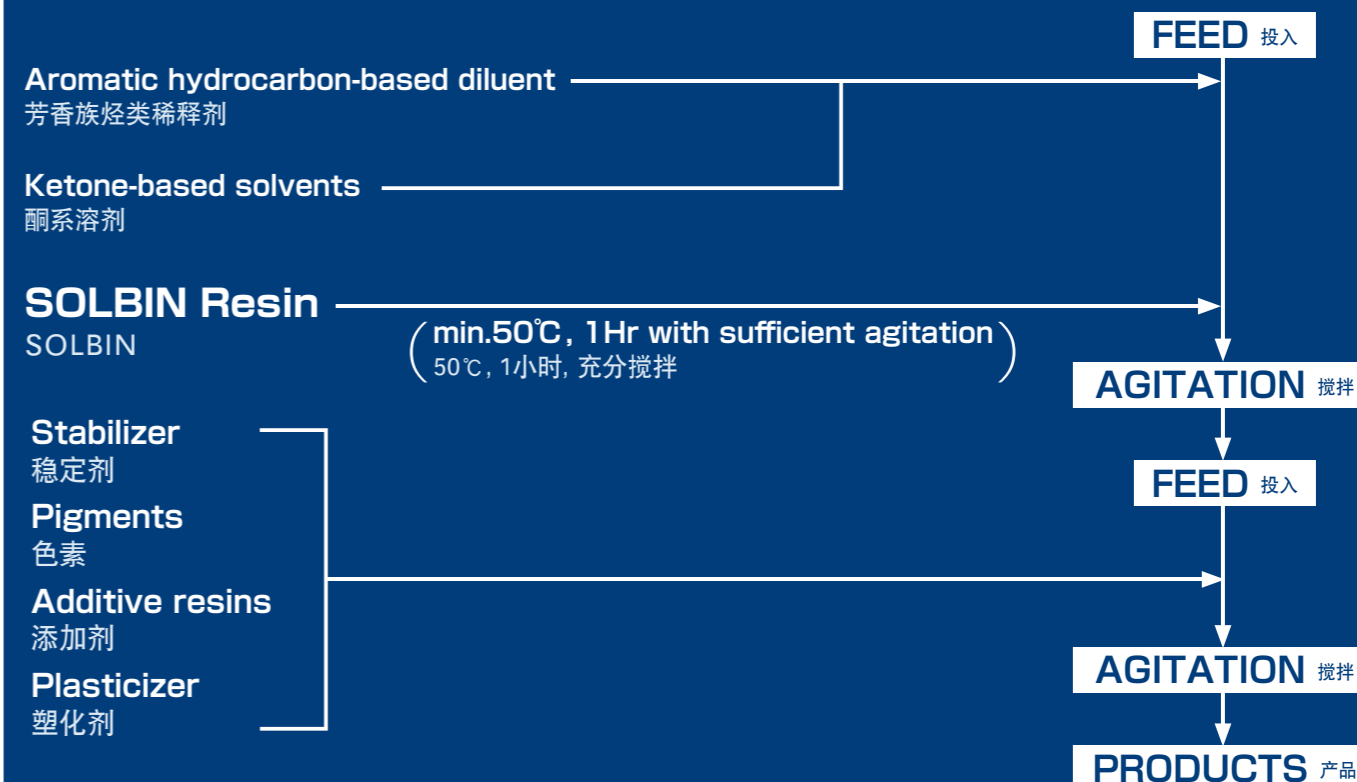
用于SOLBIN的有机溶剂

Solvent 溶剂	Temperature 温度	25°C	50°C	Solvent 溶剂	Temperature 温度	25°C	50°C
Methanol 甲醇		×	×	Cellosolve 乙二醇		△	△
IPA IPA		×	×	Acetone 丙酮		○	○
n-Butanol n-丁醇		×	×	MEK MEK		○	○
Methyl acetate 醋酸甲基		×	○	MIBK MIBK		○	○
Ethyl acetate 醋酸乙烷基		△	○	Isophorone 异佛尔酮		○	○
Butyl acetate 醋酸丁酯		△	○	Cyclohexanone 环己酮		○	○
DIDP DIDP		△	△	Ethylene chloride 二氯乙烷		○	○
DINP DINP		△	△	Toluene 甲苯		×	×
Tetrahydrofuran 四氢呋喃		○	○	Solvesso #150 四甲苯(Solvesso) #150		×	△
Dioxane 二恶烷		○	○	Aliphatic carbide 脂肪族碳化物		×	×

○:Soluble 溶解    △:Swells or partially insoluble 膨润或者部分不溶解    ×:Insoluble 不溶解

### How to use SOLBIN

如何使用SOLBIN

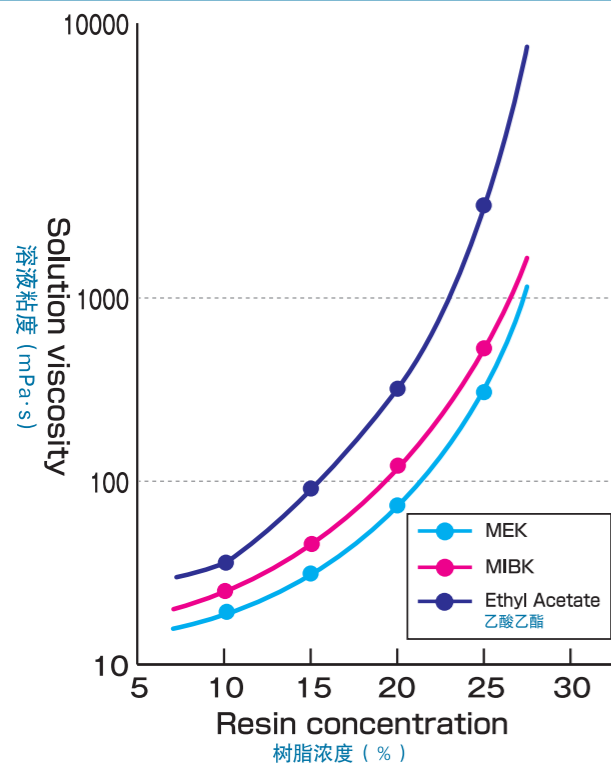


#### 4 Solution viscosity of SOLBIN (25°C)

SOLBIN的溶液粘度 (25°C)

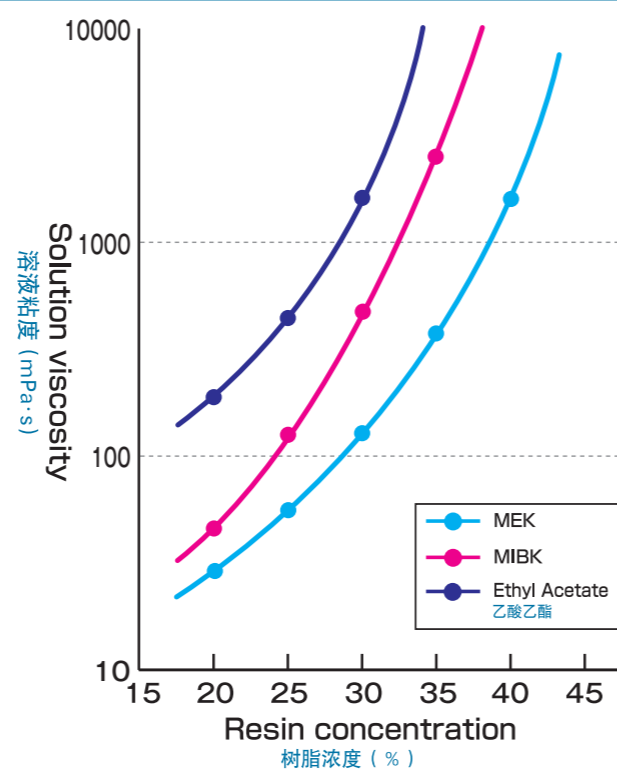
##### Viscosity of SOLBIN C solutions in various solvents

SOLBIN C的各种溶剂溶液粘度



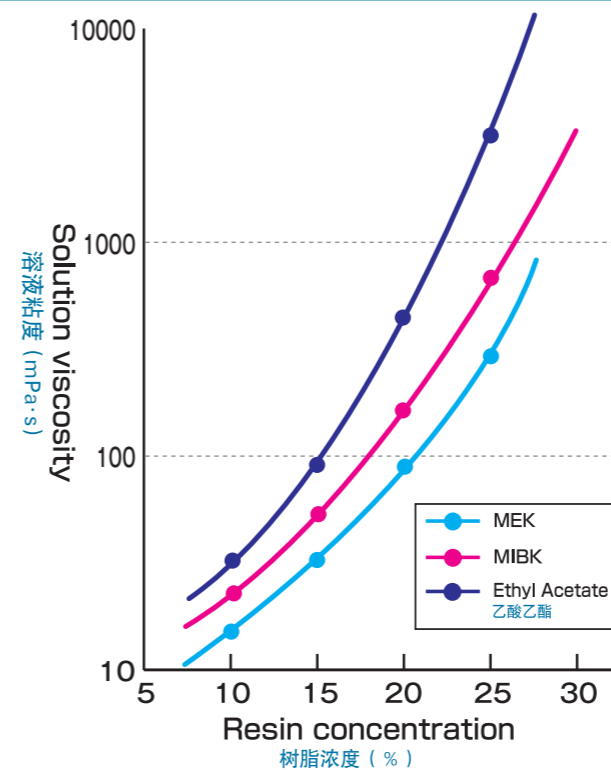
##### Viscosity of SOLBIN CL solutions in various solvents

SOLBIN CL的各种溶剂溶液粘度



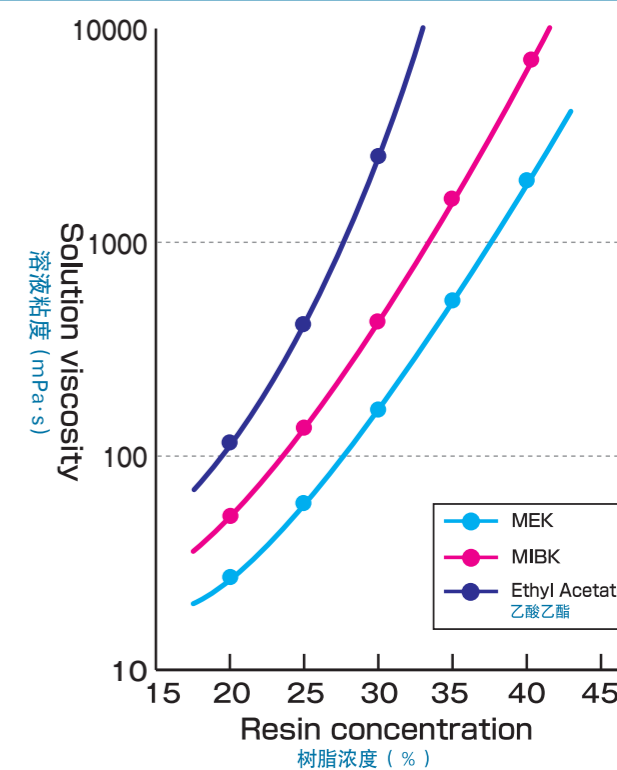
##### Viscosity of SOLBIN A solutions in various solvents

SOLBIN A的各种溶剂溶液粘度



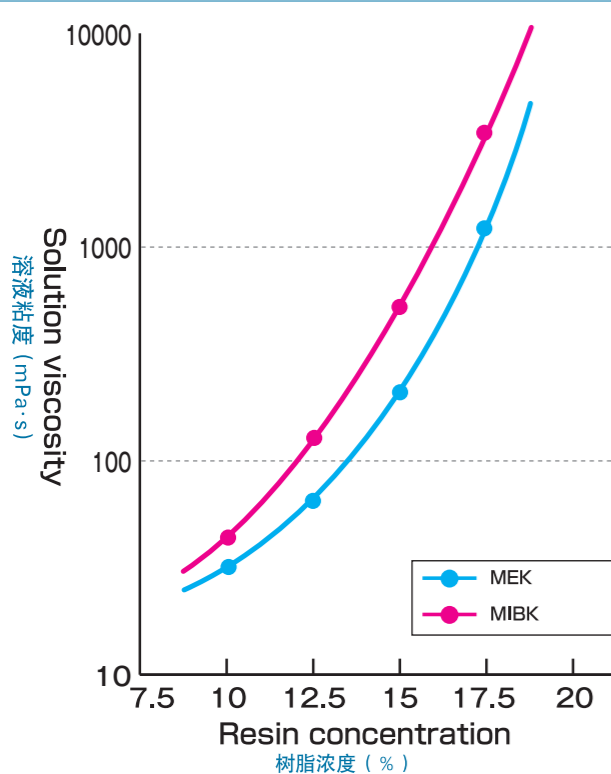
##### Viscosity of SOLBIN AL solutions in various solvents

SOLBIN AL的各种溶剂溶液粘度



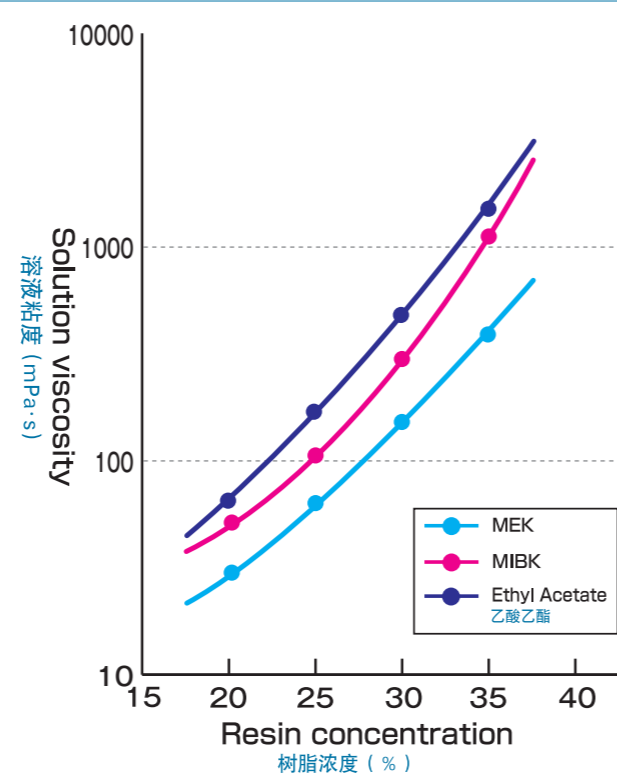
##### Viscosity of SOLBIN CN solutions in various solvents

SOLBIN CN的各种溶剂溶液粘度



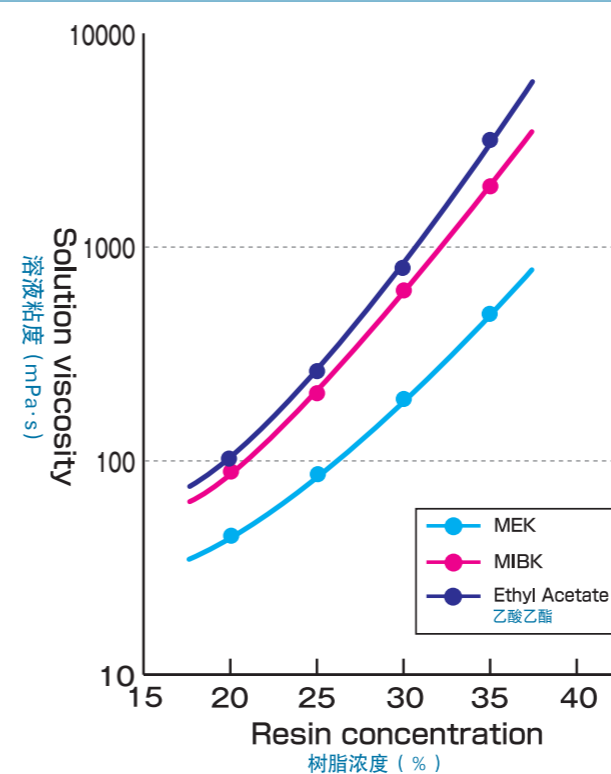
##### Viscosity of SOLBIN C5R solutions in various solvents

SOLBIN C5R的各种溶剂溶液粘度



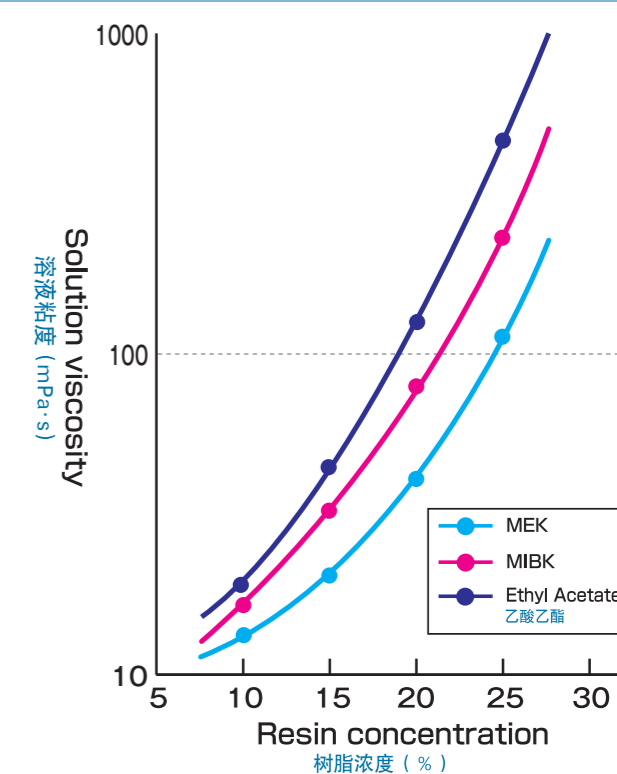
##### Viscosity of SOLBIN TA5R solutions in various solvents

SOLBIN TA5R的各种溶剂溶液粘度



##### Viscosity of SOLBIN M5 solutions in various solvents

SOLBIN M5的各种溶剂溶液粘度



## 5 Compatibility of representative SOLBIN with other resins

具有代表性的SOLBIN与其他树脂的相容性

Resin 树脂名	Trade name 商品名	SOLBIN A/Other resin SOLBIN A/其他树脂				SOLBIN C or M5/ Other resin SOLBIN C or M5/其他树脂				
		9/1	4/1	1/1	1/4	9/1	4/1	1/1	1/4	
Alkyd 醇酸树脂	Beckosol*1	1307-60-EL	○	○	○	○	○	○	○	×
		1334-EL	○	○	○	○	○	○	×	×
		1323-60-EL	○	○	○	○	○	○	×	×
Styrenate alkyd 苯乙烯改性醇酸树脂	Styrensol*1	4250	△	△	×	×	△	△	×	×
		4400	○	○	×	×	△	×	×	×
Melamine 三聚氰胺树脂	Beckamine*1	J-138	○	○	○	○	△	×	×	×
		TD-126	○	○	○	×	○	○	△	×
	Super Beckamine*1	J-820	○	○	○	○	△	△	×	×
		G-821	○	○	○	○	○	○	△	×
Epoxy 环氧树脂	Epicoat*2	828	○	○	○	○	○	○	○	○
		1001	○	○	△	×	○	○	×	×
Urethane 聚氨酯树脂	Nippotane*3	2300 series	○	○	○	○	○	○	○	○
		3000 series	○	○	○	○	○	○	○	○
	Coronate L*3	○	○	○	-	○	○	○	-	

O: Transparent coating  
涂膜透明  
△: Slightly clouded coating film  
涂膜上有些模糊不清  
×: Whitish or knurled coating film  
涂膜白浊或有颗粒突起

\*1: DIC Corporation. \*2: Japan Epoxy Resins Co., Ltd. \*3: Nippon Polyurethane Industry Co., Ltd.

## 6 Representative stabilizers used in SOLBIN

用于SOLBIN的具有代表性的稳定剂

Base 类别	Trade name 品名
Tin 锡系	TVS 8831*1, TVS 8813*1, TVS 8102*1, TVS Tin. Lau*1, TVS 86-SP*1, Adekastab 1292*2 Adekastab 465E*2, Adekastab 466*2, TS 300*3, KS 6C 6*4, KS 2000A*4, KS-1260*4
Epoxy 环氧树脂系	Epolite 100MF*5, Epicoat #828*6, Epicoat #834*6, Adekasizer O-130P*2

\*1: Nitto Kasei Co., Ltd. \*2: ADEKA CORPORATION. \*3: Akishima Chemical Industries Co., Ltd. \*4: Kyodo Chemical Co., Ltd.

\*5: Kyoisha Chemical Co., Ltd. \*6: Japan Epoxy Resins Co., Ltd.

## U.S. Food and Drug Administration (FDA) 21 CFR Food and Drugs

SOLBIN Products: C, CL, CH, CN, CNL, C5R, M5, A, AL, and TA5R conform to the FDA regulations in Parts 175—177. However, the final article/product that is produced using these SOLBIN products must meet the following requirement.

Note: Part 174.5. General provisions applicable to Indirect Food Additives.

According to the FDA, the following Federal Register rule applies to the use of these SOLBIN products for Indirect Food Additives articles/products identified in 21 CFR Parts 175—177.

Federal Register, Vol. 51, No. 22, February 3, 1986 (Proposed Rules). Pages 4185—4188. This rule limits Vinyl Chloride residual in the final Indirect Food Additive article/product.

Part	Use
175	INDIRECT FOOD ADDITIVES : ADHESIVES AND COMPONENTS OF COATING
§ 175.105	Adhesives.
§ 175.300	Resinous and polymeric coatings.
§ 175.320	Resinous and polymeric coatings for polyolefin films.
176	INDIRECT FOOD ADDITIVES : PAPER AND PAPERBOARD COMPONENTS
§ 176.170	Components of paper and paperboard in contact with aqueous and fatty foods.
§ 176.180	Components of paper and paperboard in contact with dry food.
177	INDIRECT FOOD ADDITIVES : POLYMERS.
§ 177.1210	Closures with sealing gaskets for food containers.

Since government regulations are subject to revision, it is the user's responsibility to refer to the Code of Federal Regulations or the Federal Register to determine current regulatory status.

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