Susterra® Propanediol

Product Data Sheet – Polyurethanes

1,3-Propanediol

CAS No. 504-63-2

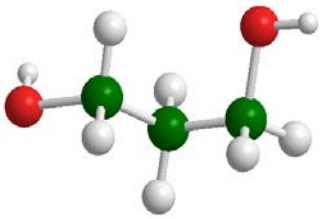
Description

Susterra® propanediol (bio-derived 1,3-propanediol) is a unique offering from DuPont Tate & Lyle Bio Products. Manufactured via a propriety fermentation process, Susterra® is a specialty diol made from corn sugar, a sustainable and renewable resource. Susterra® propanediol offers a non-petroleum based alternative for end uses that desire a bio-based product but demand performance and quality.

Susterra® propanediol is a non-controlled diol with improved handling at lower temperatures, and good miscibility with polylols. Susterra® is a versatile intermediate because of its two primary hydroxyl groups that enable it to be used in both the manufacture of polyester polyols as well as to be incorporated into the hard segment of the final urethane.

Typical Properties

Boiling Point (760 mmHg)	214 ^{o}C / 417 ^{o}F
Freezing Point	-24 ^{o}C / -11 ^{o}F
Molecular Weight	76.1
Density (20 ^{o}C)	1.053
Hydroxyl Value	1475
Viscosity, cP (20 ^{o}C)	52
Flash Point	129 ^{o}C / 264 ^{o}F
Purity, wt%	99.7
Water, % max	0.05
Color, APHA max	15



Applications

In polyurethane applications, Susterra® can be used as a polyol building block or as chain extender. Susterra® reacts with MDI to yield linear urethane domains with low melt energies at room temperature in thermoplastic urethane elastomers. An example of the use of polyester adipates manufactured with Susterra® is their formulation into cast urethane elastomers to replace 1,4-butanediol (BDO) adipates. Materials with comparable shore A hardness showed improved pot life, and abrasion resistance upon replacing BDO with Susterra®, satisfying desired mechanical properties (Table 1.).

Susterra® adipates can also successfully replace the mixed BDO/EG adipates in solvent borne polyurethane systems. Adipates made with Susterra® crystallize slowly at room temperature. Mixed Susterra®/EG polyester adipates are liquids at room temperature. Improved handling, clear or transparent polyurethanes, and polyurethanes with improved low temperature properties are expected to result from mixed glycol Susterra® based adipates.

Susterra® propanediol can be used in urethanes for coatings, adhesives, sealants, and (microcellular) elastomers (CASE), thermoplastic polyurethanes, and aqueous polyurethane dispersions. Uses in downstream markets include footwear, and wheels and casters.

Table 1

	Unit	Incumbent	Susterra® Formulation
Composition			
Polyester Polyol		BDO Adipate	Sustera® PDO Adipate
Isocyanate		MDI	MDI
Chain Extender		BDO	Susterra® PDO
NCO/OH ratio		1.05	1.04
Percentage NCO	wt %	8.7-9.4	9.0-9.3
Bio-content (ASTM D6866)	wt %	0	30
Properties			
Shore A hardness		93	95
Resilience	%	50	47
Split tear strength	KN/m	320	252
Die C tear strength	KN/m	600	487
Tensile strength	MPa	7000	5307
Ultimate elongation	%	470	496
300% Modulus	MPa	2800	2682
Compression set	%	15	30
Taber abrasion	mm^3	20	12
Pot life	minutes	3-4	7

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Storage Conditions and Expiration Date

Due to its low vapor pressure, toxicity and flammability, Susterra® propanediol presents no special handling problems. Sealed containers should be stored within a temperature range of 0° – 50^oC (32° – 122^oF). Containers can be resealed and stored within the same temperature range. Avoid prolonged exposure to oxygen and water. The use of nitrogen during storage is encouraged. If the seal is unbroken and the material has been stored according to the manufacturer's recommendations, a 2 year shelf life can be expected.

Susterra® propanediol is hygroscopic and may require storage designed to minimize moisture intrusion, unless increased water content can be tolerated. Storage vessels and transfer lines of mild steel may be used if slight increases in color and trace iron levels are not objectionable. Stainless steel and/or mild steel vessels with baked phenolic or epoxy-phenolic linings are recommended to promote long-term storage and to maintain high quality. Susterra® is compatible with EPDM, Nitrile, PTFE, Viton®, and Teflon® for ancillary tubing and gaskets.

Packaging

18.1 kg (40 lb) Pails, 199.8 kg (440 lb) Drums, 1,000 kg (2,200 lb) Totes, Tank Trucks, Iso Tanks, Rail Tanks

For additional information please contact:

DuPont Tate & Lyle Customer Service
In the US, Canada or Mexico: 866-404-7933
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