

# 3M™ Flame Barrier FRB-NC Series

Data Sheet

November 2012

**Description** 3M™ Flame Barrier FRB-NC Series provide the high flammability resistance, arc resistance, and dielectric strength to help safely contain electrical hazards.

These barriers are available in roll or sheet form.

The flame barrier FRB-NC series provide the reliability you need, from 3M, a trusted company with over 30 years of experience providing insulating solutions that protect people, equipment, and property around the globe.

**Applications** The flame barrier FRB-NC series provides both electric shock and flame protection for electrical and electronic device applications such as:

- General purpose lighting luminaires (including LED type)
- Battery housing barrier (including electric and hybrid vehicles)
- Appliance enclosure or insulation of live parts

**Features** The flame barrier FRB-NC series is:

- An inorganic-based, halogen free material (see regulatory section)
- UL 94-5VA rated - the most flame retardant UL 94 rating, even better than UL 94V-0
- Dimensionally stable – minimal to no shrinkage at elevated temperatures
- Available in thicknesses from 5 to 16 mil (0.127 to 0.406 mm)

**Regulatory** The flame barrier FRB-NC series is:

- **REACH compliant.** Product contains no Substances of Very High Concern (SVHC's) on the REACH candidate lists according to article 59 of Regulation (EC) No 1970/2006 up to June 2012. For current status, go to [www.3M.com/REACH](http://www.3M.com/REACH)
- **RoHS Meets MCVs 2011/65/EU.** "RoHS meets MCVs" means that the product or part does not contain any of the substances in excess of the maximum concentration values ("MCVs") in EU RoHS Directive 2011/65/EU. The MCVs are by weight in homogeneous materials.
- **Halogen Free** defined as both 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.
- The above information represents 3M's knowledge and belief which may be based in whole or in part on information provided by 3<sup>rd</sup> party suppliers to 3M.
- UL component recognized in accordance with UL 746 file # E65069

**Flammability** The UL 94 test method is used to classify materials based on results from specified small-scale flame tests. These classifications (5VA, 5VB, V-0, V-1, V-2, HB), listed in decreasing order of flame resistance, are used to distinguish a material's burning characteristics after test specimens have been exposed to a specified test flame under controlled laboratory conditions. These classifications typically apply to materials used in manufacturing enclosures, structural parts, and insulators found in consumer electronic products.

A material classified as 5VA or 5VB is subjected to a flame ignition source that is approximately five times more severe than that used in the V-0, V-1, V-2 and HB tests. Furthermore, specimens in 5VA or 5VB may not drip any flaming particles and 5VA rated specimens may not develop any burn-through holes during the test.

## 3M™ Flame Barrier FRB-NC Series

### Typical Properties

Technical information provided consists of typical product data and should not be used for specification purposes. Unless otherwise noted, all tests are performed at room temperature.

Property	Units	Test Method	FRB-NC127	FRB-NC178	FRB-NC229	FRB-NC305	FRB-NC406
Nominal Thickness	mm mil	ASTM D-645	0.127 5.0	0.178 7.0	0.229 9.0	0.305 12.0	0.406 16.0
Color			Ivory	Ivory	Ivory	Ivory	Ivory
<b>Physical Properties</b>							
Basis Weight	g/m <sup>2</sup> lb/yd <sup>2</sup>	ASTM D-202	103 0.19	157 0.29	201 0.37	271 0.50	356 0.66
Density	g/cc		0.80	0.88	0.88	0.89	0.88
Flame Rating (UL File E65069)	Flammability rating	UL94	V-0, 5VA	V-0, 5VA	V-0, 5VA	V-0, 5VA	V-0, 5VA
Moisture Absorption	%	ASTM D-644	< 1	< 1	< 1	< 1	< 1
Dimensional Shrinkage, (150 °C), MD	%	ASTM D-2305	<0.3	<0.3	<0.3	<0.3	<0.3
Dimensional Shrinkage, (200 °C), MD	%	ASTM D-2305	<0.3	<0.3	<0.3	<0.3	<0.3
Thermal Conductivity (180 °C)	W/mK	ASTM E-1530	0.10	0.12	0.13	0.14	0.15
<b>Electrical Properties</b>							
High-Voltage Arc Tracking Rate (HVTR)	PLC assigned	UL 746A	0	0	0	0	0
Comparative Tracking Index (CTI)	PLC assigned	UL 746A	0	0	0	0	0
Hot Wire Ignition (HWI)	PLC assigned	UL 746A	4*	4*	4*	4*	4*
High Current Arc to Ignition (HAI)	PLC assigned	UL 746A	3	3	3	3	3
High Volt, Low Current Arc Resistance	PLC assigned	ASTM D-495	5	5	5	5	5
Dielectric Breakdown Voltage	kV	ASTM D-149	0.9	1.5	1.8	2	3.2
Dielectric Breakdown Strength	V/mil	ASTM D-149	180	214	200	216	200
<b>Mechanical Properties</b>							
Nominal Thickness	mm mil	ASTM D-645	0.127 5.0	0.178 7.0	0.229 9.0	0.305 12.0	0.406 16.0
Tensile Strength, MD	lb/inch N/cm	D-828	7 12	14 24	16 27	22 39	21 37
Tensile Strength, CD	lb/inch N/cm	D-828	4 8	6 11	9 15	16 28	23 40
Elongation to Break, MD	%	D-828	1.0	1.5	1.5	1.5	1.7
Elongation to Break, CD	%	D-828	1.0	1.2	1.3	1.2	1.5
Elmendorf Tear, MD	g N	D-689	50 0.5	80 0.8	108 1.1	232 2.3	329 3.2
Elmendorf Tear, CD	g N	D-689	80 0.8	112 1.1	132 1.3	300 2.9	347 3.4

\* - Materials that do not comply with the minimum hot-wire ignition levels may be evaluated by an abnormal overload test or the glow-wire end-product test, per UL 746C

## 3M™ Flame Barrier FRB-NC Series

---

<b>Shelf Life &amp; Storage</b>	This product has a 5-year shelf life from date of manufacture when stored in a humidity controlled storage (from 10°C / 50°F to 27°C / 80°F and <75% relative humidity)
---------------------------------	---

---

<b>Availability</b>	For availability, please contact your local distributor. Names and addresses are available from <a href="http://3M.com/electrical">3M.com/electrical</a> [Where to Buy] or call 1-800-676-8381.
---------------------	---

---

---

<b>Important Notice</b>	All statements, technical information, and recommendations related to 3M's products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use. Any statements related to the product which are not contained in 3M's current publications, or any contrary statements contained on your purchase order shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of 3M.
-------------------------	---

---

<b>Warranty; Limited Remedy; Limited Liability</b>	This product will be free from defects in material and manufacture at the time of purchase. <b>3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.</b> If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. <b>Except where prohibited by law, 3M will not be liable for any indirect, special, incidental or consequential loss or damage arising from this 3M product, regardless of the legal theory asserted.</b>
--	---

---

3M is a trademark of 3M Company.  
All other trademarks are property of their respective owners.



**Electrical Markets Division**  
6801 River Place Blvd.  
Austin, TX 78726-9000  
800 676 8381  
FAX 800 828 9329

Please recycle.  
© 3M 2012 All rights reserved.  
78-8141-5285-2 Rev C