



## Test Certificate

1. Client
  - Name : Alcopanel Co., Ltd.
  - Address : 351, Chungyong-Ri, Samsung-Myun, Eumsung-Gun, Chungcheongbuk-Do, Korea
  - Date of Receipt : Nov. 05th, 2014
2. Use of Report : Performance Test for Ministry of Land, Transport and Maritime Affairs, Notification No. 2012-624
3. Test Sample : Honeycomb panel
4. Date of Test : Nov. 19th, 2014
5. Test method : Performance criteria for finish material. Ministry of Land, Transport and Maritime Affairs, Notification No. 2012-624
6. Testing Environment
  - (Con Calorimeter test Lab) Temperature :  $(23 \pm 2) ^\circ\text{C}$  , Relative Humidity :  $(50 \pm 5) \% \text{ R.H.}$
  - (Hazardous Gas test Lab) Temperature :  $(23 \pm 2) ^\circ\text{C}$  , Relative Humidity :  $(50 \pm 5) \% \text{ R.H.}$
  - Location : Reaction to fire test Laboratory
7. Test Results
  - Suitability for-fire retardant material

Division	Specimen	1	2	3	Judgement	Criteria
Cone Calorimeter test	THRR ( $\text{MJ}/\text{m}^2$ )	0.7	3.2	6.5	Suitability	8 $\text{MJ}/\text{m}^2$ below
	HRR time over $200\text{kW}/\text{m}^2(\text{s})$	0	0	0	Suitability	10 s below
	Whole melting of core material or any cracking or hole that penetration to the rear side	not be observed	not be observed	not be observed	Suitability	Whole melting of core material or any cracking or hole that penetration to the rear side shall not be observed
Hazardous Gas test	Average deed stopping time(min, s)	12, 37	14, 00		Suitability	more than 9 min

- KS F 2271:2006 Testing method for incombustibility of internal finish material and element of buildings
- KS F ISO 5660-1:2008 Reaction to fire test-Heat release smoke production and mass loss rate-Part 1: Heat release rate(Cone calorimeter method)
- Consist of material : AL(0.8 mm)+core 3/8"(4.9 mm)+AL(0.5 mm)
- Refer to attachment for detail test result

Tested by : Lee, Jong Cheon  
 Researcher

Technical Manager : Cho, Nam Wook  
 Technical Manager

Nov. 21th, 2014

The President of Korea Institute of Civil Engineering and Building Technology

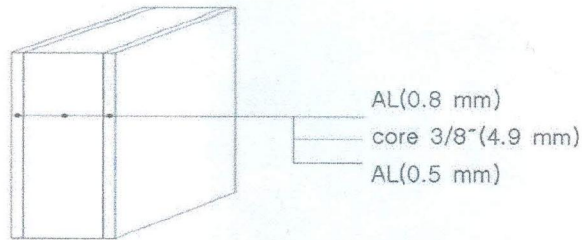


- \* The above test certificate is the accredited test results by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.
- \* This certificate may not be used besides purpose, and an unapproved copy is prohibited
- \* Above is the test result of specimen supplied by client, and the test results are not represent a quality of whole products.

7.1 Cone Calorimeter test

1) Specimen composition

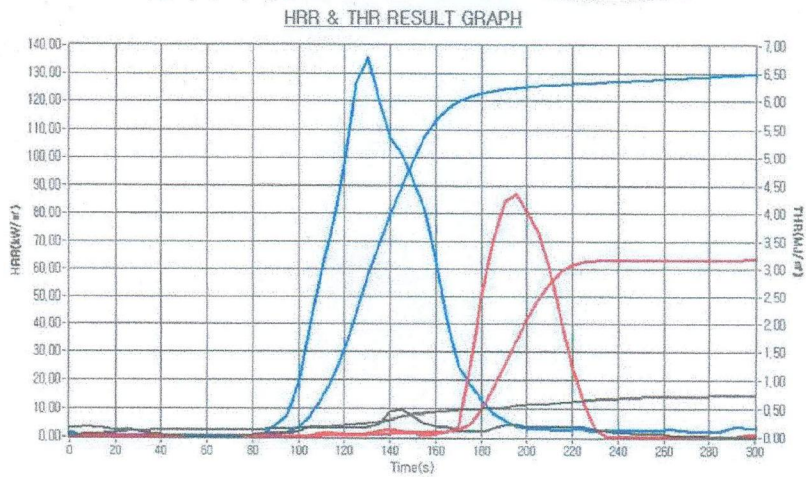
- Consist of material : AL(0.8 mm)+core 3/8"(4.9 mm)+AL(0.5 mm)
- Density of specimen : 671.9 kg/m<sup>3</sup>



(※ Non-Scale)

2) HRR Graph: kW/m<sup>2</sup> vs Time (s)

(Black:1'st specimen, Red:2'nd specimen, Blue:3'rd specimen)



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7.2 Hazardous Gas Test

1) Specimen composition

- Consist of material : AL(0.8 mm), core 3/8"(4.9 mm)+AL(0.5 mm)
- Density of specimen : 625.1 kg/m<sup>3</sup>

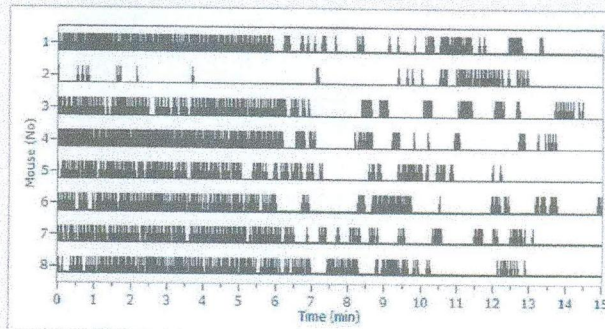
2) Test results

Division	Unit	KS F 2271	
		1'st	2'nd
Thickness	mm	6.7	6.4
weight	g	199.2	199.7
Average value of the deed stopping time	min, s	13, 28	14, 24
Standard deviation	min, s	00, 51	00, 24
Average deed stopping time	min, s	12, 37	14, 00

3) 1'st specimen result graph

M1	13 min 21 s
M2	12 min 57 s
M3	14 min 29 s
M4	13 min 44 s
M5	12 min 13 s
M6	15 min 00 s
M7	13 min 06 s
M8	12 min 54 s
Average	13 min 28 s
Standard deviation	00 min 51 s
Average deed stopping time	12 min 37 s

Mouse activity graph



4) 2'nd specimen result graph

M1	14 min 53 s
M2	14 min 45 s
M3	14 min 19 s
M4	14 min 32 s
M5	14 min 12 s
M6	13 min 40 s
M7	13 min 59 s
M8	14 min 48 s
Average	14 min 24 s
Standard deviation	00 min 24 s
Average deed stopping time	14 min 00 s

Mouse activity graph

