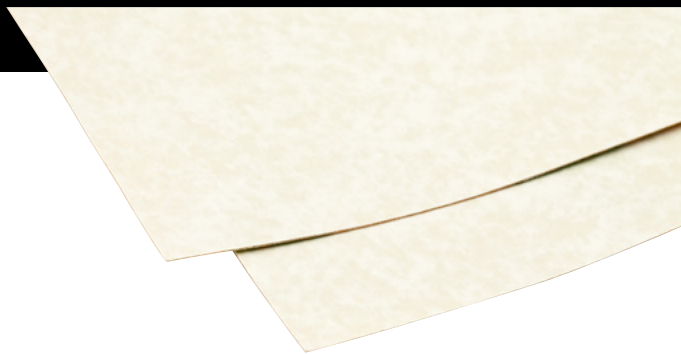
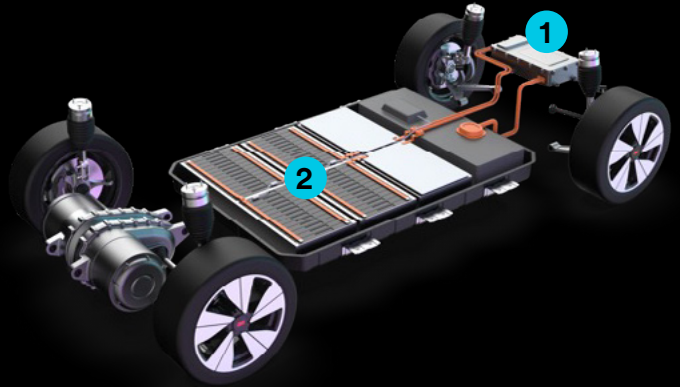


ePowertrain Electrical Insulation Solutions

Electrical Markets Division



3M™ Flame Barrier FRB-NT102 and FRB-NT127

Product Description

3M™ Flame Barrier FRB-NT102, FRB-NT127 is a series of thin inorganic based, halogen free sheet material that has flammability rating, is easy to convert and has good compatibility with various adhesives. It provides protection to battery cell areas while allowing venting of high temperature gases/particulates from a battery cell undergoing thermal runaway.

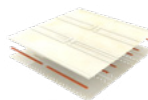
Potential Applications

1



Inverter/Power
Electronics,
Busbar Insulation

2



Above Cell & Cell
Connection System
Insulation

Product Benefits

- An inorganic-based, halogen-free* material
- UL 94 5VA flame rating at low thickness (UL File E65069)
- Excellent ignitability resistance
- Excellent arc/track resistance and good dielectric strength
- Dimensionally stable (low moisture absorption and low shrinkage at high temperature)
- Good convertibility — material is easily slit, cut, formed and die cut
- Good compatibility with various adhesives

* Halogen Free defined as i.) no halogen compounds are intentionally added to the product or used in the manufacturing process for the product and ii.) 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.

3M™ Flame Barrier FRB-NT102 and FRB-NT127

Mechanical Properties

Mechanical Property	3M FRB-NT102	3M FRB-NT127
Nominal thickness	4 mils (0.102 mm) per ASTM D-645	5 mils (0.127 mm) per ASTM D-645
Basis weight	0.29 lb/yd ² (156 g/m ²) per ASTM D-202	0.36 lb/yd ² (195 g/m ²) per ASTM D-202
Tensile strength, MD	22 lb/inch (39 N/cm)	31 lb/inch (54 N/cm)

Electrical Properties

Electrical Property	3M FRB-NT102	3M FRB-NT127
Dielectric breakdown voltage	2,200 V per ASTM-D149	2,700 V per ASTM-D149
Comparative Tracking Index**	PLC 0 per ASTM D3638	PLC 0 per ASTM D3638

Other Properties

Property	3M FRB-NT102	3M FRB-NT127
Flame rating**	V-0, 5 VA per ANSI/UL 94	V-0, 5 VA per ANSI/UL 94

Notes: The technical information and data in the above tables should be considered representative or typical only and should not be used for specification purposes.

Product Construction

- An inorganic-based, halogen free material*

* Halogen Free defined as i.) no halogen compounds are intentionally added to the product or used in the manufacturing process for the product and ii.) 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.

** UL QMFZ2/E65069 assigned rating

Electrical Insulation Materials

Intended Use: These products are intended for use within a high voltage lithium-ion battery pack to help prevent the unintended contact of electrically charged surfaces of cells and pack components operated at standard temperature conditions in automotive, off-highway, industrial and marine battery applications. Since there are many factors that can affect a product's use, the customer remains responsible for determining whether the 3M product is suitable and appropriate for the customer's specific application and system, including customer conducting an appropriate risk assessment and evaluating the 3M product in customer's application and system.

Restricted Use: 3M advises against the use of this 3M product in any application other than the stated intended use(s), since other applications have not been evaluated by 3M and may result in an unsafe or unintended condition

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