96-D Allen Boulevard
Farmingdale, New York 11735-5626 USA
Tel. +1 (631) 293-8944 Fax +1 (631) 293-8956
e-mail: testing@govmark.com

Received: 04/25/2018	Completed: 04/30/2018	Letter: H2	AN	P.O.#: USMMM58MGJ	Test Report #: 3-25725-2-
Client's Identification	Lot #: L48087-07. Date of Mfg.: 3/28/2018. Style: 363/363L 3M High Temperature Aluminum Foil Glass Cloth Tape. Composition: Aluminum Foil Glass Cloth with Silicone Adhesive. (see continuation)				

Tested For: **Steve Ilkka**
3M Company
3M Center, Bldg 0230-02-F-15
St. Paul, MN 55144-1000

Key Test: ASTM E1354 895

Tel: 1-(651)-736-1210 **Ext:**
Fax: 1-( )- -

CLIENT'S IDENTIFICATION (contiuation):

Product End Use: Thermal shielding/barrier protection.

Specimen Preperation as Directed by Client:

Step 1: Using 70% rubbing alcohol and tissue/cloth clean steel plate to remove any dirt, debris, oily residue that might significantly reduce the adhesion of the tape to the 1/16 steel plate.

Step 2: Peel back release liner to expose adhesive.

Step 3: Center tape over the steel plate with liner peeled part way off. Use Blue PA-1 wipe (supplied by client) to rub tape down onto steel plate as you pull the liner away from adhesive. Wipe the tape down until wrinkles are minimized and tape is fully adhered.

Step 4: Flip taped steel plate upside down and trim off excess tape from edges using box cutter or utility knife.

Step 5; Finish trimming and the 1/16" steel plate is now laminated to 363/363L tape.
Note: Adhesion will build continue to build over time. Testing can start at 12 to 24 hours after all steps are completed.

Test Category: Cone Specifier: Various LE 2017; V 11/17 PC: ME NTR 4/16 SM/mo/mg

TEST PERFORMED: ASTM E1354 - Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter

APPROXIMATE [x] THICKNESS [ ] DIAMETER OF MATERIAL (as measured by Govmark): 0.2 mm

[x] Flat Specimen: 4" x 4"
[ ] Cable Specimen: 4" lengths vertically grouped to form the 4" x 4" test specimens

HEAT FLUX: [ ] 35 kW/m²; [x] 50 kW/m²; [ ] Other: _____ kW/m²

IGNITION MODE: [x] External Spark; [ ] Non External

RETAINING WIRE GRID PLACED OVER FACE OF SPECIMEN: [x] Yes; [ ] No

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BRIEF DESCRIPTION OF TEST: A test specimen measuring 4" X 4" X 2" maximum thickness is mounted into the specimen holder. The specimen holder sits on a load cell. The opening of a "cone shaped" radiant heat source faces the test specimen.

A pre-selected heat flux of anywhere from 0 to 100 kW/m² (most often 50 kW/m²) is radiated onto the surface of the specimen while a spark is introduced to ignite the off-gases. While the test specimen is subjected to the radiant heat, certain measurements are made in the exhaust system of the apparatus.

Using the oxygen concentrations present during combustion, pressure flow rates, and thermocouple temperatures, the mass of oxygen consumed at any given time can be calculated. Heat release values are then determined using a defined formula based on the release rate of 13.1 MJ per kg oxygen consumed (hence the term oxygen consumption calorimetry).

Simultaneously, the optical photometrics, or smoke obscuration measuring system, is gauging smoke release while the weigh cell is tracking specimen mass loss.

The smoke value is reported as the specific extinction area [SEA].

-- See Page 3 for "Results" --

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CATEGORY:		RESULTS			
		Specimen #1	Specimen #2	Specimen #3	AVERAGE
Time to Ignition (Sustained Flaming)	[seconds]:	DNI	DNI	DNI	DNI
Test End (Code)	[code]:	6	6	6	N/A
Test End (Time*)	[seconds]:	1920	1920	1920	1920
Peak Heat Release Rate (HRR)	[kW/m²]:	7.4	9.2	7.3	8.0
Average Heat Release Rate (Avg HRR):					
At 60 seconds	[kW/m²]:	0.3	1.9	2.3	1.5
At 180 seconds	[kW/m²]:	0.2	1.5	1.9	1.2
At 300 seconds	[kW/m²]:	0.3	1.9	1.6	1.3
Average Mass Loss Rate	[g/m² sec]:	0.0	0.1	0.1	0.1
Total Heat Release	[MJ/m²]:	3.6	7.2	4.2	5.0
SEA:					
At 180 seconds	[m²/kg]:	1789	0	0	596
At test end	[m²/kg]:	1259	40	255	518
Effective Heat of Combustion	[MJ/kg]:	23.6	31.4	24.6	26.5
Caloric Content	[MJ/kg]:	0.2	0.5	0.3	0.3

* Includes 2 minutes of data collection after entry of test end code.

ABBREVIATION USED: SEA = Visible smoke development of material (expressed as the Specific Extinction Area).

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Key Test: ASTM E1354 895

Tel: 1-(651)-736-1210 **Ext:**
Fax: 1-( )- -

TEST END CODES:

1 - Flaming/combustion ceased
2 - Average mass loss over a 1 minute period dropped below 150 g/m²
3 - Load cell returned to the pre-test value
4 - Oxygen returned to near pre-test value for 10 minutes
5 - Sixty minutes have elapsed
6 - No ignition after 30 minutes

ABBREVIATIONS WHICH MAY BE USED:

NR = Not recorded.
NA = Not avaliable.
N/A = Not applicable.

REMARKS:

[x] None.

[ ] Test specimens are thermally thin, containing little mass and fuel. The small amount of fuel results in a very short burning time, e.g. the specimen under test never reaches a steady state burning condition. The small mass results in extremely small mass loss rates nearing the limit of the instrument's capability to measure. This results in high variability in reported results calculated with mass in the denominator, specifically SEA and Effective Heat of Combustion.

[ ] Specimen/s _____ exhibited intumescent behavior (swelling as a result of heat exposure) of approximately _____ mm above the top of the specimen holder frame which did not interfere with the burner.

[ ] Specimen/s _____ exhibited intumescent behavior (swelling as a result of heat exposure) which interfered with the burner. The distance of the heating surface of the cone heater to the face of the specimen was increased to 60 mm as per the instructions in ASTM E1354.

[ ] Other (describe): _____

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ACCEPTANCE CRITERIA: None cited.

CONCLUSION: Not applicable.

CERTIFICATION: I certify that the above results were obtained after testing specimens in accordance with the procedures and equipment specified above.

AUTHORIZED SIGNATURE
GOVMARK
/ac
/gb

(Page 5 of 5)

Douglas W. Lipp

MAY 14 2018

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RptHdr_FireFlammability.jpg

Program: ASTM E1354 (version 4.30)

ASTM E1354 Test Report

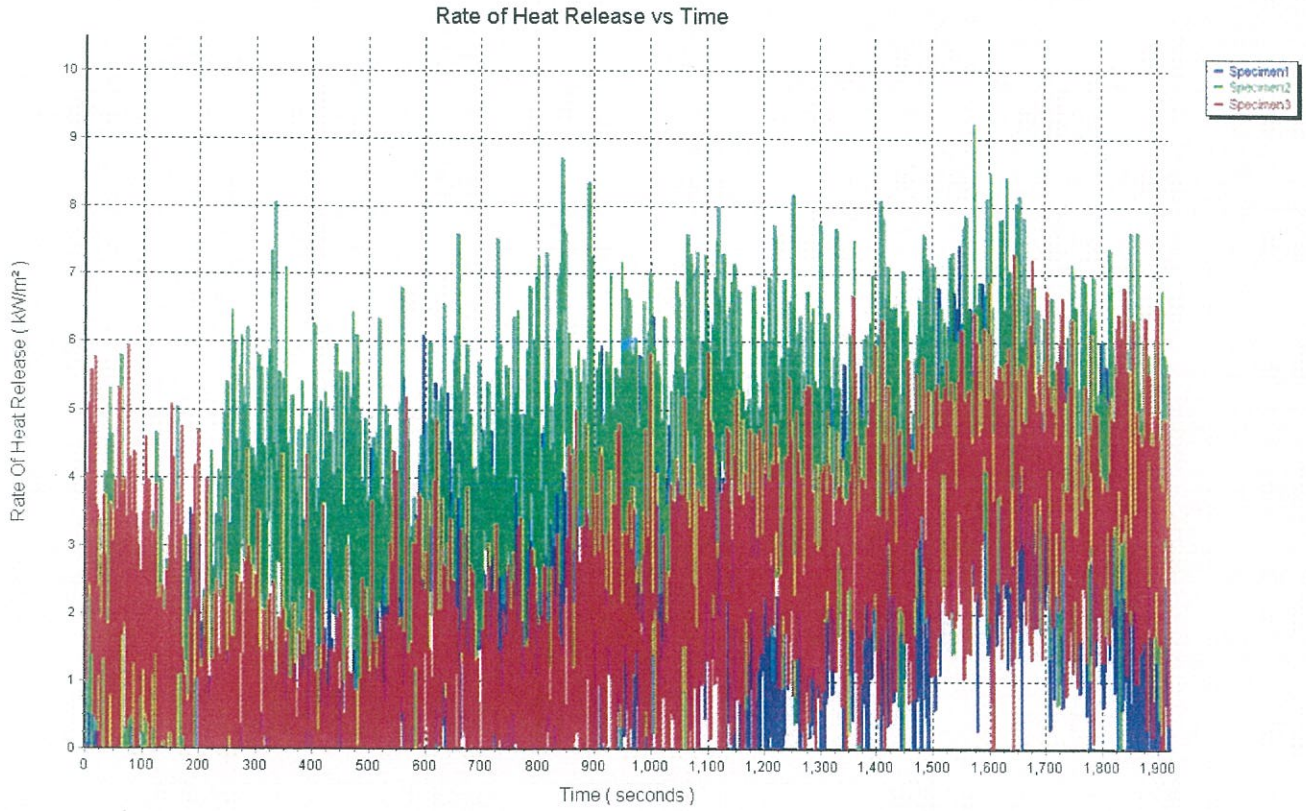
Test Report Number	: 3-25725-2-H2	Test Date	: 04/30/18
Client	: 3M Company	Operator	: Andrew Niemczyk
Specimen ID	: Lot #: L48087-07.	Heat Flux	: 50 kW/m²
Composition	: Aluminum Foil Glass Cloth with Silicone Adhesive	Calibration Constant	: 0.047
Specimen Color	: Silver	Test Orientation	: Horizontal
Specimens Tested	: 3	Retaining Wire Grid Used	: Yes

	Specimen			
	1	2	3	Average
Test Duration (seconds)	1920	1920	1920	1920
Time to Sustained Ignition (seconds)	DNI	DNI	DNI	DNI
Peak Rate of Heat Release (kW/m²)	7.4	9.2	7.3	8.0
Time of Peak RHR (s)	1547	1574	1645	1589
Average RHR - 60 seconds (kW/m²)	0.3	1.9	2.3	1.5
Average RHR - 180 seconds (kW/m²)	0.2	1.5	1.9	1.2
Average RHR - 300 seconds (kW/m²)	0.3	1.9	1.6	1.3
Total Heat Released (MJ/m²)	3.6	7.2	4.2	5.0
Initial Mass (g)	148.1	149.3	148.9	148.8
Final Mass (g)	146.6	147.0	147.2	146.9
Mass at Sustained Flaming (g)	n/a	n/a	n/a	n/a
Mass Loss (g/m²)	150.0	224.0	176.0	183.3
Average Mass Loss Rate (g/m²-s)	0.0	0.1	0.1	0.1
Avg Effective Heat of Combustion (MJ/kg)	23.6	31.4	24.6	26.5
Caloric Content (MJ/kg)	0.2	0.5	0.3	0.3
Avg Specific Extinction Area (m²/kg)	1259	40	255	518
Avg SEA @ 180 seconds (m²/kg)	1789	0	0	596
Thickness (mm)	0.2	0.2	0.2	0.2
Exhaust Flow rate (m³/s)	0.024	0.024	0.024	0.024

RptHdr_FireFlammability.jpg

Test : ASTM E1354
Test Report # 3-25725-2-H2

Program: ASTM E1354 (version 4.30)



RptHdr_FireFlammability.jpg

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Test Report # 3-25725-2-H2

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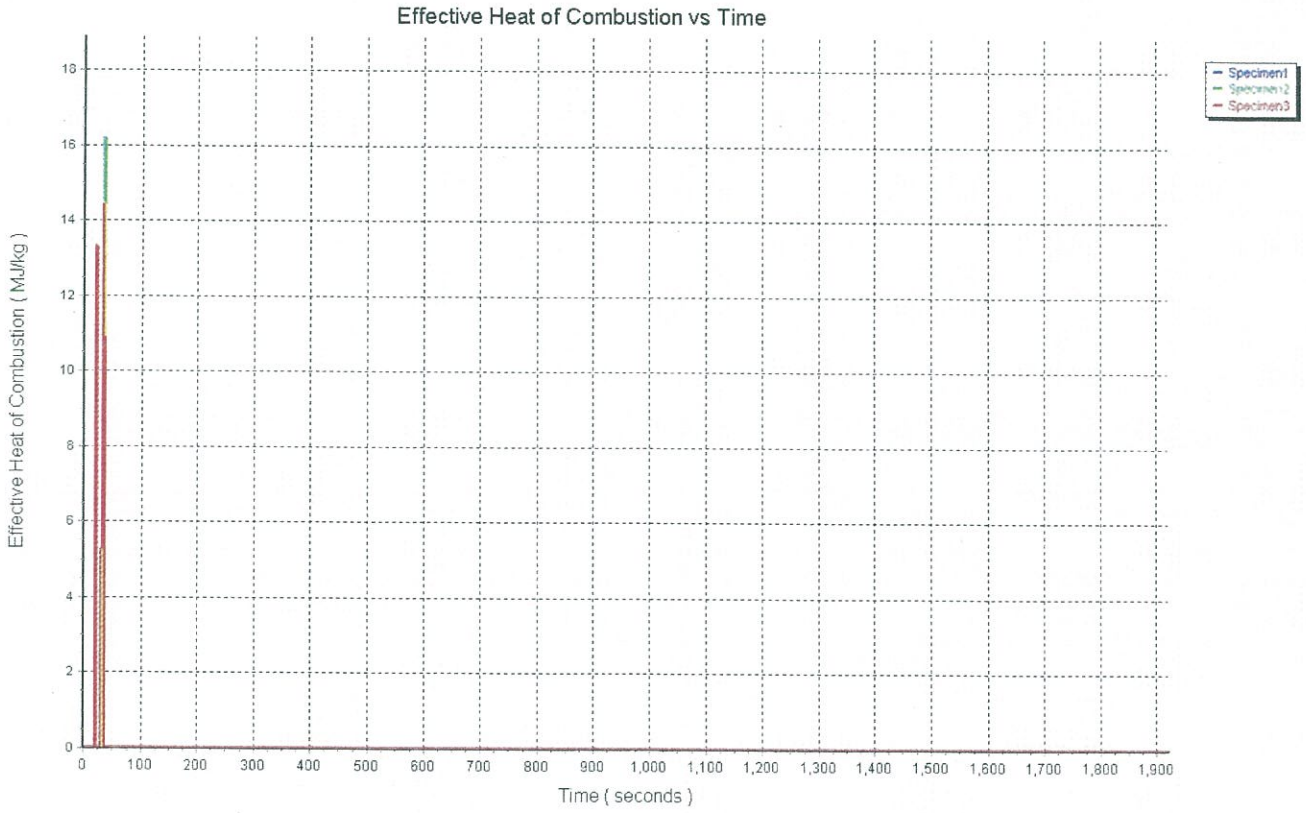


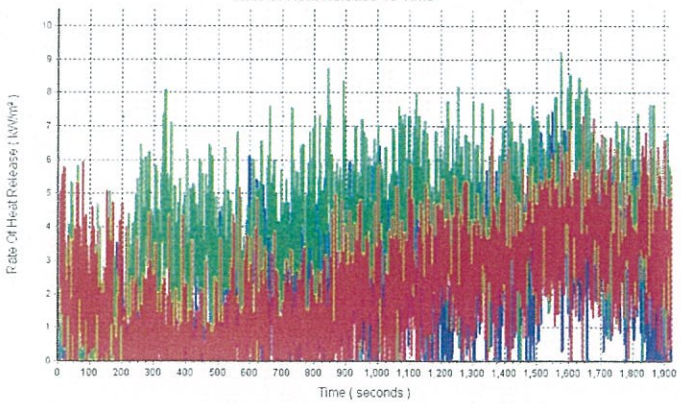
RptHdr_FireFlammability.jpg

Test : Cone Calorimeter

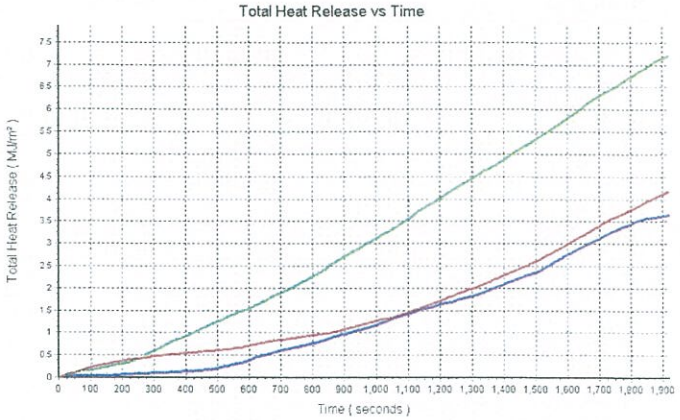
Test Report # 3-25725-2-H2

Program: ASTM E1354 (version 4.30)

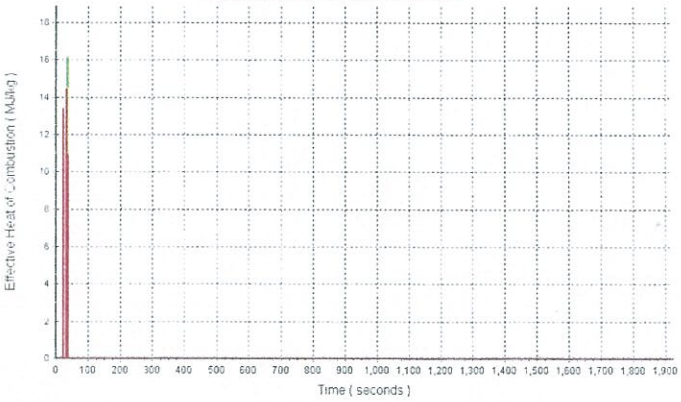
Rate of Heat Release vs Time



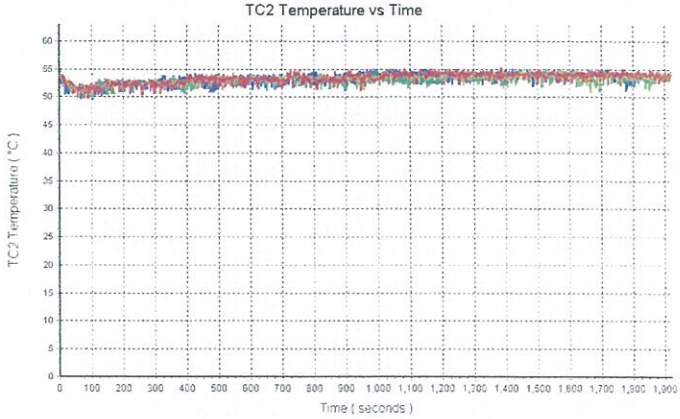
Total Heat Release vs Time



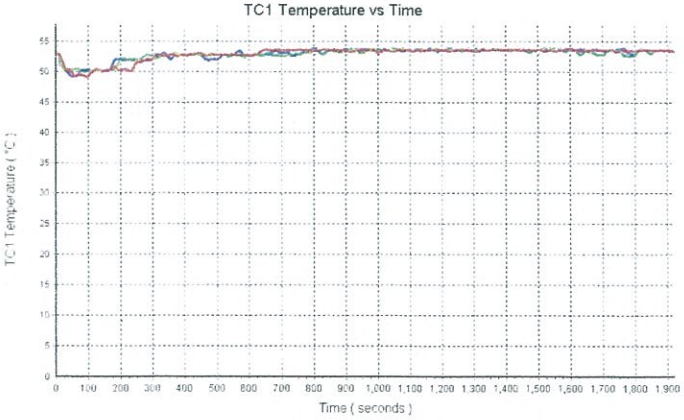
Effective Heat of Combustion vs Time



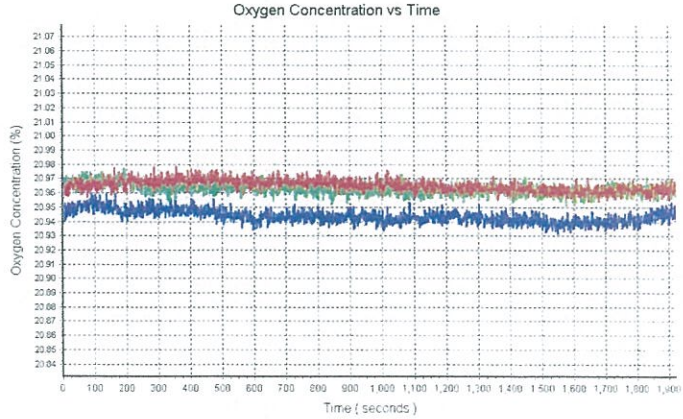
TC2 Temperature vs Time



TC1 Temperature vs Time



Oxygen Concentration vs Time



RptHdr_FireFlammability.jpg

Test : Cone Calorimeter

Test Report # 3-25725-2-H2

Program: ASTM E1354 (version 4.30)