

**Help protect and  
insulate energy  
storage systems.**

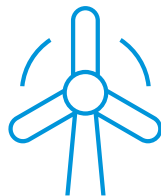
**3M Solutions for  
OEMs and Converters**





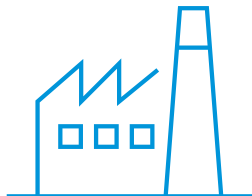
# Solutions across the energy storage landscape.

Energy storage systems (ESS) play a critical role in helping energy grids keep up with increased electrical usage. Battery ESS are used across the entire energy landscape: in front-of-the-meter applications, such as electricity generation and distribution, along with behind-the-meter applications in commercial, industrial, and residential markets.



## Front-of-the-meter Electricity generation and distribution

- Price arbitrage
- Long-term capacity payments
- Ancillary service markets
- Derisking renewable generation
- Investment deferral



## Behind-the-meter Commercial and industrial

- Renewable integration
- Uninterruptible power supply
- Power cost optimization
- Electric vehicle (EV) charging infrastructure



## Behind-the-meter Residential

- Home integration of renewable integration
- Home integration of EV charging infrastructure

All of these requirements add up to a growing demand for reliable ESS. The market is expected to grow from \$50 billion in 2023 to \$150 billion in 2040.

### Benefits of ESS

- Frequency regulation: Batteries can be charged or discharged to stabilize the grid.
- Asset aggregation: ESS can be used to manage multiple assets in a building or campus to work as a single entity.
- Generator replacement or offsetting: Extended battery capacity can provide an environmentally friendly alternative to diesel generators.

Source for all data: [“Enabling renewable energy with battery storage systems,” McKinsey & Company, Aug. 2023.](#)





3M Electrical Insulation Materials

Cell Can Insulation

Key Requirements:

- Electrical insulation
- Peel adhesion on aluminum
- Shear strength and good bonding to structural adhesives
- Fulfills cleanliness requirements
- Good adhesion at cell edge

EMD Products:

- 3M™ Polyester Film Electrical Tape 1350F-1
- 3M™ UVi Electrical Insulation Tape 1924B-1

Cold Plate Insulation/Module Housing Insulation

Key Requirements:

- Electrical insulation
- Peel adhesion on aluminum
- Bubble-free application
- Shear strength and good bonding to gap fillers or structural adhesives

EMD Products:

- 3M™ Polyester Film Electrical Tape 1350F-1
- 3M™ Polyester Film Electrical Tape 1350F-2
- 3M™ UVi Electrical Insulation Tape 1924B-1

3M Barrier Materials

Above Cell Barrier

Key Requirements:

- Electrical insulation
- Penetrable cell vent passage
- Resistance against hot particle burn-through

EMD Products:

- 3M™ Flame Barrier FRB-NT

Venting Path Barrier/Venting Hole Cover

Key Requirements:

- Electrical insulation
- Blast resistance
- Mechanical reinforcement
- Thermal isolation
- Penetrable cell vent passage

EMD Products:

- 3M™ Torch Flame Resistant Barriers TFRB-SE1 and TFRB-SE3
- 3M™ Glass Cloth Electrical Tape 9

# ESS solutions for thermal barrier and electrical insulation applications.

3M™ Glass Cloth Electrical Tape 9

For applications requiring thermal and electrical insulation of components, this tape has a thermosetting silicone adhesive and glass cloth backing that resists shrinking and burning.

- UL component recognized: UL510A Standard, Category OANZ2, File No. E17385
- CSA certified: Standard C22.2 No. 66, File No. 093411, Class 9052-30
- Flame-retardant, UL temperature rated up to 200°C (392°F)

3M™ Polyester Film Electrical Tapes

3M 1350 series tape is a broad portfolio offering electrical tapes for different application requirements. They provide reliable electrical insulation with consistent and complete coverage of the application area.

- Durable polyester backing for high tensile strength and elongation
- UL component recognized: UL510A Standard, Category OANZ2, File No. E17385 (1350F, 1351, 1350T, 1388)

3M™ UVi Electrical Insulation Tape 1924B-1

For electrical insulation of electrical components where a higher bond strength is required.

- Low tack for easy positioning
- Semi-structural bonding strength after full cure
- Excellent electrical insulation properties

3M™ Torch Flame Resistant Barriers TFRB-SE1 and TFRB-SE3

These products may be applied under the lid or to provide venting channel protection.

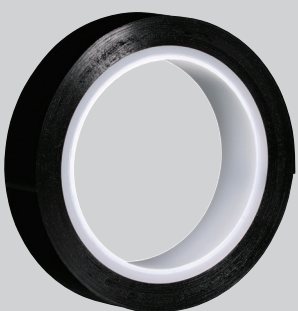
- Inorganic-based paper reinforced on one side or both sides for improved mechanical properties
- Could be combined with flame-retardant 3M™ VHB™ Tape or double coated tape (DCT) for adhesion to a surface
- High temperature and flame resistant up to 1000°C (1832°F) for at least 10 minutes.
- Good dielectric strength

3M™ Flame Barrier FRB-NT

To enhance electrical insulation post-cell burst, use these materials in areas above cells. They have low moisture absorption and low shrinkage and the material can be easily slit, cut, formed, or die-cut for specific applications.

- Inorganic-based, halogen-free\* materials
- Excellent ignitability, arc, and track resistance
- Good dielectric strength
- Dimensionally stable
- Easy to convert
- UL 94 V0, 5VA flame rating at low thickness, UL File E65069

\*Halogen-free defined as 1) no halogen compounds are intentionally added to the product or used in the manufacturing process for the product and 2) any impurities present are less than 900 ppm bromine, less than 900 ppm chlorine, and/or less than 1500 ppm total bromine and chlorine. The latter are the levels set forth in certain industry standards, such as the International Electrotechnical Commission (IEC) 61249-2-21 standard.



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## 3M.com/oem



Electrical Markets Division  
13011 McCallen Pass, Bldg. C  
Austin, TX 78753-5380

Phone 800.676.8381  
Fax 800.828.9329  
[www.3M.com/oem](http://www.3M.com/oem)

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