3M™ Flame Barrier FRB-WT Series

Data Sheet **January 2013**

Description

3M™ Flame Barrier FRB-WT Series is a high, diffuse reflectance coated version of 3M Flame Barrier FRB-NT. The white coating provides greater 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-WT 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-WT series combines a high, diffuse reflectance surface to maximize light output with both electric shock and flame protection for lighting luminaires (particularly LED type). The excellent thermal stability of the flame barrier FRB WT series is also useful for high temperature labels.

Features

The flame barrier FRB-WT series is:

- An inorganic-based, halogen-free material (see regulatory section)
- Coated to provide a white, 90% diffuse 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-WT 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*
- **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 3rd 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-WT Series

Typical Properties – Flame Barrier FRB-WT

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-WT145	FRB-WT225
Nominal Thickness	mm mil	ASTM D-645	0.145 5.8	0.225 8.8
Color			White	White
Construction			FRB-NT102 base with white coating on both sides	FRB-NT178 base with white coating on both sides
Physical Properties				
Basis Weight	g/m^2 lb/yd^2	ASTM D-202	233 0.43	351 0.63
Density	g/cc		1.6	1.5
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	90	90
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
Electrical Properties				
High-Voltage Arc Tracking Rate (HVTR)	PLC assigned	UL 746A	2	2
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	1.6	3.3
Dielectric Breakdown Strength	V/mil	ASTM D-149	275	375

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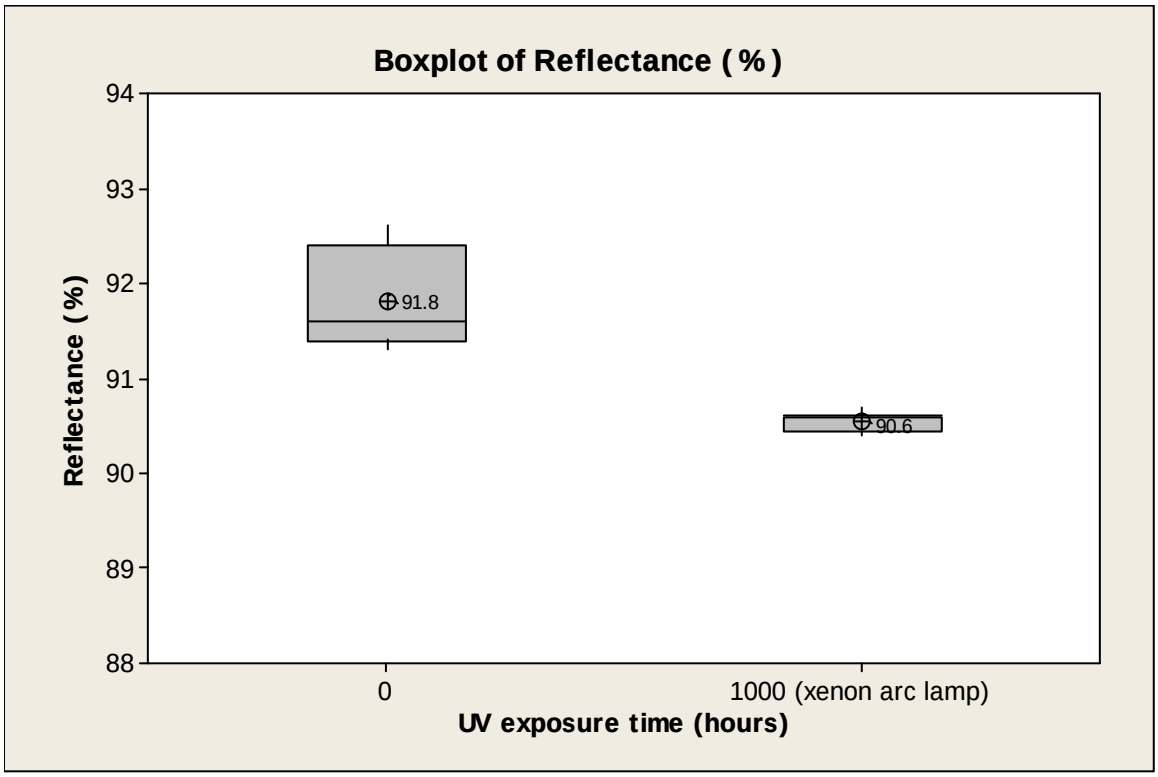
Property	Units	Test Method	FRB-WT145	FRB-WT225
Mechanical Properties				
Tensile Strength, MD	lb/inch N/cm	ASTM D-828	20 35	40 70
Tensile Strength, CD	lb/inch N/cm	ASTM D-828	10 18	20 35
Elmendorf Tear, MD	g N	ASTM D-689	120 1.17	200 1.95
Elmendorf Tear, CD	g N	ASTM D-689	240 2.35	350 3.4

Note: 3M™ Flame Barrier FRB-WT 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.

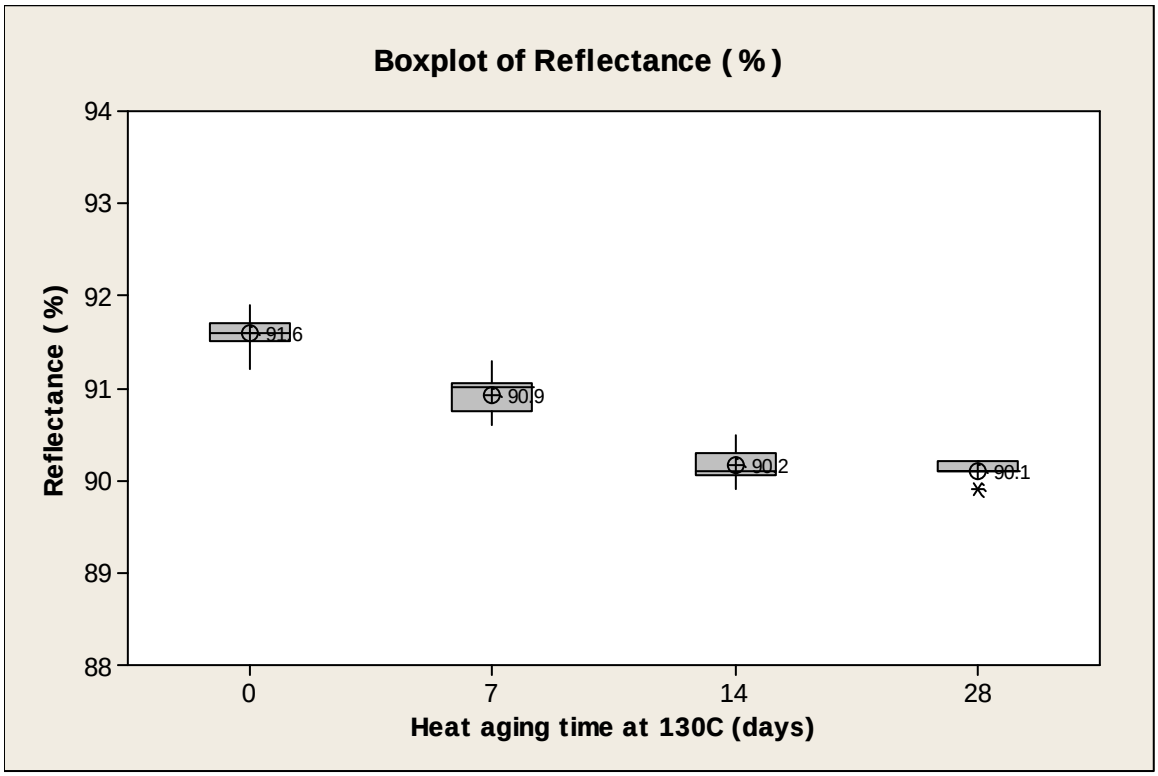
Reflectance Stability of FRB-WT Series after Accelerated UV Aging

After accelerated UV exposure of 1000 hours with a xenon arc light source (ASTM G155 – Cycle 1, no water spray), the FRB-WT145 still retains high reflectance as shown in the graph below. (Reflectance measurements were made with a Photovolt Model 577 Reflectance Meter).



Reflectance Stability of FRB-WT Series after Heat Aging at 130°C

After heat aging at 130°C for 28 days, the FRB-WT145 still retains high reflectance as shown in the graph below.



Typical Outgassing Results for 3M™ Flame Barrier FRB-WT120 (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)

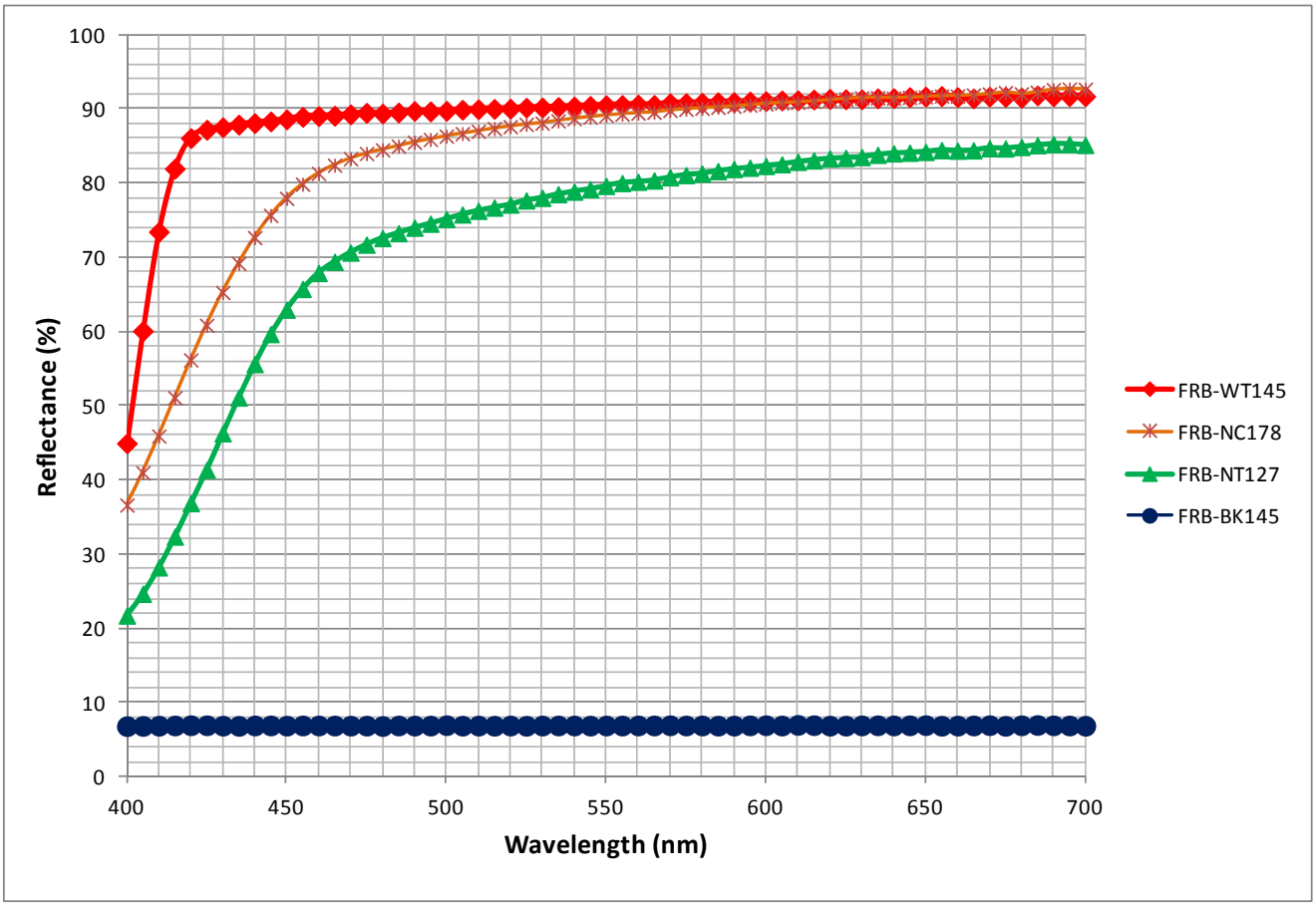
Dynamic headspace analysis of volatile components was collected during a 3 hour at 120°C heat cycle using a Markes Micro-Chamber/Thermal Extractor™ cell and Tenax® adsorbent tubes. Analysis was by a Markes Ultra™ Thermal Desorptian System desorber coupled to an Agilent 6890 gas chromatograph / 5975 mass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

Total volatiles < 67 ppm by mass.

A more detailed test report may be provided on request.

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).



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.

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