

Lubrizol



Sports & Recreation

Innovative Polymer Solutions
for Footwear Applications

A Bit More Amazing



Lubrizol
Engineered Polymers

Footwear

Lubrizol, An Essential Ingredient

Lubrizol is a global technology company with a strong belief in innovation. With over 7,500 employees and manufacturing operations in more than 17 countries, we strive to be the essential ingredient in our customers' success through collaboration, applied science and demonstrated value.

We Engineer Polymers

With over 50 years of experience, Lubrizol is a leading polymer solutions supplier and manufacturer. Working hand in hand with our customers, we provide the right mix of formulation design, manufacturing, R&D, applications/technical service labs, sales professionals and cutting-edge technologies to address the unique needs of our customers.

Lubrizol Engineered Polymers offers an extensive portfolio that includes resins that can be bio-based*, recyclable**, light stable, flame retardant, adhesive breathable or chemically resistant, along with other features almost too numerous to mention.

Why Estane® Engineered Polymers

Estane® Engineered Polymers are highly versatile, thermoplastic polyurethanes (TPUs) that bridge the gap between flexible rubber and rigid plastics. Estane® Engineered Polymers represents a single, convenient and reliable source with multiple product groups working together to solve some of today's toughest challenges in the footwear market.

As the inventor of TPU, Lubrizol has been teaming up with inventive and pioneering partners, setting the precedent for the

current innovations and advancements in the footwear industry. The shoes you wear today are more comfortable, longer lasting and better constructed due to Lubrizol's commitment to this dynamic market.

Product Innovation

BROADEST PRODUCT PORTFOLIO

- Aliphatic, aromatic, bio-based*, polyester, polyether, polycaprolactone, hot melt adhesive, static dissipative, special compounds

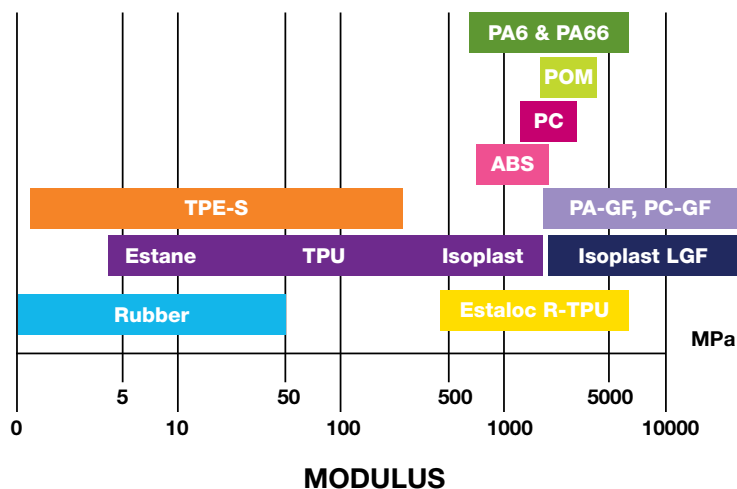
BEYOND THE TRADITIONAL BOUNDARIES OF TPUS

- Super soft to extremely hard products in our portfolio to replace rubber/silicone to metal parts and components - see chart





REPLACEMENT PRODUCTS



FULL LINE OF RESINS AND COMPOUNDS FOR ALL PROCESSING

- Blow molding, calendaring, extrusion, fabric coating, film and sheet, injection molding, over molding, melt and solution coating

QUALITY AND CONSISTENCY

- Easier processing, low gels and excellent clarity with lot-to-lot consistency

CONTINUOUS ADVANCEMENT THROUGH R&D

- Knowledge and expertise of over 200 Ph.D.'s around the world and experimental design and analysis capabilities

GLOBAL AVAILABILITY AND SUPPORT

- Responsive field and technical service support from a global network

*Bio-based content as certified in accordance with ASTM D-6866.

**Recyclability is based on access to a readily available standard recycling program that supports such materials. This product may not be recyclable in all areas.



Lubrizol

www.lubrizol.com/engineeredpolymers

Products

- Estane® TPU
- Estane® ETE TPU
- Estaloc™ RETPU
- Isoplast® ETP
- Pearlthane™ TPU
- Pearlthane™ ECO* TPU
- Pearlbond™
- Pearlbond™ ECO

*Bio-based content as certified in accordance with ASTM D-6866.



Why Estane® Engineered Polymers for Footwear Applications

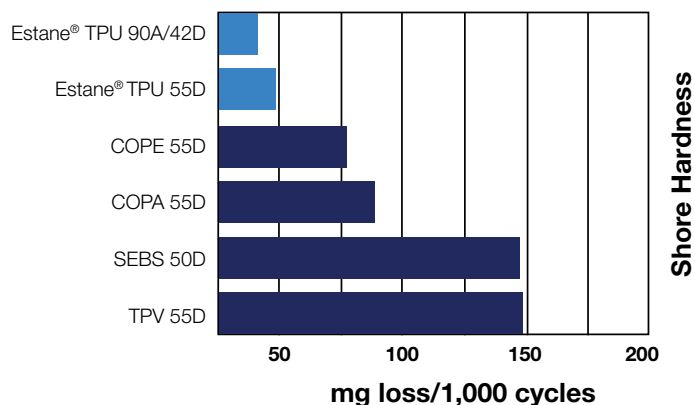
OUTSTANDING ABRASION AND WEAR RESISTANCE

- The Estane Engineered Polymers portfolio is preferred by end-users, design engineers and processors for their outstanding properties in demanding and high abuse applications. This is why footwear is an ideal application for our resins and compounds. Compared to other elastomers and rigid plastics, our engineered polymers exhibit superior abrasion and wear resistance for extended periods of time.

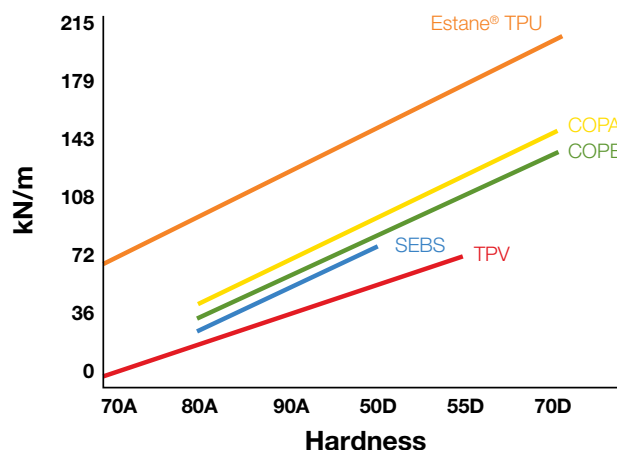
TOUGHNESS AND DURABILITY

- Our resins and compounds are engineered to be exceptionally tough. Estane Engineered Polymers provide high tensile strength and elongation properties relative to other elastomers, while delivering superior resistance to punctures and tears. Isoplast ETPs and Estaloc RETPUs also deliver high tensile strength and flexural modulus with impact resistance to meet, and often exceed performance requirements of athletic footwear applications.

Taber Abrasion Resistance Comparison H-18 wheel, 1,000 gram load



Tear Strength



CRYSTAL CLARITY AND REDUCED YELLOWNESS

- Our transparent series of engineered polymers provide solutions for those who seek consistently clear and lower yellowing index for footwear aesthetics. These attributes enable footwear designers and color formulators to create consistently color filled products.

EXCELLENT LOW TEMPERATURE FLEXIBILITY

- Flexibility over a broad temperature range is critical to footwear applications especially the outsole plate. Our portfolio delivers unmatched performance with materials capable of maintaining their flex characteristics down to -45°C . Such performance is well below the point at which ordinary elastomers and many rubber products become rigid and brittle. Most Estane Engineered Polymer grades offer excellent flex fatigue characteristics that cannot be matched by other elastomer systems.

SOLVENT-FREE BONDING

- Estane Engineered Polymers are well formulated for water based bonding systems that make footwear assembly more efficient and environmentally friendly. Their good chemical compatibility allows for over molding with various materials which automates the assembly of individual components and allows designers and engineers their creative freedom. In addition, our adhesive films provide long lasting bonds for soles and work with a wide-range of materials.

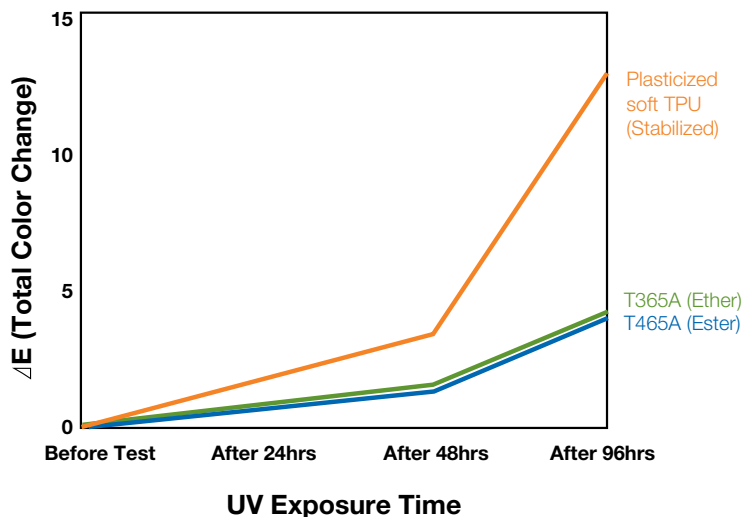
ENHANCEMENT OF RECYCLABILITY*

- Our wide range of Estane Engineered Polymers gives the footwear industry a broader selection to choose from when designing new components of a shoe. By replacing traditional materials with our engineered polymers, brand OEMs can increase recyclability, which also benefits the processors during manufacturing compared to thermoset users.

*Bio-based content as certified in accordance with ASTM D-6866

UV RESISTANCE

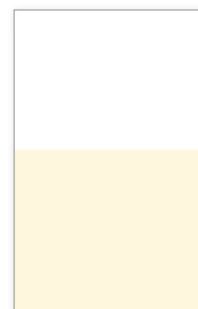
- Estane Engineered Polymers in footwear applications are specifically formulated to minimize discoloration, resulting in a UV stable product. Leading footwear OEMs choose our plasticizer-free, soft engineered polymers for their outstanding UV stability over time compared to the other plasticized ones.



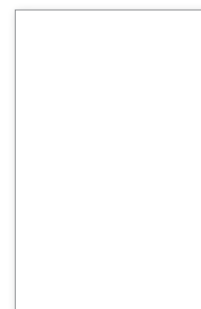
After 48hrs



Plasticized soft TPU (Unstabilized)



Plasticized soft TPU (Stabilized)



Plasticizer-free soft TPU (Stabilized Estane T465A)

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Where Estane® Engineered Polymers Make the Difference in Footwear



UPPER



SHANK



CUSHIONING
STRUCTURE



OUTSOLE PLATE/STUD

EYELET



LOGO

HEEL CUP

TOE CAP

Lubrizol
Engineered Polymers



Lubrizol

A Bit More Amazing

We work alongside companies, providing spirited teamwork, chemical expertise, unique resources, an efficient network and much more. Lubrizol is, in fact, built to be a catalyst to your success.

Our engineered polymers and the people who develop them allow our customers to go beyond. To do more. To expect more. How far away is amazing? It's much closer when you have a partner such as Lubrizol.



Belgium
Brazil
China
India
Korea
Malaysia
Mexico
Singapore
Spain
USA

Global Presence

Global Headquarters - Americas
Phone: +1 888.234.2436

Asia Pacific
Phone: +86.21.3866.0366

Europe, Middle East, India and Africa
Phone: +32(0)2.678.1911

For more information, visit us at:
www.lubrizol.com/engineeredpolymers
Email: **engineeredpolymers@lubrizol.com**

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