

1. NAME OF : KHPT CO., LTD.
2. PROJCT NAME : Arzew Refinery Rehabilitation and Adaptation Project
3. Material Requisition NO. : HW-2208-00-MR-20-00-0003
4. Purchase Order No. : HW-2208-00-PO-20-00-0003
5. Material / Equipment Name & No : BLASTING DOOR (BGD-01~BGD-09. Total:9sets)

FIELD TEST REPORT



August. 19th. 2011.

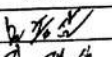

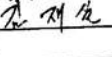

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ATTENDANT LIST OF FIELD TEST

ARR & A PROJECT (BLAST RESISTANT AND GASTIGHT DOORS)

August. 11th, 2011

NAME	COMPANY	SINATU
1. 	KHPT	
2. 	KHPT	
3.		
4.		
5.		
6.		
7.		
8.		
9.		





GENERAL ENGINEER  SONG, KI SUB (CONSTRUCTION STRUCTURAL ENGINEER)

SENIOR ENGINEER JUNE LIM. 

ATTENDANT LIST OF FIELD TEST

ARR & A PROJECT (BLAST RESISTANT AND GASTIGHT DOORS)

August. 12th, 2011

NAME	COMPANY	SINATURE
1. 정병오	(주) KHPT	
2. 김희성	.	
3. 김희성	.	
4. 이양근	이양근건축, 1000호	
5.		
6.		
7.		
8.		
9.		

GENERAL ENGINEER **SONG, KI SUB** (CONSTRUCTION STRUCTURAL ENGINEER)



SENIOR ENGINEER **JUNE LIM.**



2. General Subject

2-1 Background and Purpose of Field Test.

The task which sees the possibility of subsisting enough under condition
Of explosive etc. in order to be, plans, production, must be space-time.

The task which sees hereupon there is the goal inspects the **BGD** proof
Meaning of a passage public ability which is actual space-time in advance.

2-2 Test Relation Standard.

(1) Air Leakage (ASTM E 783-93)

Standard Test Method for Field Measurement of Air Leakage
Through Installed Exterior Windows and Doors

(2) Reference Standard.

① AAMA 501 - 05 ;

Methods of Tests for Exterior Walls

② AAMA 502 - 08 ;

Voluntary Specification for Field Testing of Newly Installed
Fenestration Products

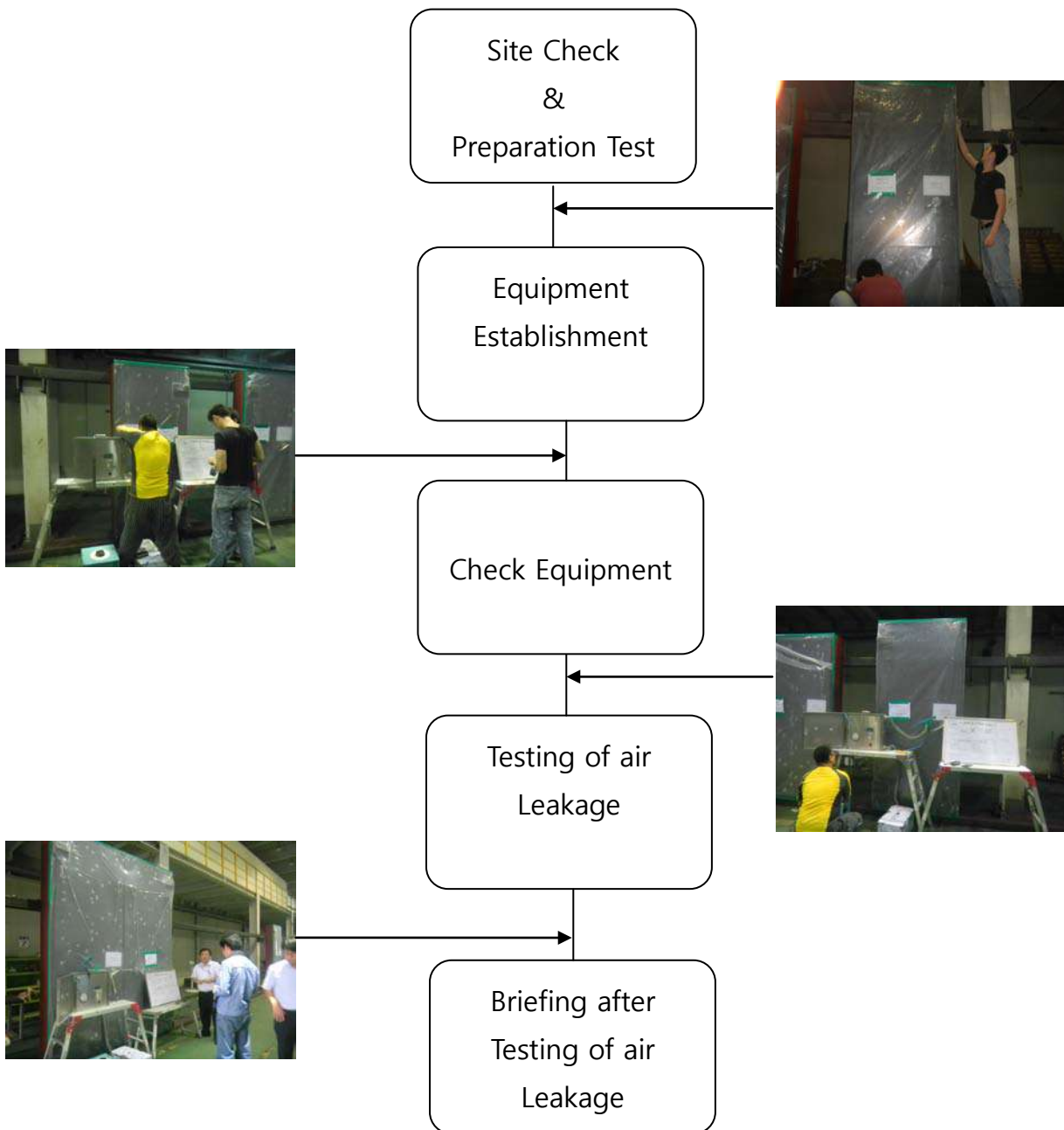
③ AAMA 503 - 08 ;

Voluntary Specification For Field Testing of Newly Installed Storefronts,
Curtain Walls and Sloped Glazing Systems;

2-3 Test Use equipment & Kind

Use equipment	Model Name	Contents	Remark
Lab pack			Air handling equipment
Cadillac blower			" "
Manometer	MAGNEHELIC	Pressure Checking equipment	" "
Digital Camera			" "
Microchronometer			

2-4 Folw Chart of Field Test



2-5 Site Test Progress.

- (1) The vinyl attaches rightly in form and size of the test body, an
Equipment data where is necessary to a site test and prepares.
- (2) The equipment and the manpower which site test are necessary will
Arrive to a site and inspects the region which will be examined.
- (3) Hold an examination site, after inspecting the region which will become
In the region which will be examined on the test body inside air leakage
Simplicity chamber establishes the with the vinyl which is excellent.
- (4) Before site test starting executes the test Briefing which is simple.
- (5) Hold an Performance test for air leakage of the site tentative region.
- (6) The performance test for air leakage that the door which arrives to the pressure
Which provided an efficiency and chamber measures an
air leakage respectively about the and examines.
- (7) Test body air leakage ocean yes or confirmation and result Briefing after test
end do.

2-6 Site test term.

(1) Site Test.

① BLAST RESISTANT AND GASTIGHT DOORS

- D A T E : August 11th, 2011
- Test Contents : Visited a site and(BGD-1,4,5,6,8,9) the established advanced a Equipment and a site test.

② BLAST RESISTANT AND GASTIGHT DOORS

- D A T E : August, 12th, 2011
- Test Contents : Visited a site and (BGD-2,3,7)the established advanced a Equipment and a site test.

(2) Report Make : August 12th, 2011

(3) Report Submit : August 19th, 2011

3. Product Outline.

- (1) Product Name : BLAST RESISTANT AND
GASTIGHT DOORS(BGD-1)
- (2) Location : 96-2, Dodang-dong, Wonmi-gu,
Bucheon-si, Gyeonggi-do, 420-803 Korea
- (3) USE : Explosion-proof door.
- (4) Important structure : Galvanized steel plate.
- (5) SIZE :
- ① BGD-1 / 1185(W) , 2545(H)
 - ② BGD-2 / 2390(W), 3050(H)
 - ③ BGD-3 / 1180(W), 2550(H)
 - ④ BGD-4 / 1185(W), 2390(H)
 - ⑤ BGD-5 / 980(W), 2200(H)
 - ⑥ BGD-6 / 1980(W), 2970(H)
 - ⑦ BGD-7 / 2380(W), 3015(H)
 - ⑧ BGD-8 / 3180(W), 2500(H)
 - ⑨ BGD-9 / 985(W), 2255(H)

4. Information

4-1 Site information.

- 1) 96-2, Dodang-dong, Wonmi-gu, Bucheon-si, Gyeonggi-do,
420-803 (KHPT)

A. FIRST DAY.

- (1) Test date and time : August 11th, 2011 (14 : 00 ~ 20 : 00)
- (2) Temperature : 30 °C
- (3) Humidity : 70 %
- (4) Atmospheric : 890 hPa
- (5) Weather : Clear

B. SECOND DAY

- (1) Test date and time : August 12th, 2011 (10:00 ~ 12:00)
- (2) Temperature : 27.5 °C
- (3) Humidity : 85 %
- (4) Atmospheric : 950 hPa
- (5) Weather : Rain

4-2 Site test target

1) test target Type

- ① Explosion-proof door

2) test target size

- ① BGD - 1

DOOR: 1185mm (W) X 2545mm(H)

$$\therefore 2 \times (3.89 \text{ ft} + 8.35 \text{ ft}) = 24.48 \text{ ft}$$

A. DOOR 1 : 0.375 CFM/FT

$$\therefore 24.48 \times 0.375 = 9.18 \text{ CFM}$$

- ② BGD - 2

DOOR: 1195mm (W) X 3050mm(H)

$$\therefore 4 \times (3.92 \text{ ft} + 10 \text{ ft}) = 55.68 \text{ ft}$$

A. B. DOOR : 0.375 CFM/FT

$$\therefore 55.68 \times 0.375 = 20.88 \text{ CFM}$$

- ③ BGD - 3

DOOR : 1180mm (W) X 2550mm(H)

$$\therefore 2 \times (3.87 \text{ ft} + 8.37 \text{ ft}) = 24.28 \text{ ft}$$

A. DOOR : 0.375 CFM/FT

$$\therefore 24.28 \times 0.375 = 9.10 \text{ CFM}$$

④ BGD - 4

DOOR : 1185mm (W) X 2390mm(H)

$$\therefore 2 \times (3.89 \text{ ft} + 7.84 \text{ ft}) = 23.46 \text{ ft}$$

A. DOOR 1 : 0.375 CFM/FT

$$\therefore 23.46 \times 0.375 = 8.80 \text{ CFM}$$

⑤ BGD - 5

DOOR: 980mm (W) X 2200mm(H)

$$\therefore 2 \times (3.22 \text{ ft} + 7.22 \text{ ft}) = 20.87 \text{ ft}$$

A. DOOR 1 : 0.375 CFM/FT

$$\therefore 20.87 \times 0.375 = 7.82 \text{ CFM}$$

⑥ BGD - 6

DOOR: 990mm (W) X 2970mm(H)

$$\therefore 4 \times (3.25 \text{ ft} + 9.74 \text{ ft}) = 51.97 \text{ ft}$$

A. B. DOOR 1 : 0.375 CFM/FT

$$\therefore 51.97 \times 0.375 = 19.49 \text{ CFM}$$

⑦ BGD - 7

DOOR: 1190mm (W) X 3015mm(H)

$$\therefore 4 \times (3.90 \text{ ft} + 9.89 \text{ ft}) = 55.18 \text{ ft}$$

A. B. DOOR 1 : 0.375 CFM/FT

$$\therefore 55.18 \times 0.375 = 20.69 \text{ CFM}$$

⑧ BGD - 8

DOOR: 1590mm (W) X 2500mm(H)

$$\therefore 4 \times (5.22 \text{ ft} + 8.20 \text{ ft}) = 53.67 \text{ ft}$$

A. B. DOOR 1 : 0.375 CFM/FT

$$\therefore 53.67 \times 0.375 = 20.13 \text{ CFM}$$

⑨ BGD - 9

DOOR: 985mm (W) X 2255mm(H)

$$\therefore 2 \times (3.23 \text{ ft} + 7.40 \text{ ft}) = 21.26 \text{ ft}$$

A. DOOR : 0.375 CFM/FT

$$\therefore 21.26 \times 0.375 = 7.97 \text{ CFM}$$

4-3 Air leakage test result.

(1) Test Pressure : 7.6kgf/m²

(2) Continuous time : The pressure of +7.6 kgf/m² is stabilized and will be made
To maintain is not taken up.

(3) The air leakage quantity which dawns from the test target :

1) BGD - 1

A. DOOR 1 test

① The limit

Test Area: 0.375 CFM/FT : 24.48 x 0.375= 9.18CFM

② result :

Test Area: real average air leakage (1.24 CFM) < limit air leakage (9.18CFM)

2) BGD - 2

A. B. DOOR 1 test

① The limit

Test Area: 0.375 CFM/FT : 55.68 x 0.375= 20.88CFM

② result :

Test Area: real average air leakage (7.4 CFM) < limit air leakage (20.88CFM)

3) BGD - 3

A. DOOR 1 test

① The limit

Test Area: $0.375 \text{ CFM/FT} \cdot 24.28 \times 0.375 = 9.10 \text{CFM}$

② result :

Test Area: real average air leakage(1.87 CFM) < limit air leakage(24.18CFM)

4) BGD - 4

A. DOOR 1 test

① The limit

Test Area: $0.375 \text{ CFM/FT} \cdot 23.46 \times 0.375 = 8.80 \text{CFM}$

② result :

Test Area: real average air leakage (7.9 CFM) < limit air leakage (8.80CFM)

5) BGD - 5

A. DOOR 1 test

① The limit

Test Area: $0.375 \text{ CFM/FT} \cdot 20.87 \times 0.375 = 7.82 \text{CFM}$

② result :

Test Area: real average air leakage(4.77 CFM) < limit air leakage (7.82CFM)

6) BGD - 6

A. B. DOOR 1 test

① The limit

Test Area: $0.375 \text{ CFM/FT} \cdot 51.97 \times 0.375 = 19.49 \text{CFM}$

② result :Test Area: real average air leakage(3.5 CFM) < limit air leakage (19.49CFM)

7) **BGD - 7**

A. B. DOOR 1 test

① The limit

Test Area: $0.375 \text{ CFM/FT} \cdot 55.18 \times 0.375 = 20.69 \text{ CFM}$

② result :

Test Area: real average air leakage(13 CFM) < limit air leakage (20.69CFM)

8) **BGD - 8**

A. DOOR 1 test

① The limit

Test Area: $0.375 \text{ CFM/FT} \cdot 53.67 \times 0.375 = 20.13 \text{ CFM}$

② result :

Test Area: real average air leakage(20.03 CFM) < limit air leakage (20.13CFM)

9) **BGD - 9**

A. DOOR 1 test

① The limit

Test Area: $0.375 \text{ CFM/FT} \cdot 21.26 \times 0.375 = 7.97 \text{ CFM}$

② result :

Test Area: real average air leakage(7.9 CFM) < limit air leakage (7.97CFM)

4.4 Synthetic opinion.

(1) Air leakage results : 4.3.3.1.2 reference

- Based on the results of 16page, BGD(BRAST RESISTANT AND GASTIGHT DOORS- to air leakage) no air leakage occurs during a test. Therefore, We think that the Air leakage test it is passing.

appendix

1. Site target test photo
2. Authentication relation document.

1. Site target photo



<photo> LAP PACK SETTING



<사진> LAP PACK SETTING FINISH



<사진> air leakage test<BGD - 1>

BGD-1
(18x2545)

2017. 8. 11.	공사명	ARR & A PROJECT (BGD-1)		
날짜	차	cbar		
1. DESIGN WIND LOAD: kg / m ²				
2. CHAMBER SIZE (mm)	1185	x	2545	
DOOR	1185	x	2545	
3. AIR INFILTRATION TEST (ASTM E 783)				
3.1 TEST PRESSURE : 7.6 kg / m ²				
3.2	Test Area	Allowable Air Leakage		Test Result
1) Wwp	24.48 (2.06M)	0.375CFM / FT	9.18	CFM 1.24
		0.375CFM / FT		CFM END
2) Sliding		0.45CFM / FT'		CFM
3) Fix		0.09CFM / FT'		CFM
	TOTAL			CFM
				CFM
4. WATER PENETRATION TEST (ASTM E 1105)				
4.1 TEST PRESSURE :				
4.2 TEST Water-Spray : 204ℓ / hr·m ²	4.3 TEST Time : 15-minute	4.4 Allowable Water Leakage : 15ml		
		kg / m ²		

<사진> after air leakage test <BGD-1>



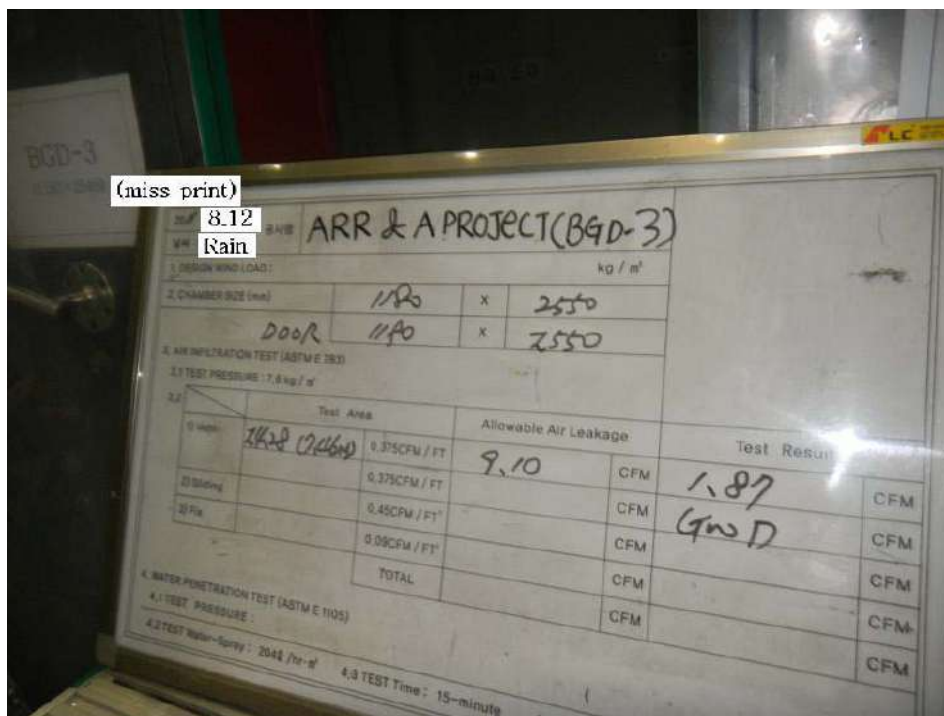
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<photo> after air leakage test <BGD-2>



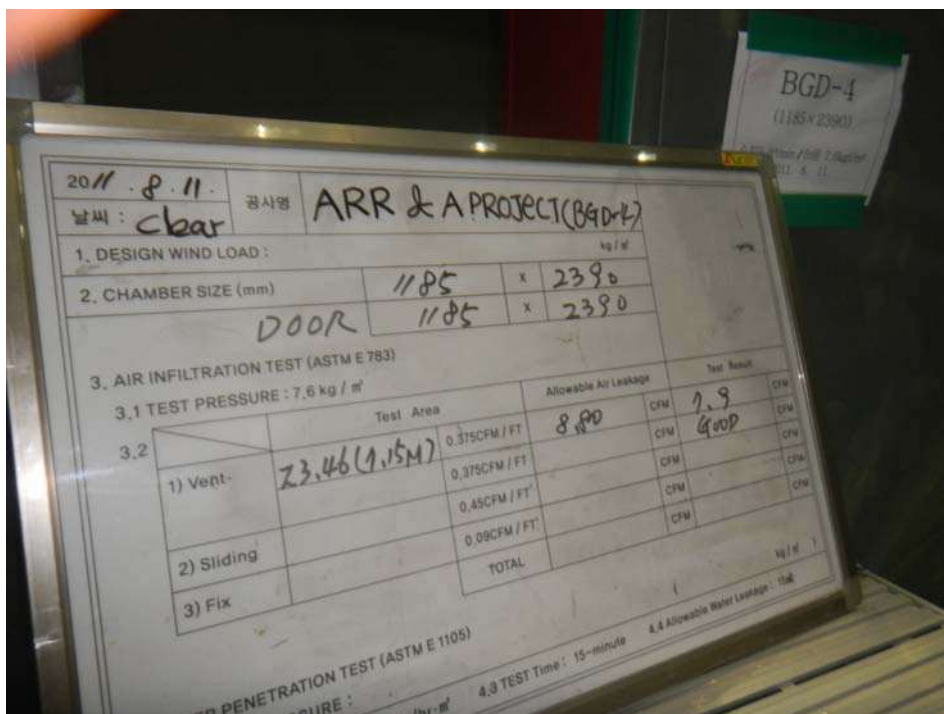
<photo> air leakage test<BGD - 3>



<photo> after air leakage test <BGD-3>



<Photo> air leakage test<BGD - 4>



<사진> after air leakage test <BGD-4>



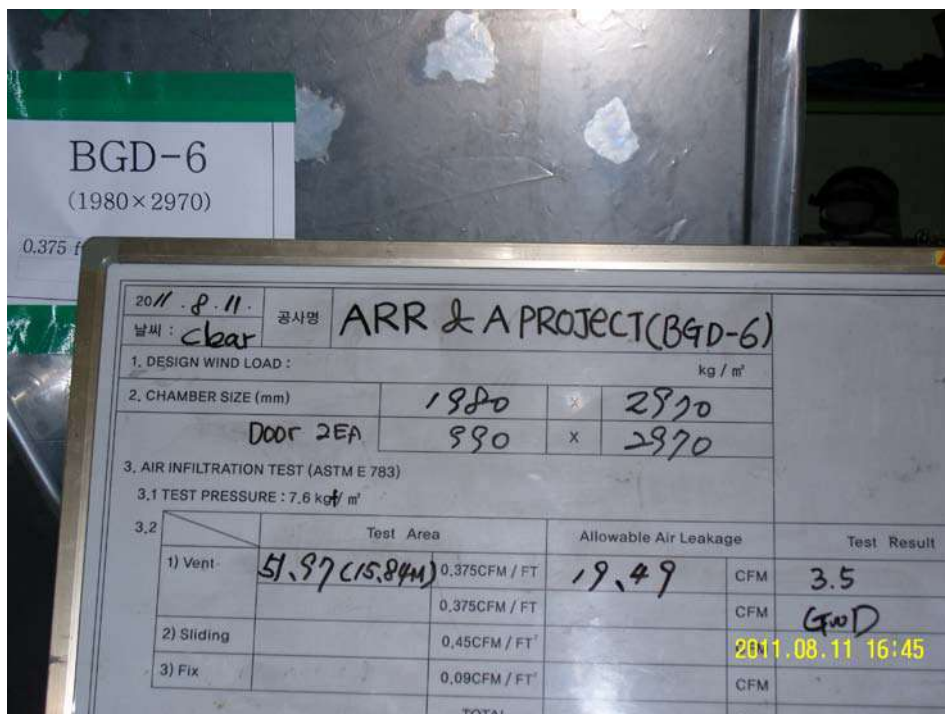
<사진> air leakage test<BGD - 5>



<사진> after air leakage test <BGD-5>



<photo> air leakage test<BGD - 6>



<photo> after air leakage test <BGD-6>



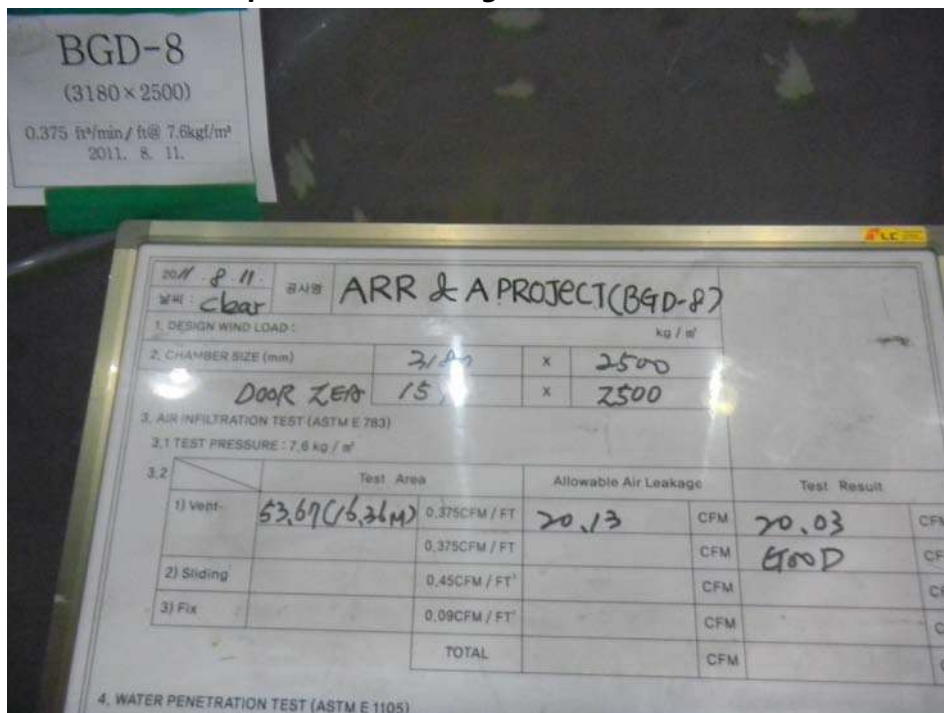
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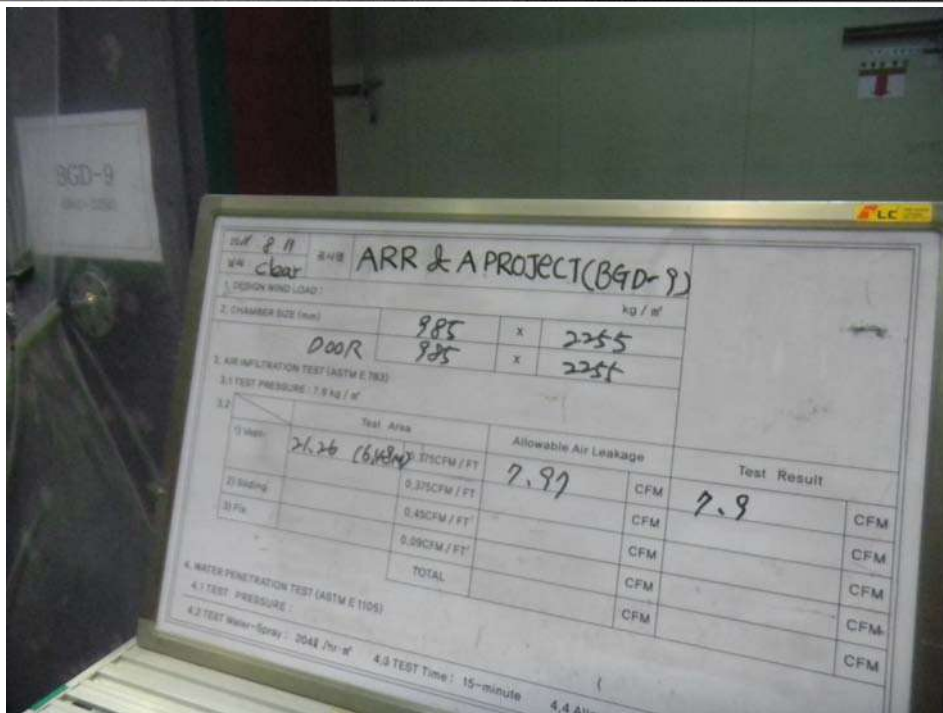
<photo> after air leakage test <BGD-7>



<photo> air leakage test <BGD - 8>



<photo> after air leakage test <BGD-8>





THE AMERICAN ASSOCIATION FOR
LABORATORY ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

HANKUK GLASS INDUSTRIES INC.

Chonbuk, Korea

for technical competence in the field of

Mechanical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to *joint ISO-ILAC-IAF Communiqué dated 18 June 2005*).

Presented this 25th day of November 2008.

President
For the Accreditation Council
Certificate Number 0183.01
Valid to October 31, 2010



For the tests or types of tests to which this accreditation applies, please refer to the laboratory's Mechanical Scope of Accreditation.



American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

HANKUK GLASS INDUSTRIES INC.
77 Soryong-Dong, Gunsan
Chonbuk 573-400, Korea
Soo-Choel Chae Phone: 011 82 63 460 4510

MECHANICAL

Valid To: October 31, 2010

Certificate Number: 0183.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following window and door testing:

ASTM E283	Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors
ASTM E330	Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
ASTM E331	Water Penetration of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
ASTM E547	Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential
AAMA 501.5	Test Method for Thermal Cycling of Exterior Walls
AAMA 501.4	Lateral Displacement Test
JIS A1414	Seismic Racking Test
JIS A1517	Water Tightness for Windows and Doors
ASTM E783*	Measurement of Air Leakage Through Installed Exterior Windows and Doors
ASTM E1105*	Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform or Cyclic Static Air Pressure Difference

*Field Test



(A2LA Cert. No. 0183.01) 11/25/08

Page 1 of 1

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