
Polyurethane Solutions, Suitable for Manufacturing Synthetic Leather,
Surface Finishing of Poromeric Leather and PVC Leather and Fabric Coating

Polyurethane Solutions for Dry-Process Leather and Fabric Coating

Preface

We offer a wide range of polyurethane solutions for dry-process leather and fabric coating. The appropriate polyurethane solutions for the dry process can be selected according to production methods and applications, such as synthetic leather manufacturing, surface finishing of poromeric leather, natural split leather and PVC leather, and fabric coating typically used for waterproof moisture-permeable fabric and other waterproof fabric.

We also offer polyurethane solutions that produce a microporous layer and an impregnated layer for wet-process leather and fabric coating.

Typical Properties

Tables 1 to 2 show the typical properties of the following SANPRENE products. The values are representative.

Table 1. Typical Properties of Polyurethane Solutions and Solvents

Product Name	Typical Properties				Solvents **
	Appearance (20 ± 5 °C)	Viscosity mPa·s (20 °C)	Residue on Evaporation wt %	Flash Point °C *	
One-component, semi-non yellowing type					
SANPRENE LQ-695	Pale yellow liquid	90,000	30	5	DMF, TOL
SANPRENE LQ-306	Pale yellow liquid	40,000	30	5	DMF, TOL
One-component, non yellowing type					
SANPRENE LQ-3510	Pale yellow liquid	40,000	30	4	TOL, IPA

* Measured using closed cup method

** DMF: dimethylformamide, TOL: toluene, IPA: isopropanol

Table 2. Physical Properties of Dry Film, and Features

Product Name	Physical Properties of Dry Film **					Features
	100% Modulus MPa	Tensile Strength MPa	Elon- gation %	Softening Point °C	Yellow- ing ***	
One-component, semi-non yellowing type						
SANPRENE LQ-695	5.5	75	650	220	4 – 5	Water moisture Permeability Heat resistance
SANPRENE LQ-306	5.8	64	670	210	4 – 5	Water moisture permeability, Heat resistance
One-component, non yellowing type						
SANPRENE LQ-3510	10.4	54	510	170	5	Rapid drying

** According to JIS K 6251, the film with a thickness of approx. 200 µm and a dumbbell No.3 type die, was measured at 20 °C.

*** Irradiated under ultraviolet rays for 50 hours in a fade meter(temperature of the black panel is 63 ± 3 °C). The degree of yellowing was evaluated using grey scale to assess change in color. A value of 5 is the highest resistance to yellowing. The higher the value, the better the yellowing resistance.

Application Methods

1. Product Selection

Product names, processes, coating methods, and end uses of polyurethane resin solutions for dry processes are shown below.

Table 3. Product Selection

Product Name	Process	Coating Methods	End Uses
SANPRENE LQ-695	Fabric coating	Direct, Transfer	Waterproof moisture-permeable clothes
SANPRENE LQ-306	Fabric coating	Direct, Transfer	Waterproof moisture-permeable clothes
SANPRENE LQ-3510	Surface layer of synthetic leather, Surface layer of poromeric leather	Transfer, Gravure	Bags
	Surface layer of natural split leather	Spray	Bags
	Surface layer of PVC leather	Transfer, Gravure	Miscellaneous goods

2. Coating Methods and Example Formulas of Coating Solutions

A. Direct Coating Method

- This is a process typically used to produce waterproof moisture-permeable fabrics, and other waterproof fabrics.
- Using a doctor blade, a comma coater or other coating machines, the method is direct coating fabrics (e.g., nylon taffeta and polyester taffeta) with the coating solution.
- A schematic view of the direct coating method and example formulas are shown below.

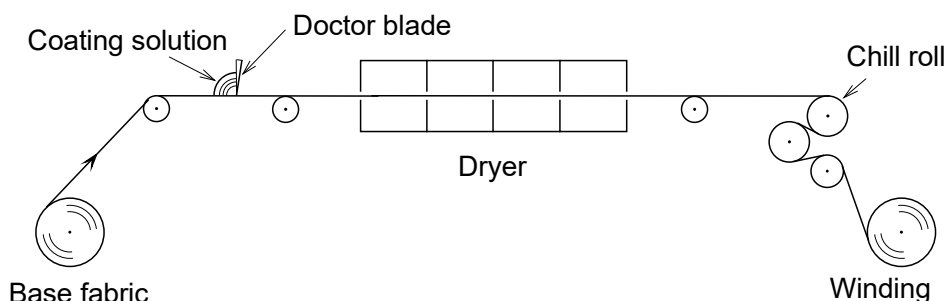


Figure 1. Schematic View of Direct Coating Method

Table 4. Example Formulas of Coating Solution Used for Direct Coating Method

Product Name	Formula (weight ratio)
SANPRENE LQ-306	100
Methyl ethyl ketone	0 - 10
Amount of coating g/m ² (wet)	40 - 120

B. Transfer Coating Method

- This is a process typically used to produce synthetic leather and to form a surface layer on natural split leather.
- Using a doctor blade, a comma coater or other coating machines, this method is to coat releasing paper with surface layer working solution, and to dry it to form a surface layer (film). Similarly, the surface layer is coated with adhesive-layer working solution. Finally, the layers are transferred and adhered to a substrate (such as a woven fabric, knitted fabric, gigger fabric, nonwoven fabric, and their resin-impregnated fabrics, as well as natural split leather).
- There are three variations of the transfer coating method. These are: wet lamination that sticks the layers to the substrate immediately after coating with an adhesive; semi-dry lamination that dries the adhesive somewhat before sticking; and dry lamination that dries the adhesive almost completely before sticking. The kind of lamination is selected according to the conditions including the substrate type, leather performance, and the production facility.
- Swelling may occur on the surface layer (that is, surface roughness may occur because solvent in the adhesive layer mixture causes resin in the surface layer to swell and peel off the releasing paper, and the grain is not transferred adequately). In such cases, replace several percent of the solvent in the adhesive-layer coating solution formula, with dimethylformamide, in order to adjust the swelling of the surface layer resin.
- A schematic view of the transfer coating method and example formulas of the surface layer for coating solutions are shown below.

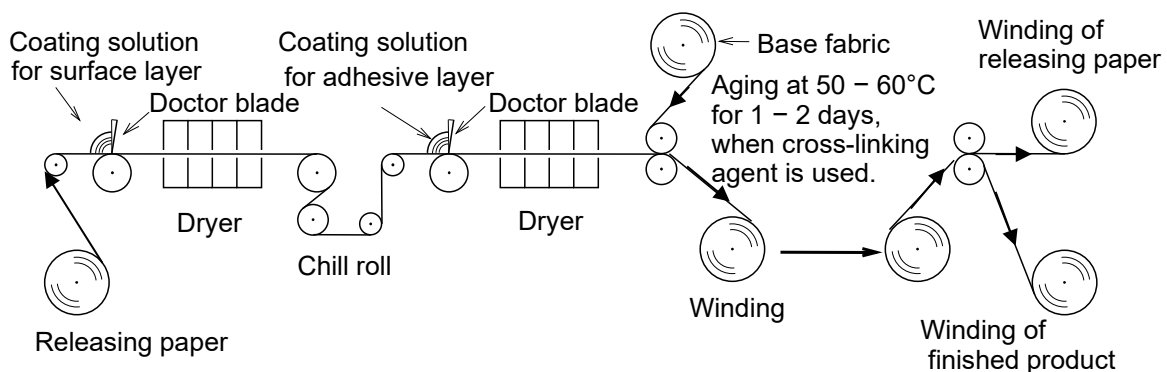


Figure 2. Schematic View of Transfer Coating Method

Table 5. Example Formulas of Surface Layer Coating Solution Used for Transfer Coating Method

Product Name	Formula (weight ratio)
SANPRENE LQ-695	100
Toluene	50
Toner	5 - 10
Amount of coating g/m ² (wet)	50- 150

C. Gravure Coating Method

- This is a process typically used for surface finishing of poromeric leather and PVC leather.
- Using a gravure roll coater, this method directly coats poromeric leather and PVC leather. In order to provide texture on the leather surface, or to make the leather permeable to vapor, coating is generally repeated a few times.
- A schematic view of the gravure coating method and example formulas are shown below.

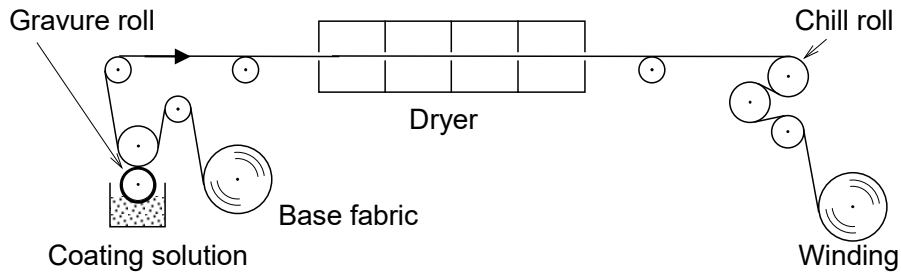


Figure 3. Schematic View of Gravure Coating Method

Table 6. Example Formulas of Coating Solution Used for Gravure Coating Method

Product Name	Formula (weight ratio)
SANPRENE LQ-3510	100
Methyl ethyl ketone	130 – 180
Coated materials	Middle layer of PVC leather

D. Spray Coating Method

- This is a process typically used for surface finishing of poromeric leather and natural split leather.
- Using a spray coater, this method is direct coats poromeric leather and natural split leather.
- A schematic view of the spray coating method and example formulas are shown below.

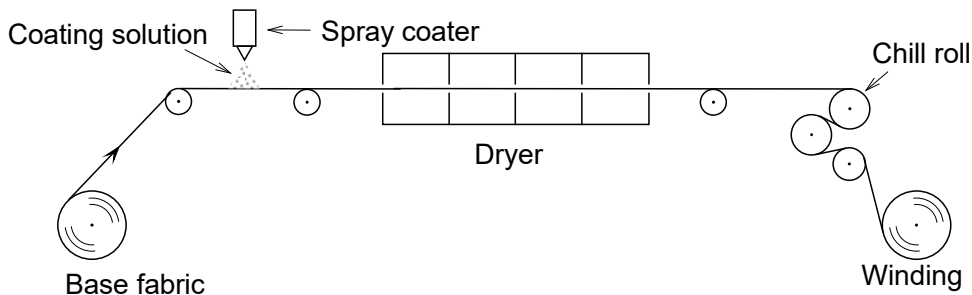


Figure 4. Schematic View of Spray Coating Method

Table 7. Example Formulas of Coating Solution Used for Spray Coating Method

Product Name	Formula (weight ratio)
SANPRENE LQ-3510	100
Dimethylformamide	35 – 45
Toluene	175 – 225
Isopropanol	140 – 180
Toner	0 – 2

Precautions Against Mishandling

- When other agents are used with these products listed in this brochure, test their compatibility beforehand to ensure that there are no problems.
- Before use, completely dry the working solution preparation bath, the coating machine, and other plant units. If moisture remains, part of the polyurethane resins in the working solution coagulate and precipitate, resulting in formation of a film with inferior surface lubricity and tactile properties.

Important :

Before handling these products, refer to the Safety Data Sheet for recommended protective equipment, and detailed precautionary and hazards information.

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