



# TEST REPORT

## Test Report



68, Gajaeul-ro, Seo-gu, Incheon, 22829, Korea TEL 82-41-589-0010 FAX 82-41-589-0012	Report No. : THF-2023-000029 1 / 9
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### 1. Applicant

- Company Name : Saint-Gobain Isover Korea Co.,Ltd
- Address : 1F, 70, Bugokgongdan 1-gil, Songak-eup, Dangjin-si, Chungcheongnam-do, Republic of Korea
- Date of receipt : 20230106

### 2. Test target product

- Sample Name : ISOVER 4+
- Applied Range : Exterior Finishing Materials
- Product No. : ISOVER 4+\_221229

3. Test Standard : Ministry of Land, Infrastructure and Transport Notice No. 2022-84(2022) 'Quality recognition and management standards for building materials, etc.'

4. Purpose of the report : QUALITY CONTROL

5. Test period : 2023. 01. 06. ~ 2023. 03. 09.

6. Test Environment : Temperature : (15~30) °C, humidity : (20~80) % R.H.

7. Test Results : Suitable with test results according to Ministry of Land, Infrastructure and Transport Notice No. 2022-84 'Quality recognition and management standards for building materials, etc.' Article 23 Subparagraphs 1 and 2

- ①. The test results of this test report are only limited in to the samples and sample names provided by the client and do not guarantee the quality of all products of the client. You Can check website ([www.ktr.or.kr](http://www.ktr.or.kr)) or QR code to verify the authenticity of the certificate.
- ②. This test report shall be used only within the purpose of its defined usage and shall not be used for public relation, advertisement and lawsuit.
- ③. This test report is only valid when printed on KTR original report paper with hologram and when re-issued by KTR.

Confirm	Prepared by	Technical Manager
	Name : Park Sanghyo <i>Park Sanghyo</i>	Name : Lee Seong-gyu <i>Lee Seong-gyu</i>

Issue Date : 2023. 03. 09.

Korea Testing & Research Institute

President *Kim Hyun cheol*



QR Code to verify genuineness

\* Test reports are valid for 3 year from the date of issuance of the report.

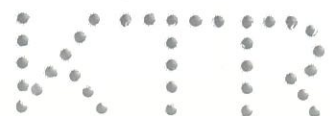




8. Test Results

Division	Test Item	Unit	Test Results			Criteria	Test Method	Test Site	
			1st	2st	3st				
Interior and Exterior Finishing materials	Non-combustibility test	Mass reduction rate	%	6.7	6.8	8.4	30 % below	(1)	A
		The difference between maximum furnace temperature and final equilibrium temperature	K	3.1	2.5	1.9	20 K below		
	Hazardous Gas test	Average deed stopping time	min:s	14:54	14:52	-	more than 9 min		

- \* Performance test was done according to the Article 23, (1) and (2) of the 「Ministry of Land, Transport and Maritime Affairs, Notification No. 2022-84」.(Client provided)
- \* Suitable to the heat release rate (cone calorimeter method) test result according to Article 23, (1) of 「Notice No. 2022-84 of the Ministry of Land, Infrastructure and Transport」.
- \* Suitable to gas hazard test results according to Article 23 (2) of 「Notification No. 2022-84 of the Ministry of Land, Infrastructure and Transport」.
- \* Test reports are valid for three years from the date of issuance of the report according to the Article 29, (4) of the 「Ministry of Land, Transport and Maritime Affairs, Notification No. 2022-84」.
- \* Test Method
  - (1) 「Ministry of Land, Infrastructure and Transport Notice No. 2022-84」
- \* Test site A. Korea Testing & Research Institute Building C, 68, Gajaeul-ro, Seo-gu, Incheon, Republic of Korea
- \* Non-combustible materials performance criteria in the Article 23(1) and (2) of the 「Ministry of Land, Transport and Maritime Affairs, Notification No. 2022-84」.
  - 1) After heating, the mass reduction rate of the specimen must be 30% or less
  - 2) The maximum temperature in the heating furnace should not rise by more than 20K over the final equilibrium temperature for 20 minutes after the start of heating.
  - 3) The average time of suspension of behavior in experimental mice should be more than 9 minutes.





성적서 번호 : THF-2023-000029

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■ Test conditions for Non-combustibility test

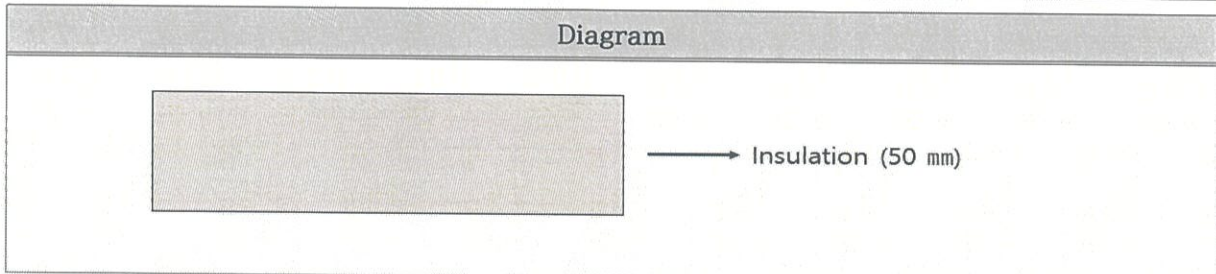
	Date of Test	2023. 02. 28.
Testing Environment	Temperature ( 23 ± 2 ) °C, Relative Humidity ( 50 ± 5 ) % R.H.	
Test Time (min)	20	

■ Non-combustibility test conditions

Diameter (mm)	No. 1	45.0	No. 2	45.0	No. 3	45.0
Height (mm)		50.0		49.0		49.8
Initial mass (g)		1.9		1.9		1.9
Final mass (g)		1.8		1.8		1.8
Maximum furnace temperature (°C)		770.0/766.0		773.0/771.0		774.0/771.0
Final equilibrium temperature (°C)		766.6/763.2		770.6/768.4		772.8/768.5
The difference between maximum furnace temperature and final equilibrium temperature (K)		3.1		2.5		1.9
Total density (kg/m <sup>3</sup> )		24.3		24.2		24.2
Core density (kg/m <sup>3</sup> )		-		-		-
Pretreatment		Temperature ( 23 ± 2 ) °C, Relative Humidity ( 50 ± 5 ) % R.H.				
	( 60 ± 5 ) °C					

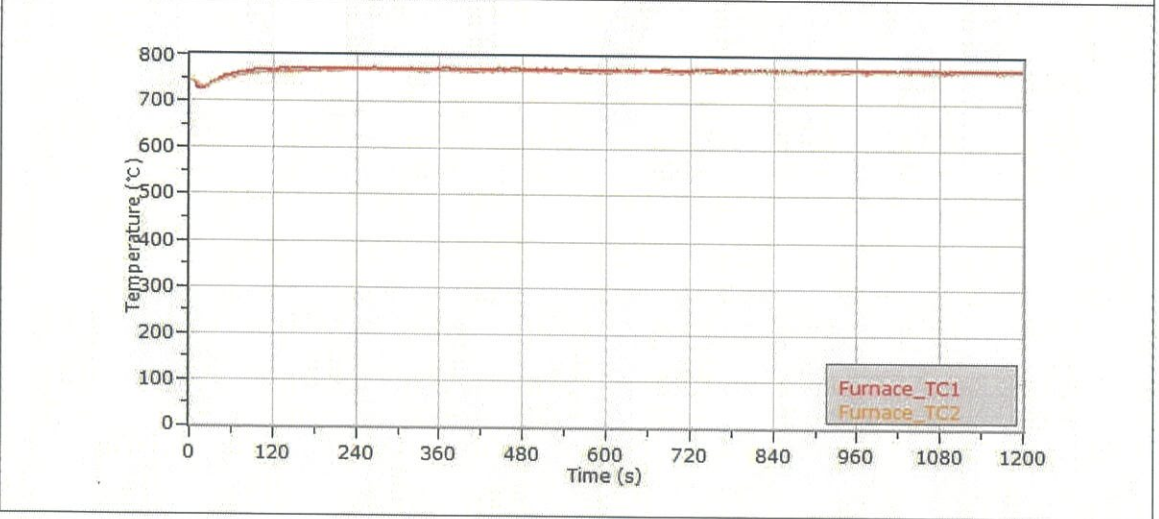
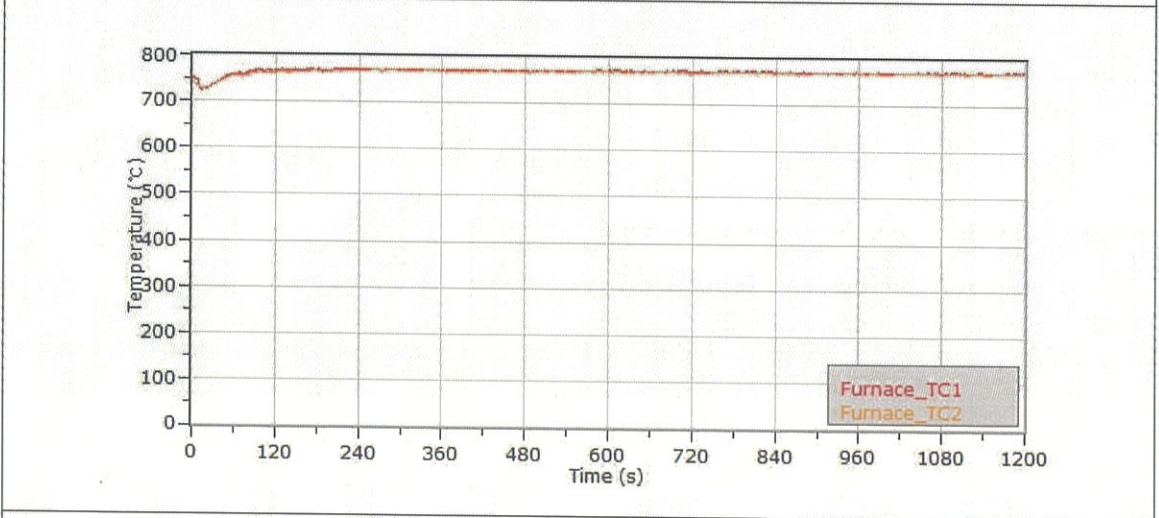
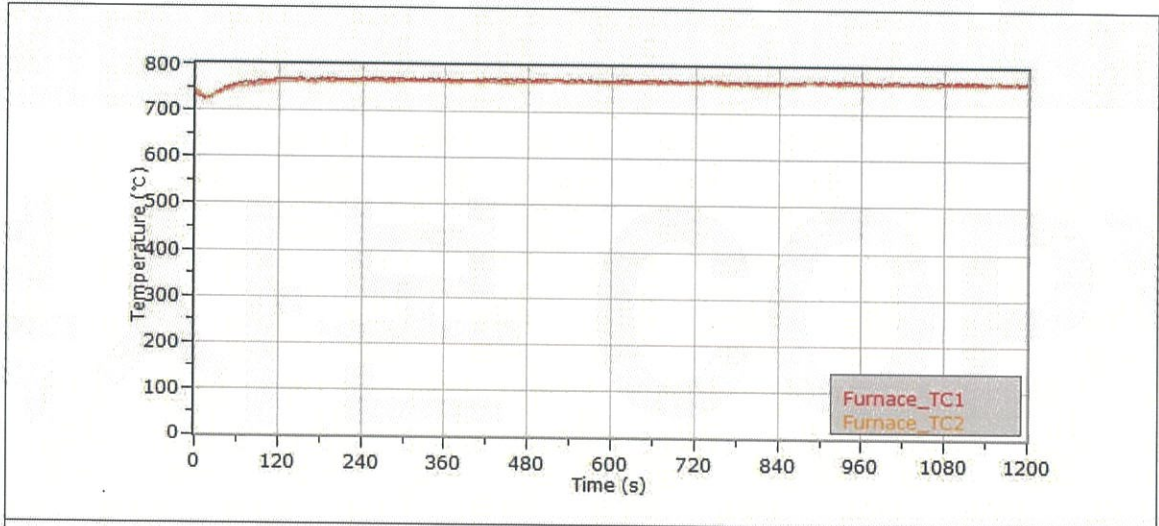
■ Composition of specimen

Composition	Quality of the material	Manufacturer	Model	Thickness (mm)
Insulation	Glasswool	Isover korea	Isover 4+	50 mm





■ Non-combustibility test Temperature Graph





■ Gas Hazard test result

Test Items	Unit	Test result		Test Method
		No. 1	No. 2	
Average deed stopping time of Test Mouse	min:s	14:54	14:52	(1)

Date of Test	2023. 03. 07.
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■ Gas Hazard Test Conditions

Heating Condition	Start heating with a sub-heat source (LPG) for 3 minutes first, heat with a main heat source (full heat) from 3 minutes, and end after 6 minutes (sub-heat source: 6 minutes, main heat source: 3 minutes)				
Burning surface (Client provided)	Separate display of Burning surface				
Testing Environment	Temperature (23 ± 2) °C, Relative Humidity (50 ± 5) % R.H.				
Test Time (min)	15				
Test Mouse	Line	ICR, Female	Age	5	Weight (18 ~ 22) g

■ Gas Hazard Test Specimen Conditions

	No. 1	No. 2
Width (mm)	218.7	218.1
Length (mm)	219.6	218.7
Thickness (mm)	49.7	49.6
Mass (g)	51.6	45.6
Total density (kg/m <sup>3</sup> )	23.2	22.7
Pretreatment	Temperature (23 ± 2) °C, Relative Humidity (50 ± 5) % R.H.	

■ Report on the end of animal testing

Committee approval number	IAC2023-0512
Committee approval date	2023-02-21





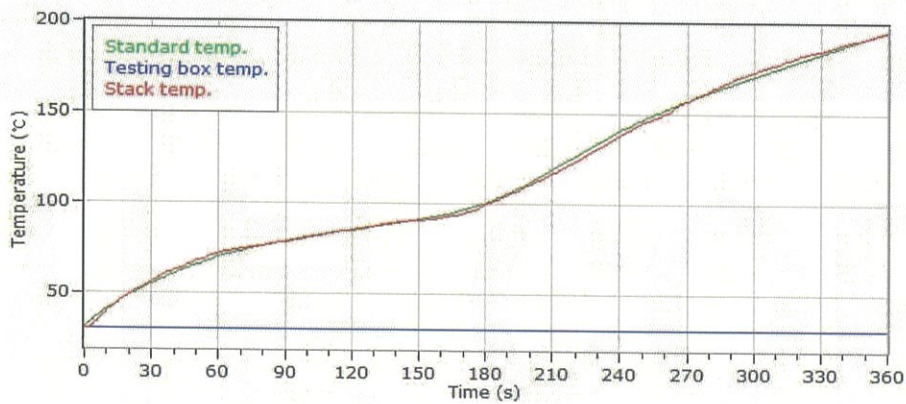
■ Standard Form Test

- Standard Form : Fiber Reinforced Calcium Silicate Board

< Exhaust Temperature >

Elapsed Time (s)	Standard Temperature (°C)	Measure Temperature (°C)	Temperature range (°C)
0.0	30	29.9	-0.1
60.0	70	71.6	1.6
120.0	85	84.5	-0.5
180.0	100	99.3	-0.7
240.0	140	137.5	-2.5
300.0	170	172.5	2.5
360.0	195	194.4	-0.6

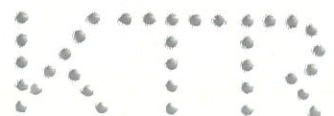
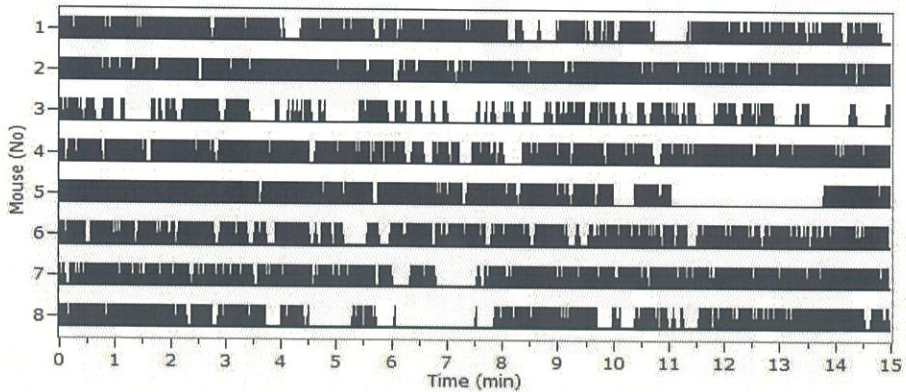
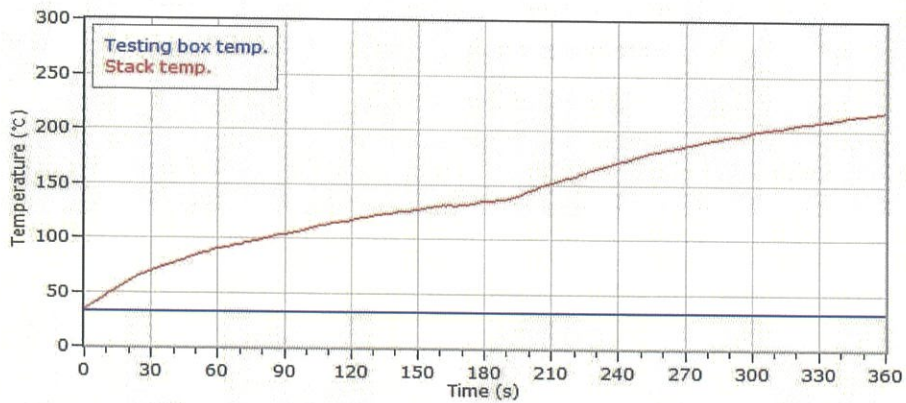
< Exhaust Temperature Curve >



■ Hazardous gas test result(No. 1)

Elapsed Time (s)	Measure Temperature (°C)
0	33.1
60	89.3
120	115.8
180	134.1
240	170.1
300	197.8
360	217.1

Spinning box	Stop time
M1	14 min 49 s
M2	15 min 00 s
M3	15 min 00 s
M4	15 min 00 s
M5	15 min 00 s
M6	14 min 57 s
M7	14 min 57 s
M8	15 min 00 s
Average	14 min 58 s
Standard deviation	00 min 04 s
Average deed stopping time	14 min 54 s

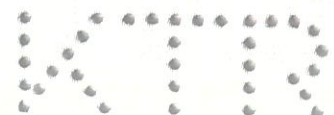
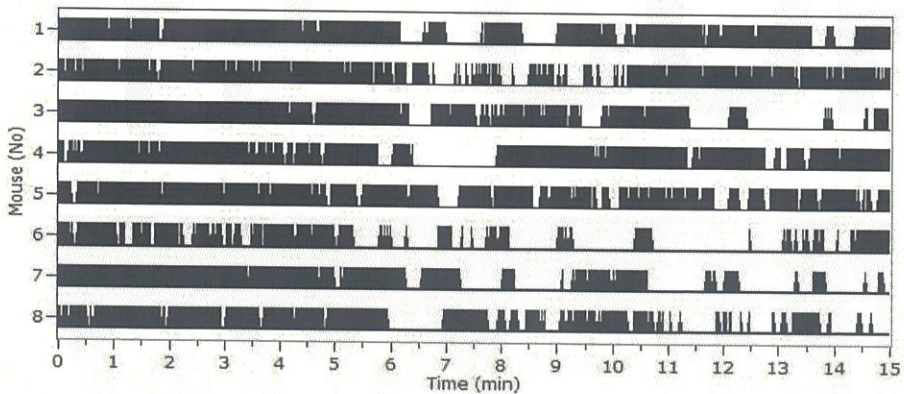
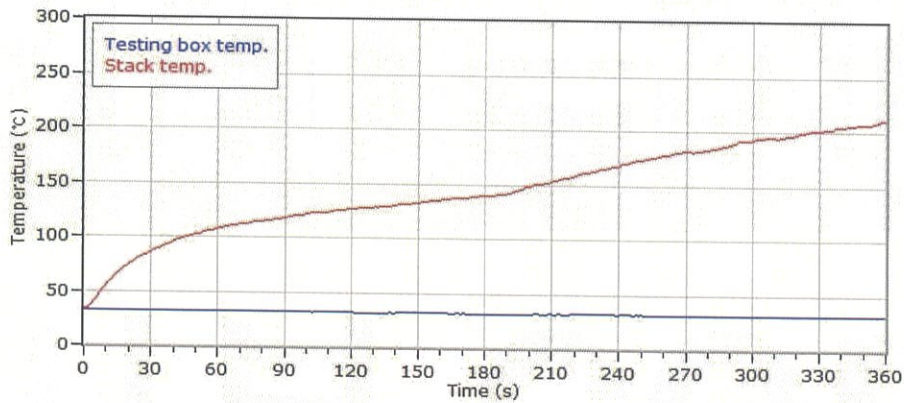




■ Hazardous gas test result(No. 2)

Elapsed Time (s)	Measure Temperature (°C)
0	32.6
60	107.1
120	126.0
180	139.1
240	167.4
300	191.4
360	210.1

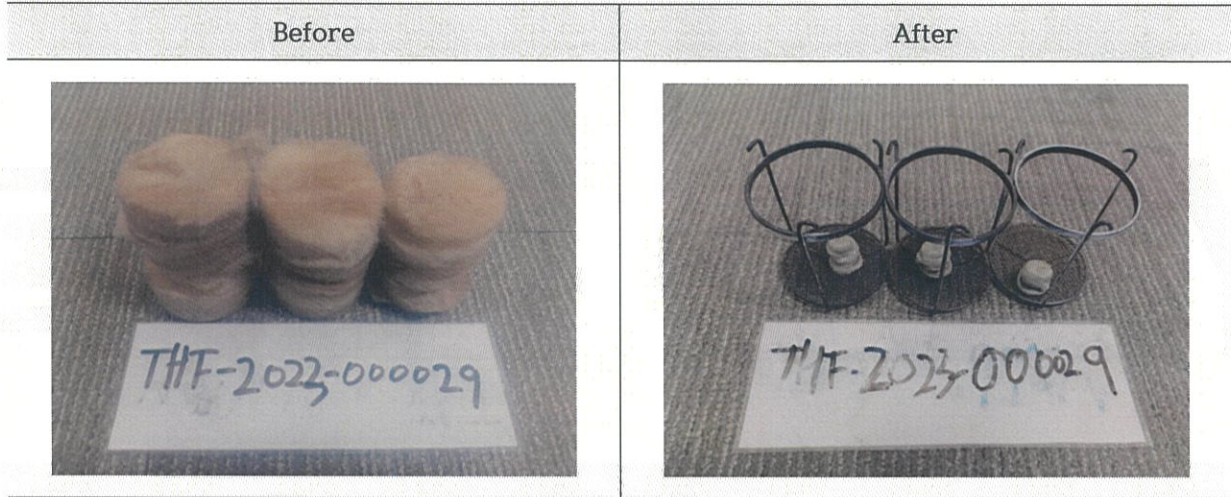
Spinning box	Stop time
M1	15 min 00 s
M2	15 min 00 s
M3	15 min 00 s
M4	15 min 00 s
M5	15 min 00 s
M6	15 min 00 s
M7	15 min 00 s
M8	14 min 41 s
Average	14 min 58 s
Standard deviation	00 min 06 s
Average deed stopping time	14 min 52 s



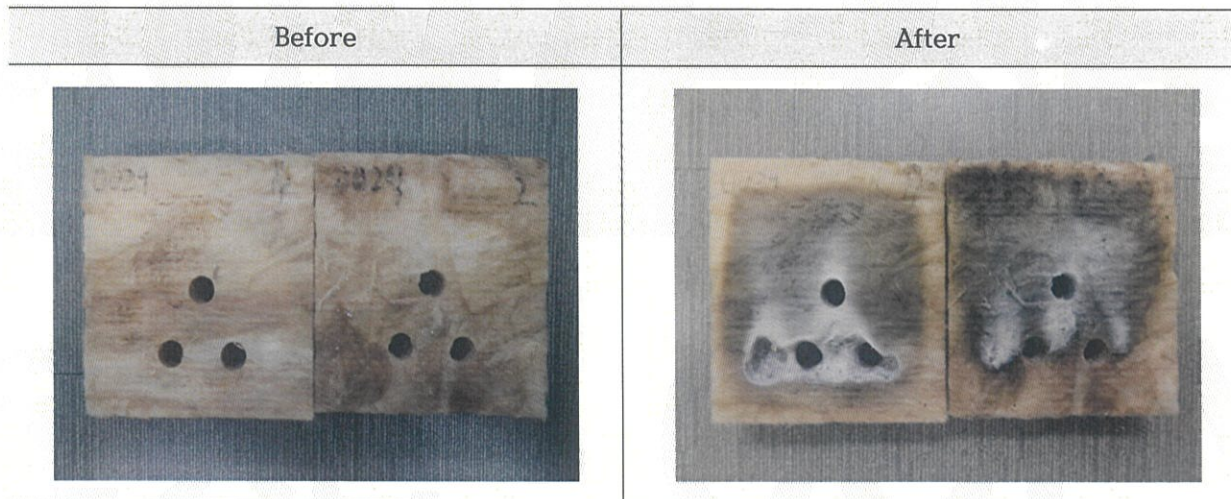


■ Test sample picture

< Non-combustibility test >



< Gas Hazard Test >



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