



Lubrizol Sustainability Initiatives – What’s Next for Medical-Grade Materials

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Lubrizol

Imagined for Life. Enabled by Science.™

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LUBRIZOL PURPOSE STATEMENT

“Lubrizol science delivers sustainable solutions to advance mobility, improve wellbeing and enhance modern life.”

Advance
Mobility



Enhance
Modern Life



Improve
Well-Being



Corporate Sustainability Strategy



Responsible Citizenship
Doing business responsibly,
everywhere, every day

20% reduction in Scope 1 & 2
GHG emissions

10% reduction in waste to landfill

**Water – Biennial Risk
assessments** and restoration
projects



Sustainable Solutions
Delivering sustainable solutions
that empower customers'
innovation and technology

**100% of new Corporate
Innovation Projects**
assessed using **Sustainable
Solutions Criteria**




**Engaged Team and
Communities**
Connecting with our communities
as positive Lubrizol ambassadors

100,000 hours of employee
volunteer time

\$20,280,000 donated to
organizations in our local
communities


Continually Evolving Our Flagship Technology

1959 – Today




Next-Generation Sustainable TPU
IMPACT: 30-70% Bio-Based Content, Bio TPU

1959 – Today



Clean Water and Reduced Impact with CPVC
IMPACT: 44% Lower Life Cycle Assessment

1958 – Today



Inherently Biodegradable Carbopol Fusion Polymer
IMPACT: 39%* Lower Environmental Footprint

*Comparative calculations made with acrylate performance benchmark per assumptions. Customers need to assess impact on their finished formulations based on the use rate of each ingredient.

How We Define a Sustainable Solution

Climate



Reduces
Climate Impact

Conservation



Enhances Resource
Conservation and Efficiency

Circularity



Empowers
Circularity



Target: 100% of new Corporate Innovation projects
assessed using Sustainable Solutions Criteria by 2025

Responsible Citizenship – Environmental Targets

Our Progress (2024)

Energy & Climate



target

20%

Reduction in combined Scope 1 & Scope 2 GHG by 2030, over 2018 baseline

progress

16%

Reduction in combined Scope 1 & Scope 2 GHG in 2024, over 2018 baseline

Waste Reduction



target

10%

Reduction in waste to landfill

progress

18%

Reduction in waste to landfill in 2024, over 2018 baseline

Water



progress

Results

Of the biennial risk assessments communicated and preparations made for next assessments

Sustainability Scores and Capabilities

Key Sustainability Scores

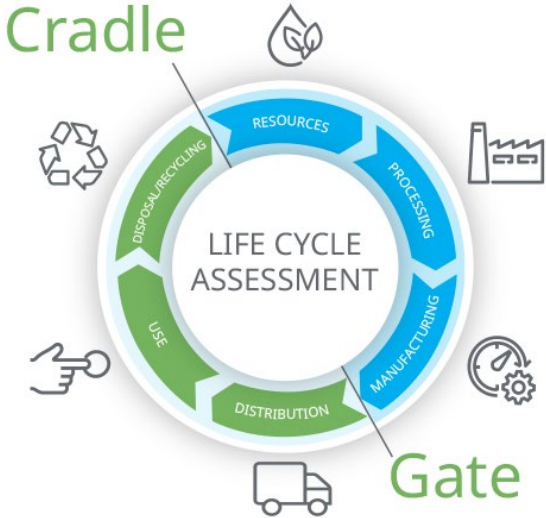


72 / 100
91st / Percentile



B / Climate Change
B / Water
C / Forest

Product Life Cycle Analysis



GRI Aligned Reporting



Mass Balance Traceability



Mass Balance Certified

Sustainability Solutions for Medical Solutions

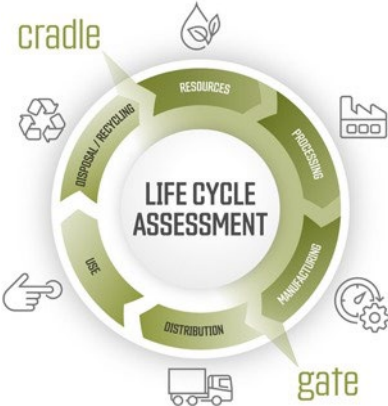
ISCC PLUS Certified Site

Biomass balance approach possible for Pellethane® & Isoplast® from Avon Lake facility



Life Cycle Assessment

LCA possible for all medical grade polymers



Recycling Opportunities

Recycling for Isoplast®, dental aligner waste material, is possible without sacrificing optical and mechanical properties.



Lubrizol science delivers sustainable solutions to improve well-being.

Sustainable Solutions – 3 Pillar Examples



ESTANE® PIR TPU – Our customized high-performing post-industrial recycled (PIR) materials are backed by Lubrizol’s technical expertise, value chain partners and certified product data. All of which are designed to enable your circularity.



ESTANE® RNW TPU – ESTANE® RNW TPU portfolio offers biomass balance versions of several standard product grades. These materials provide the same high quality and performance while using bio and/or biomass balanced feedstocks.



BIO TPU – ESTANE® ECO and PEARLBOND ECO bio-based TPUs enable sustainably driven product design without compromising on material quality and performance.

Pearlbond™ ECO TPU – Life Cycle Assessment Example

For each **1 MT. of Pearlbond ECO 590 TPU** used instead of a petroleum-based hot melt adhesive, you...



Avoid the **same amount of CO₂** as the gas sequestered by **66 trees** grown for 10 years



Save **greenhouse emissions** produced by a **family car** driven for **10.3 months**



Avoid the same amount of **greenhouse gas emissions** as **recycling 168 trashbags** instead of landfilling

Lubrizol Medical Solutions

Vision:

To be a global leader and most trusted partner in the medical device industry, recognized for best-in-class materials that enhance healthcare results.

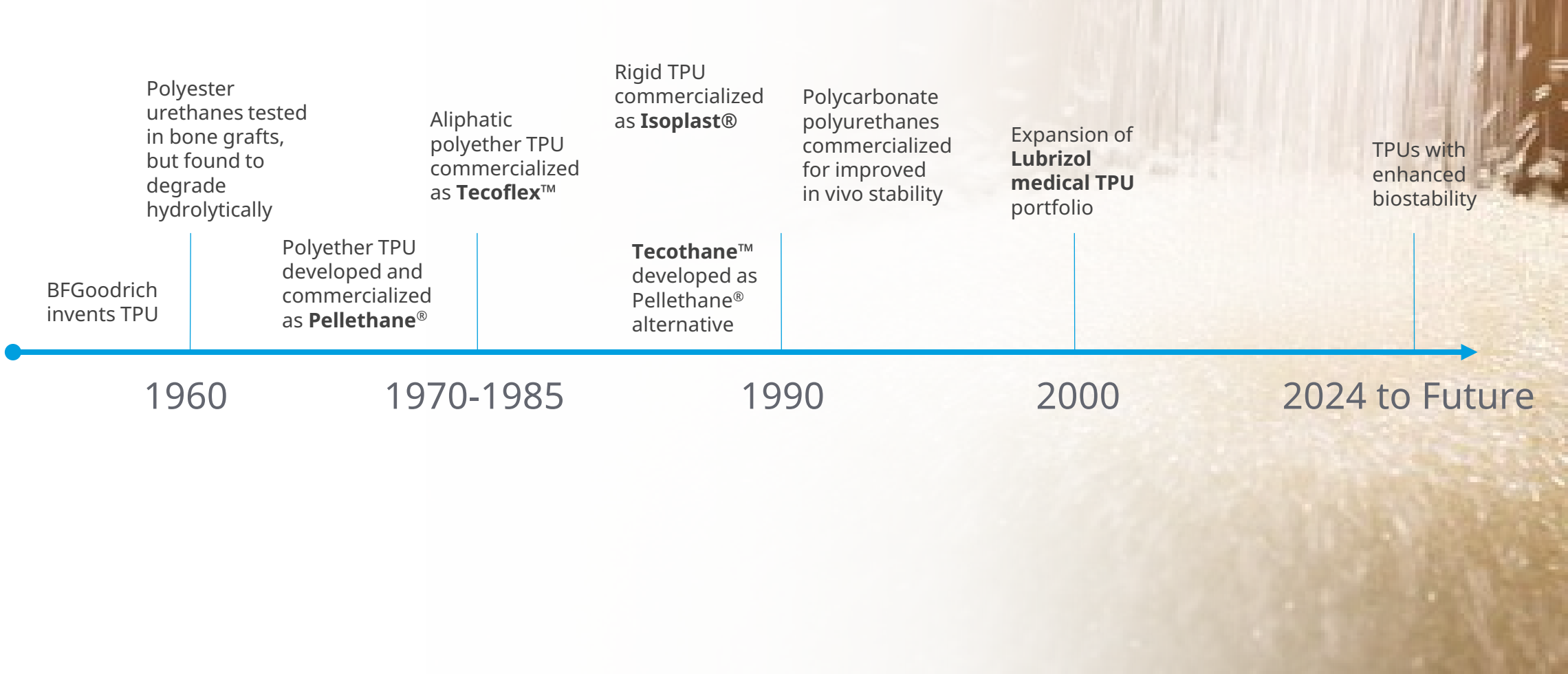
Mission:

To empower medical device OEMs by efficiently delivering the high-quality products and custom solutions that improve patient outcomes.

Lubrizol offers:

- Global manufacturing for high volume & customized solutions
- Materials with superior biocompatibility & biostability
- Medical grade material support
- Development services
- Technical capabilities
- A long history of success in the medical industry

The Evolution of TPU for Medical Devices



Sustainability - Local Manufacturing Where You Need It

Legacy TPU Medical Polymers

Component and Finished Device Manufacturing

Device Design and Development

North America

Avon Lake, OH

- Standard/Continuous Medical TPU Manufacturing

Brecksville, OH

- Applications Lab

Corona, CA

- Device Development
- Thermoplastic Extrusion & Assembly

Wilmington, MA

- Custom/Batch Medical TPU Manufacturing

Victor/Hamilton, MT

- Silicone Dip Casting
- Sheeting & Assembly

Franklin, WI

- Silicone Extrusion
- Molding & Assembly

Europe

Sibiu, RO

- Balloon Catheter Assembly

Wessling/Gilching, DE

- Device Development
- Balloon Catheter Assembly

India

Chennai, IN

- Medical Tube Manufacturing Partner



Polymer Synthesis → Applications → Formulation → Finished Product Design & Manufacturing

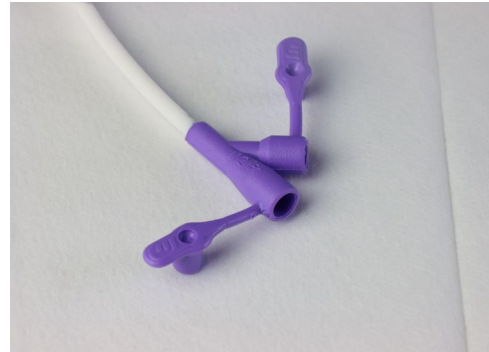
Primary Markets Served

Segments

- Endoscopy & Minimally Invasive Surgical Devices
- Interventional Catheters
- Vascular Infusion Catheters



- Heart Support & Implants
- Drug Delivery
- Dental & Orthodontics
- Diagnostics



- Urology
- Wound Care & Sterile Barrier Films
- Respiratory & Airway Management
- Gastric & Enteral Feeding



Variety of Medical Polymer Products

Carbothane™ TPU

Offering excellent oxidative stability for long-term blood contact applications, these aliphatic and aromatic polycarbonate TPUs are available in natural and radiopaque formulations.

Tecoplast™ TPU

Formulated to produce durable injection molded components exhibiting elevated hardness and optimum heat deflection temperatures and is intended for hubs, fittings, or any other components that require impact-resistant properties.

Pathway™ TPU Excipients

Pathway™ TPU is an ideal option for implantable drug delivery systems and drug/device combination products.

Tecoflex™ TPU

Available in a variety of hardnesses, colors and radio pacifier formulations. Tecoflex offers an inherent ultraviolet (UV) stability that resists yellowing by aging.

Pellethane™ TPU

Ideal for medical device applications requiring flexibility and strength, these aromatic polyether and polyester TPUs are recognized for their history of use in medical applications.

Tecothane™ TPU

Designed for superior physical performance, these aromatic polyethers are available in natural, radiopaque and custom colors.

Isoplast™ TPU

Formulated for durability, these rigid aromatic polyurethanes exhibit superior toughness, impact, abrasion and chemical resistance.

Tecophilic™ TPU

Specially formulated to absorb equilibrium water contents from 20 to 1000% of the weight of dry resin, this product is available in three grades: extrusion, hydrogel, and solution.



Lubrizol's Differentiated Value

What We Provide

Lubrizol Medical Solutions provides medical-grade thermoplastic polyurethane (TPU) for a wide range of medical applications.

Who We Serve

We serve medical device OEMs and material processors that supply short-term and life-of-patient devices to the market.

How We Support Our Customers

Our material is manufactured in **ISO certified** facilities. We maintain a **quality audit program**, possess a robust **change management process**, provide **regulatory assistance, record retention, and product evaluation**.

Lubrizol's Promise of Quality and Reliability.

Imagined for Life. Enabled by Science.™



[lubrizol.com/
sustainability](https://lubrizol.com/sustainability)



LinkedIn



Instagram

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