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	<b>Facility: Johns Manville          Technical Center</b>	<b>Date: September 30, 2004          Page: Title</b>

**TITLE:**

FAA Flame Propagation Part 25 FAR 25.856  
 Microlite® AA - Standard and Premium - Unfaced

**EXECUTIVE SUMMARY:**

Johns Manville Microlite® AA Standard and Premium unfaced blankets were tested for compliance to the FAA Flame Propagation test (FAR 25.856). Each product type was evaluated using samples from five different production runs. Test results showed that all of the products passed this FAA requirement with zero failures. Statistical analysis showed that there was less than one chance in a million for product failure.

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**KEYWORDS:**

Microlite AA, FAA, flame propagation qualification, Defiance, aerospace

**NOTEBOOK:**

CO541

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## SUMMARY

Johns Manville Microlite® AA is a critical part of the insulation blanket used in commercial aircraft. As part of the component requirements, this material must comply with current FAA standards. On July 31, 2003 the FAA released a new Flame Propagation standard FAR 26.856 for evaluation of composite systems from which entire insulation blanket systems must be tested and show compliance to this standard. Individual materials making up the blanket are not required by the rule to meet this standard.

Prior to the issuing of the FAR 25.856 specification, Microlite AA fiber glass insulation blankets were tested and complied per the FAR 25.853 (vertical Bunsen burner test) specification. However, the new FAR 25.856 replaces and supersedes the requirements of the FAR 25.853.


This project was initiated to confirm that the Microlite AA blanket component (either standard or premium grade) would not negatively contribute to the flame properties of a finished blanket.

All testing was performed using an electric radiant panel test apparatus. There were 90 tests performed and results of this study showed the Microlite AA blankets, when tested alone, passed the test 100% of the time. Statistical analysis of the test results showed there was less than one chance in one million the Microlite AA blanket by itself would fail the test.

Based on these results, Microlite AA blankets do not negatively contribute to the flame properties of a finished blanket per FAR 25.856 specification. For quality control purposes, Johns Manville will continue to perform the vertical Bunsen burner test as part of our standard compliance testing to ensure that all Microlite AA blankets meet the same criteria as product used in this study.

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## DISCUSSION

Three types of Microlite AA, covering the full range of product density used on commercial aircraft, were tested on August 26, 2004. Tests were performed on each of these products produced during the past four years and consisted of five different code dates for each product. Product testing also included an evaluation of both the top and bottom surface of each blanket. A total of 6 test samples were tested for each code date.

All products used in this evaluation were subject to Johns Manville typical and standard testing for product certification. This included tests such as binder content, punking, and flammability via Bunsen burner (FAR 25.853 Appendix F Part I & FAA Aircraft Materials Handbook Chapter 1 & 2). The results of these tests confirm the historical observation that flame propagation has not been an issue with plain or unfaced Microlite AA standard or premium blankets. For aerospace use, these products were certified to material standards such as ASTM C800.

Results also showed there was no difference due to blanket orientation, top or bottom surface of the blanket.

The results of these tests support the opinion that the current protocol and testing followed for product certification of Microlite AA Standard or Premium blankets provides sufficient capability to insure that these blankets will always pass the new FAA standard.

### **FAA Flame Propagation test (FAR 25.856)**

Test Method designed to determine the flammability and flame propagation characteristics of thermal/acoustic insulation composites (issued July 31, 2003). This test method is used to evaluate the flammability and flame propagation characteristics of thermal/acoustic insulation when exposed to both a radiant heat source and a flame. (See [www.fire.tc.faa.gov](http://www.fire.tc.faa.gov) for additional detail).

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### *Equipment and methodology*

Tests were conducted in the radiant panel test chamber as specified in Title 14 CFR (Code of Federal Regulations) 25.856. The radiant heat energy source was an electrical panel mounted in a cast iron frame, with a radiation surface of 12 1/2 by 18 inches. It is capable of operating at temperatures up to 1300°F. The system was calibrated before testing using a calorimeter per the CFR method.

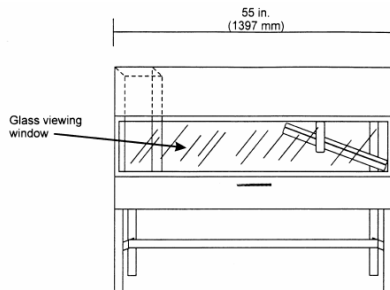


Figure 1 - Radiant Panel Test Chamber



After calibration, tests were performed by placing 12" x 18" x 2" samples in the test chamber. Product was tested for 15 seconds as measured by placement then removal of propane ignition source onto the surface of the test sample. Upon removal of ignition source, observe sample for any after flame.



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*Report*

Identify and describe specimen being tested

At completion of test

Report any shrinkage or melting of the test specimen

Report the Burn length

Report Extinguishing Time

*Test Requirements*

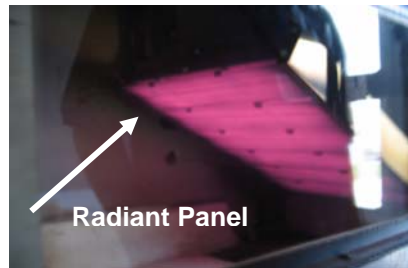
There must be no flame propagation beyond 2 inches (51 mm) to the left of the centerline of the pilot flame application.

The flame time after removal of the pilot burner may not exceed 3 seconds on any specimen.

**Test Results**

**Equipment setup**

Heat Flux Calibration	Initial	1.50 Btu/Sec Sqft	Final	1.496 Btu/Sec Sqft
Laboratory Temperature -	Initial	74F	Final	76 F
Temperature for C	Initial	494 F	Final	487 F
Panel Temperature	Initial	1313 F	Final	1314 F



**Product tested**

Microlite® AA

Premium 0.34 pcf x 1"    Standard 0.42 pcf x 1" or ½"    Standard 1.5 pcf x 3/8"



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**Products Tested Microlite® AA Standard and Premium - Water Repellent**  
**Test Facility - FAA Test Center - Electric Radiant Panel - August 26, 2004**  
**(Exploratory Test - Not for Product Certification)**

Product		Prem .34 pcf x 1"			Std 0.42 pcf x 1"			Std 1.5 pcf x 3/8"		
Sample #	Blanket Orientation	AF* (Sec)	FP (In)	R P/F	AF* (Sec)	FP (In)	R P/F	AF* (Sec)	FP (In)	R P/F
ID.		<b>80402636</b>			<b>6246</b>			<b>90203630</b>		
1	Top	0	0	P	0	0	P	0	0	P
2	Top	0	0	P	0	0	P	0	0	P
3	Top	0	0	P	0	0	P	0	0	P
4	Bottom	0	0	P	0	0	P	0	0	P
5	Bottom	0	0	P	0	0	P	0	0	P
6	Bottom	0	0	P	0	0	P	0	0	P
ID.		<b>102202323</b>			<b>12212223 ½" thick</b>			<b>102212323</b>		
1	Top	0	0	P	0	0	P	0	0	P
2	Top	0	0	P	0	0	P	0	0	P
3	Top	0	0	P	0	0	P	0	0	P
4	Bottom	0	0	P	0	0	P	0	0	P
5	Bottom	0	0	P	0	0	P	0	0	P
6	Bottom	0	0	P	0	0	P	0	0	P
ID.		<b>3248531</b>			<b>2787224</b>			<b>3244548</b>		
1	Top	0	0	P	0.5	0	P	0	0	P
2	Top	0	0	P	0.5	0	P	3	0	P
3	Top	0	0	P	0	0	P	0	0	P
4	Bottom	0	0	P	0	0	P	0	0	P
5	Bottom	0	0	P	0	0	P	0	0	P
6	Bottom	0	0	P	0	0	P	0	0	P
ID.		<b>304082223</b>			<b>304082123</b>			<b>304092223</b>		
1	Top	0	0	P	0	0	P	0	0	P
2	Top	0	0	P	0	0	P	0	0	P
3	Top	0	0	P	0	0	P	0	0	P
4	Bottom	0	0	P	0	0	P	0	0	P
5	Bottom	0	0	P	0	0	P	0	0	P
6	Bottom	0	0	P	0	0	P	0	0	P
ID.		<b>312112124</b>			<b>312082323</b>			<b>202232124</b>		
1	Top	0	0	P	0	0	P	0	0	P
2	Top	0	0	P	0	0	P	0	0	P
3	Top	0	0	P	0	0	P	0	0	P
4	Bottom	0	0	P	0	0	P	0	0	P
5	Bottom	0	0	P	0	0	P	0	0	P
6	Bottom	0	0	P	0	0	P	0	0	P

\* AF - After Flame - ≤ 3 sec, FP - Flame Propagation - ≤ 2 In, R Rating - Pass/Fail Test --- Width 12', Length 18", Thickness 2"

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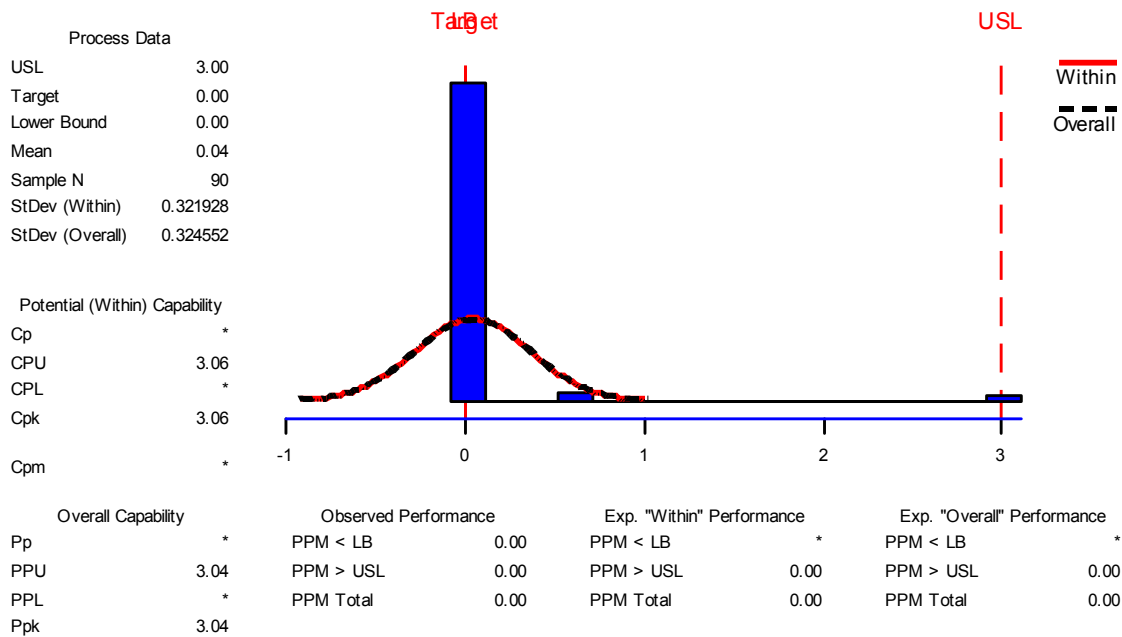
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**Statistical Analysis**

Test results were analyzed using Minitab with the following observations. Product capability analysis showed a Cpk of 3.06, or less than one chance in a million of failing the after flame portion of the flame propagation test. Product anomalies, shown in the data, were included as part of this analysis and still resulted in this excellent process capability.


**Process Capability Analysis for After flame**



No statistical analysis was possible for flame propagation portion of the test since no samples failed or exceeded the allowable value (2”).

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### **Conclusion & Recommendations**

Microlite AA Standard and Premium unfaced aircraft fiberglass insulation passes the new FAA Flame Propagation FAR 25.856 specification. Blanket orientation does not impact test results.

Microlite AA Standard and Premium unfaced products which have been certified to historical material standards (FAR 25.853 specification) will pass the new FAA Flame Propagation test.

Based on this work and given the requirements for the current FAA standard, the following is recommended:

Use existing product certification methodology to insure unfaced blankets will meet intent of FAR 25.856 standard.

Product certification for unfaced blankets should continue to include testing to FAR 25.853 Appendix F Part I standard (FAA Aircraft Material Handbook - Chapter 1 & 2) for flame spread and punking.

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