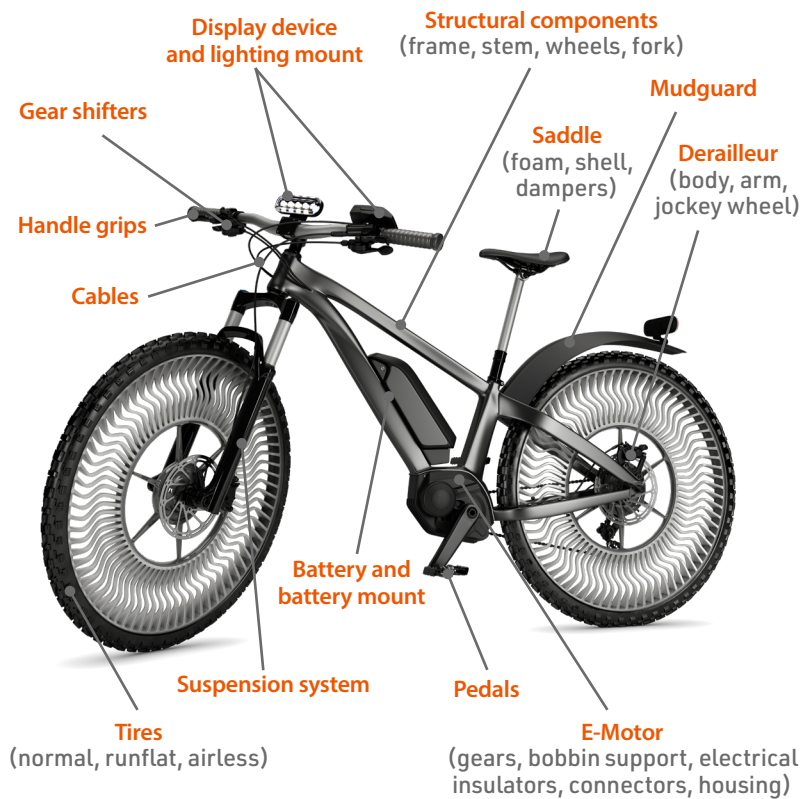


ENERGIZE E-BIKE INNOVATION AND SUSTAINABILITY WITH SPECIALTY POLYMERS

Over the next five years, the e-Bike market is expected to double in size. Demand is rising along with the price of petrol and the growing desire for a more sustainable means of everyday transportation. From folding and e-cargo to gravel, mountain, and commuter e-bikes, the pace of innovation in this industry is breathtaking. Celanese offers a tailwind to this innovation with our forward-looking, sustainable polymer solutions coupled with design and processing expertise.



CELANESE PERFORMANCE PLASTICS CAN:

- Support your innovative designs
- Increase durability and strength
- Reduce total weight
- Enable parts' consolidation

WHERE MATERIALS SCIENCE MEETS E-MOBILITY INNOVATION

Choose from the broad portfolio of tested, trusted Celanese plastics that optimize e-bike components and processes. Read on to explore top e-bike applications, including:

- **E-motor and battery parts** such as connectors, battery components, gears, and insulators
- **Comfort and accessories** such as saddle dampers and shells, damping and suspension components, and mudguards
- **Structural components** such as frame and stems, wheels (airless tires), and pedals
- **Other essential components** including derailleur, brakes, shifters, display mounts, run flat tire inserts, hoses, and sheaths

SUPPORTING YOUR SUCCESS

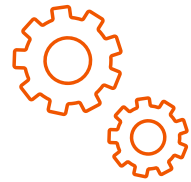
Celanese provides solutions for engineering and production challenges. We understand that getting it right, right away matters to your reputation and your bottom line. Engage us for support with e-bike innovation:

- Material selection and material data
- Part design review and optimization through FEA analysis
- Processing support and optimization through molding simulation
- Material sampling
- Prototyping and testing



E-MOTOR AND BATTERY

	Celanese Materials	Properties
Connectors and Insulators	Crastin® PBT Rynite® PET Zytel® PA / Zytel® HTN	<ul style="list-style-type: none"> • Excellent electrical properties • NHFR V0 flame retardancy and hydrolysis resistance • Excellent CTI, GWFI, and RTI performance • Superior flowability and dimensional stability • Encapsulation compatible and EIS registered
Battery Components	Crastin® PBT Rynite® PET Zytel® PA / Zytel® HTN	<ul style="list-style-type: none"> • Excellent toughness and stiffness (housing) • Good dimensional stability and low warpage • Electrical insulation and NHFR V0 flame retardancy • Superior flowability for complex designs • Good surface finish and UV resistance (housing)
Gears	Zytel® PA Zytel® HTN	<ul style="list-style-type: none"> • Excellent high temperature mechanical performance • Good fatigue and creep resistance • Low wear and friction • Excellent dimensional stability, low moisture pickup • Noise reduction



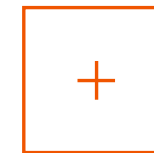
STRUCTURAL COMPONENTS

	Celanese Materials	Properties
Frame, Stem, Rims, and Fork	Zytel® PA Zytel® HTN	<ul style="list-style-type: none"> • Superior strength and stiffness, high fiber content • Excellent dimensional stability and low warpage • Good surface finish and paint compatible • High-temperature, UV and weather resistance • Easy processing and high flow
Wheel (airless tire)	Hytrel® TPC-ET Zytel® PA	<ul style="list-style-type: none"> • Outstanding creep and flex fatigue performance • Excellent low-temperature flexibility and toughness • Sustainable with recyclable and bio sourced grades • Good flow and weld lines for large parts • Broad service temperature (-40°C to 150°C) • Wide range of hardness and softness
Pedals	Zytel® PA	<ul style="list-style-type: none"> • Superior strength and impact resistance • Highly reinforced materials for lightweight design • Excellent part finish • UV and weather resistance • Colorable and paintable



COMFORT AND ACCESSORIES

	Celanese Materials	Properties
Saddle <i>Foam, dampers, and shell</i>	Hytrel® TPC-ET (injected and foam) Zytel® PA Zytel® LCPA	<ul style="list-style-type: none"> • 100% recyclable, no foaming agent (physical foaming) • Closed cell foam with no water absorption • Foam density 0.10 – 1.16 g/cm³, superior resilience • Easy, flexible, and scalable process • Reduces adhesive usage with integrated solution • Excellent strength, stiffness, and toughness (shell)
Dampening/suspension components	Hytrel® TPC-ET	<ul style="list-style-type: none"> • Excellent flexural fatigue and creep resistance • Outstanding oil, abrasion, and weather resistance • Non-migratory (no plasticizer), RoHS compliant • Lightweight and recyclable • Broad service temperature (-40°C to 150°C) • Easy processing and fast cycle times
Mudguards	Zytel® PA	<ul style="list-style-type: none"> • Excellent mechanical properties • Easy processing and good flow for thin sections • Dimensional stability and low warpage • Weather and UV resistant • Colorable and paintable



OTHER ESSENTIAL COMPONENTS

	Celanese Materials	Properties
Derailleur, brakes, shifters, and display mount	Zytel® PA Zytel® HTN	<ul style="list-style-type: none"> • Excellent strength and stiffness • Impact resistant toughened grades • Dimensional stability and low warpage • Superior flowability for complex designs • Good surface finish and UV resistance
Run Flat Tire Insert	Hytrel® TPC-ET foam	<ul style="list-style-type: none"> • Lightweight and resilient foam • Adjustable density 0.10 – 1.16 g/cm³ • 100% recyclable, no foaming agent (physical foaming) • High efficiency and easy processing • Superior tear resistance and supportability
Hoses and Sheaths	Hytrel® TPC-ET Zytel® LCPA	<ul style="list-style-type: none"> • Excellent burst pressure • Excellent flexural fatigue and torsional strength • Extrusion and coating compatible • Wear and abrasion resistance • Weather and UV resistant

ABOUT CELANESE MATERIALS

Zytel® PA	This versatile polyamide supports a wide range of structural, electrical, and high-temperature applications.
Zytel® HTN	Our PPA polyamide excels in extremely high-temperature structural applications that require superior stiffness and stable dimensions. It's also an effective electrical insulator.
Zytel® LCPA	This flexible polymer material offers excellent thermal, chemical, and hydrolysis resistance. The Zytel® LCPA line also includes one of the industry's widest arrays of innovative, renewably sourced (RS) materials.
Hytrel® TPC-ET	These proven TPC-ET thermoplastic elastomers combine the flexibility of rubber with the strength and processability of thermoplastics. Manufacturers prefer parts made with Hytrel® TPC-ET for their resilience, heat and chemical resistance, as well as their strength and durability.
Crastin® PBT	For connectors requiring superior halogen-free flame retardancy, hydrolysis resistance, electrical properties, and processability.
Rynite® PET	Our PET is ideal for electronic and electrical components that require high-temperature resistance. Rynite® PET PCR non-halogen, flame-retardant solutions made from post-consumer recyclate exhibit high flow and low warpage properties while also helping manufacturers meet their sustainability targets.

COLLABORATION ON E-BIKE DESIGN AND MANUFACTURING

Our team of experienced engineers, designers, and material scientists collaborate with you to select, test, and optimize the materials for your e-mobility applications. We bring expertise and global reach to your projects. Explore more at celanese.com.

celanese.com

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