

November 30, 2006

Fukuvi USA, Inc.  
Mr. Mark Brown  
Commerce Park,  
Center Point 70  
7631 Progress Ct.  
Huber Heights, OH 45424

Our Reference: SV16584/06CA55853

Subject: Report Of Surface Burning Characteristics Tests On Samples As  
Submitted By Fukuvi USA

Dear Mr. Brown:

This is a Report summarizing the results of tests conducted under the Commercial Inspection and Testing Services (CITS) program identified as Assignment No. 06CA55853.

**GENERAL:**

The results relate only to items tested.

**METHOD:**

Each test was conducted in accordance with Standard ANSI/UL723, ninth edition, dated August 29, 2003, "Test for Surface Burning Characteristics of Building Materials" (ASTM E84).

The test determines the Surface Burning Characteristics of the material, specifically the flame spread and smoke developed indices when exposed to fire.

The maximum distance the flame travels along the length of the sample from the end of the igniting flame is determined by observation. The Flame Spread Index of the material is derived by plotting the progression of the flame front on a time-distance basis, ignoring any flame front recession, and using the equations described below:

A.  $CFS = 0.515 A_T$  when  $A_T$  is less than or equal to 97.5 minute-foot.

B.  $CFS = 4900/(195-A_T)$  when  $A_T$  is greater than 97.5 minute-foot.

Where  $A_T$  = total area under the time distance curve expressed in minute-foot.

The Smoke Developed Index (SDI) is determined by rounding the Calculated Smoke Developed (CSD) as described in UL 723. The CSD is determined by the output of photoelectric equipment operating across the furnace flue pipe. A curve is developed by plotting the values of light absorption (decrease in cell output) against time. The CSD is derived by expressing the net area under the curve for the material tested as a percentage of the area under the curve for untreated red oak.

The CSD is expressed as:

$$\text{CSD} = (A_m/A_{ro}) \times 100$$

Where:

CSD = Calculated Smoke Developed

$A_m$  = The area under the curve for the test material.

$A_{ro}$  = The area under the curve for untreated red oak.

#### SAMPLES:

The samples utilized in this investigation were neither prepared nor selected by a Laboratories' representative such that no verification of composition can be provided.

#### Sample Description

Test No.	System
1	Joint Cover 3 1/2 in wide strip OC
2	FTM 3 1/4 in wide strip OC

Each test sample was supported by 2 in. hexagonal poultry netting supported by 1/4 in. diameter steel rods spaced 2 ft apart.

#### RESULTS:

The results are tabulated below are considered applicable only to the specific samples tested.

Data sheets and graphical plots of flame travel versus time and smoke developed versus time are also enclosed.

Test Summary

Test No.	Test Code	Sample Description	CFS Calculated Flame Spread	FSI Flame Spread Index	CSD Calculated Smoke Developed	SDI Smoke Developed Index
1	11140610	Joint Cover 3 1/2 in wide strip OC	5.73	5	145.0	145
2	11140612	FTM 3 1/4 in wide strip OC	2.29	0	187.8	190

The Classification Marking of Underwriters Laboratories Inc. on the product is the only method provided by Underwriters Laboratories Inc. to identify products which have been produced under its Classification and Follow-Up Service. No use of a Classification Marking has been authorized as a result of this investigation.

Since the anticipated work has been completed, we have instructed our Accounting Department to terminate the investigation and invoice you for the charges incurred to date.

Should you have any questions, please contact the undersigned.

Very truly yours,



Karen Foxx-Smith (ext. 42293)  
Engineering Associate  
Fire Protection Division

Reviewed by:



R. K. Laymon  
Senior Staff Engineer  
Fire Protection Division

**Underwriters Laboratories Inc.**

Project: 06CA55853                      File: SV16584                      Test Code: 11140610  
Tested by: HISLOP                      Engineer: FOXX SMITH                      Date: 11/14/06  
Employee #: 7036                      Emp. #: 15116

TEST METHOD: The test was conducted in accordance with UL 723, 9th Edition

Client Name: Fukuvi USA			
Test Duration: 10 Minutes	Test No.: 1		Hot Test: No
Mounting: Rods & Wire	Test Type: CITS		Burn-Out Required: No

**Test Sample:** Joint Cover 3 1/2 in wide strip OC

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FLAME SPREAD RESULTS

**Flame Spread Data**

Distance (Feet)		Time (Sec)
Ignition		30
0.5		64
1		108
1.5		338

**Calculated Flame Spread (CFS):** 5.73  
**Flame Spread Index (FSI):** 5  
**Time to Ignition (sec):** 30  
**Maximum Flame Spread (ft):** 1.5  
**Area Under the Flame Spread Curve (ft.-min):** 11.1

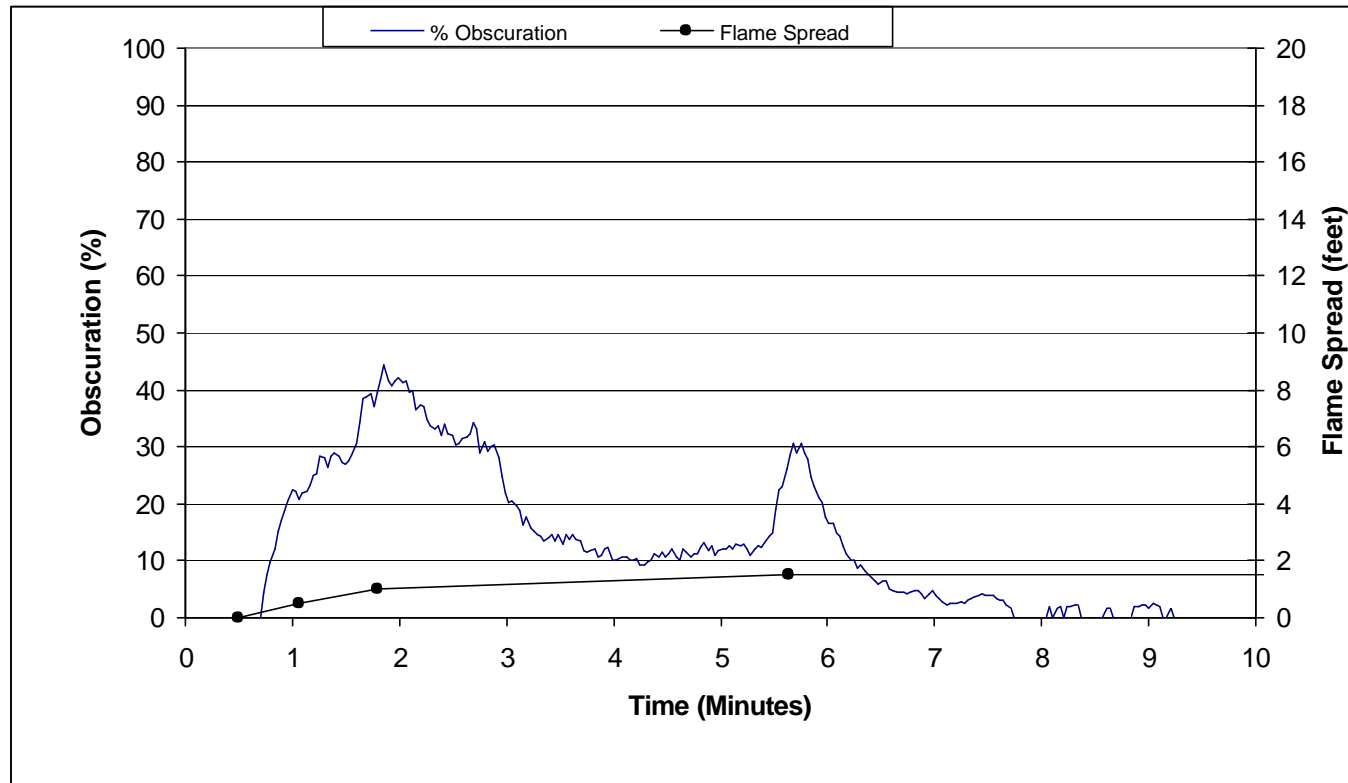
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SMOKE RESULTS

**Calculated Smoke Developed (CSD):** 145.0  
**Smoke Developed Index (SDI):** 145  
**Area Under the Smoke Curve (sq. in.):** 6.23  
**Area Under Red Oak Curve (sq. in.):** 4.3

# Flame Spread / Smoke Results

Fukuvi USA  
Joint Cover 3 1/2 in wide strip OC



Test No. 1  
06CA55853 / SV16584  
11140610

Flame Spread Index: 5  
Smoke Developed Index: 145  
Max. Flame Spread: 1.5

**Underwriters Laboratories Inc.**

Project: 06CA55853  
Tested by: HISLOP  
Employee #: 7036

File: SV16584  
Engineer: FOXX SMITH  
Emp. #: 15116

Test Code: 11140612  
Date: 11/14/06

TEST METHOD: The test was conducted in accordance with UL 723, 9th Edition

Client Name: Fukuvi USA			
Test Duration: 10 Minutes	Test No.: 2		Hot Test: No
Mounting: Rods & Wire	Test Type: CITS		Burn-Out Required: No

**Test Sample:** FTM 3 1/4 in wide strip OC

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FLAME SPREAD RESULTS

**Flame Spread Data**

Distance (Feet)		Time (Sec)
Ignition		24
0.5		82

**Calculated Flame Spread (CFS):** 2.29  
**Flame Spread Index (FSI):** 0  
**Time to Ignition (sec):** 24  
**Maximum Flame Spread (ft):** 0.5  
**Area Under the Flame Spread Curve (ft.-min):** 4.4

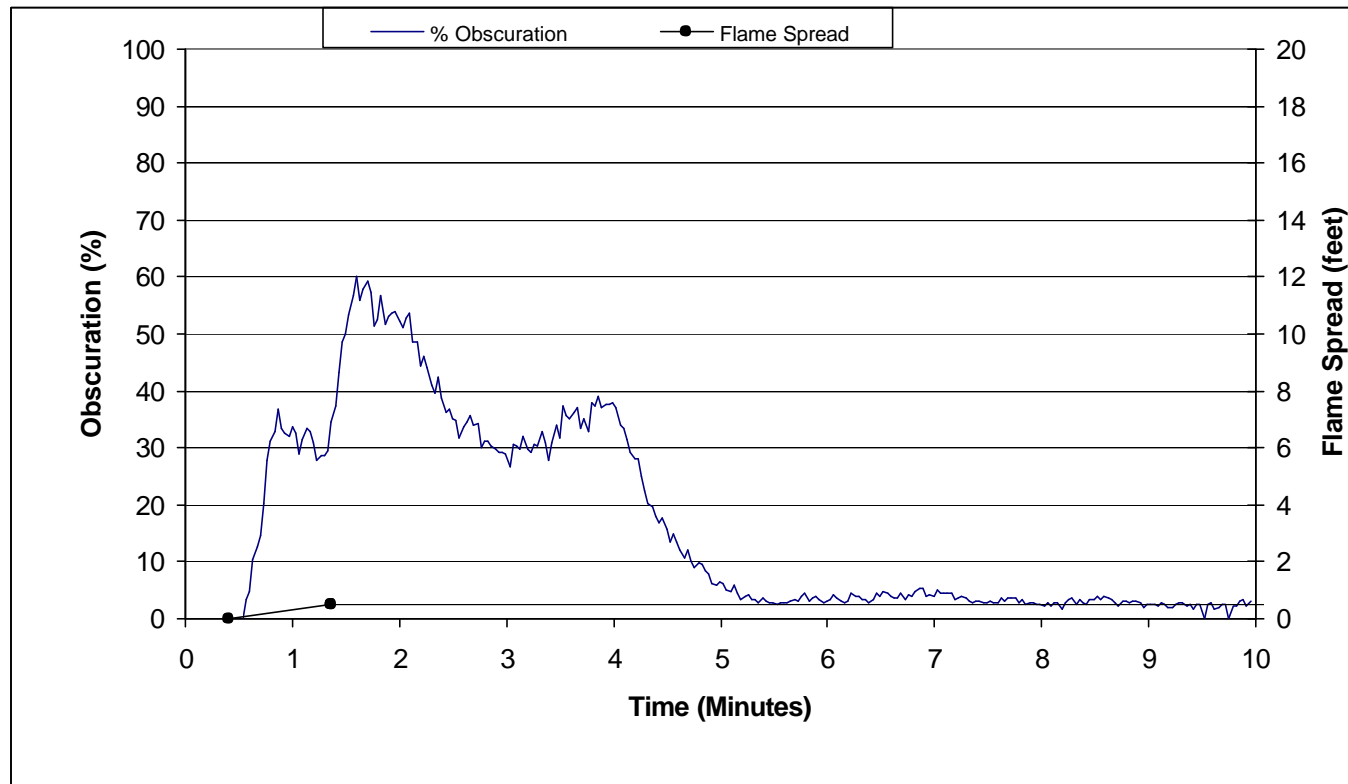
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SMOKE RESULTS

**Calculated Smoke Developed (CSD):** 187.8  
**Smoke Developed Index (SDI):** 190  
**Area Under the Smoke Curve (sq. in.):** 8.08  
**Area Under Red Oak Curve (sq. in.):** 4.3

# Flame Spread / Smoke Results

Fukuvi USA  
FTM 3 1/4 in wide strip OC



Test No. 2  
06CA55853 / SV16584  
11140612

Flame Spread Index: 0  
Smoke Developed Index: 190  
Max. Flame Spread: 0.5