

TEST REPORT

No. : TJIN2411000728CM01_EN

Date : 2025-01-13

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CUSTOMER NAME: SHIJIAZHANG SOBO COMMERCIAL CO.,LTD
ADDRESS: 14-2-402 TIANRANCHENG,NO.122 QILIAN STREET,SHIJIAZHANG
CITY

Sample Name : Mineral Fiber Blanket Insulation

Product Specification : Tk 25-150mm

Above information and sample(s) was/were submitted and confirmed by the client. SGS, however, assumes no responsibility to verify the accuracy, adequacy and completeness of the sample information provided by client.

Date of Receipt : 2024-11-28

Testing Period : 2024-11-28 ~ 2025-01-13

Test result(s) : For further details, please refer to the following page(s)
(Unless otherwise stated the results shown in this test report refer only to the sample(s) tested)

Signed for
SGS-CSTC Standards Technical
Services (Tianjin) Co., Ltd..

Duke Gai

Duke Gai
Authorized signatory



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Summary of Results:

No.	Test Item	Test Method	Result	Conclusion
1	Maximum Use and Exothermic Temperature Rise	ASTM C592-24 Section 11.1 & ASTM C447-15(2022) & ASTM C411-19	See Result	Pass
2	Density	ASTM C592-24 Section 11.2 & ASTM C167-22	See Result	Pass
3	Non-Fibrous (Shot) Content	ASTM C592-24 Section 11.3 & ASTM C1335-23 Procedure B (Manual Operation)	See Result	Pass
4	Apparent Thermal Conductivity	ASTM C592-24 Section 11.4 & ASTM C177-19ε1	See Result	Pass
5	Water Vapor Sorption - Water Vapor Sorption by Weight	ASTM C592-24 Section 11.8 & ASTM C1104/C1104M-19 Procedure A	See Result	Pass
6	Linear Shrinkage	ASTM C592-24 Section 11.9 & ASTM C356-22	See Result	Pass
7	Coefficient of Acidity*	GB/T 5480-2017	2.0	N/A
8	Combustibility Test and Surface Burning Characteristics	ASTM E136-2024b and ASTM E84-2024	See Result	Pass

Note: Pass : Meet the requirements;
Fail : Does not meet the requirements;
N/A : Not Apply to the judgment.



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1. Test Item: Maximum Use and Exothermic Temperature Rise

Test Method: ASTM C592-24 Section 11.1 & ASTM C447-15(2022) & ASTM C411-19

I. Apparatus

Apparatus of Hot-Surface Performance WRT-900

II. Temperature

The testing temperature range is $(649 \pm 5)^\circ\text{C}$, keep the constant temperature for 96 hours. The temperature at any point of measurement on the heating plate shall not vary more than $\pm 5\%$ or $\pm 14^\circ\text{C}$, whichever is less, from the desired temperature.

Type: II (offered by client)

III. Procedure

(1) Before test, measure the mass, length, width, thickness, density of the system, shown in Table 1.

Table 1 System parameters before and after test

	Length (mm)	Width (mm)	Thickness (mm)	Mass (g)	Density (kg/m ³)
Before Test	745	456	88	2149.0	71.9
After Test	745	458	111	2113.5	73.7
Change Rate (%)	0.0	-0.4	4.5	1.7	-2.5

(2) The specimen was piled onto the heating plate, and was total 1 layer. Each specimen's location was shown in Table 2. A thermocouple is placed at the center of specimen to measure the temperature. The heating plate is heated up from room temperature to the testing temperature with the speed of $2^\circ\text{C}/\text{min}$ and then kept for 96 hours. During temperature-rising period, observe whether there are the phenomena of flaming and flashing.

Table 2 Specimen number and location

No.	1
Location	Piled onto the heating plate
	First Layer



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(3) Keep the temperature for 96 hours, then power off and let the apparatus cool down to the room temperature. Remove the specimens and observe the color change and whether there are phenomena of warping or cracks through the direction of thickness. Measure the mass, length, width, thickness and density of the system, shown in Table 1.

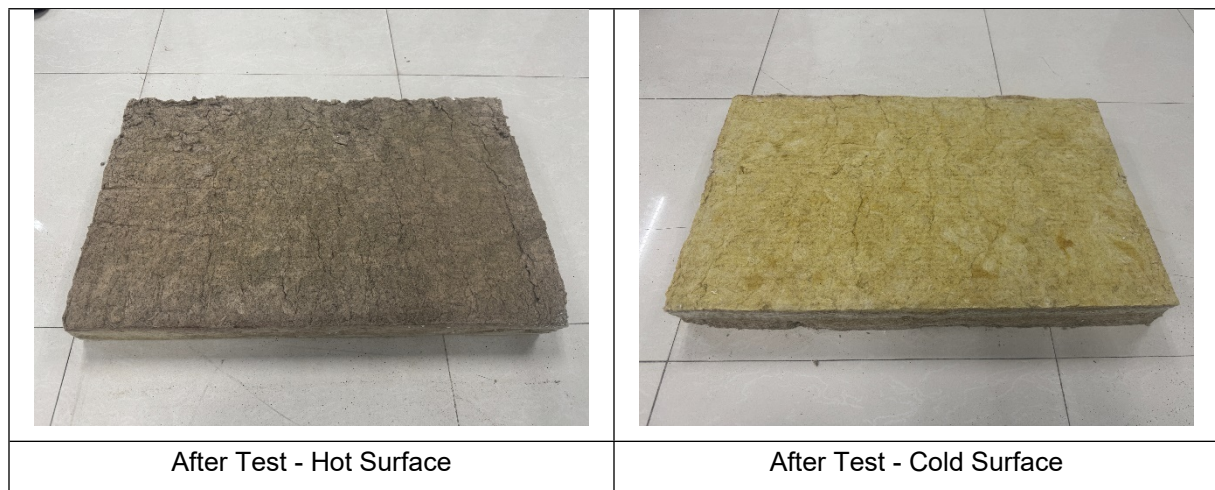
IV. Test Result

(1) During the temperature-rising period, there were no phenomena of flaming or flashing observed. There were no phenomena of cracks through the direction of thickness. After the test, the color had some changes, detailed in Table 3. The photos of the specimens after test are shown in test photo(s).

Table 3 Color changes after test

Layers	Specimen Surface	Before Test	After Test
First Layer	The Lower Surface (Hot Surface)	Yellow Green	Brown
	The Upper Surface (Cold Surface)	Yellow Green	Yellow Green

Test Photo(s):



(2) During the temperature-rising and subsequent constant temperature periods, the maximum temperature of the center of the hot surface is 683.1°C, and the maximum temperature between the



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specimen exceeded the heating plate. The maximum temperature of hot surface and between the layers of specimen was shown in table 4.

Table 4 Hot surface and specimen maximum temperature during testing

	Hot Surface	First Layer
Highest Temperature /°C	654.3	683.1

(3) Before and after test, the change rate of length, width, thickness, mass and density is 0.0%, -0.4%, 4.5%, 1.7% and -2.5% respectively.

(4) The maximum warpage developed during the test is 0mm.

V. Conclusion

Test Item	Test Result	Requirement in ASTM C592-24 Section 7.6 & Section 7.7	Conclusion
Maximum Use Exothermic Temperature Rise	No warping, flaming, glowing, melting or fiber degradation during hot surface exposure. No evidence of melting or fiber degradation after test	No warping, flaming, glowing, melting or fiber degradation during hot surface exposure. No evidence of melting or fiber degradation shall be evident upon post test inspection.	Pass
	Internal temperature at any time was higher than the hot surface temperature of 34.1°C.	No internal temperature at any time shall exceed the hot surface temperature by more than 93.3°C.	Pass

Note: Hot surface performance is relevant to the components of material, use condition, temperature gradient and etc.. The results indicate the relevant properties under the specific condition and cannot be the sole basis in actual use of properties of the material.



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2. Test Item: Density

Test Method: ASTM C592-24 Section 11.2 & ASTM C167-22

Test Condition:

Specimen: 750mm×450mm×90mm, 5pcs

Type: II (offered by client)

Lab Environmental Condition: (23±2)°C, (50±5)%RH

Test Result:

Test Item	Test Result	Requirement in ASTM C592-24 Table 1 Type II	Conclusion
Density (kg/m3)	70.7	≤ 192	Pass

Original Date:

Test Item	Test Result					
	Individual Value					Average Value
Density (kg/m3)	66.1	73.0	72.4	73.8	68.2	70.7



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3. Test Item: Non-Fibrous (Shot) Content

Test Method: ASTM C592-24 Section 11.3 & ASTM C1335-23 Procedure B (Manual Operation)

Test Condition:

Specimen: 10g, 3pcs

Test condition: 593°C, 15min

Type: II (offered by client)

Lab Environmental Condition: (23±2)°C, (50±5)%RH

Test Result:

Test Item	Test Result	Requirement in ASTM C592-24 Section 7.6	Conclusion
Non-Fibrous (Shot) Content (%)	13.5	≤ 25	Pass

Original Data:

Test Item		Test Result			
		Individual Value			WC
Non-Fibrous (Shot) Content (%)	No.20 Sieve	0.0	0.0	0.3	13.5
	No.50 Sieve	1.1	0.8	1.0	
	No.100 Sieve	11.8	12.5	12.8	

Note: Test specimens were cut from original sample.

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4. Test Item: Apparent Thermal Conductivity

Test Method: ASTM C592-24 Section 11.4 & ASTM C177-19^{ε1}

Test Condition:

Specimen 1: 300mm×300mm×50.0mm, 2pcs

Density: about 70.4kg/m³

Mean temperature: 24°C, 38°C

Specimen 2: Φ200mm×40.0mm, 2pcs

Density: about 71.0kg/m³

Mean temperature: 93°C, 149°C

Temperature difference: 20°C

Type: II (offered by client)

Lab Environmental Condition: (23±2)°C, (50±5)%RH

Test Result:

Test Item		Test Result	Requirement in ASTM C592-24 Table 1 Type II	Conclusion
Apparent Thermal Conductivity	24°C	0.035 W/(m·K)	≤ 0.036 W/(m·K)	Pass
	38°C	0.037 W/(m·K)	≤ 0.039 W/(m·K)	Pass
	93°C	0.041 W/(m·K)	≤ 0.049 W/(m·K)	Pass
	149°C	0.051 W/(m·K)	≤ 0.060 W/(m·K)	Pass

Note:

- 1) The test result can not be compared with other results obtained from different test conditions, and should not be cited to the use condition directly.
- 2) Test specimens were cut from original sample.

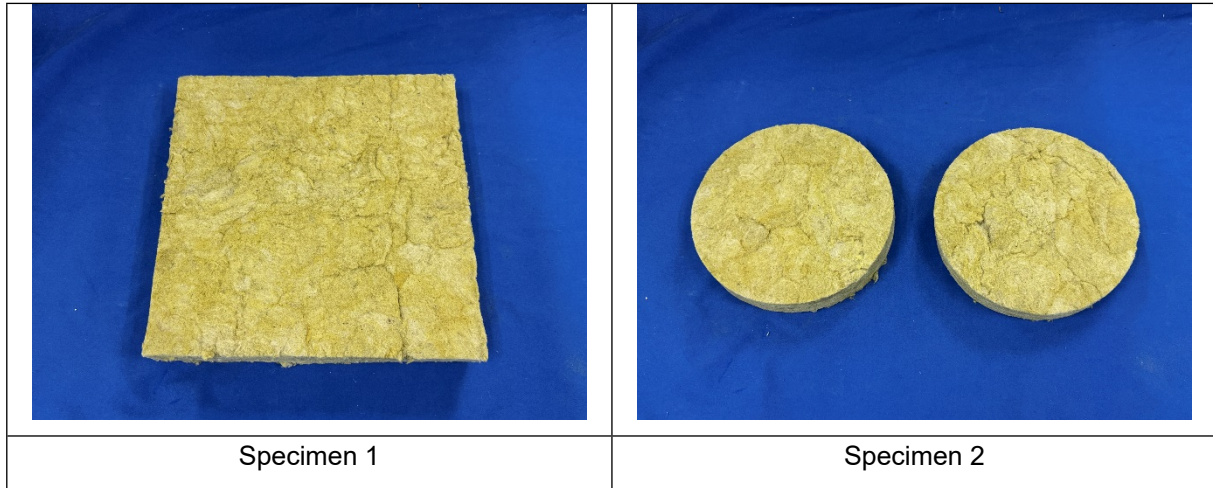
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Specimen Photo(s):



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5. Test Item: Water Vapor Sorption - Water Vapor Sorption by Weight

Test Method: ASTM C592-24 Section 11.8 & ASTM C1104/C1104M-19 Procedure A

Test Condition:

Specimen: 200mm×200mm×90mm, 3pcs

Dry condition: 105°C

Treatment condition: 49°C, 95%RH, 96h

Type: II (offered by client)

Lab Environmental Condition: (23±2)°C, (50±5)%RH

Test Result:

Test Item	Test Result	Requirement in ASTM C592-24 Table 1 Type II	Conclusion
Water Vapor Sorption - Water Vapor Sorption by Weight (%)	0.4	≤ 5.0	Pass

Original Data:

Test Item	Test Result			
	Individual Value			Average Value
Water Vapor Sorption - Water Vapor Sorption by Weight (%)	0.5	0.5	0.3	0.4

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6. Test Item: Linear Shrinkage

Test Method: ASTM C592-24 Section 11.9 & ASTM C356-22

Test Condition:

Specimen: 152.4mm×63.5mm×38.1mm, 4pcs

Dry condition: 105°C

Heating temperature: 649°C

Heating time: 24h

Type: II (offered by client)

Lab Environmental Condition: (23±2)°C, (50±5)%RH

Test Result:

Test Item		Test Result	Requirement in ASTM C592-24 Table 1 Type II	Conclusion
Linear Shrinkage (%)	Length	0.4	≤ 4.0	Pass
	Width	1.6		Pass
	Thickness	1.0		Pass

Original Data:

Test Item		Test Result				
		Individual Value				Average Value
Linear Shrinkage (%)	Length	0.4	0.3	0.5	0.4	0.4
	Width	1.5	1.4	1.3	2.0	1.6
	Thickness	1.8	0.2	0.9	1.2	1.0

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7. Test Item: Coefficient of Acidity

Test Method: GB/T 5480-2017

Test Result:

Test Item	Test Result
Coefficient of Acidity	2.0

8. Combustibility Test and Surface Burning Characteristics

(1) Combustibility Test

I. Test conducted

This test is conducted as per ASTM E136-2024b Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C. Option B test shall be in accordance with Test Method ASTM E2652.

II. Sample details

Description	Mineral wool insulation (provided by client)
Color	Yellow
Area density	4.0 kg/m ²
Size of sample	Φ45×50.0mm

Conditioning:

Precondition: The test specimens shall be dried in a ventilated oven maintained at 60 ±5°C, for between 20 and 24 h, and cooled to ambient temperature in desiccators prior to testing.

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III. Test Results

Specimen No,	1	2	3	4
Initial temperature of the furnace, (°C)	749.5	750.3	750.1	749.2
Maximum specimen interior temperature (°C)	755.7	755.1	756.2	755.4
Temperature rise in specimen interior (°C)	6.2	4.8	6.1	6.2
Maximum specimen surface temperature, (°C)	757.2	756.8	756.5	755.9
Temperature rise in specimen surface, (°C)	6.7	6.5	6.4	6.7
Test duration (s)	1800	1800	1800	1800
Specimen mass before test, (g)	6.09	5.93	6.21	6.01
Specimen mass after test, (g)	5.84	5.72	5.88	5.75
Mass loss of the specimen, (%)	4.1	3.5	5.3	4.3
Flaming at any time during the test (Yes/No)	No	No	No	No
Flaming after first 30s (Yes/No)	No	No	No	No
Observations	Color changed			

Test Criteria:

Report the material as passing the test if at least three of the four test specimens tested meet the individual test specimen criteria detailed either in 1 or in 2. The three individual test specimens do not need to meet the same individual test specimen criteria.

1. If the weight loss of an individual test specimen is 50 % or less, that test specimen is considered as having met the individual test specimen criteria when all the criteria in 1.1 through 1.3 are met:
 - 1.1 For the duration of the test, the recorded temperature of the surface thermocouple does not rise more than 30 °C (54 °F) above the stabilized furnace temperature established at T2 prior to the test.
 - 1.2 For the duration of the test, the recorded temperature of the interior thermocouple does not rise more than 30 °C (54 °F) above the stabilized furnace temperature established at T2 prior to the test.
 - 1.3 There is no flaming from the test specimen after the first 30 s.



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2. If the weight loss of an individual test specimen exceeds 50 %, that test specimen is considered as having met the individual test specimen criteria when all the criteria in 2.1 through 2.3 are met:
 - 2.1 For the duration of the test, the recorded temperature of the surface thermocouple does not rise above the stabilized furnace temperature established at T2 prior to the test.
 - 2.2 For the duration of the test, the recorded temperature of the interior thermocouple does not rise above the stabilized furnace temperature established at T2 prior to the test.
 - 2.3 There is no flaming from the test specimen at any time during the test.

Sub-Conclusion: According to the test results, the tested sample is deemed to be **non-combustible materials**.

Test results	Requirements (according to ASTM C592-24)	Conclusion
Non-combustible	Non-combustible	PASS

(2) Surface Burning Characteristics

I. Test conducted

This test was conducted in accordance with ASTM E84-2024 Standard Test Method for Surface Burning Characteristics of Building Materials.

II. Introduction

The method, designated as ASTM E84-2024, Standard Method of Test for Surface Burning Characteristics of Building Materials, is designed to determine the relative surface burning characteristics of materials under specific test conditions. Results are expressed in terms of flame spread index (FSI) and smoke developed index (SDI).

The purpose of this test method is to determine the relative burning behavior of the material by observing the flame spread along the specimen. Flame spread and smoke developed index are reported. However, there is not necessarily a relationship between these two measurements.



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III. Test procedure

The tunnel is preheated to 65.6°C (150°F), as measured by the floor-embedded thermocouple located 7.09m (23.25 ft) downstream of the burner ports, and allowed to cool to 40.6°C (105°F), as measured by the floor-embedded thermocouple located 3.96m (13 ft) from the burners. At this time the tunnel lid is raised and the test sample is placed along the ledges of the tunnel so as to form a continuous ceiling 7.32m (24 ft) long, 304.8mm (12 in) above the floor. The lid is then lowered into place.

Upon ignition of the gas burners, the flame spread distance is observed and recorded every 30 seconds. Flame spread distance versus time is plotted ignoring any flame front recessions. If the area under the curve (A) is less than or equal to 97.5 ft·min, FSI = 0.515·A; if greater, FSI = 4900/(195-A).

The test results for smoke shall be plotted and the area under the curve shall be divided by the area under the curve for heptane, multiplied by 100, and rounded to the nearest multiple of five to establish a numerical smoke-developed index (SDI).

IV. Conditioning

Prior to testing, the sample was conditioned,

To a constant weight at a temperature of 23±2.8°C (73.4±5°F) and at a relative humidity of 50±5%.

Sample details

Sample description	Mineral wool insulation (provided by client)
Color	Yellow
Thickness	45.0mm
Area density	4.0 kg/m ²
Exposed face	Any surface

Mounting methods:

The 20-gage, 2-in. (51-mm) hexagonal galvanized steel netting should span the width of the tunnel, then the specimen shall be placed on the netting.

The specimen is 2 pieces of 600mm wide by 3000mm long and 1 piece of 600mm wide by 1200mm long.

The assembly size is 7200mm x 600mm x 45.0mm.



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Test results:

Flame Spread Index, FSI	Smoke-developed Index, SDI
0	0

Rating:

The National Fire Protection Association Life Safety Code 101, Chapter 10, Section 10.2.3 Interior Wall and Ceiling Finish Classification, has a means of classifying materials with respect to Flame Spread and Smoke Developed when tested in accordance with ASTM E84 or UL 723 Method of Test of Surface Burning Characteristics of Building Materials.

International Building Code, Chapter 8, Interior Finishes, Section 803 Wall and Ceiling Finishes, was classified in accordance with ASTM E 84 or UL 723. Such interior finish materials shall be grouped in the following classes in accordance with their flame spread and smoke-developed indexes.

The classifications are as follows:

Index	Class A	Class B	Class C
Flame Spread Index	0-25	26-75	76-200
Smoke-developed Index	0-450	0-450	0-450

Since the tested sample received a Flame Spread Index 0 and a Smoke-developed Index 0, it would **meet** the requirements of **Class A** interior Wall & Ceiling Finish Category.

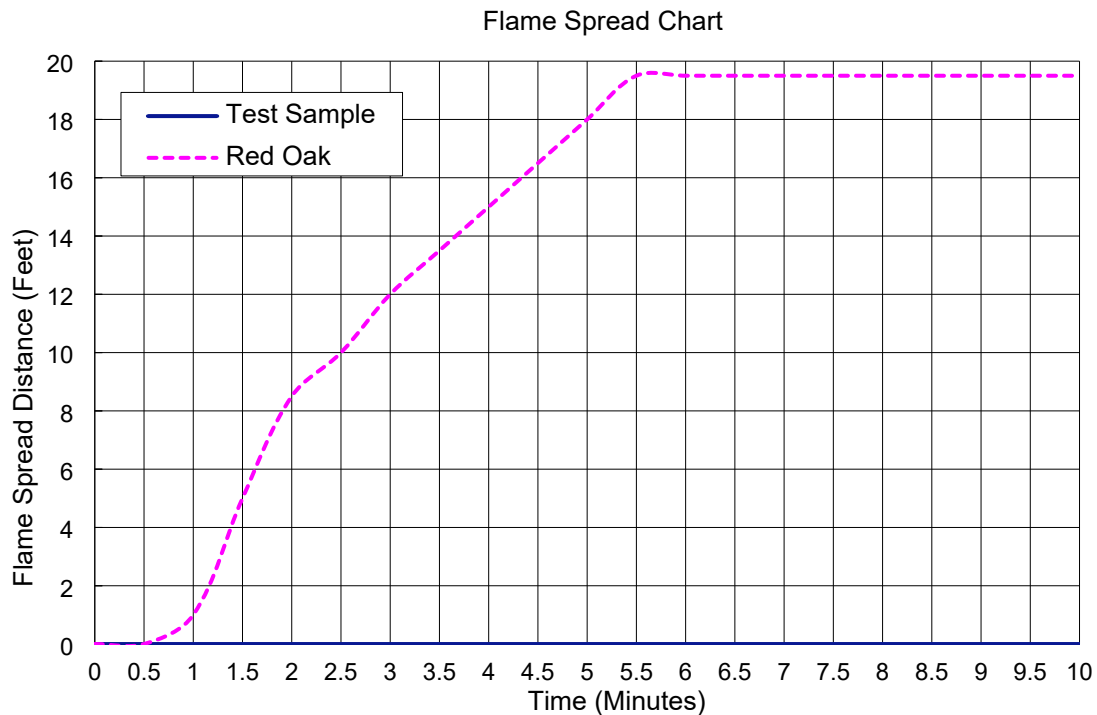
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Graphical results:



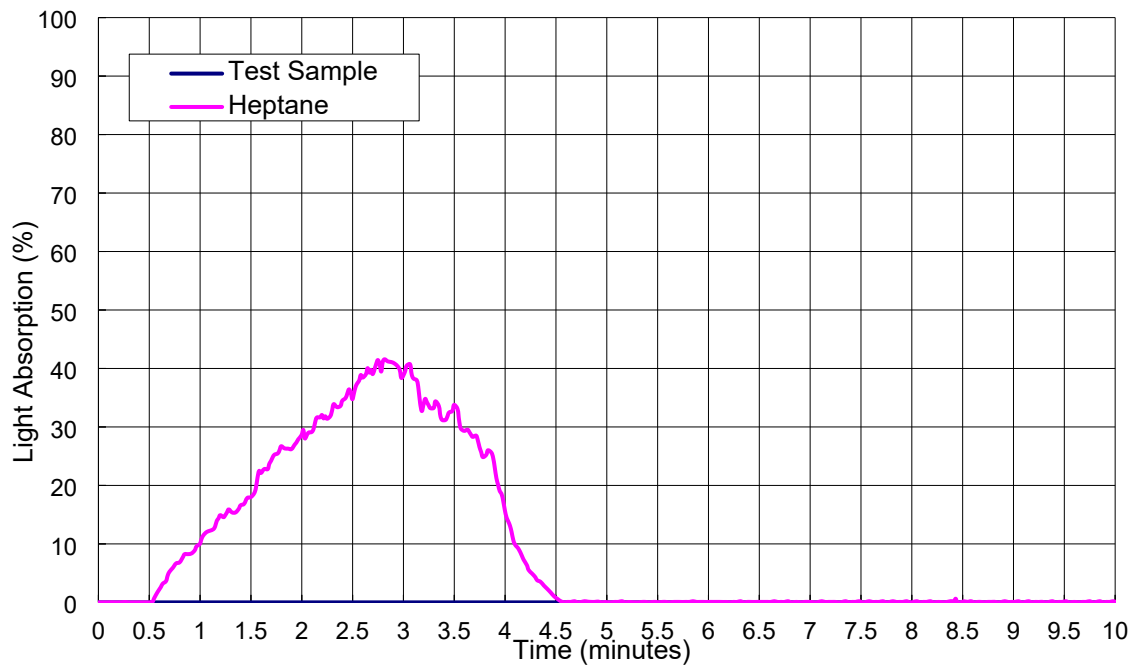
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Smoke Developed Chart



Observations:

Time to ignition (sec)	Not ignited
Time to Max. FS (sec)	Not Applicable
Maximum FS (feet)	0
Observations	None

Test results	Requirements (according to ASTM C592-24)	Conclusion
FSI=0	FSI≤25	PASS
SDI=0	SDI≤50	



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Original Sample Photo(s):



Test projects were carried out by other laboratory in SGS group

The test report shall only be used for clients' scientific research, teaching, internal quality control, product research and development, etc... and just for internal reference.

Unless otherwise stated, this report provides a declaration of conformity according to whether the test results are within the specified limits or specifications without considering the measurement uncertainty.

*****End of report*****



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Commercial Construction Material Laboratory

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