



**INNOVATIVE
POLYMER
SOLUTIONS
FOR WIRE
& CABLE**

**LUBRIZOL
ENGINEERED
POLYMERS**

**ADVANCING MATERIALS.
ELEVATING PERFORMANCE.**

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Lubrizol Engineered Polymers' innovative solutions are selected for the outstanding physical and aesthetic properties they provide in many industrial, sports, recreational and consumer goods applications. Our polymers bridge the gap between flexible rubber and rigid plastics, with a wide variety of physical and functional property combinations.

As the inventor of thermoplastic polyurethane (TPU), our Estane® polymers set the mark for performance and quality. Through decades of innovation and strong dedication to the markets we serve, we have developed one of the deepest, most specialized portfolios available.

We help customers solve some of the industry's toughest challenges, making products safer and stronger for better end-use performance, often while simultaneously improving aesthetics and sustainability outcomes.



ESTANE® TPU

Estane® TPU helps bridge the gap between flexible rubber and rigid plastics. Because of their excellent mechanical and physical properties, Estane® TPUs are widely used in wire & cable jacketing. And they offer a variety of benefits that extend the durability and service life of valuable cable systems. Choose from among various physical property combinations that'll help you satisfy numerous uses. Available in hardnesses from 60A to 85D, all Estane® TPUs achieve UL-94 HB.

ESTANE® FLAME-RETARDANT TPUs

This series consists of flame-retardant TPU compounds based on halogenated and non-halogenated technologies. Ideal for wire & cable jacketing. Designed for applications that demand lower flame spread, lower smoke generation and higher LOI yet still require the typical non-FR mechanical properties of toughness, abrasion resistance and weather resistance. Products range from UL-94 V-2 to V-0 flame ratings, with most achieving V-0. LOIs to 38.

ESTALOC® REINFORCED THERMOPLASTIC POLYURETHANE (RETPU)

This is a fiberglass RETPU based on high-performance Estane® TPU technology. Ideal for the product designer who seeks a tough, abrasion-resistant thermoplastic that withstands demanding environments for electrical connectors and enclosures. Provides durability, aesthetics, increased stiffness and dimensional stability over a broad temperature performance range in even the most abusive applications. Choose from among eight distinct products ranging in hardness from 58D to 64D.

STAT-RITE® POLYMER ALLOYS

Ideal for test and design engineers requiring permanent static dissipation without compromising cleanliness. Stat-Rite® Polymer Alloys blend a proprietary, inherently dissipative polymer with a variety of base polymers, effectively replacing older technologies such as conductive fillers and chemical anti-stats. Enjoy stability through an inherent static-dissipative network that remains intact through thermoforming, injection molding or extruding while maintaining the physical properties of the base polymer.



PRODUCT BENEFITS

It's tough out there. A jacketing material must serve as armour to protect the cable system from various elements including environmental damage, physical abuse and chemical, biological and hydrolytic attacks. At Lubrizol, numerous physical property combinations help extend the lives of your products through:

EXCELLENT ABRASION AND CUT-THROUGH RESISTANCE

Always a problem in the mining and other aggressive industries. Estane® TPU's help prolong product life and reduce maintenance needs.

HIGH FLEX LIFE

In robotics and almost anywhere there's repetitive motion, Estane® TPU's make jacketing last longer, require less maintenance and ensure processing lines keep processing.

FLAME RETARDANCY

Flame-retardant cables resist spreading a fire into new areas, adding a higher measure of safety. High LOI. UL-94 V-0.

LOW SMOKE, LOW TOXICITY (LSLT)

Should a fire erupt in a building, vehicle or other confined area, LSLT formulations will not produce high levels of smoke or toxic byproducts.

EXCELLENT CHEMICAL RESISTANCE

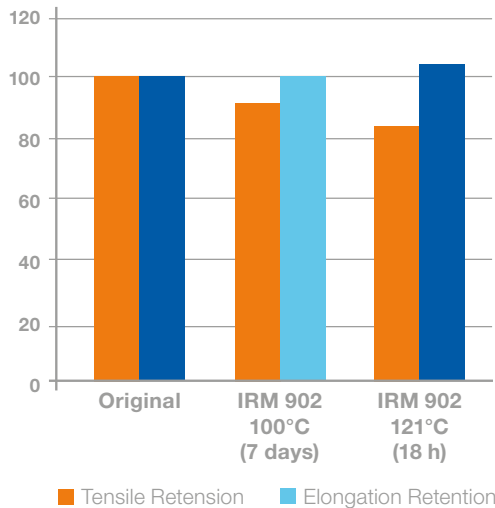
The tougher the jacket is, the longer the cable or wire will last. That leads to fewer replacements and lower costs.

WEATHERING RESISTANCE TO UV AND HARSH ENVIRONMENTS

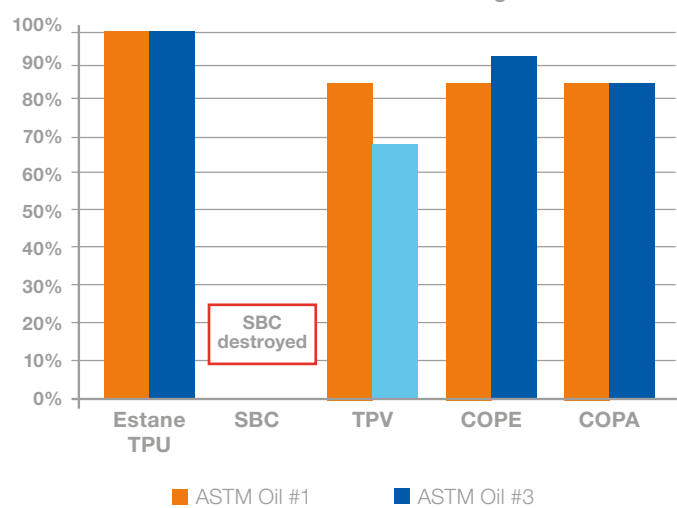
Know that your wires & cables are always fighting the elements when the jacketing is fortified with Estane® TPU's.

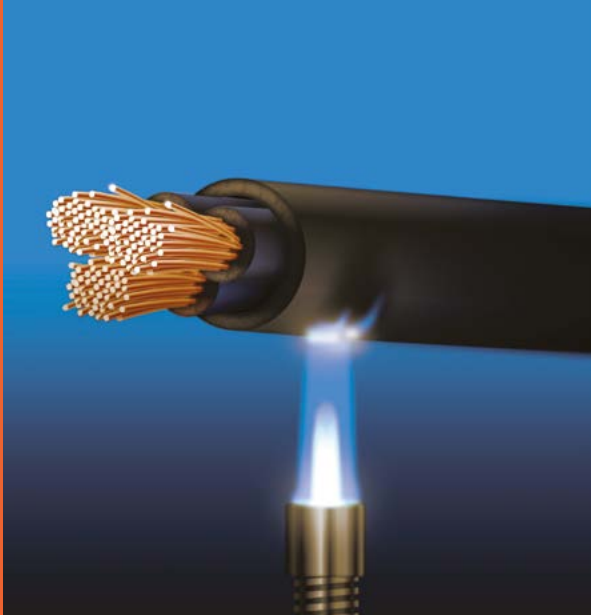
CHEMICAL RESISTANCE

Oil Aging of Estane® Zero Halogen Flame-Retardant TPU



Oil Aging of Estane® TPU % Retention Tensile Strength





ELECTROSTATIC DISCHARGE (ESD) PROPERTIES

A critical property when reliability, value and safety matter in dissipating electrostatic charge. Offering a surface resistance greater than $1 \times 10^4 \Omega$ and less than $1 \times 10^{11} \Omega$ (per ESD Association Advisory S11.1)

MATTE TO GLOSS FINISH

When appearance counts, know that you have choices with Estane® TPUs.

ANTIMICROBIAL*

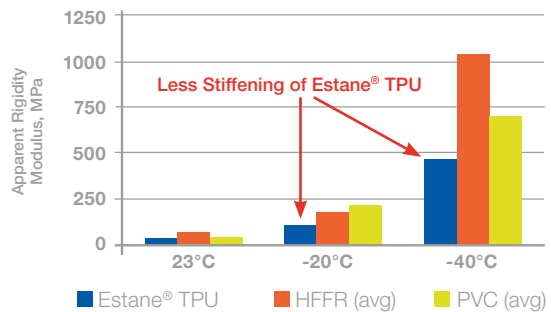
Store your wire/cable right in the field without worrying about fungal or microbial growth.

LOW-TEMPERATURE FLEXIBILITY

When the temperature drops, your productivity won't suffer because of cable jackets that crack, become brittle and lose their ability to flex.

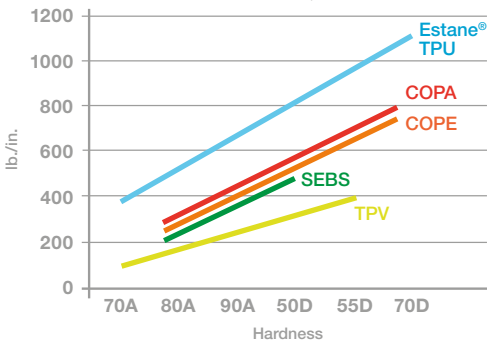
Excellent Low-Temperature Flexibility

ASTM D1053 – Standard Test Methods for Rubber Property Stiffening at Low Temperatures: Flexible Polymers and Coated Fabrics



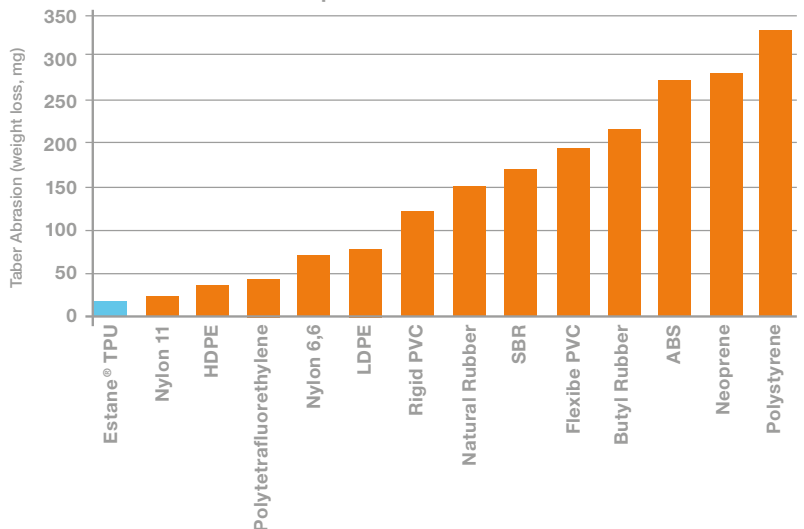
TEAR STRENGTH

Tear Strength
ASTM D-624, Die C



ABRASION RESISTANCE

Superior Abrasion Resistance



*Via MIL-STD-810F method 508.5- fungus



COMMUNICATION

Estane® TPUs insulate and protects all wires — inside and out, above ground and below — for all of your customers' everyday and critical wiring needs in the areas of security, data, communications and signals.

ENERGY

Creating higher performance wires used for wind power, solar panels, hydroelectric installations, power plants, offshore, geophysical and other energy installations requiring resistance to harsh environments and flame retardancy.

INDUSTRIAL

Estane® TPUs are specified around the world by companies that create wire & cable for equipment, machinery, process lines, robotics and almost anything used in the manufacture of products and components.

MILITARY

In most every phase of its operations, the military trusts wire & cable enhanced, in part, by Estane® TPUs. That includes MIL-SPEC hookup wire, lead wire, multiconductor cables, cords, flat cable, molded cable, assemblies and more for vehicles, aircraft, boats and many types of equipment.



FOCUS MARKETS

What kinds of wire & cable do you work with? Lubrizol probably makes a polymer that can enhance their performance, increase their value and give you a definite edge. Let our experienced teams help you select, process and integrate the precise engineered polymer needed for your end-uses. Here are some of the markets and products that we impact:

OIL & GAS

Estane® TPUs impart a new level of toughness for wiring used onshore and offshore applications subject to extremely harsh conditions, extreme temperatures, considerable winding and handling and more.

MINING

Estane® TPUs low-smoke, low-toxicity (LSLT) and chemical-resistant formulations provide added safety to those who work underground or surface mining.

TRANSPORTATION

Estane® TPUs combine processing- and end-use versatility, making them ideal for use throughout in today's vast and demanding transportation market. Our polymer solutions are used in almost every kind of wire & cable in automotive, passenger cars, trucks, trains, subways, shipboard and planes.

LOCALLY PRESENT GLOBALLY NETWORKED

With local sales and technical support, R&D and manufacturing centers of excellence in each region, and a well-networked global supply chain, we offer a convenient, single source of reliable solutions for customers across the world.

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