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Report No.	20200709	Date of Receipt	2020-07-22	Date of test	2020-09-11 ~ 2020-09-15
Client	GYEONGGI INSULATION CO., LTD.			Name	Youngdoo Kim
Address	(15618) 14, Jinheung-ro 38 beon-gil, Danwon-gu, Ansan-si, Gyeonggi-do, Republic of Korea			Uses	For submission
Test Sample	GIS-205CW-B28P		Test Item	Thermal Transmittance, Air Tightness	

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Test Results

1. Test method used : KS F 2278:2017 Standard test method for thermal resistance for windows and doors
KS F 2292:2019 The method of air tightness for windows and doors
2. Instrument : Thermal Transmittance & Dew point system, Trust, Korea
Air tightness, water tightness & wind pressure system, Trust, Korea
3. Testing environment : Temperature : (26.1 ± 5.0) °C, Humidity : (52 ± 5) %R.H., Pressure (1 012 ± 5) hPa
4. Window Specification



Test Specimen	Curtain wall		Opening Type	Fix & Project
Frame material	Aluminum		Frame width (mm)	205
Spacer material	Insulating spacer (SWS-U)		Cavity gas	Argon (Ar)
Glass combination (outer->inner)	Specification	Thickness (mm)	Details	
	Insulating Glazing Unit	28	6 CL + 16 Ar (SWS-U) + 6 LE (PLA ONE)	

5. Test Results

Test Item	Unit	Test Results
Thermal transmittance	U-Value	W/(m ² · K)
Air tightness	Air flow (Class)	m ³ /(h · m ²)

- * Attachment 1. Raw data of Thermal transmittance
- * Attachment 2. Raw data of Air tightness
- * Attachment 3. Drawing of Test specimen
- * Attachment 4. Photograph of Test specimen

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Affirmation	Measurements performed by Name : Hwang Se Young 	Approved by Title : Technical Manager Name : Park, Dong Young 
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17 - 09 - 2020

Hankuk Glass Industries Inc.
Director of R&D Center
Accredited by KOLAS, Republic of KOREA



1. The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
2. The above test report can not be used for any advertisement & lawsuit and for other purpose than submitted.
3. The above test certificate is the accredited test result by Korea Laboratory Accreditation Scheme, which signed the ILAC-MRA.

Attachment 1. Raw data of Thermal transmittance

	Warm Box [m]	Cold Box [m]	Guarded Hot Box [m]	Open face of surround panels [m]
Dimension of instrument	2.6 × 3.0 × 3.6 (W x H x D)	2.6 × 3.0 × 3.6 (W x H x D)	2.0 × 2.5 × 0.7 (W x H x D)	2.0 x 2.0 x 0.3 (W x H x D)

Dimension of Test Specimen				Specimen material
width [mm]	height [mm]	thickness [mm]	Area [m ²]	Aluminum
2 000	2 000	205	4.00	

Measurement details		1st	2nd	3rd	Average
Environmental Temperature [°C]	Guarded hot box	19.64	19.63	19.64	19.64
	Warm box	20.35	20.35	20.36	20.35
	Cold box	0.28	0.27	0.28	0.28
	Temperature difference ※1	19.36	19.36	19.36	19.36
Power [W]	Total Supplied Power ※2	117.34	117.30	117.22	117.29
	Corrected Power ※3	26.69	26.66	26.63	26.66
	Power through Test Specimen	90.65	90.64	90.59	90.62
Total surface coefficient heat transfer [(m ² · K)/W]	Surface heat transfer resistance	0.18	0.18	0.18	0.18
	Correction factor	-0.02	-0.02	-0.02	-0.02
Thermal resistance R, [(m ² · K)/W]		0.835	0.835	0.835	0.835
Thermal Transmittance, U, [W/(m ² · K)]		1.198	1.198	1.198	1.198
note	1. Set up condition for Warm box and Guarded hot box : (20±1) °C , Relative humidity 50 % R.H. 2. Set up condition for cold box : Environmental temperature 0 °C, convection speed 2.0 m/s 3. Convection : Horizontal				

※ 1. Temperature difference : The average temperature between 9 point in guarded box (10 cm from the surface of specimen) and warm box.

※ 2. Total supplied power : the total thermal transmittance from the fan and heater in guarded hot box.

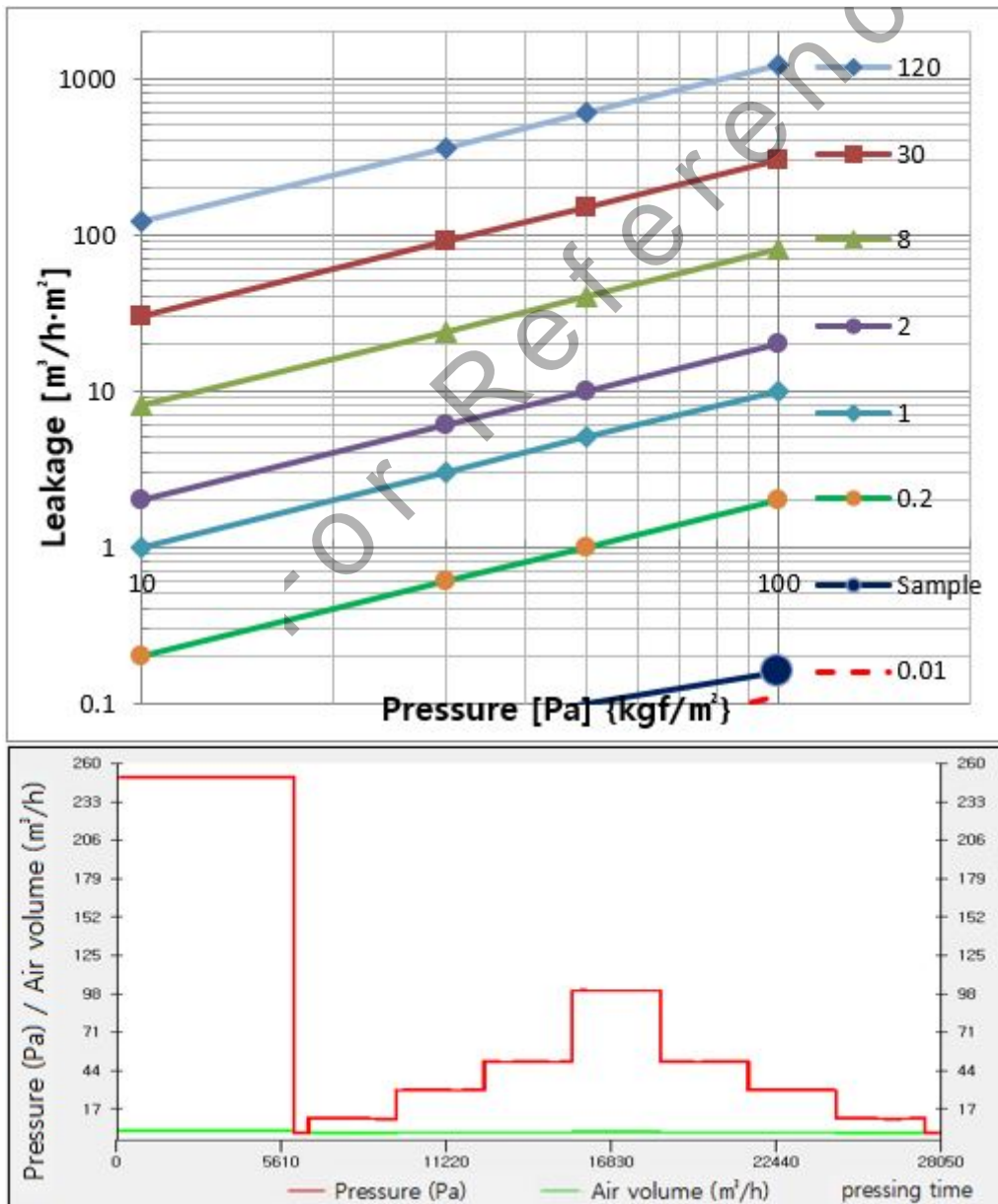
※ 3. Corrected power : The corrected thermal transmittance of guarded hot box wall and surround panel

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Attachment 2. Raw data of Air tightness

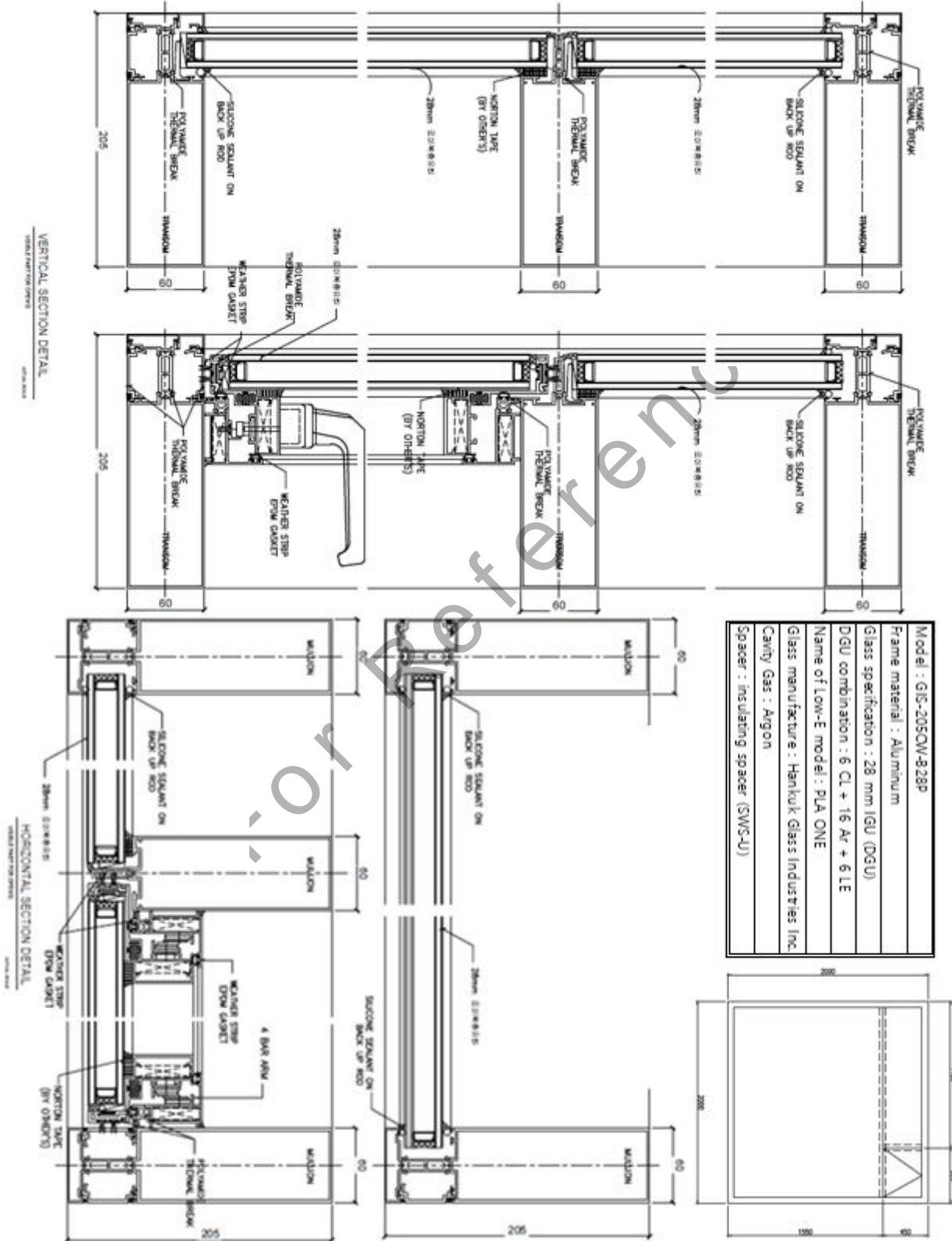
Dimension and Area	Specimen (mm)			Area		
	W	H	D	Glass (m ²)	Window (m ²)	Area ratio
	2 000	2 000	205	3.32	0.68	1 : 0.21
Pressure		Pa	10	30	50	100
Air volume	Pressure	m ³ /h	0.05	0.26	0.41	0.64
	Depressure	m ³ /h	0.04	0.26	0.40	0.64
	Max. value	m ³ /h	0.05	0.26	0.41	0.64
Air flow		m ³ /(h·m ²)	0.01	0.06	0.10	0.16

Grade line & Test procedure (Pressure & Air volume vs. Time)



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Attachment 3. Drawing of Test specimen



' Continued '

Attachment 4. Photograph of Test specimen



Warm side



Cold side

Installation of specimen to measure thermal transmittance (U-Value)



Installation of specimen to measure air tightness



' End '