



Lubrizol Collaboration Produces Innovative Fashion-Functional Multi-Tech Commuter Jacket with Warmth on Demand Powered by Flexible Electronics

November 8, 2018

CLEVELAND, November 8, 2018 – The Lubrizol Corporation announces that it will unveil its fashion-functional Multi-Tech Commuter (MTC) Jacket at the IDTechEx Show! in Santa Clara, CA, November 14-15, 2018. The MTC Jacket was commissioned by Lubrizol with the purpose of demonstrating how solutions and supply chain partners can be integrated to deliver innovative, valuable solutions to the wearables market.

The MTC Jacket is the result of an impressive multiple-partner collaboration between leading experts including Lubrizol, Principled Design, ACI Materials, and Butler Technologies that took the project from concept to completion in just nine (9) months. The project underscores the importance of systems thinking in the development of novel wearable electronics -- combining design, material science, applications know-how, and value chain partners having the right mindset and capabilities – to quickly turn innovative ideas into prototypes and then commercial scale realities.

The process began with Lubrizol commissioning Despina Papadopoulou from Principled Design (New York, New York) to design and oversee development of Lubrizol's Multi-Tech Commuter Jacket, including development of the supply chain and contract assembly of jacket components into final garment form. "First and foremost, our jacket had to look good, feel good and be easy to maintain. In other words, we designed this jacket for humans," states Ms. Papadopoulou. The jacket showcases innovative technologies from Lubrizol's Engineered Polymers and Performance Coatings portfolios especially well-suited for Electronics including flexible hybrid electronics, wearables, mobile devices and accessories, and 3D printing.

To incorporate Lubrizol's highly flexible material solutions into a wearable platform, Principled Design then selected ACI Materials (Goleta, CA) for their expertise in conductive inks, encapsulants and resistance heater flexible circuit technology and Butler Technologies, Inc. (Butler, PA) for their proven capabilities in developing printed electronics, proof of concept and

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prototyping. Each member of the team brought a deep understanding in their area of expertise and contributed to problem-solving relating to the advanced design, materials and the interplay between technology to deliver form, comfort and functionality.

Company	Role in Lubrizol MTC Jacket Development
Lubrizol Advanced Materials, Inc.	Project owner; material solutions provider of stretch fabrics, flexible substrates, hot melt thermoplastic polyurethane (TPU) film adhesives, 3D printing TPU filaments and stretch control fabric coatings (Lubrizol Engineered Polymers and Performance Coatings)
Principled Design	Jacket design, development of supply chain, contract assembly of jacket components into final garment form; project management
Prosperity Denim	Comfort stretch denim fabric produced using Lubrizol's revolutionary X4zoI™-J fiber technology
Ruey Tay	Comfort fit interlining produced using Lubrizol's revolutionary X4zoI™-J fiber technology
ACI Materials	Flexible conductive and resistance inks for printed circuits, flexible circuit encapsulants and adhesives, heater circuit design and technology
Butler Technologies, Inc.	Screen printing of flexible circuits, application of hot melt flexible adhesive layer, assembly of flexible circuit layer(s) stack up

Each partner in the collaboration contributed to a clear, shared vision and committed resources to drive the program's speed, problem-solving, and successful outcomes.

Designed for stylish and functional street-to-office wearability, the Multi-Tech Commuter Jacket features Lubrizol materials that ensure function, comfort and durability over the life of the garment. Stretch denim and polyester fabrics move and breathe with the wearer for comfortable motion and mobility. ACI's flexible circuit heating element with stretchable encapsulation providing protection for conductive traces located across the inside of the jacket's back provides warmth on demand – without the bulk of additional clothing layers. Fabric treatment at the elbows and palms with Lubrizol coating technology enhances garment durability both in-use and when laundering.

Lubrizol's MTC jacket can be seen at the IDTechEx Show! on November 14-15, 2018 at the Santa Clara Convention Center in Santa Clara, CA, in Lubrizol's booth (#N28), ACI Materials' booth (# T37) and Butler Technologies' booth (#A27), helping bring to life the theme of the event, "Connecting Emerging Technologies with Global Brands".

About The Lubrizol Corporation

The Lubrizol Corporation, a Berkshire Hathaway company, is a market-driven global company that combines complex, specialty chemicals to optimize

the quality, performance and value of customers' products while reducing their environmental impact. It is a leader at combining market insights with chemistry and application capabilities to deliver valuable solutions to customers in the global transportation, industrial and consumer markets. Lubrizol improves lives by acting as an essential partner in our customers' success, delivering efficiency, reliability or wellness to their end users. Technologies include lubricant additives for engine oils, driveline and other transportation-related fluids, industrial lubricants, as well as additives for gasoline and diesel fuel. In addition, Lubrizol makes ingredients and additives for home care, personal care and skin care products and specialty materials encompassing polymer and coatings technologies, along with polymer-based pharmaceutical and medical device solutions.

With headquarters in Wickliffe, Ohio, Lubrizol owns and operates manufacturing facilities in 17 countries, as well as sales and technical offices around the world. Founded in 1928, Lubrizol has approximately 8,700 employees worldwide. Revenues for 2017 were \$6.3 billion. For more information, visit www.Lubrizol.com.

*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. Products may not be available in all areas.

Media Contacts

Lubrizol Engineered Polymers

Nick Galioto

ngalioto@lubrizol.com

+1 216 447-7382

Lubrizol Performance Coatings

Mike Heil

mheil@lubrizol.com

+1 216 447-5176

Websites

www.lubrizol.com/engineered-polymers

www.lubrizol.com/coatings

www.lubrizol.com