



Test
TS EN ISO/IEC 17025
AB-0531-T

AB-0531-T

020.973.11/2017

30.11.2017

Merkez / Head Office

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DENEY SERTİFİKASI / Test Certificate

Müşterinin Adı ve Adresi / Customer's Name & Address: Burak Alüminyum San. ve Tic. A.Ş.

Orta Mah. Hamdi Efendi Sok. No:16 D:32 İztower 34880 Kartal / İstanbul / TÜRKİYE

Numunenin Adı ve Tanımı / Sample's Name & Description: BG60 Inside Opening Hidden Vent In The Capped
Curtain Wall

Numune Kabul Tarihi : 22.11.2017
Acceptance Date of Item

Referans No : 2017.885
Reference No

Uygulanan Normlar / Norms Applied: EN 12153, EN 12155, EN 12179

Sonuçlar / Results: Air Permeability : EN 12152 - Class A4 ; EN 12207 - Class 4 (± 600 Pa)
Watertightness : EN 12154 - Class RE 1200 (1200 Pa)
Resistance to Wind Load : EN 13830 - OK (criteria 5 mm + L/300 ; ± 2000 Pa)

Test Tarihi / Date of Test
22-23 / 11 / 2017

Sayfa Sayısı / Number of Pages
1 / 17

Deneysel laboratuvarı olarak faaliyet gösteren FTI Fasad Teknoloji Merkezi, TÜRKAK 'tan AB-0531-T numarası ile TS EN ISO/IEC 17025 standardına göre akredite edilmiştir.
FTI Façade Testing Institute accredited by TURKAK under registration number AB-0531-T for TS EN ISO/IEC 17025 as test laboratory.

Türk Akreditasyon Kurumu (TÜRKAK) deney laboratuvarlarının tanınırlığı konusunda Avrupa Akreditasyon Birliği (EU) ile Çok Taraflı Anlaşma ve Uluslararası Laboratuvar Akreditasyon Birliği (ILAC) ile karşılıklı tanıma anlaşması imzalamıştır.
Turkish Accreditation Agency (TURKAK) is a signatory to the European co-operation for Accreditation (EA) Multilateral Agreement (MLA) and to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA) for the recognition of test reports.

Deneysel ve/veya ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri (olması halinde) ve deneysel metodları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir. Bu sertifika yalnızca test edilen numuneye ait sonuçları içerir ve ekte sunulan ilgili test raporu ile birlikte geçerlidir.
The test and/or measurement results, the uncertainties (if applicable) with confidence probability and test methods are given on the following pages.
This certificate includes the test results of the specimen which is identified above and its valid with the related test report.



Tarih / Date
30 / 11 / 2017

Test Faaliyetleri Yöneticisi
Testing Manager
Ayfer DİNCEL

Laboratuvar Müdürü
Laboratory Manager
Öner ARSLAN

F.15.22 REV. NO: F MART 2017



TEST REPORT

Testing Reference : EN 12153 Curtain Walling - Air Tightness - Test Method
EN 12155 Curtain Walling - Water Tightness - Laboratory Tests Under Static Pressure
EN 12179 Curtain Walling - Resistance to Wind Load - Test Method

Product / Project : BG 60 Inside Opening Hidden Vent In The Capped Curtain Wall

Prepared by : Ayfer DİNCEL



1. PREFACE

This report comprises of tests and results, which were performed by FTI Façade Testing Institute at the address; Çakıl Mah. Şehit Teğmen Tamer Aydın Sok. No: 76 34540 Çatalca – İstanbul / TURKIYE.

Test sample is BG 60 Inside Opening Hidden Vent In The Capped Curtain Wall which has been designed and constructed by Burak Alüminyum San. ve Tic. A.Ş.

Tests were carried out on 22 / 11 / 2017 for the determination of air infiltration, water penetration (under static pressure), wind load resistance, and extreme wind load resistance performances.

Test sample has been sent to FTI Laboratory on 22 / 11 / 2017.

2. CLIENT

Burak Alüminyum San. ve Tic. A.Ş.

Orta Mah. Hamdi Efendi Sok. No:16 D:32 İztower 34880

Kartal / İstanbul / TÜRKİYE

3. TEST METHODS

The above mentioned test has been carried out in project specifications and classified on the standard indicated below.

<u>Document No</u>	<u>Date of Press</u>	<u>Subject of Document</u>
TS EN 12153	11.2006	Curtain Walling – Air Tightness – Test Method
TS EN 12152	12.2004	Curtain Walling – Air Tightness – Performance Requirement and Classification
TS EN 12155	03.2005	Curtain Walling – Water Tightness – Laboratory Tests Under Static Pressure
TS EN 12154	04.2004	Curtain Walling – Water Tightness – Performance Requirements and Classification
TS EN 12179	11.2000	Curtain Walling – Resistance to Wind Load – Test Method

4. TEST DATE AND PARTICIPANTS

Tests were performed on 22-23 / 11 / 2017 by the following crew:

Mr. Öner ARSLAN FTI Laboratory Manager

Mrs. Ayfer DİNCEL FTI Testing Engineer

and the witnesses;

Hüseyin GÜRSOY Burak Alüminyum San. ve Tic. A.Ş.

5. DESCRIPTION OF TEST SAMPLE

Type of sample	Curtain Wall
System Name	BG 60 Inside Opening Hidden Vent In The Capped Curtain Wall
Dimension of Sample (L x H)	2100 mm x 3800 mm
Surface area of Sample	7,98 m ²
Fixed Joint Length	35,40 m
Dimensions of Operable (L x H)	700 mm x 1500 mm
Surface Area of Sash	1,05 m ²
Sash Joint Length	4,40 m
Glass Type	6 mm + 16 mm + 6 mm flat ISICAM

Please refer to the annexes for the system details.

6. CONDITIONS

Date	:	22.11.2017	23.11.2017
Local Temperature (°C)	:	16	15
Atmospheric Pressure (mbar)	:	1022,0	1021,0
Ambient Humidity (%)	:	63	67

7. TEST PERFORMANCE

STEPS		POSITIVE PRESSURE (Pa)	NEGATIVE PRESSURE (Pa)
1	PA	600	600
2	PW	1200	-
3	PD	2000	2000
4	PE	1800	3000

PA: Pressure for Airtightness , PW: Pressure for Watertightness ; PD:Design Pressure
PE: Extreme Pressure

7.1 Air Permeability

Before starting the test, 3 pulses at 660 Pa is applied to the sample. During the tests, the pressure at the following values is applied for 10 seconds. The following data includes the remaining values of the system after tare.

Air permeability measurements based on overall area;

POSITIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m ³ /h)	Air Leakage (m ³ /h/m ²)
50	1,70	0,21
100	2,65	0,33
150	3,02	0,38
200	3,66	0,46
250	3,89	0,49
300	4,61	0,58
450	5,60	0,70
600	6,48	0,81

Test No: 2017.885.03 / 22.11.2017

NEGATIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m ³ /h)	Air Leakage (m ³ /h/m ²)
50	1,97	0,25
100	3,28	0,41
150	4,21	0,53
200	5,08	0,64
250	5,62	0,70
300	6,47	0,81
450	7,79	0,98
600	10,11	1,27

Test No: 2017.885.04 / 22.11.2017

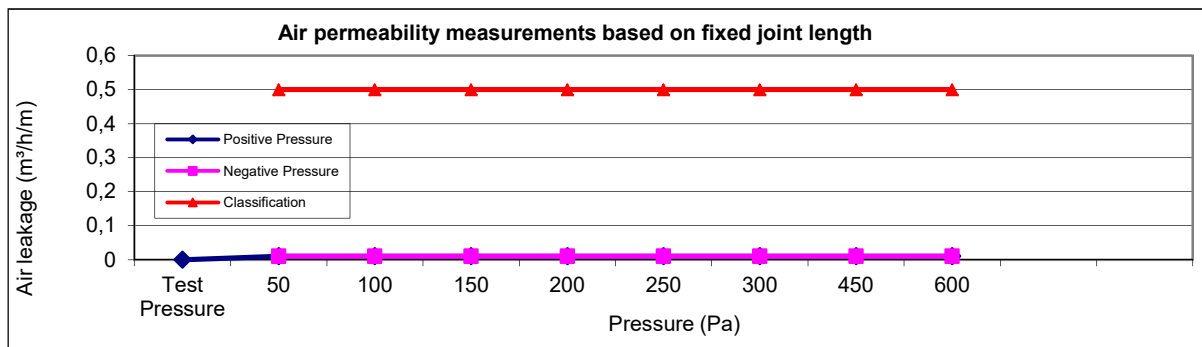
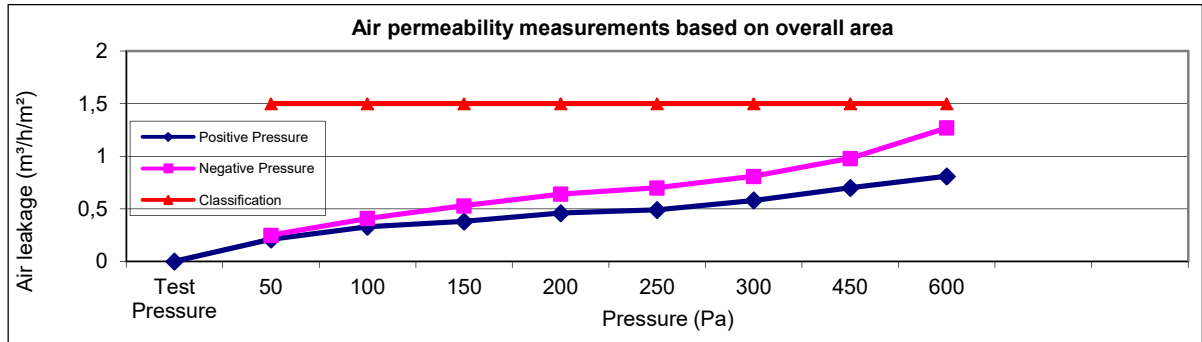
Air permeability measurements based on fixed joint length;

POSITIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m ³ /h)	Air Leakage (m ³ /h/m)
50	0,07	0,01
100	0,01	0,01
150	0,07	0,01
200	0,08	0,01
250	0,16	0,01
300	0,19	0,01
450	0,01	0,01
600	0,05	0,01

Test No: 2017.885.07 / 22.11.2017

NEGATIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m ³ /h)	Air Leakage (m ³ /h/m)
50	0,02	0,01
100	0,03	0,01
150	0,05	0,01
200	0,04	0,01
250	0,03	0,01
300	0,18	0,01
450	0,06	0,01
600	0,02	0,01

Test No: 2017.885.08 / 22.11.2017



Air permeability measurements based on overall area for operable part;

POSITIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m³/h)	Air Leakage (m³/h/m²)
50	1,77	1,69
100	2,66	2,53
150	3,09	2,94
200	3,74	3,56
250	4,05	3,86
300	4,42	4,21
450	5,61	5,34
600	6,43	6,12

Test No: 2017.885.05 / 22.11.2017

NEGATIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m³/h)	Air Leakage (m³/h/m²)
50	1,99	1,90
100	3,25	3,10
150	4,26	4,06
200	5,04	4,80
250	5,65	5,38
300	6,29	5,99
450	7,73	7,36
600	10,09	9,61

Test No: 2017.885.06 / 22.11.2017

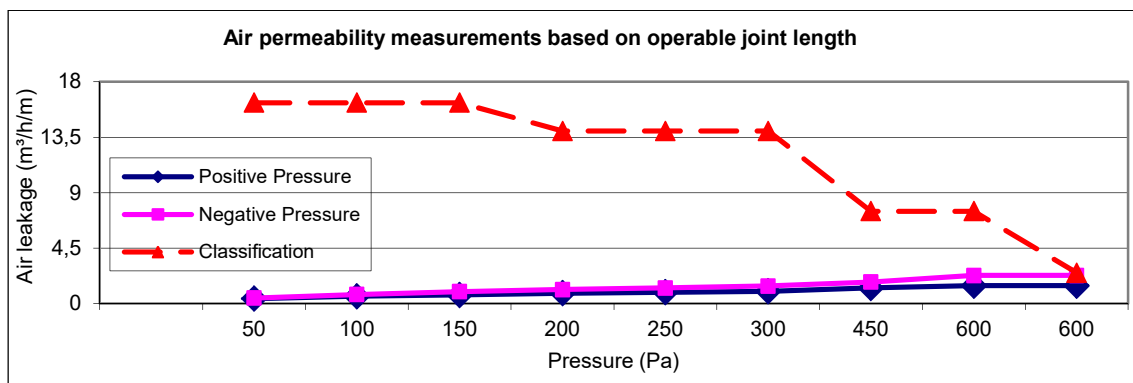
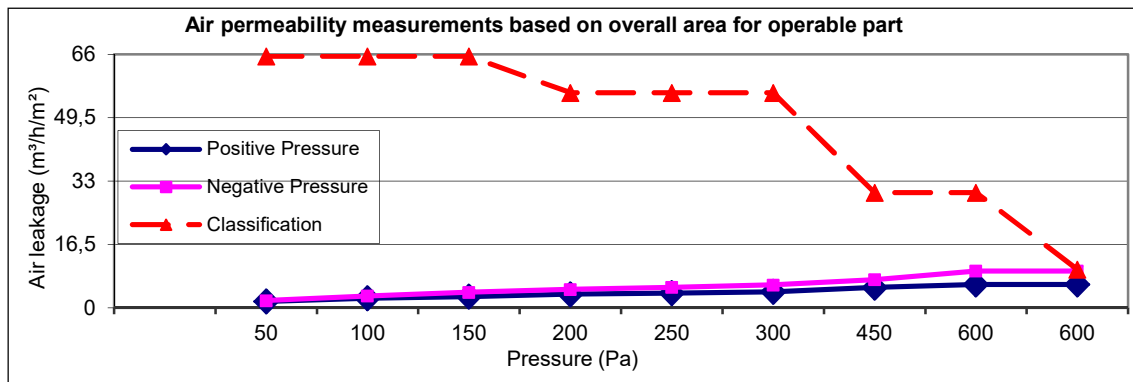
Air permeability measurements based on operable joint length;

POSITIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m³/h)	Air Leakage (m³/h/m)
50	1,77	0,40
100	2,66	0,60
150	3,09	0,70
200	3,74	0,85
250	4,05	0,92
300	4,42	1,00
450	5,61	1,28
600	6,43	1,46

Test No: 2017.885.05 / 22.11.2017

NEGATIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m³/h)	Air Leakage (m³/h/m)
50	1,99	0,45
100	3,25	0,74
150	4,26	0,97
200	5,04	1,15
250	5,65	1,28
300	6,29	1,43
450	7,73	1,76
600	10,09	2,29

Test No: 2017.885.06 / 22.11.2017



7.2 Watertightness Under Static Pressure

Before starting the test, 3 pulses at 1320 Pa were applied to the sample. Waiting duration between each impacts were 3 seconds. An adjustable device for spraying water 2,0 l/m².min so that a constant and continuous film was applied to the outside surface of the specimen.

The amount of water applied to the façade = 2,0 l/m².min x 7,98 m² = 15,96 l/min. = 957,6 l/h

Observations

Pressure Value (Pa)	Time Period (min)	Observations
0	15	No water leakage was observed.
50	5	No water leakage was observed.
100	5	No water leakage was observed.
150	5	No water leakage was observed.
200	5	No water leakage was observed.
300	5	No water leakage was observed.
450	5	No water leakage was observed.
600	5	No water leakage was observed.
750	5	No water leakage was observed.
900	5	No water leakage was observed.
1050	5	No water leakage was observed.
1200	5	No water leakage was observed.

Test No: 2017.885.09 / 22.11.2017

7.3 Resistance to Wind Load

Before starting the test, 3 pulses at - 1000 / + 1000 Pa are applied to the sample. Waiting duration between each impacts were 3 seconds. During the tests, the pressure values are applied for 10 seconds.

Sensor positions: Vertical distance for mullion at middle axis, interstory height **L = 3800 mm**

Under the imposed wind loads only the maximum frontal deflection (d) of the curtain walling's framing members shall not exceed the following limits:

- $d \leq L / 200$, if $L \leq 3000$ mm;
- $d \leq 5 \text{ mm} + L / 300$, if $3000 \text{ mm} < L < 7500$ mm;
- $d \leq L / 250$, if $L \geq 7500$ mm.

Vertical $(3800 / 300 = 12,66 \text{ mm}) + 5 \text{ mm} = \underline{17,66 \text{ mm}}$

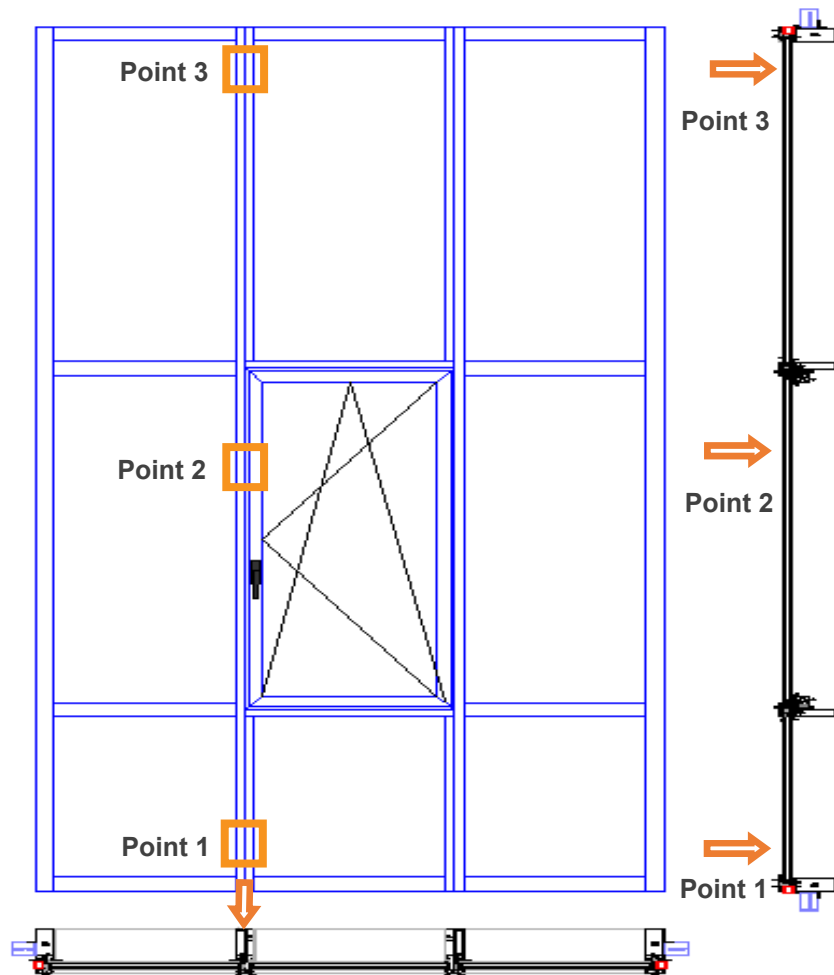


Figure 1. Positions of the deflection sensors on the specimen

Specimen dimensions and sensor placement coordinates;

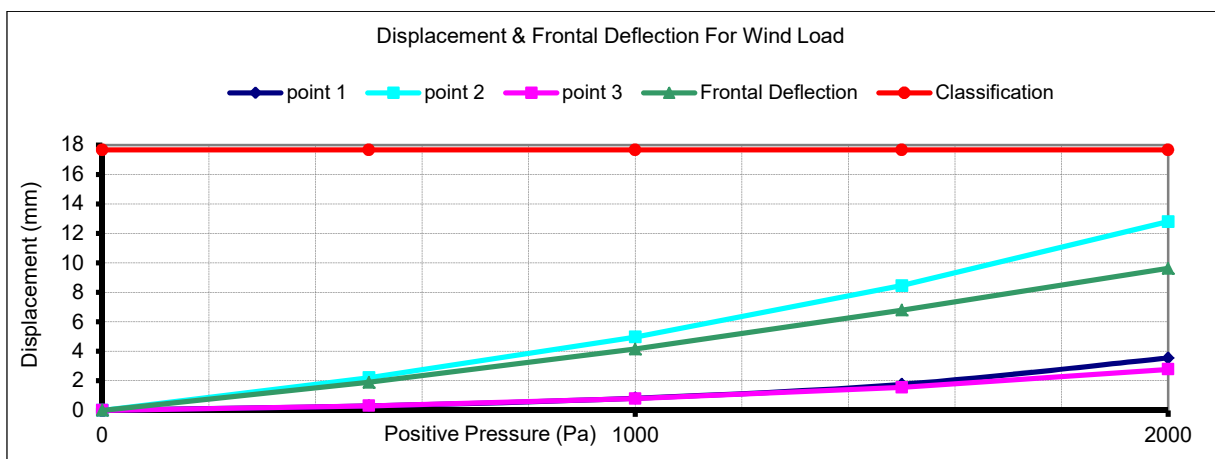
	X coordinates (mm)	Y coordinates (mm)
External Dimensions	2100	3800
Sensor 1 Replacement	700	100
Sensor 2 Replacement	700	1900
Sensor 3 Replacement	700	3700

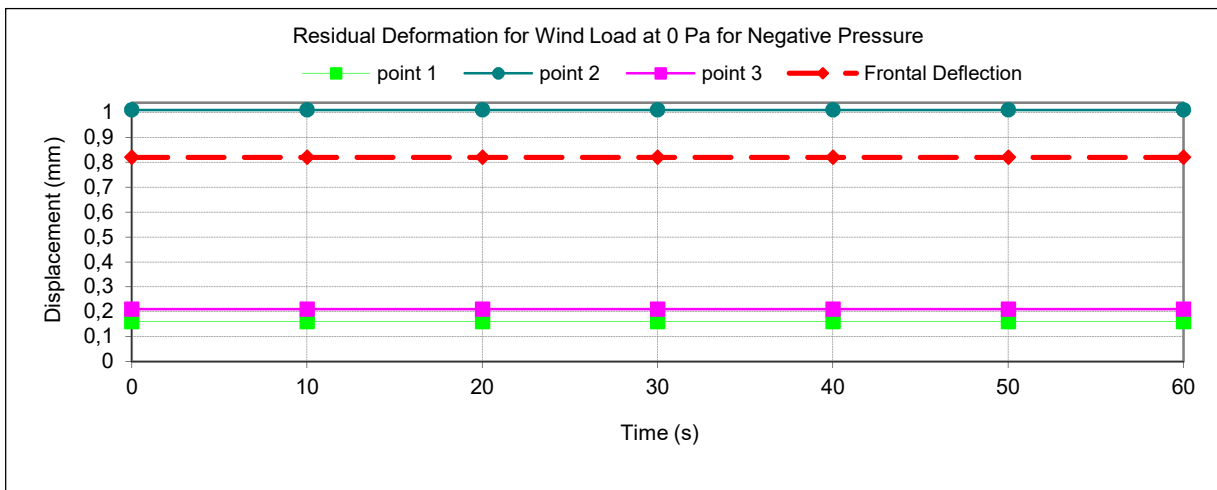
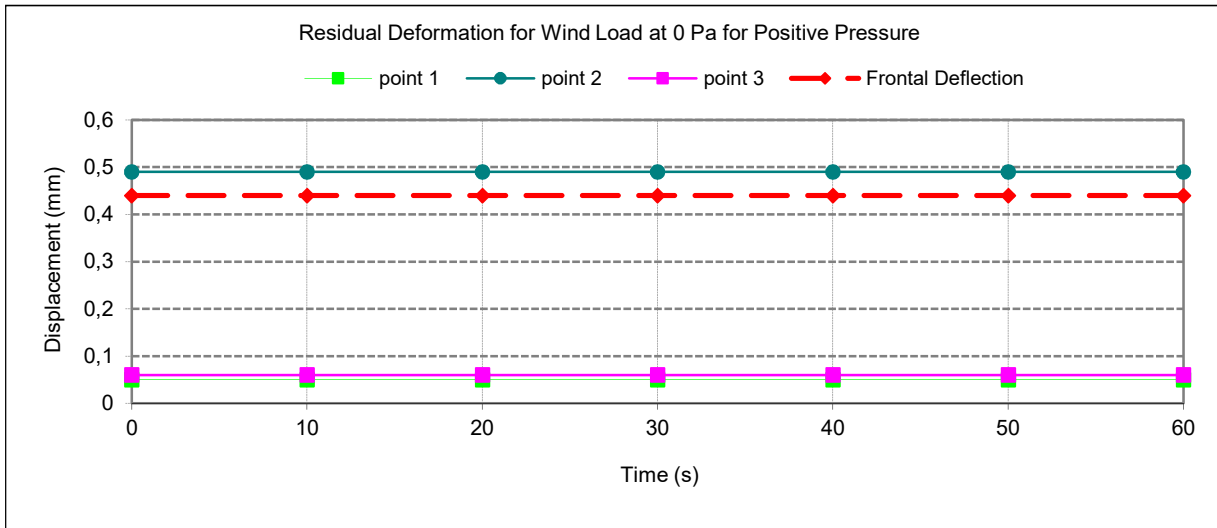
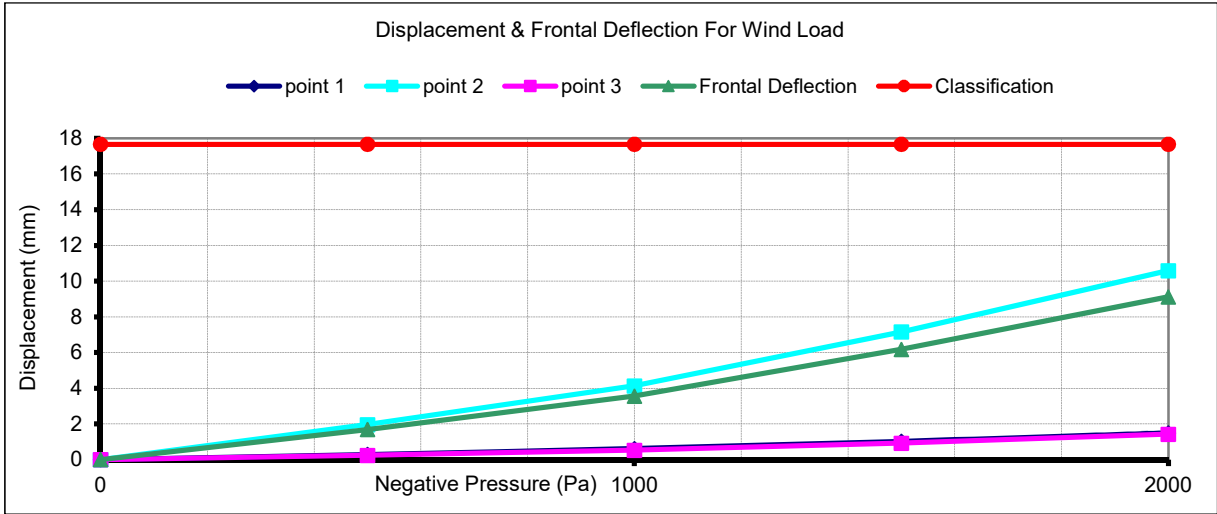
Frontal deflection measurement results on the vertical mullion;

Positive Pressure (Pa)	Point 1 (mm)	Point 2 (mm)	Point 3 (mm)	Frontal Deflection - d - (mm)	Negative Pressure (Pa)	Point 1 (mm)	Point 2 (mm)	Point 3 (mm)	Frontal Deflection - d - (mm)
0	0,00	0,00	0,00	0,00	0	0,00	0,00	0,00	0,00
500	0,30	2,21	0,30	1,90	500	0,29	1,97	0,25	1,69
1000	0,82	4,97	0,79	4,16	1000	0,62	4,14	0,53	3,56
1500	1,76	8,45	1,55	6,79	1500	1,03	7,16	0,93	6,18
2000	3,55	12,80	2,78	9,63	2000	1,50	10,59	1,43	9,12
0	0,05	0,49	0,06	0,44	0	0,16	1,01	0,21	0,82

Test No: 2017.885.10 / 23.11.2017

Test No: 2017.885.11 / 23.11.2017





7.4 Extreme Load Test

Test Pressure	Applied		Observations
	Positive	Negative	
PE = + 1800	+ 1800 Pa	-	No damage was observed on the sample.
PE = - 3000	-	- 3000 Pa	No damage was observed on the sample. OK

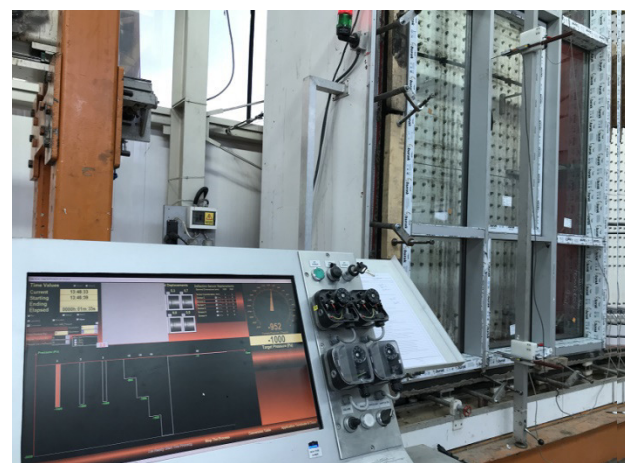
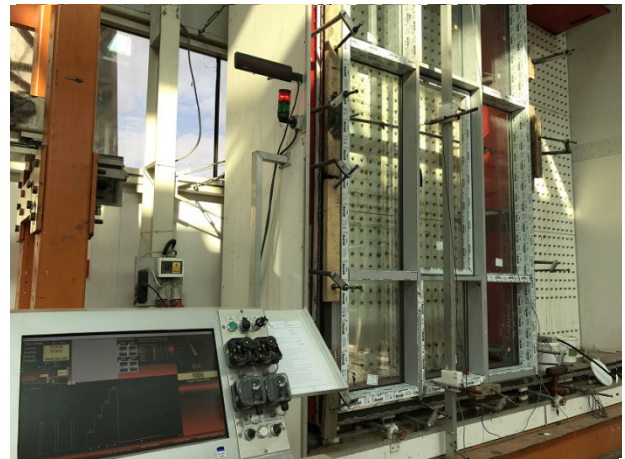
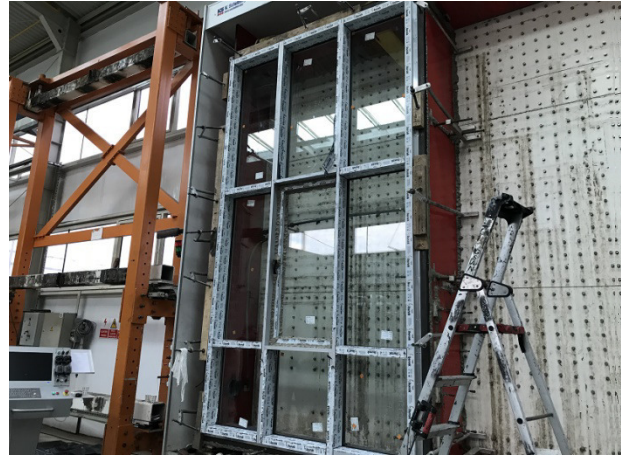
Test No: 2017.885.12 / 23.11.2017

Note: Extreme pressure could not reach to +3000 Pa, cause of the air leakage.

8. RESULTS

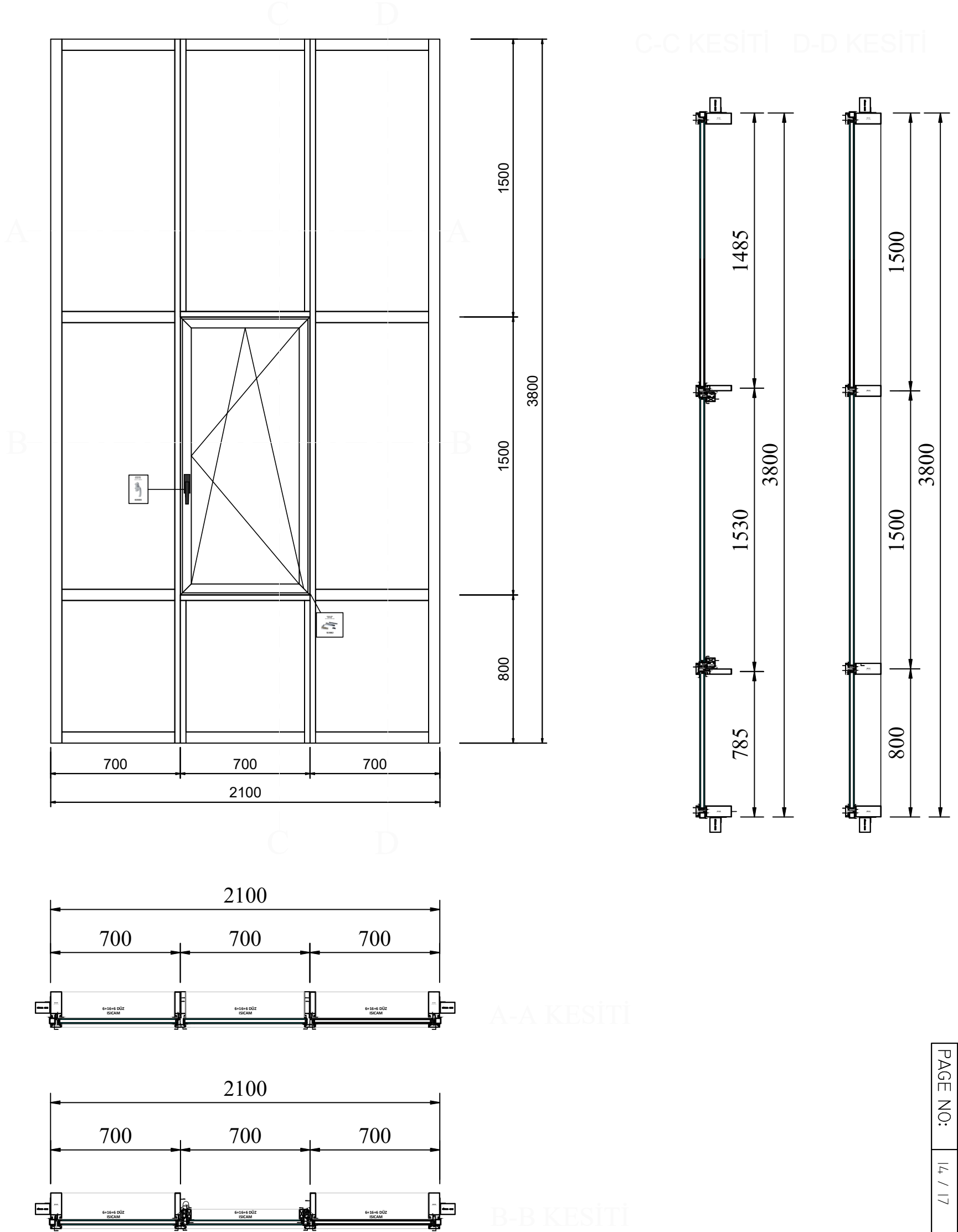
	CONDITIONS	RESULTS		CLASSIFICATION
AIR PERMEABILITY EN 12152	at 600 Pa $\phi < 1,5 \text{ m}^3/\text{h},\text{m}^2$ overall area at 600 Pa $\phi < 0,5 \text{ m}^3/\text{h},\text{m}$ fixed joint length	Positive Pressure	0,81 0,01	A4
	at 600 Pa $\phi < 1,5 \text{ m}^3/\text{h},\text{m}^2$ overall area at 600 Pa $\phi < 0,5 \text{ m}^3/\text{h},\text{m}$ fixed joint length	Negative Pressure	1,27 0,01	A4
AIR PERMEABILITY EN 12207	at 600 Pa $\phi < 10 \text{ m}^3/(\text{h},\text{m}^2)$ overall area for openable part at 600 Pa $\phi < 2,5 \text{ m}^3/\text{h},\text{m}$ openable joint length	Positive Pressure	6,12 1,46	4
	at 600 Pa $\phi < 10 \text{ m}^3/(\text{h},\text{m}^2)$ overall area for openable part at 600 Pa $\phi < 2,5 \text{ m}^3/\text{h},\text{m}$ openable joint length	Negative Pressure	9,61 2,29	4
WATER-TIGHTNESS (Static Pressure) EN 12154	There should be no water leakage at 1200 Pa	Water leakage was observed at 1200Pa.		RE₁₂₀₀
RESISTANCE TO WIND LOAD (Design Load) EN 13830	Deflection < 17,66 mm at +2000 Pa and -2000 Pa	Positive Pressure	$\lambda_1 = 9,63 \text{ mm}$	OK
		Negative Pressure	$\lambda_2 = 9,12 \text{ mm}$	
RESISTANCE TO WIND LOAD (Extreme Load) EN 13830	There should be no damage at extreme load.	There was no damage observed at +1800 Pa (positive extreme load)		Extreme pressure could not reach to +3000 Pa, cause of the air leakage.
		There was no damage observed at -3000 Pa (negative extreme load)		OK

9. PHOTOS



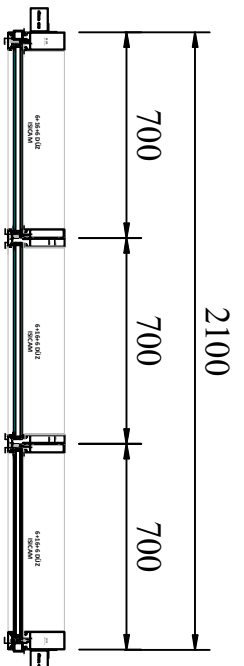
BG 60

Kapaklı Cephe İçerisinde İÇeri Açılır Gizli Kanat (Inside Opening Hidden Vent In The Capped Curtain Wall)

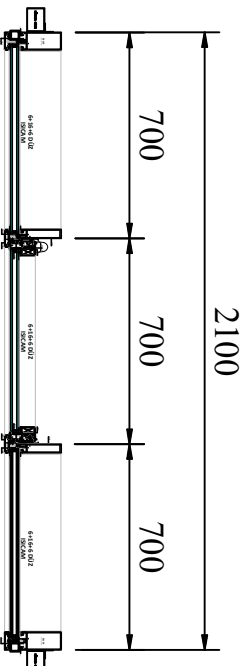


NOTIFIED BODY NO:	NB-2547	PROJECT	BG60 INSIDE OPENING HIDDEN VENT IN THE CAPPED CURTAIN WALL		
ACCREDITATION NO:	AB-0531-T		GENERAL PROFILE DETAILS		
REPORT NO:	020.973.1 / 2017	PROJECT CODE:	2017.885	DATE:	30.11.2017
PREPARED BY:	A.DINCEL	CLIENT:	BURAK ALUMINYUM SAN. VE TIC. A.S.	REV.NO:	A
CONTROL BY:	Ö.ARSLAN	EXPLANATION:	AIR PERMEABILITY, WATERTIGHTNESS AND RESISTANCE TO WIND LOAD		

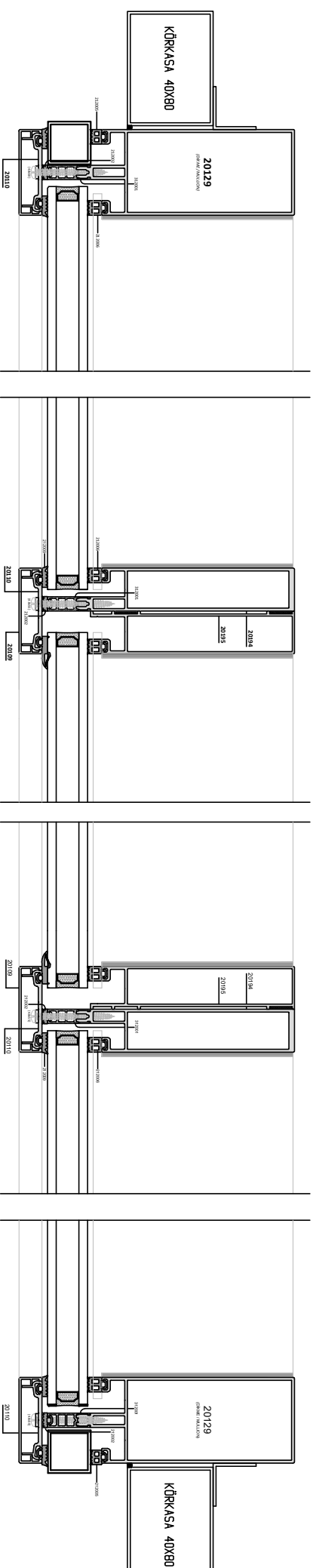
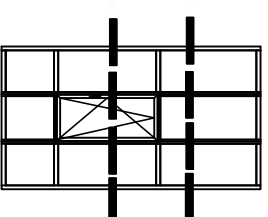




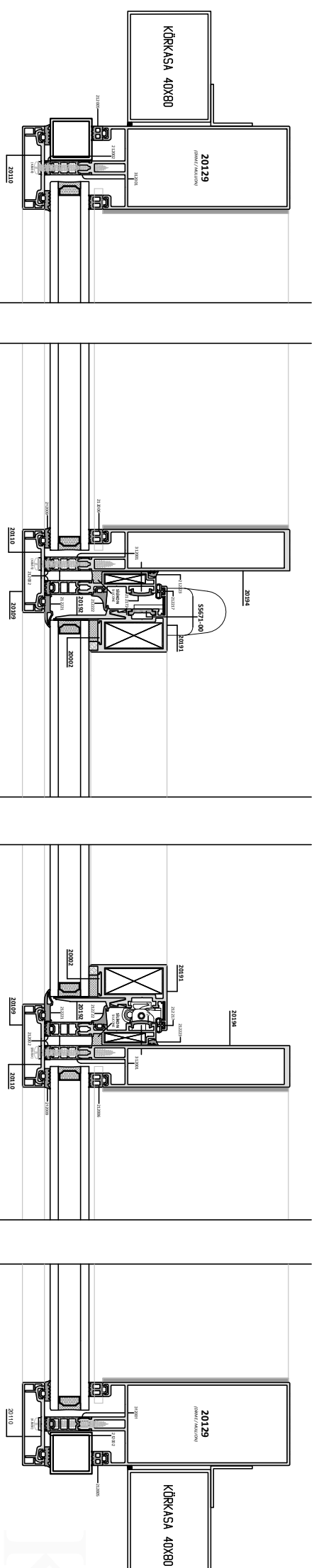
A-A KESİTİ



B-B KESİTİ



A-A



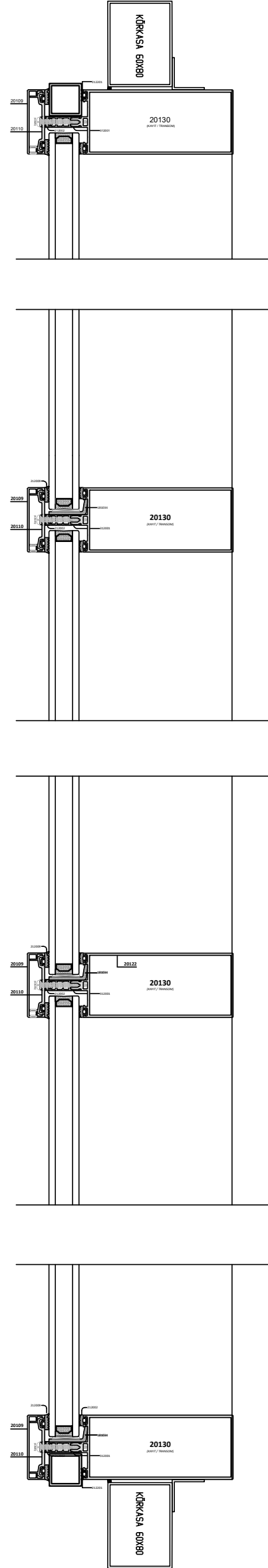
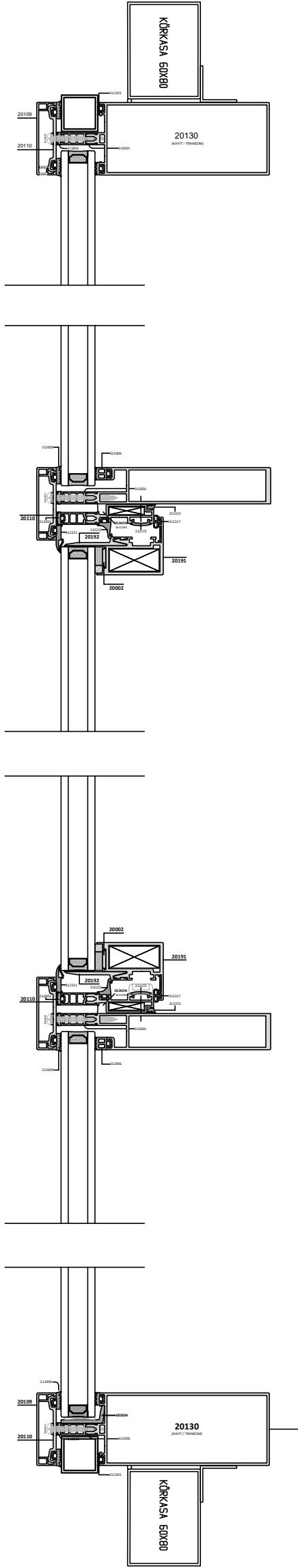
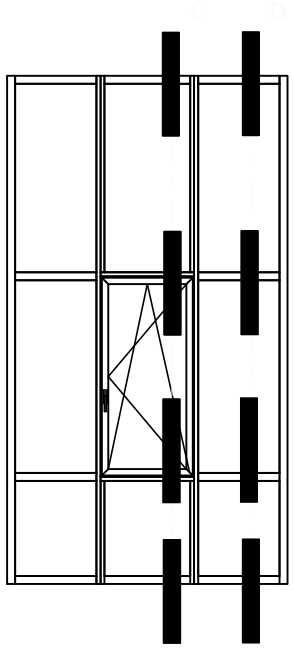
B-B

NOTIFIED BODY NO	NB-2547	DETAIL:	BG 60 INSIDE OPENING HIDDEN VENT IN THE CAPPED CURTAIN WALL
ACCREDITATION NO	AB-0531-T	SAMPLE NO	A-A SECTION & B-B SECTION / PLAN DETAILS
REPORT NO	020.973.1 / 2017	DATE	30.11.2017
PREPARED BY	A.DINCEL	REV.NO	A
CONTROL BY	Ö.ARSLAN	EXPLANATION	AIR PERMEABILITY, WATERTIGHTNESS AND RESISTANCE TO WIND LOAD

FTI

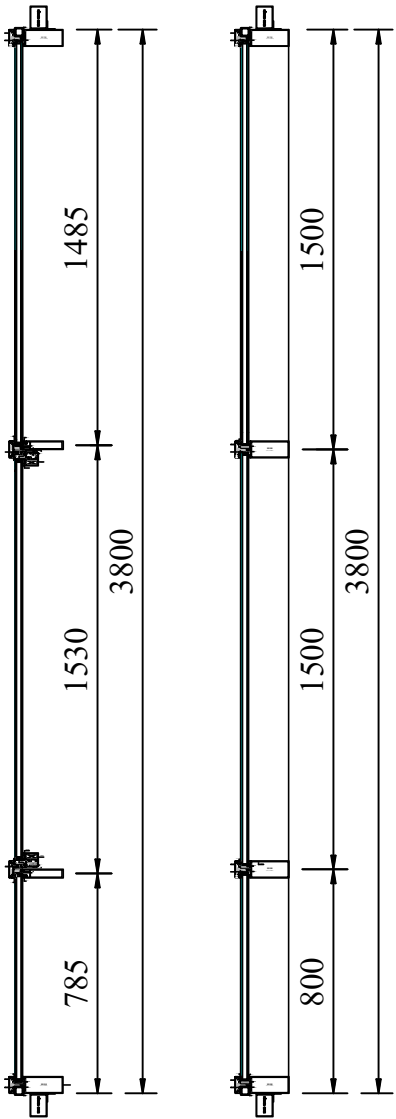
C-C KESİTİ

D-D KESİTİ



C-C KESİTİ

D-D KESİTİ



REPORT NO: 020.973.1/2017
PAGE NO: 16 / 17

NOTIFIED BODY NO:	NB-2547	DETAIL:	BG60 INSIDE OPENING HIDDEN VENT IN THE CAPPED CURTAIN WALL C-C SECTION & D-D SECTION / SECTION DETAILS		
ACCREDITATION NO:	AB-0531-T	PROJECT CODE:	2017.885	DATE:	30.11.2017
REPORT NO:	020.973.1/2017	CLIENT:	BURAK ALUMINYUM SAN. VE TIC. A.S.	REV.NO:	A
PREPARED BY:	A.DINCEL	EXPLANATION:	AIR PERMEABILITY, WATERTIGHTNESS AND RESISTANCE TO WIND LOAD		
CONTROL BY:	Ö.ARSLAN				



F.15.21 REV.NO:A OCAK 2012

BG 60

Kapaklı Cephe İçerisinde İçeri Açılır Gizli Kanat (Inside Opening Hidden Vent In The Capped Curtain Wall)

GIESSE
ÇİFT
MAÇALI
KOL
TWO-WAY
CREMONE

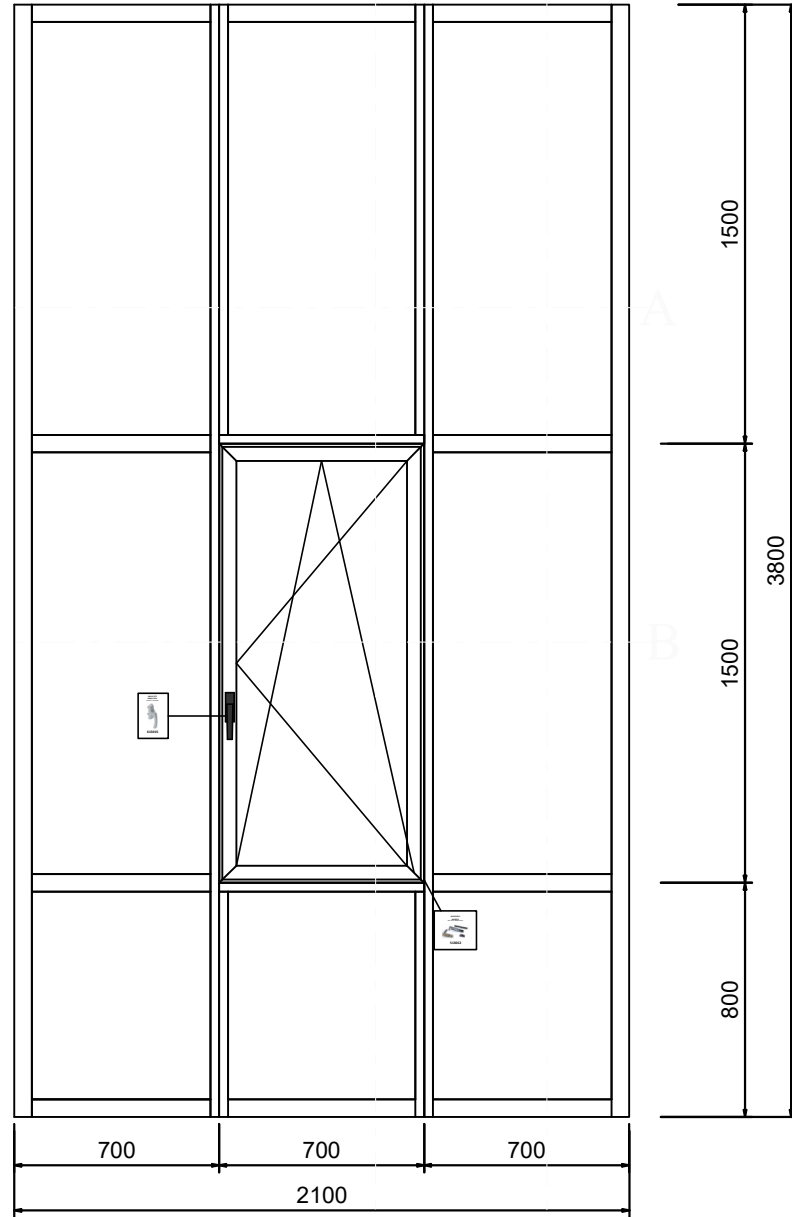


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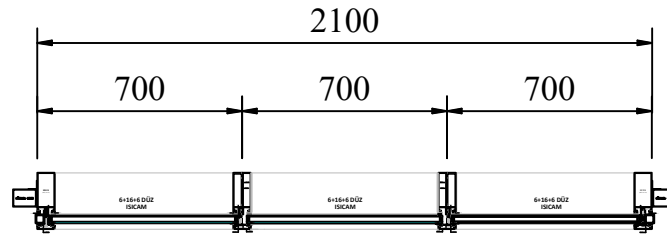
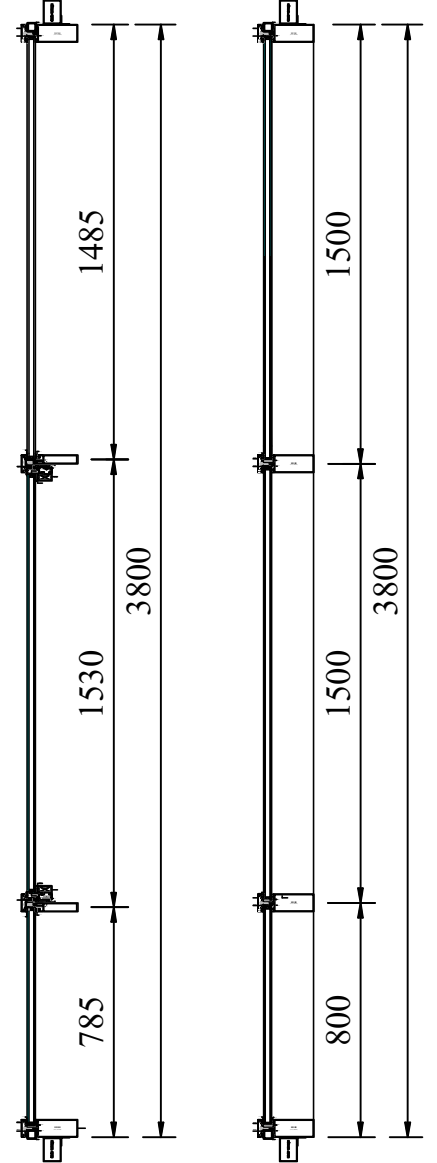
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GİZLİ
MENTEŞE
SIDE
HINGE



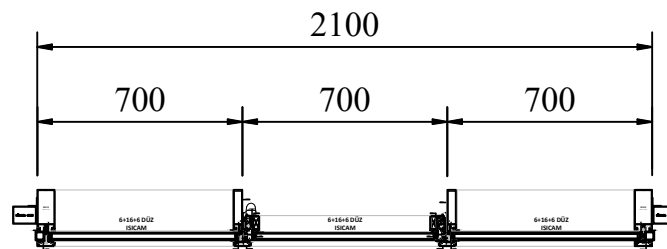
513062



C-C KESİTİ D-D KESİTİ



A-A KESİTİ



B-B KESİTİ

REPORT NO: 020.973.1/2017
PAGE NO: 17 / 17

NOTIFIED BODY NO:	NB-2547	DETAIL:	BG60 INSIDE OPENING HIDDEN VENT IN THE CAPPED CURTAIN WALL SASH MECHANISM DETAILS		
ACCREDITATION NO:	AB-0531-T	PROJECT CODE:	2017.885	DATE:	30.11.2017
REPORT NO:	020.973.1 / 2017	CLIENT:	BURAK ALUMINYUM SAN. VE TIC. A.S.	REV.NO:	A
PREPARED BY:	A.DINCEL	EXPLANATION:	AIR PERMEABILITY, WATERTIGHTNESS AND RESISTANCE TO WIND LOAD		
CONTROL BY:	Ö.ARSLAN				



F.15.21 REV.NO:A OCAK 2012