

Celgard® Dry-Process Lithium-Ion Battery Separators



Celgard, a subsidiary of Asahi Kasei since 2015, is a global leader in the development and production of high-performance membrane separator technology. Our products are used in a broad range of energy storage applications including rechargeable lithium-ion batteries, disposable lithium batteries and specialty energy storage.

With more than 40 years of market-leading research, development, and manufacturing, we are equipped with the capacity and the manufacturing process technologies to meet the needs of virtually any customer.

Application Areas:

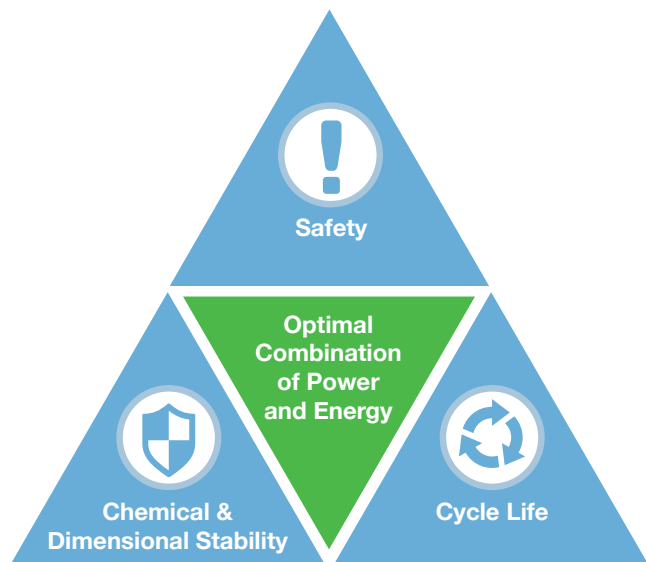
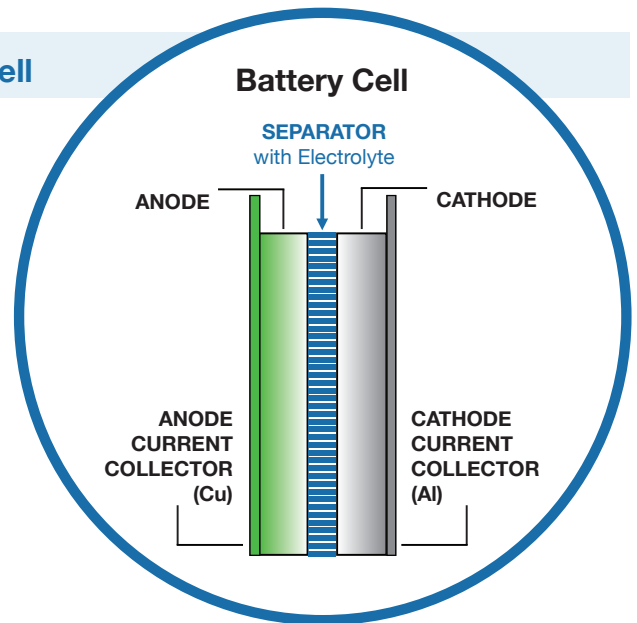
- Automotive - Electric Drive Vehicles (EDV)
- Energy Storage Systems (ESS)
- Other lithium-ion battery applications (power tools, military, motorsport, specialty)

Primary Functions of a Separator in a Battery Cell

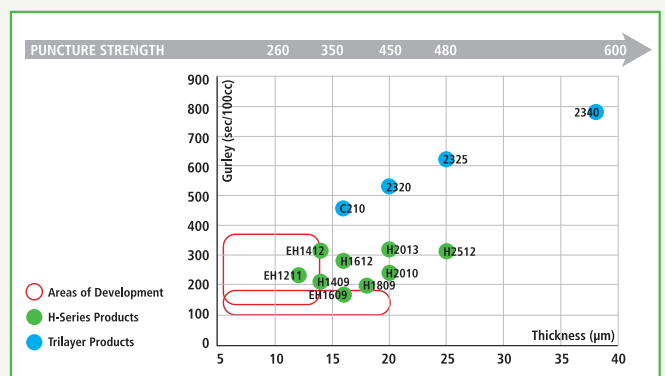
- Prevents electronic contact of the electrodes
- Allows ionic transport between the electrodes
- Usable on a high-speed winding machine
- Enables thermal fuse - a key shutdown feature

EDV Battery Performance Criteria

Celgard offers products for a variety of battery separator applications that balance the competing demands of EDV performance criteria, including safety, chemical and dimensional stability, and cycle life.



Celgard® Separators: Thickness vs. Gurley



Celgard's Family of Separator Technology Solutions

As the world's leader in battery separator technology, Celgard has both the expertise and the portfolio of product solutions required for next generation batteries.

| MARKET | EDV | | |
|-----------------------------|---|--|--|
| | Battery Electric Vehicles (BEV) | Plug-In Hybrid Electric Vehicles (PHEV) | Hybrid Electric Vehicles (HEV) |
| CELGARD PRODUCT SOLUTIONS | Trilayer PP/PE/PP H-Series (High Porosity Trilayer) Q-Series (Ceramic Coated) | Trilayer PP/PE/PP H-Series (High Porosity Trilayer) | H-Series (High Porosity Trilayer) Monolayer PP |
| MARKET NEEDS | <ul style="list-style-type: none"> Vehicle Range Long Battery Life Safety | <ul style="list-style-type: none"> High Power for Acceleration Long Battery Life Consistent Energy Output over an Extended Period of Time | <ul style="list-style-type: none"> High Power for Acceleration Ability to Withstand Frequent Charges and Discharges over the Life of the Battery |
| FEATURES | <ul style="list-style-type: none"> Low Ionic Resistance and High Porosity PP Outer Layers Provide High Temperature Melt Integrity (HTMI) and Oxidative Resistance PE Inner Layer Provides High-Speed Shutdown During a Thermal Event | <ul style="list-style-type: none"> Excellent Electrolyte Absorption for Fast Ion Transfer Sustained Separator Mechanical Integrity over the Life of the Battery | <ul style="list-style-type: none"> High Cycle Life Unparalleled Tolerance or Resistance to Electrochemical Oxidation at Elevated Temperatures and Voltages |
| APPLICATION/BATTERY BENEFIT | <ul style="list-style-type: none"> Increased Battery Energy Density for Longer Driving Ranges Increased Battery Longevity and Strength Increased Battery Safety | <ul style="list-style-type: none"> High Battery Discharge Rate for Vehicle Acceleration Ability to Withstand Deep Battery Discharges Increased Battery Longevity and Strength | <ul style="list-style-type: none"> Fast Charge and Discharge Rates over the Life of the Battery Increased Battery Longevity and Strength |

Celgard® H-Series Trilayer Products

