



**Performance is in our nature.**

**susterra**<sup>®</sup>  
bio-based performance



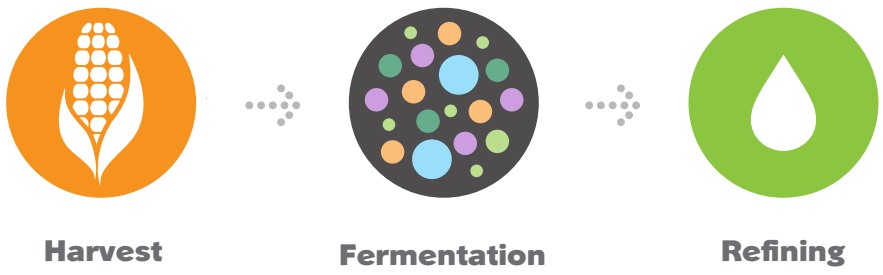
# Susterra® Propanediol for TPU Outsoles and Other TPU Applications

Susterra® propanediol is the building block that delivers high performance in a variety of polyurethane applications, from thermoplastic polyurethane (TPU) outsoles and waterproof films to synthetic leather and hot-melt adhesives. Made from renewably sourced materials and certified 100% bio-based by

the USDA, Susterra® propanediol offers **improved flexibility at low temperatures, softness and transparency** and **enhanced processing with shorter demolding times** 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.



## How it performs

### Elastomer physical properties for polyester TPU

Polyol (2000Mw) Chain Extender	AA/BDO BDO	AA/PDO BDO	Sb/PDO BDO	AA/BDO BDO	AA/PDO BDO	Sb/PDO BDO
Bio Content (%)	0	25	50	0	20	45
Hardness, Shore A	90	90	90	95	95	95
Tensile Strength (psi)	4,691	4,305	5,054	4,905	4,691	5,305
Elongation at Break (%)	614	678	654	581	646	638
100% Modulus (psi)	949	1,139	1,068	962	967	1,121
200% Modulus (psi)	1,372	1,516	1,383	1,504	1,378	1,596
400% Modulus (psi)	2,736	2,517	2,910	2,873	2,536	2,613
Die C Tear Strength (lbf/in)	801	850	838	925	931	950
Compression Set, 23°C (%)	25	35	20	20	30	20
Bayshore Rebound (%)	43	40	49	40	38	45
Abrasion Resistance	25	35	20	20	30	20
Demolding Time (sec)	30	40	25	25	35	20
Tg by DSC (°C)	-38	-40	-42	-37	-42	-45

Hardness segment concentration = 40% (90A), 45% (95A) and index is 0.98.

## How it performs

### Improved flexibility at low temperatures

In studies, Susterra® propanediol was evaluated against traditional polyols as a polyester thermoplastic polyurethane for an outsole application. Susterra® propanediol, combined with adipic acid (AA), exhibited excellent low-temperature flexibility 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 low-temperature flexibility. Wear trial participants were impressed by its performance, even in blizzard conditions.

In snowy conditions, hydrolysis performance is important as well. According to application demands, Susterra® propanediol can be paired with the right chemistry to perform as well as—or better than—traditional TPUs.

### Softness and transparency

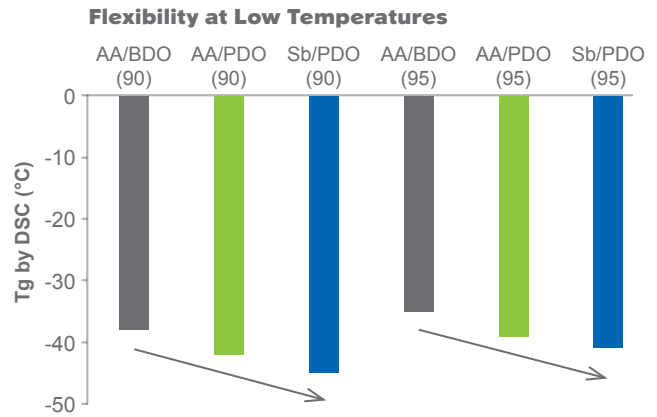
Not every application requires crystal-clear materials, but polyurethanes with Susterra® propanediol can be made transparent, as well as matched to color, texture, and feel preferences.

### Enhanced processing with shorter demolding times

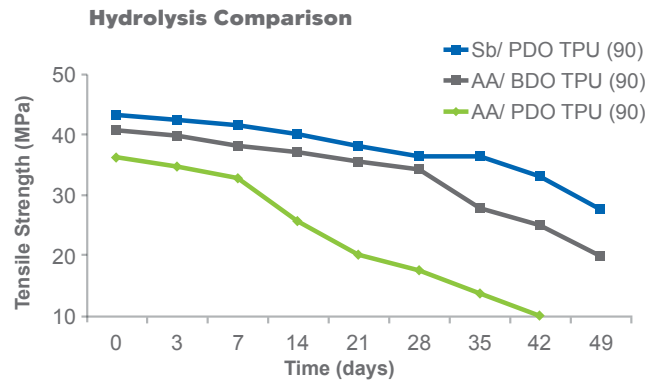
Time is money. Susterra® propanediol and Sb TPU samples demonstrated faster demolding times, which may lead to cycle time improvements for TPU manufacturers and cost savings for brand owners.

## The greener alternative

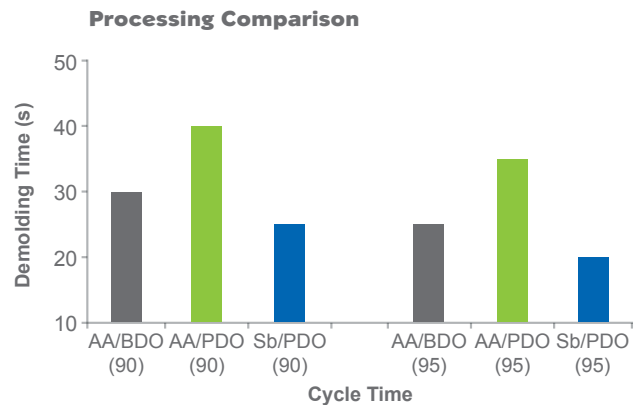
From “cradle-to-gate” (extraction and production prior to delivery to the consumer), Susterra® propanediol produces 56% less greenhouse gas emissions and consumes 42% less nonrenewable energy than petroleum-based



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



Susterra® propanediol and Sb TPU samples showed better hydrolysis results over time compared to BDO and PDO samples combined with AA.



**At full capacity, our process achieves greenhouse gas emissions reductions equivalent to taking 40,000 passenger cars off the road for one year.**



**At full capacity, our process saves enough nonrenewable energy to power 1 million 100W incandescent lightbulbs for one year.**

[susterra-performs.com](http://susterra-performs.com)

## **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](http://www.duponttateandlyle.com)

