



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



# 3M™ Flame Barrier FRB-BK Series

Data Sheet

January 2013

**Description** 3M™ Flame Barrier FRB-BK Series is a low reflectance coated version of 3M Flame Barrier FRB-NT. The black coating provides less light reflectance, while the base 3M FRB-NT substrate material from 3M provides high flammability resistance, arc resistance, and dielectric strength to safely contain electrical hazards.

These thin and flexible flame barriers are available in roll or sheet form, can be easily converted to produce quality die-cut parts, and assembled into a finished product.

The flame barrier FRB-BK series provides 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-BK series combines a low light reflectance surface to minimize light pollution with both electric shock and flame protection for lighting luminaires (particularly LED type).

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

- An inorganic-based, halogen-free material (see regulatory section)
- Coated to provide a low, 6% reflectance surface
- UL 94 5VA rated – the most flame-retardant UL 94 rating, even better than UL 94 V-0
- Available in thicknesses of 5.8 and 8.8 mil (0.145 and 0.225 mm)
- Dimensionally stable – minimal to no shrinkage at elevated temperatures
- Low volatile outgassing

**Regulatory** The flame barrier FRB-BK 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-BK Series

### Typical Properties – Flame Barrier FRB-BK Series

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

| Property   | Units              | Test Method                           | FRB-BK145                                       | FRB-BK225                                       |
|--|--------------------|---------------------------------------|---|---|
| Nominal Thickness  | mm                 | ASTM D-645                            | 0.145   | 0.225   |
|  | mil                |                                       | 5.8   | 8.8   |
| Color  |                    |                                       | Black   | Black   |
| Construction   |                    |                                       | FRB-NT102 base with black coating on both sides | FRB-NT178 base with black coating on both sides |
| <b>Physical Properties</b>                                   |                    |                                       |   |   |
| Basis Weight   | g/m <sup>2</sup>   | ASTM D-202                            | 200   | 318   |
|  | lb/yd <sup>2</sup> |                                       | 0.38  | 0.58  |
| Density  | g/cc               |                                       | 1.4   | 1.4   |
| Flame Rating (UL File E65069)                                |                    | UL 94                                 | V-0, 5VA  | V-0, 5VA  |
| Relative Thermal Index, Component, Electrical                | °C                 | UL 746B                               | 140   | 140   |
| Relative Thermal Index, Component, Mechanical without impact | °C                 | UL 746B                               | 130   | 130   |
| Reflectance  | %                  | Photovolt Model 577 Reflectance Meter | 6   | 6   |
| Moisture Absorption  | %                  | ASTM D-644                            | < 1   | < 1   |
| Dimensional Shrinkage, (150 °C), MD                          | %                  | ASTM D-2305                           | <0.3  | <0.3  |
| Dimensional Shrinkage, (200 °C), MD                          | %                  | ASTM D-2305                           | <0.3  | <0.3  |
| Thermal Conductivity (180 °C)                                | W/mK               | ASTM E-1530                           | 0.15  | 0.15  |
| <b>Electrical Properties</b>                                 |                    |                                       |   |   |
| High-Voltage Arc Tracking Rate (HVTR)                        | PLC assigned       | UL 746A                               | 0   | 0   |
| Comparative Tracking Index (CTI)                             | PLC assigned       | UL 746A                               | 0   | 0   |
| Hot Wire Ignition (HWI)                                      | PLC assigned       | UL 746A                               | 1   | 1   |
| High Current Arc to Ignition (HAI)                           | PLC assigned       | UL 746A                               | 1   | 1   |
| Glow wire ignition temperature (GWIT)                        | °C                 | IEC 60695-2-13                        | 930   | 930   |
| Glow wire flammability index (GWFI)                          | °C                 | IEC 60695-2-12                        | 960   | 960   |
| High Volt, Low Current Arc Resistance                        | PLC assigned       | ASTM D-495                            | 4   | 4   |
| Dielectric Breakdown Voltage                                 | kV                 | ASTM D-149                            | 2.8   | 3.4   |
| Dielectric Breakdown Strength                                | V/mil              | ASTM D-149                            | 482   | 385   |

## 3M™ Flame Barrier FRB-BK Series

| Property                     | Units           | Test Method | FRB-BK145   | FRB-BK225   |
|------------------------------|-----------------|-------------|-------------|-------------|
| <b>Mechanical Properties</b> |                 |             |             |             |
| <b>Tensile Strength, MD</b>  | lb/inch<br>N/cm | ASTM D-828  | 20<br>35    | 40<br>70    |
| <b>Tensile Strength, CD</b>  | lb/inch<br>N/cm | ASTM D-828  | 10<br>18    | 20<br>35    |
| <b>Elmendorf Tear, MD</b>    | g<br>N          | ASTM D-689  | 120<br>1.17 | 200<br>1.95 |
| <b>Elmendorf Tear, CD</b>    | g<br>N          | ASTM D-689  | 240<br>2.35 | 350<br>3.4  |

Note: 3M™ Flame Barrier FRB-BK Series may exhibit surface imperfections due to intrinsic process variations. These imperfections may include Mayer rod lines, streaks, polish marks, mottled areas and color variation. Please contact technical service for more information.

**Typical Outgassing Results for 3M Flame Barrier FRB-BK145** (3M Test Report ID#205802 )  
 Technical information provided consists of typical product data and should not be used for specification purposes.

### **Gas Chromatography/Mass Spectroscopy (GC/MS) Outgassing (3 hours at 120°C)**

Dynamic headspace analysis of volatile components collected during a 3 hour at 120 °C heat cycle using a Markes Micro-Chamber/Thermal Extractor™ cell and Tenax® adsorbent tubes. Analysis was by a Markes Ultra™ Thermal Desorption System desorber coupled to an Agilent 6890 gas chromatograph / 5975 mass spectrometer.

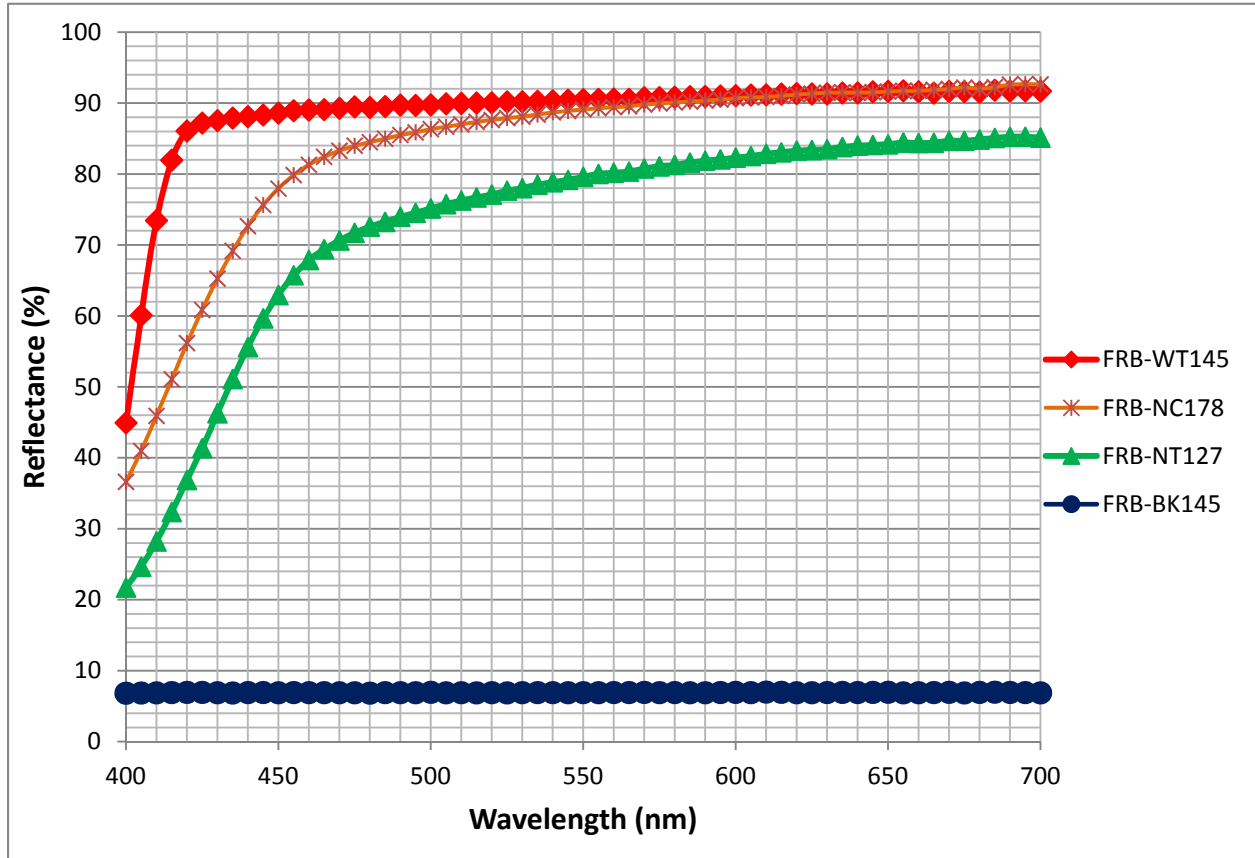
Total volatiles < 84 ppm by mass.

A more detailed test report may be provided on request.

# 3M™ Flame Barrier FRB-BK Series

## Reflectance vs Wavelength for 3M™ Flame Barrier FRB Product Family

A graph of the typical reflectance vs wavelength for all the 3M™ Flame Barrier FRB product types is shown below. (These measurements were made with a HunterLAB UltraScan PRO spectrophotometer).



# 3M™ Flame Barrier FRB-BK Series

---

**Shelf Life & Storage**

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)

---

**Availability**

For availability, please contact your local distributor. Names and addresses are available from 3M.com/electrical [Where to Buy] or call 1-800-676-8381.

---

---

**Important Notice**

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.

---

**Warranty; Limited Remedy; Limited Liability**

This product will be free from defects in material and manufacture at the time of purchase. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** 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. **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.**

---

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  
www.3M.com/OEM

Please recycle.  
© 3M 2013 All rights reserved.  
78-8141-5627-5 Rev B