vestolit

# Artificial Leather

An easy-care and cost-effective alternative

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Polymer Solutions

# Content



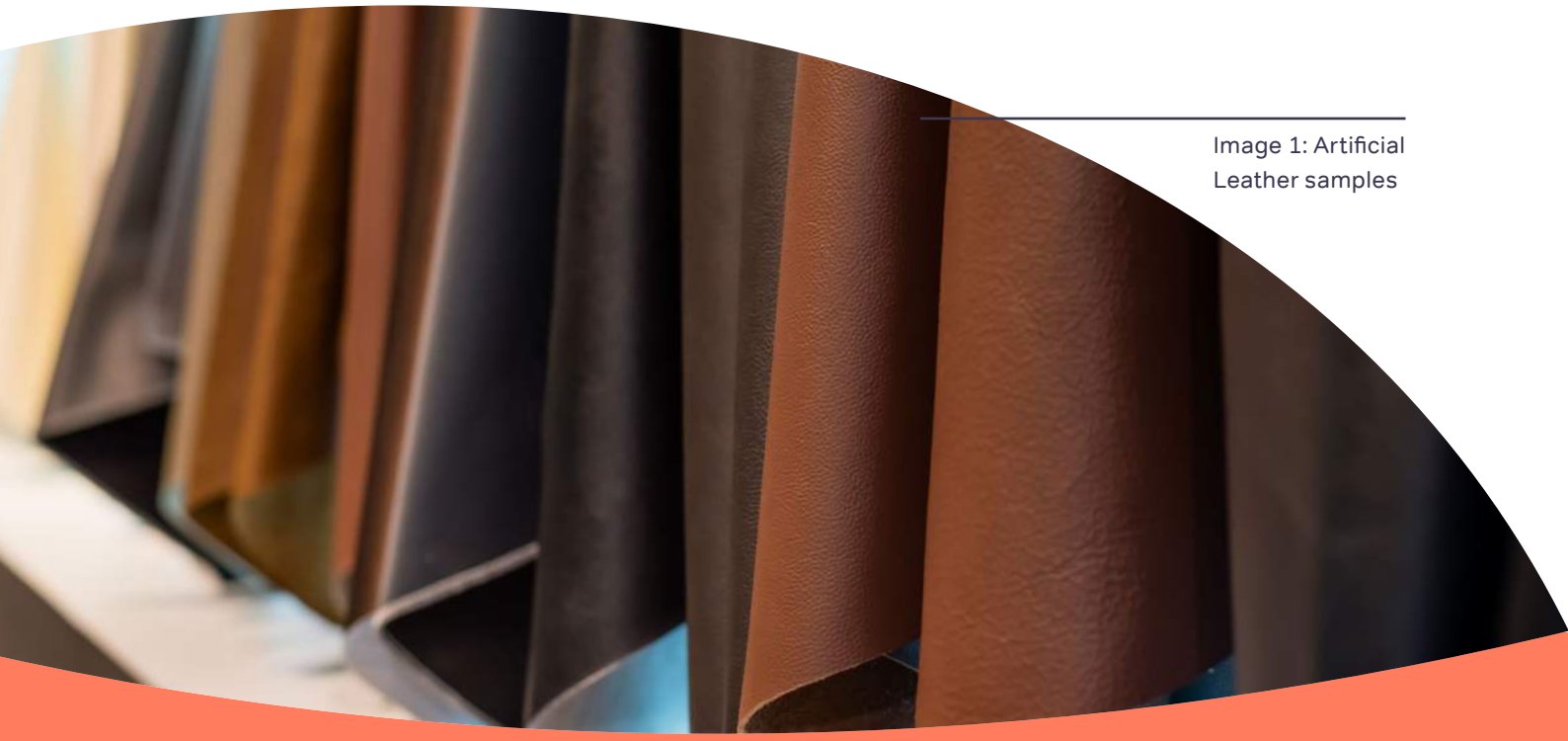

Image 1: Artificial Leather samples

# Artificial Leather

**PVC synthetic leather is an easy-care and cost-effective alternative to leather of animal origin. The products are durable and can be designed according to almost any pattern.**

PVC resins play a critical role as the principle binder in the manufacture of Artificial Leather. Depending on the targeted end use, different types of PVC resins are carefully synthesized so that, when mixed with the appropriate choice of plasticisers, Stabilisers, pigments, fillers, and additives, they can provide the desired strength, flexibility and durability to the Artificial Leather. The choice of the fabric to be coated also contributes to the overall performance of the formulated Artificial Leather.

Image 2: Jacket

# Manufacturing

The general production process of Artificial Leather is quite detailed and can be broken down into the following steps:

1. Preparing the plastisol (polymer dispersion) – in a mixing vessel, the required amounts of plasticisers and Stabilisers are premixed, followed by the sifting of PVC resin into the liquid under agitation (typically a high shear mixer type). The mixer speed is increased until the desired uniform dispersion of the PVC resin is achieved. This is followed by addition of fillers, coloring agents and other additives to complete the basic “recipe”.

2. First coating layer – The plastisol is then poured into a release paper, often with a built-in leather-like pattern that can get transferred to the coating interface. This coated paper goes through heated rollers where the plastisol is cured to a uniform film with a coating thickness of about 0.1 mm.

3. Second coating layer – Following the first coat, a second thicker layer is applied on the first layer. The plastisol is specifically formulated with blowing agents, goes through a curing oven, where the blowing agents cause the coating to foam and rise to about 1 mm.

4. Backing fabric gluing, removing the release paper – After cooling down, the foamed layer is applied with glue and then the back fabric (often cotton or polyester) is fed to be pressed on to the plastisol layer. This glued fabric goes through another baking oven, allowing the glue to form a very strong bond with the plastisol. At the end of this step, the release paper is peeled off to reveal the top surface of the coated fabric.

5. Optional protection layer – Manufacturers may optionally apply an additional coating layer for improved weatherability, gloss or texture, or a combination of these attributes.

Image 3: Artificial Leather color variations

This coating process is essentially the same for any of the three sub-segments listed below – namely, Apparel, Furniture and Transportation. The overall performance expectations often dictate the type and thickness of the fabric to be coated, the coating formulation, coating thickness, and the surface finish.

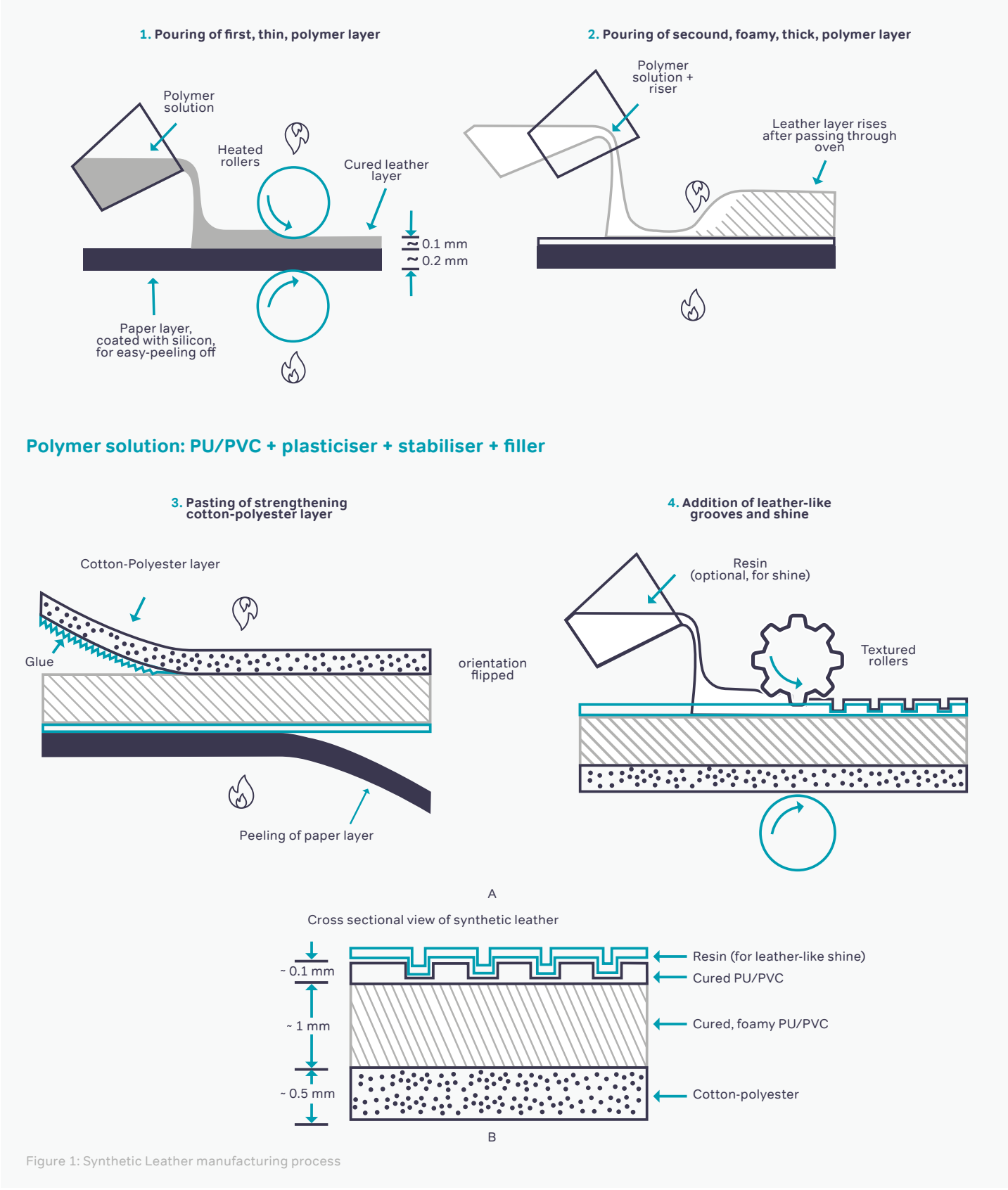


Figure 1: Synthetic Leather manufacturing process

Image 4: Further processing in the apparel industry

# Apparel

PVC is often used in Apparel industry for jackets, handbags and shoes. It is versatile, sustainable and more cost-efficient than traditional leather.

The synthetic leather fabric market for Apparel is largely dominated by either PVC based on polyurethane (PU) based fabrics. Regardless of the resin type, the basic process of fabric making is the same as described above. Both chemistries are specifically formulated to achieve a desired fabric feel, flexibility and texture. A central difference between the two is that PVC based fabric is inherently flame retardant, and longer lasting (more weatherable) than PU. The PUs are then again generally more “breathable” and feel more natural while wearing, and are hence favored by more exclusive manufacturers. But both resin types can be used to produce a vast variety of colors while also being very well suited to be cut and stitched into various end uses and holding up very well to the rigors of each market’s performance demands.

Image 5: Artifical Leather furniture

## Furniture

Also, in the production of Furniture like sofas and chairs, PVC Artificial Leather is a sustainable, versatile and lower-cost alternative to traditional leather.

Similar to the production of apparel, the Artificial Leather market regarding Furniture is also dominated by PVC and PU based chemistries, with PVC based fabric holding the cost advantage over PU. Due to the impervious nature of PVC based Artificial Leather, it is the preferred material of choice for medical devices like dentist chairs or examination tables where a resistance to frequent cleaning or an exposure to strong detergents and disinfectants is necessary.

Image 6: Artifical Leather


Image 7: Artifical Leather car interior

# Transportation

Its versatility and sustainability make PVC Artificial Leather also a suitable material in the Transportation industry. Typical applications include upholstery and the lining of car interiors.

PVC based Artificial Leather finds extensive use in the Transportation industry – for example for cars, scooters, motorbikes, airplanes or marines. Each specific subsegment of the Transportation industry brings along stringent performance requirements – durability, weatherability or chemical resistance.

Automotive interior components (car seats, dashboard covers, door panels), are required to meet additional requirements like “low fog” – where under elevated temperature and time, the organic volatiles of the PVC surface could deposit in the glass interior and create a “fog” that is not easy to clean or to remove by air conditioning. Specific performance specifications have been set for PVC resins and cannot be exceeded. For example, European specifications are based on gravimetric (weight) loss, whereas in the United States, it is based on photometric (light) transmittance. Artificial Leather producers for this segment ask PVC resin producers to only supply resins that are certified to meet this low-fog test specifications.

Vestolit offers a wide variety of PVC grades (dispersion/paste as blending resins) with varying mechanical, rheological and foaming properties that meet or exceed the overall requirements for all three manufacturing sub-segments listed above. See table for the resin choices.

Due to such a large choice of resin options available globally, we strongly recommend that potential users of these resins hold detailed 1-on-1 conversations with Vestolit commercial and technical professionals to choose the right resin(s) for their specific end use.

| Product Code | K value | Description |
|---|---|---|
| VESTOLIT G 55 | 55 | Very low molecular weight, low viscosity, recommended when the fusion process needs to be conducted at relatively low temperatures |
| VESTOLIT XG 218 | 59 | Coarse particle, low molecular weight blending resin providing faster fusion and low gloss performance |
| VESTOLIT B 6021 Ultra | 60 | Low viscosity, fast fusion at low temperatures, fine cell structure, high embossing speed, excellent drum release properties |
| VESTOLIT XM 100X122 | 64 | Blending resin used with dispersion resins to aid in Brookfield and Seversviscosity control of plastisols |
| VESTOLIT B 6512 | 65 | Low viscosity, fast expansion, very good foam color, high proportion of open cells, excellent release from metal surfaces |
| VESTOLIT XC 866 | 66 | Blending resin. Low gloss, good air release, fast fusion |
| VESTOLIT E 450 | 67 | Medium viscosity, good expansion, good pore quality in foam |
| VESTOLIT E 455 | 67 | Medium viscosity, good expansion, good pore quality in foam |
| VESTOLIT E 67 | 67 | Medium viscosity, high blow ratio foams |
| VESTOLIT G 67 F | 67 | Low viscosity, foamable with high filler level, good cell quality, color and thermal stability |
| VESTOLIT XG 217 | 67 | Low to medium molecular weight homopolymer blending resin for solid and foamed plastisol applications |
| VESTOLIT E 7012 S | 67 | Fast expansion and very good foam color, with a high degree of open cells, wide processing range |
| VESTOLIT G 68 | 68 | Low viscosity, good air release |
| VESTOLIT T 68 | 68 | Low viscosity, good air release, high gloss and clarity |
| VESTOLIT P 124 | 69 | General purpose resin, good chemical foamability for medium to high density applications. Excellent viscosity stability |
| VESTOLIT A 67 | 70 | High viscosity, good air release |
| VESTOLIT G 120X400 | 70 | Good chemical foamability for producing medium to high density foams. It contains lower emulsifier level results in lower plate-out |
| VESTOLIT B 7021 Ultra | 70 | Low viscosity, universal resin, low viscosity, good storage stability and low moisture absorption, excellent drum release properties |
| VESTOLIT E 7031 | 70 | Distinctly pseudoplastic |
| VESTOLIT P 1353 K | 70 | Producing high viscosity pastes with pronounced pseudoplastic flow for compact processing and for chemical expansion |
| VESTOLIT P 1430 K 70 Ultra | 70 | Low viscosity, high gloss, excellent air release, superior transparency, good thermostability |
| VESTOLIT G 137 | 73 | Carboxyl functional copolymer, adhesion to synthetic fabrics, ability to crosslink with epoxies |
| VESTOLIT A 74 L | 74 | Medium viscosity, low fogging |
| VESTOLIT A 74 LM | 74 | Medium viscosity, low fogging |
| VESTOLIT G 74 | 74 | Low viscosity, good air release, high mechanical strength |
| VESTOLIT G 121 AR | 74 | Good chemical foamability for producing medium to high density foams. Good dispersability for easier plastisol preparation" |
| VESTOLIT G 129X115 | 74 | Good chemical foamability for producing medium to high density foams. Good dispersability for easier plastisol preparation |
| VESTOLIT G 410 | 75 | Medium viscosity, good foaming properties, good mechanical properties, low fogging |
| VESTOLIT G 415 | 75 | Low viscosity, good air release, low fogging |
| VESTOLIT T 75 | 75 | Low viscosity, good air release, high gloss and clarity, superior mechanical properties |
| VESTOLIT G 138 | 75 | Vinyl ester copolymer dispersion resin, exhibiting fast fusion at low processing temperatures, mechanically and chemically foamable |
| VESTOLIT B 7521 Ultra | 75 | Low viscosity, low moisture absorption, good mechanical properties |
| VESTOLIT P 121 | 77 | General purpose resin |
| VESTOLIT T 75 M | 77 | Low viscosity, good air release, low gloss, good clarity, good mechanical properties |
| VESTOLIT G 129 | 77 | Good chemical foamability for producing medium to high density foams. Good dispersability for easier plastisol preparation |
| VESTOLIT T 1069 | 80 | High mechanical properties, excellent transparency, high water and solvents resistance, adherence to metallic areas |
| VESTOLIT T 80 | 80 | Low viscosity, good air release, high gloss and clarity, superior mechanical properties |
| VESTOLIT P 1415 K80 Ultra | 80 | Low viscosity, excellent drum release, low gloss |
| VESTOLIT P 1430 K90 Ultra | 90 | Low viscosity, low gloss, excellent air release, superior transparency, mat surface finish |

Table A: Product overview for Artificial Leather

# Locations


### Vestolit Europe

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### Vestolit's Application Brochures

Artificial Leather
Commercial Graphic Films
Film & Sheets
Flooring
Medical Devices
Profiles & Pipes
Sealants
Technical Coatings
Textile Coating
Wallpaper
Wire & Cables

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## About Orbia

Orbia is a company driven by a shared purpose: to advance life around the world. The five Orbia business groups have a collective focus on expanding access to health and wellness, reinventing the future of cities and homes, ensuring food and water security, connecting communities to information and accelerating a circular economy with basic and advanced materials, specialty products and innovative solutions.

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