Performance is in our nature.
Susterra® Propanediol for Synthetic Leather

Susterra® propanediol is the building block that delivers high performance in a variety of synthetic leather applications, from daypacks and footwear to furniture and vehicle interiors. Made from renewably sourced materials and certified 100% bio-based by the USDA, Susterra® propanediol offers enhanced abrasion resistance and low temperature performance, as well as excellent elasticity and a soft hand versus traditional polyols.

How it’s made

Susterra® propanediol is manufactured through a proprietary fermentation process using plant-derived glucose instead of petroleum-based feedstocks. The resulting product is 99.7% pure.

Where it’s used

Synthetic leather can be made through a wet process using solvents or through a dry process without solvents. Regardless of the process, the end product has multiple layers—top coat, skin coat, foam layer—that can incorporate Susterra® propanediol as a polyol in the final urethane layer to maximize bio-content.

Polyurethane Synthetic Leather Layers with Average Weight Percent

- Top coat: 5 wt%
- Skin coat: 20 wt%
- Tie coat: 5 wt%
- Porous foam layer: 40 wt%
- Substrate: 30 wt%

Susterra® propanediol is used in the PU skin coating. Based on bio-content needs, use in the top coat or foam layer can be explored.
How it performs

Enhanced abrasion resistance
In studies, Susterra® propanediol was evaluated against traditional polyols as a polyurethane dispersion in the skin coat and top layer for a dry process application. Some end-use brands prefer the dry process for manufacturing synthetic leathers because it is solvent-free (no DMF); uses up to 95% less water; and consumes up to 55% less energy. However, it is also harder to manufacture high-quality, durable synthetic leathers using a dry process.

Susterra® propanediol, combined with adipic acid (AA), exhibited enhanced abrasion resistance when compared to butanediol (BDO) combined with AA. When Susterra® propanediol was combined with sebacic acid (Sb), a bio-based alternative to AA, it further improved abrasion performance.

Superior abrasion performance may be achieved by polymerizing Susterra® propanediol to form polytrimethylene ether polyol (PO3G). PO3G or PTMEPOL is not a DuPont Tate & Lyle product; however, it is available through third parties that base their product on Susterra® propanediol.

Low temperature performance
Susterra® propanediol exhibits a low glass transition temperature, which is a strong indicator of improved flexibility at lower temperatures.

Excellent elasticity and a soft hand
Synthetic leather made with Susterra® propanediol feels as soft as genuine leather. Dialed in by the manufacturing process, synthetic leathers made with Susterra® propanediol can also match desired colors, textures and feel.

Physical Properties of Waterborne PU Leather Prepared

<table>
<thead>
<tr>
<th>Repeat unit</th>
<th>MEK/30 min</th>
<th>-20°C/100,000 cycles</th>
<th>Taber abrasion (H22 1kg/cycle)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-AA-BDO-</td>
<td>pass</td>
<td>crack</td>
<td>700</td>
</tr>
<tr>
<td>-AA-PDO-</td>
<td>pass</td>
<td>slight damage</td>
<td>750</td>
</tr>
<tr>
<td>-Sb-PDO-</td>
<td>pass</td>
<td>pass</td>
<td>2,100</td>
</tr>
<tr>
<td>PO3G</td>
<td>pass</td>
<td>pass</td>
<td>10,000</td>
</tr>
</tbody>
</table>

The greener alternative
From “cradle-to-gate” (extraction and production prior to delivery to the consumer), Susterra® propanediol produces 56% less greenhouse gas emissions and consumes 42% less nonrenewable energy than petroleum-based 1,3-propanediol. Compared with BDO, Susterra® propanediol produces 52% less greenhouse gas emissions and uses 32% less nonrenewable energy from cradle-to-gate.

DuPont Tate & Lyle Bio Products bio-based 1,3-propanediol LCA data based on Loudon process design data.
About DuPont Tate & Lyle Bio Products

DuPont Tate & Lyle Bio Products Company, LLC., is a joint venture between DuPont, a global science company, and Tate & Lyle, a world-leading renewable food and industrial ingredients company. DuPont Tate & Lyle Bio Products provides natural and renewably sourced ingredients that enhance product performance. We offer solutions for a wide variety of markets and applications through our bio-based performance brands, Susterra® and Zemea®. For more information, visit www.duponttateandlyle.com