Nissin Chemical Industry Co., Ltd.

ShinEtsu Group

SOLBIN® CLL TECHNICAL DATA SHEET

Product description

Solbin CLL is a copolymer of vinyl chloride (VC) and vinyl acetate (VAc).
Due to its lower molecular weight than Solbin C & CL, it provides lower solution viscosity.

Product characteristics

- Soluble in ketones, esters and chlorinated hydrocarbons. Use aromatic hydrocarbons as diluent solvents. Insoluble in alcohol, oil and aliphatic hydrocarbons.
- Superior filter penetration with its excellent solubility, even better than "SOLBIN CL".
- Chemically stable and is unaffected by acids and alkalis at normal temperature.
- It combines high water resistance with low moisture permeability and low water absorption.
- Tough, resilient and non-flammable.
- It possesses an excellent ability to resist the effects of weather and aging.
- Solbin CLL is colorless and transparent with a high refraction index, it can be changed into any bright color and produces a highly glossy film.
- As a thermoplastic, films made with Solbin CLL can be easily heat sealed.

General properties

Attributes	Test Results
Appearance	White powder
Grain Size	Passes wholly through 28 mesh sieve
Bulk Density (g/cc)	~ 0.6
Composition (weight %)	
VC	84.0 ± 1.5
VAc	16.0 ± 1.5
Degree of Polymerization	260 ± 30
Molecular Weight Mn	Ca. 1.9 X 10^4
Glass Transition Temp.	70°C
Solution Viscosity (mPa·s)	35 ± 20
Solution Appearance	Colorless, Transparent

Solubility

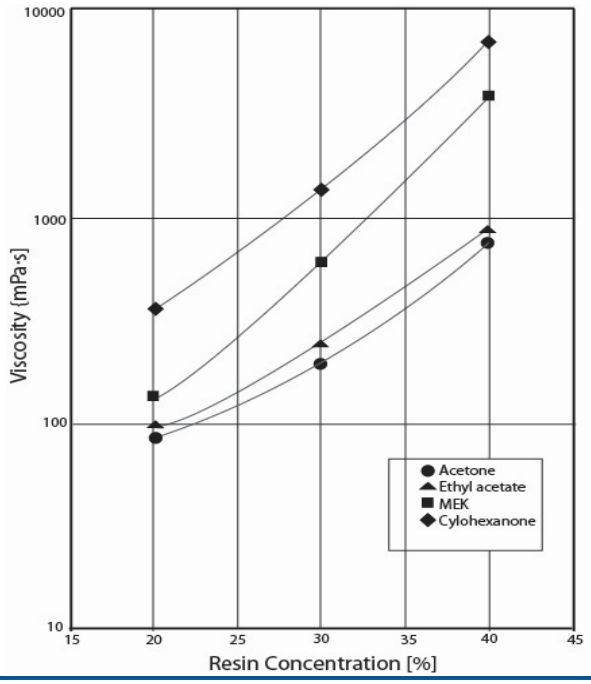
Solbin CLL is highly soluble in organic solvents such as ketones, esters and chlorinated hydrocarbons.

Solubility of Solbin CLL solutions with various Solvents.

Solvent	25°C	50°C	Solvent	25°C	50°C
Tetrahydrofuran	S	S	Methanol	I	I
Acetone	S	S	Isopropanol	I	I
MEK	S	S	n-Butanol	I	I
MIBK	S	S	Ethylene glycol	I	I
Cyclohexanone	S	S	Methyl acetate	I	SC
Ethylene dichloride	S	S	Ethyl acetate	I	S
Aromatic hydrocarbon	SW	SW	Butyl acetate	I	S
Toluene	SW	SW	DBP	S	S
Xylene	SW	SW	Dioxane	S	S
Aliphatic hydrocarbon	I	I	Isophorone	S	S

Notes: S... Soluble, PS...Partially soluble, SC... Soluble but turns cloudy; SW...Swells, I...Insoluble

Viscosity of Solbin CLL solutions with various solvents (@25°C)



SOLBIN CLL

Compatibility with Modifying resins			SOLBIN CLL/ Other			
			9/1	4/1	1/1	1/4
Alkyd	Beckosol*1	1307-60-EL	O	O	O	X
		1334-EL	O	O	X	X
		1323-60-EL	O	O	X	X
Styrene -Alkyd	Styresol*1	4250	Δ	Δ	X	X
		4400	Δ	X	X	X
Melamine	Beckamine*1 Superbeckamine*1	J-138	X	X	X	X
		TD-126	O	O	Δ	X
		J-820	Δ	Δ	X	X
		G-821	O	O	Δ	X
Epoxy	Epikote*2	828	O	O	O	O
		1001	O	O	Δ	X
Urethane	Nippolan*3	2300 series	O	O	O	O
		3000 series	O	O	O	O
	Coronate*3	L	O	O	O	

Coating/film Notes: O-Transparent ; Δ - Slightly clouded; X– Whitish or knurled. *1—DIC Crop.; *2—Japan Epoxy Resins Co. Ltd.; *3 Nippon Polyurethane Industry Co., Ltd.

Applications

- SOLBIN CLL has excellent solubility and filtration properties making it the ideal choice for inkjet ink.
- Solbin CLL can be used in place of both SOLBIN C and CL:
  - Metal Protective Paints
  - Metal Container Paints – anti-corrosive properties
  - Paper and Textile Coating - waterproof protection, gloss for a better decorative effect.
  - Cellophane coating—damp-proof film readily heat sealed ideal for coating cellophane.
  - Concrete and Plaster Paints— Waterproof properties
  - Adhesives—PVC
  - Plastic coatings—Adds gloss to coating

How to Use

- To ensure Solbin CLL quickly goes into solution it is recommended to disperse it into a weaker solvent such as toluene and xylene then blend with the stronger solvent.
- Solbin CLL is usually dissolved in a combination of both ketone (e.g. MEK and MIBK) and aromatic hydrocarbon (e.g. toluene and xylene) solvents in equal proportions, to produce a solution of 15% - 20% concentration by weight. For coatings on a porous substance, (paper or cloth), faster drying solvents such as MEK and acetone are recommended.
- For Spray coating, MIBK is used. For baking on metals, ketone with a high boiling point such cyclohexanone is used. For roll coatings, cyclohexanone or isophorone are sometimes used. Heating to around 50°C and sufficient agitation are required to speed up dissolving.
- In order to provide proper flexibility, resilience and adhesiveness to film, 5-10 PHR of plasticizer are added. Plasticizers used for blending polyvinyl chloride resins are all applicable.
- Stabilizers against heat and light are used, as with conventional polyvinyl chloride resins. The addition of about 0.2% propylene oxide, in this case, can prevent the corrosion of containers and change in paints in storage.
- Any method of coating, including spraying, roll coating and others, may be used. For roll coating, a solution of 200-400 seconds in Ford Cup No.4 viscosity should be used. For Spray applications a solution of 60-80 seconds Ford Cup No.4 viscosity should be used at an air pressure of 98-100psi and a liquid pressure of 20-30psi.
- Solbin CLL does not usually provide satisfactory adhesion through air drying alone. The following chart provides the degree of adhesion to various surfaces by air drying:

Excellent	Polyvinyl chloride resin, Acryl resin
Good	Concrete, Plaster
Fair	Chlorinated rubber
Inferior	Metal, Wood, Paper, Cloth, Phenol resin, Alkyd resin, Butyral resin, Celluloid, Shellac, Dried waterborne or oil paints

- Short-time baking at 170-190°C will significantly improve adhesion and surface gloss. When primers are used, sufficient adhesion may be obtained without baking.

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Caution

- Follow the precautions in the material safety data sheet and technical references.
- SOLBIN is for industrial use only.
- The data in the this document does not include all specifications. Purchasers must conduct tests of their own before putting the product to practical use to verify its compliance, with their intentions for its employment.
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