

Lubrizol's
Medical & HealthCare
Engineered Solutions

Medical & HealthCare

Performance for the Designer / Manufacturer.

Precision for the Surgeon. Comfort for the Patient.



Good Chemistry & Rich History



At **The Lubrizol Corporation**, we provide the right mix of people, ideas and market knowledge to bring our customers what they need most – solutions that improve their products.

Lubrizol is one of the world's leading materials companies, serving the global transportation, industrial and consumer markets. Our focus is on delivering unique formulations in surface active chemistries, rheology modifiers, and polymer and film technologies. We innovate and problem solve – partnering with our customers to provide new and improved technologies that enhance product performance.

Our founders were innovators. They pioneered the lubricant additive industry in 1928 – and still lead that industry today. Lubrizol maintains its headquarters in Wickliffe, Ohio, and with manufacturing facilities in 17 countries, is well-equipped to serve customers on a global basis. We provide advanced research and development, comprehensive analytical lab services and material testing.

Lubrizol's financial discipline, balanced portfolio of businesses, technical expertise and global presence positions us to manage through changing economic conditions. We remain focused on a vision for growth, leveraging our capability for technical innovation, global reach and knowledge of customers and markets.

A History of Achievement



Lubrizol Advanced Materials is a leading global producer of advanced polymer-based formulations, specialty chemicals and chemical additives for a broad range of consumer and industrial applications.

Our strong history in technological achievements and product innovations dates back more than 50 years. This legacy includes introducing the world to the first thermoplastic polyurethane (TPU) compound in 1959.

We continue to build upon our strong heritage by leading the industry in technologies for additives, ingredients and compounds that enhance the quality, performance and value of customer's products, while reducing their environmental impact.

Lubrizol's Medical & HealthCare Group



Lubrizol's medical and healthcare portfolio offers high performance products and brings more than 50 years of TPU experience to our customers' applications, backed by global resources that offer expertise in specification, design and manufacturing. Our worldwide network includes manufacturing, R&D, application and technical service labs, sales professionals, distributors and agents who are there to assist.

TPUs are making inroads into the medical field where new processing methods allow it to be used in a number of life-saving devices. This move is being further advanced through the experience and reputation of Lubrizol Medical & HealthCare, which is now one of the leading suppliers to the medical device industry with our outstanding array of TPU products.

We operate a complete resin and tubing production facility in Wilmington, MA, USA, which conforms to specifications of Good Manufacturing Practices and specially designs to extrude our own polyurethane resins. All tubing extruded from Lubrizol is produced on a custom order basis to ensure exact dimensions and configuration. Markets for Lubrizol Medical & HealthCare are numerous and growing every year. We bring the right mix of capabilities to our customers.



A Comprehensive Product Portfolio

Lubrizol is a leading supplier of engineered polymers for the medical industry, offering a family of products which feature numerous benefits such as:

- ▶ *Unique softening in the body for patient comfort*
- ▶ *Excellent processing attributes for extrusion or injection molding and solution coatings*
- ▶ *Biocompatibility and biostability*
- ▶ *Clear/radiopaque/pigmented*
- ▶ *High tensile and elongation*
- ▶ *Multi-extrusion technology for unique applications*

Carbothane TPU

Carbothane, a family of aliphatic, polycarbonate-based TPUs are available over a wide range of hardness, colors, and radiopacifiers. If your application requires flexibility, Carbothane TPU is a premier product with elevated performance properties such as resistance to bodily fluids, good oxidative and biostable properties.

Tecoflex TPU

Tecoflex TPUs are available in a variety of hardness', color and radiopacifier formulations. It can be formulated through multiple processes (Extrusion and Injection Molding and Solution Coating) and offers an inherent ultraviolet (UV) stabilizer that resists yellowing by aging. Lubrizol offers a unique capability to fill Tecoflex TPUs with barium sulfate or tungsten, as well as utilizing custom color-matching for your specific application needs.

Isoplast ETPU

Isoplast Engineered Thermoplastic Polyurethanes (ETPUs) are designed for rigid polymer requirements due to their high tensile strength and impact resistance. They combine the toughness and dimensional stability of amorphous resins with the chemical resistance of crystalline materials. It is ideal for applications needing an impact resistance-based polymer, and is available in impact modified, clear and glass-filled grades.

Tecoplast TPU

Tecoplast TPUs provide aromatic properties that are formulated to produce durable injection molded components exhibiting elevated hardness' and optimum heat deflection temperatures. This TPU is intended for hubs, fittings or any other components that require impact resistant properties. Tecoplast TPUs are customizable in transparent and opaque colors.

Pellethane TPE

Pellethane Thermoplastic Elastomers (TPEs) offer a wide range of properties for medical and healthcare products. These polymers are available as an aromatic polyether and are known for their flexibility and wide range of hardness'. Pellethane TPEs are ideal for a variety of medical applications including tubing, catheters, and other short-term uses.

Tecothane TPU

Tecothane TPUs are available over a wide range of hardness', colors, and radiopacifiers. Tecothane resins exhibit solvent resistance and biostability over a wide range of hardness'. They offer customization options such as radiopaque filled, pre-colorization, varied hardness levels and customization. We offer a unique capability to fill Tecothane TPUs with barium sulfate or tungsten, as well as utilizing custom color-matching for your specific application needs.

Tecophilic TPU

Tecophilic TPUs offer an aliphatic, hydrophilic polyether-based resin which has been specially formulated to absorb equilibrium water contents from 20 to 1000% of the weight of dry resin. Three grades are available – extrusion, hydrogel and solution.

Products for a World of Applications

Lubrizol Medical & HealthCare is a leading supplier of engineered polymers for the medical industry, offering a family of products which feature numerous benefits.

Few medical products are as flexible in a wide range of applications as Lubrizol's Medical & HealthCare portfolio. From cardiology and neurology management devices to wound dressings, gowns, drapes, and other medical components, our engineered polymers meet the most challenging medical needs. They provide biocompatibility, biostability, strength, process versatility and the ability to soften in the body.



BENEFITS

Unique softening in the body for patient comfort

Excellent processing attributes for extrusion or injection molding and solution coatings

Biocompatibility and biostability

Clear/radiopaque/pigmented

High tensile and elongation

Multi-extrusion technology for unique applications

Catheters / IVs

Multiple in-dwelling catheter and IV applications maintain comfort while entering the body and then soften after placement. Our polymers are known to maintain strength, biocompatibility, biostability and elasticity throughout their use.

Wound Dressings & Tapes

Lubrizol's engineered polymers are ideal when manufacturing films for wound care due to their ability to be extruded into thin films that exhibit resilience, biocompatibility, vapor transmission and barrier properties.

Medical Bags

Lubrizol's engineered polymers are ideal for medical bag applications because of their biocompatibility, unique chemistry and ease of processing. Additional benefits may include sterilization, patient comfort and compatibility.

Tubing

Lubrizol's Medical & HealthCare tubing conforms to specifications of Good Manufacturing Practices and ISO-9001-2000. All tubing is produced on a custom order basis to ensure exact customer dimensions and configuration. It is subject to strict quality control criteria at each stage of production.

A Market for Every Need

Wound Care

Wound care is the treatment of injuries caused by burns, lacerations, infection, ulcers, or general damage to tissue. Engineered polymers from Lubrizol find utilization in general and advanced wound care. Benefits include strength, biocompatibility, biostability, and a unique balance of barrier and MVTR (moisture vapor transmission rates) properties.

Orthopedics

Innovations in joint replacement techniques and materials of construction should have dramatic impact on future patient care. Improvements in the stability and durability of artificial knees and hips; improved bone and tissue scaffold technologies; and the use of CAD/CAM for construction of custom implants are major focus areas for tomorrow.

Lubrizol's thermoplastic polyurethane resins (TPUs) may aid joint replacement (arthroplasty) designers in their quest to reduce stress shielding (i.e. the reduction in bone density as a result of removal of normal stress from the bone by an implant) and to improve abrasion resistance while maintaining the balance between biocompatibility and mechanical strength.*

Orthodontics

Orthodontics is the structural improvement of the mouth which increases oral health and continues to drive orthodontic innovation. Lubrizol's engineered polymers provide designers with a range of non-metallic options for next generation oral appliances. Performance features include excellent biostability, strength and rigidity, and customizable water barrier properties.

Miscellaneous

Lubrizol's Medical & HealthCare is one of the technology leaders in engineered polymer resins for medical devices and technology. Engineered polymers provide the very same performance characteristics of flexibility, durability and breathability that have increased demand in many life-saving medical devices. Each of Lubrizol's engineered polymers has been specifically formulated to have good biocompatibility, flexural endurance, high strength and processing versatility over a wide range of applications.

** Contact Lubrizol to discuss potential applications.*

Markets for Lubrizol's Medical & HealthCare group are numerous and growing every year. Chances are good that you have used a product made by one of our engineered polymers: catheters and IVs; wound care dressings and tapes; and even medical gloves and garments. Housing for defibrillators as well as leads for pacemakers all claim an engineered polymer as a component and one possibly from Lubrizol.

Vascular

Vascular therapies represent an alternative to traditional invasive surgical techniques for the treatment of disease such as coronary artery disease. Engineered polymer resins from Lubrizol are well suited for use in endovascular medical because of their biocompatibility, biostability and in-dwelling softening characteristics.

Cardiac

Cardiac Assist Devices have expanded the medical community's ability to partially or completely replace heart function. Lubrizol's engineered polymer resins provide design engineers with biocompatibility, biostability, elasticity, strength, chemical resistance and in-dwelling softening.

Urology

Lubrizol's engineered polymers are well suited for use in a variety of urological applications because of their chemical (acidic) resistance, hydrophilic (water absorption) properties, in-dwelling softening characteristics and lubricity.

Neurovascular

The field of interventional neuroradiology (INR) also referred to as endovascular surgical neuroradiology employs the use of micro catheters for a wide variety of treatments. Engineered polymers from Lubrizol provide designers with a range of properties to meet pushability, trackability and over-the-wire requirements. These performance attributes include flexural strength, in-dwelling softening and the ability to impart hydrophilic properties (enhanced navigation).

Gastroenterology

Lubrizol's engineered polymers provide device manufacturers with a broad material selection for consideration in a variety of gastroenterologic applications due to excellent biostability, biocompatibility, flexural endurance and in-dwelling softening.





Bandages

Wound Dressings

Poly Casts

Implants

Braces / Retainers

Mouth Guards

Prosthetic Devices

Medical Garments

Syringes

Splints



Medical & HealthCare



Medical & HealthCare
Engineered Solutions

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