

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

AB-0531-T

020 969 1 / 2017

22.11.2017

## Merkez / Head Office

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## Laboratuvar / Laboratory

Çakıl Mahallesi Şehit Tamer Aydın Sok. No:76 34540 Çatalca / İstanbul / TÜRKİYE  
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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 Iztower 34880 Soğanlık- Kartal / İstanbul / TÜRKİYE

Numunenin Adı ve Tanımı / Sample's Name & Description: BM 66 Window System

Numune Kabul Tarihi : 27.09.2017  
Acceptance Date of Item

Referans No : 2017.884  
Reference No

Uygulanan Normlar / Norms Applied: EN 1026, EN 1027, EN 12211

Sonuçlar / Results: EN 12207 - Air Permeability : Class 4 ( ± 600 Pa )  
EN 12208 - Watertightness : Class E 1200 ( 1200 Pa )  
EN 12210 - Resistance to Wind Load : Class C 5 ( ± 2000 Pa )  
EN 12210 - Resistance to Safety Load : OK ( ± 3000 Pa )

Test Tarihi / Date of Test  
27.09.2017

Sayfa Sayısı / Number of Pages  
1 / 18

Deney 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.

Deney ve/veya ölçüm sonuçları, genişletilmiş ölçüm belirsizlikleri (olması halinde) ve deney metotları bu sertifikanın tamamlayıcı kısmı olan takip eden sayfalarda verilmiştir. Bu sertifika yalnız 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.



Mühür / Seal

Tarih / Date  
22.11.2017

Test Faaliyetleri Yöneticisi  
Testing Manager

Ömer DİNCEL

Laboratuvar Müdürü  
Laboratory Manager

Ömer ARSLAN

F.15.22 REV NO: F MART 2017



## TEST REPORT

**Testing Reference** : TS EN 14351 -1 + A1 Windows and Doors - Product Standard

**Product / Project** : BM 66 Window System - Inside opening Vent

**Prepared by** : Ayfer DİNCEL

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**Accreditation Nr.** AB-0531-T  
**Report Nr.** 020.969.1/2017  
**Date** 22.11.2017

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## 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 window system which name is BM 66 Window has been produced and designed by Burak Alüminyum San. ve Tic. A.Ş. Tests were carried out on 27 / 09 / 2017 for the determination of air infiltration water penetration (under static pressure) and wind resistance performances.

Test sample has been sent to FTI Laboratory on 27 / 09 / 2017.

## 2. CLIENT

BURAK ALÜMİNYUM SAN. VE TİC. A.Ş.

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

Soğanlık-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 14351	12.2016	Windows and doors - Product standard, performance characterist
TS EN 1026	07.2016	Windows and doors - Air permeability - Test method
TS EN 12207	03.2017	Windows and doors - Air permeability - Classification
TS EN 1027	07.2016	Windows and doors - Watertightness - Test method
TS EN 12208	03.2004	Windows and doors - Watertightness - Classification
TS EN 12211	07.2016	Windows and doors - Resistance to wind load - Test method
TS EN 12210	07.2016	Windows and doors - Resistance to wind load – Classification

## 4. TEST DATE AND PARTICIPANTS

Tests were performed on 27 / 09 / 2017 by the following crew:

Mr. Öner ARSLAN FTI Laboratory Manager

Mr. Berk ÖZTÜRK FTI Testing Engineer

and the witnesses;

Hüseyin GÜRSOY BURAK ALÜMİNYUM SAN. VE TİC. A.Ş.

## 5. DESCRIPTION OF TEST SAMPLE

Type of sample	Window System
System Name	BM 66
Dimension of Sample (L x H)	1244 mm x 1244 mm
Surface area of Sample	1,55 m <sup>2</sup>
Dimension of Sash ( L x H )	1120 mm x 478 mm
Surface area of Sample	0,54 m <sup>2</sup>
Operable joint length	3,20 m
Glass Type	6mm + 16 mm + 6 mm flat ISICAM

*Please refer to the annexes for the system details.*

## 6. CONDITIONS

Local Temperature	23	°C
Humidity	65	%
Atmospheric Pressure	1019,0	mbar

## 7. TEST PERFORMANCE

STEPS		POSITIVE PRESSURE (Pa)	NEGATIVE PRESSURE (Pa)
1	PA	600	600
2	PW	1200	-
3	PD	2000	2000
4	PC	1000	1000
5	PA	600	600
6	PE	3000	3000

PA: Pressure for Airtightness ; PW: Pressure for Watertightness ; PD: Design Pressure

PC: Pressure Cycle ; 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 <sup>3</sup> /h)	Air Leakage (m <sup>3</sup> /h/m <sup>2</sup> )
50	2,12	1,37
100	3,05	1,97
150	4,02	2,60
200	4,74	3,06
250	5,32	3,44
300	6,02	3,89
450	7,56	4,88
600	8,87	<b>5,73</b>

Test No : 2017.884.03 / 27.09.2017

NEGATIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m <sup>3</sup> /h)	Air Leakage (m <sup>3</sup> /h/m <sup>2</sup> )
50	1,98	1,28
100	3,01	1,94
150	3,81	2,46
200	4,54	2,93
250	5,27	3,40
300	5,81	3,75
450	7,17	4,63
600	8,55	<b>5,53</b>

Test No : 2017.884.04 / 27.09.2017

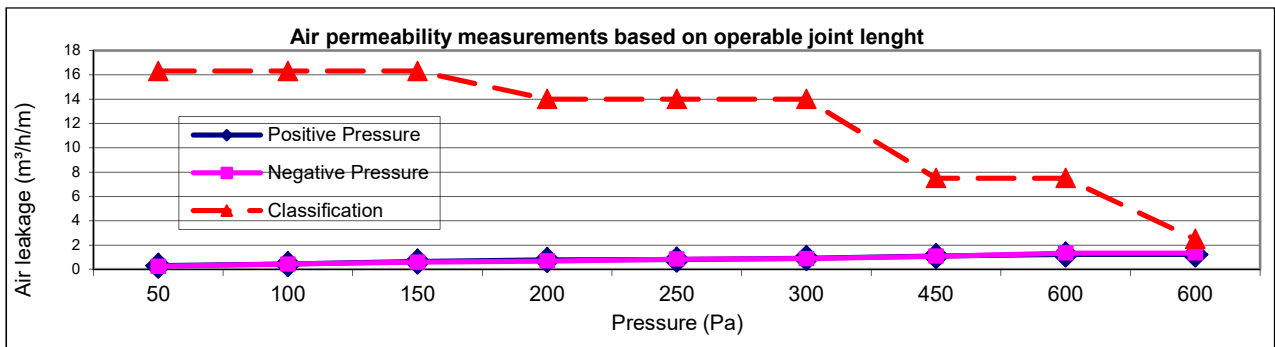
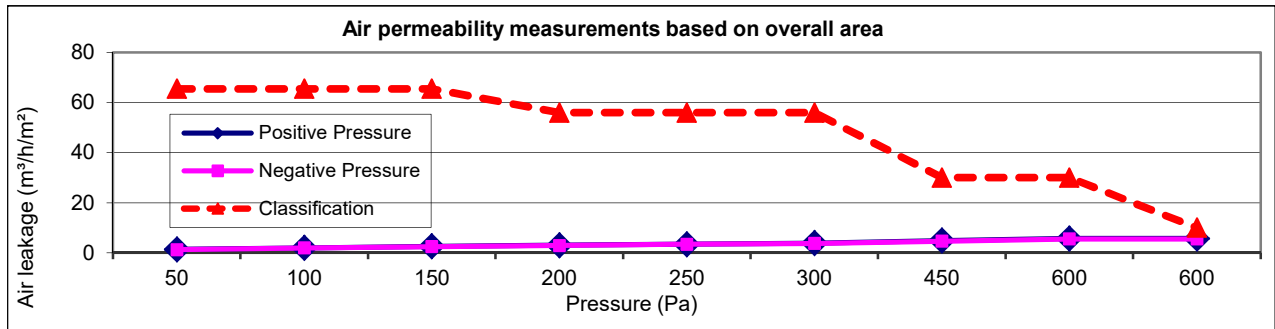
#### Air permeability measurements based on opening joint length;

POSITIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m <sup>3</sup> /h)	Air Leakage (m <sup>3</sup> /h/m)
50	0,94	0,29
100	1,37	0,43
150	2,04	0,64
200	2,47	0,77
250	2,57	0,80
300	2,95	0,92
450	3,49	1,09
600	3,89	<b>1,22</b>

Test No : 2017.884.05 / 27.09.2017

NEGATIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m <sup>3</sup> /h)	Air Leakage (m <sup>3</sup> /h/m)
50	0,80	0,25
100	1,37	0,43
150	1,89	0,59
200	2,18	0,68
250	2,67	0,83
300	2,81	0,88
450	3,42	1,07
600	4,27	<b>1,34</b>

Test No : 2017.884.06 / 27.09.2017



### 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/m<sup>2</sup>.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/m<sup>2</sup>.min x 1,55 m<sup>2</sup> = 3,10 l/min. = 186,0 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.
250	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 : 2017.884.07 / 27.09.2017

### 7.3 Resistance to Wind Load

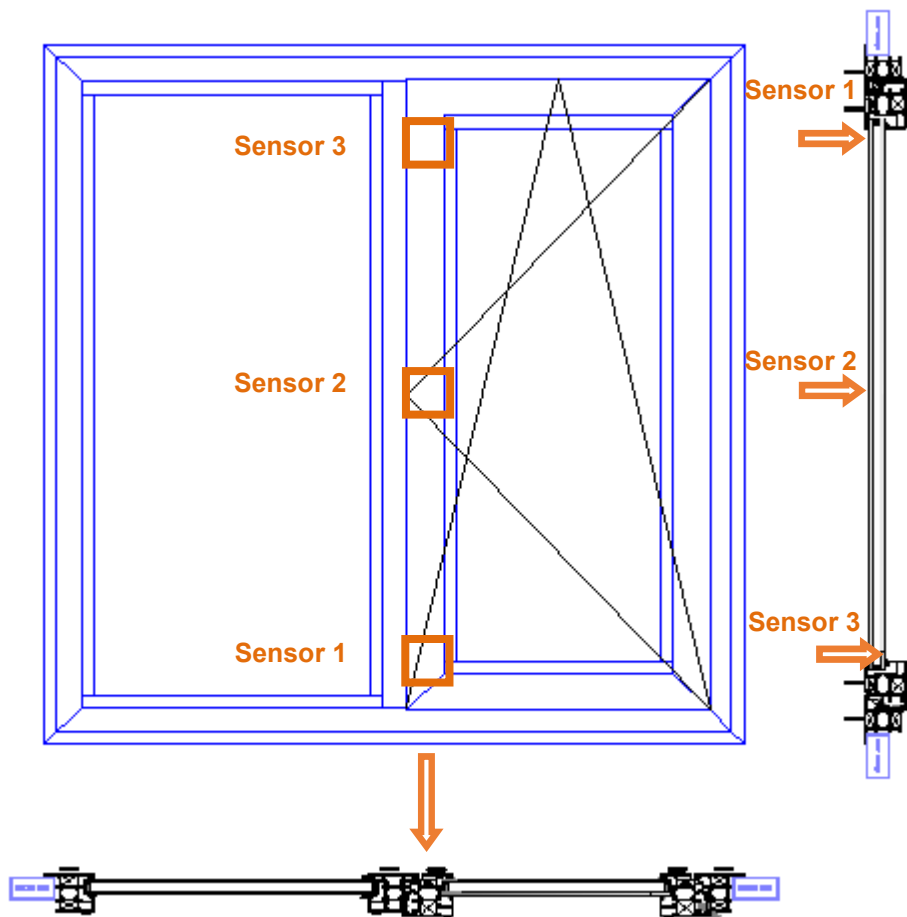
Before starting the test, 3 pulses at - 2200 / + 2200 Pa are applied to the sample. Waiting duration between each impacts were 3 seconds. During the tests, the pressure values are applied for 10 seconds.

Length of vertical profile **L = 1120 mm**

The measured frontal deflection (d) on the vertical profile should not exceed the identified limit which is determined according to the following criterias :

- if  $d \leq L / 150$  , Class A
- if  $d \leq L / 200$  , Class B
- if  $d \leq L / 300$  , Class C

**$1120 / 300 = 3,73$  mm for L/300 criteria**



*Figure 1.* The view of specimen's sensor points

**Specimen dimensions and sensor replacement coordinates;**

	X coordinates (mm)	Y coordinates (mm)
External Dimensions	1244	1244
Sensor 1 Replacement	675	160
Sensor 2 Replacement	675	658
Sensor 3 Replacement	675	1155

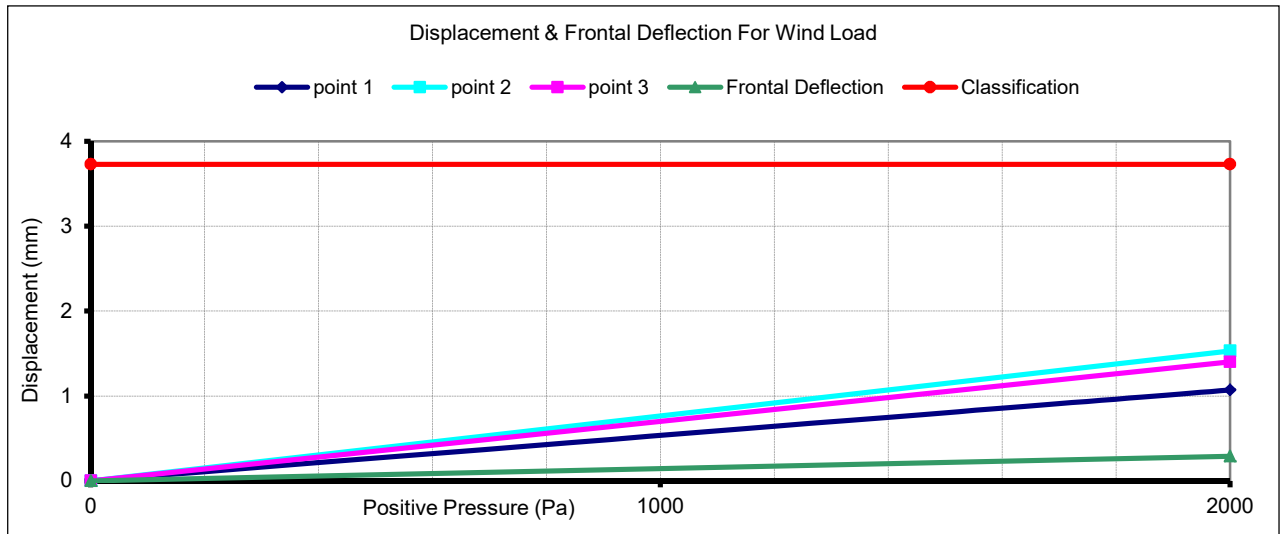
**Frontal deflection measurement results on the vertical profile;**

Positive Pressure (Pa)	Point 1 (mm)	Point 2 (mm)	Point 3 (mm)	Frontal Deflection (mm)
2000	1,07	1,53	1,40	<b>0,29</b>
0	0,00	0,01	0,02	0,00

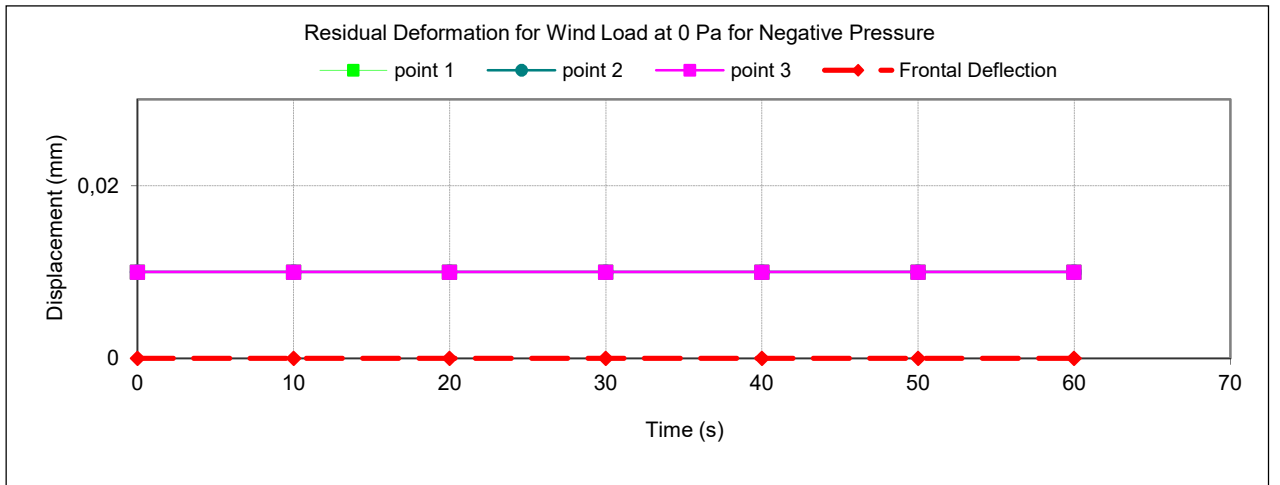
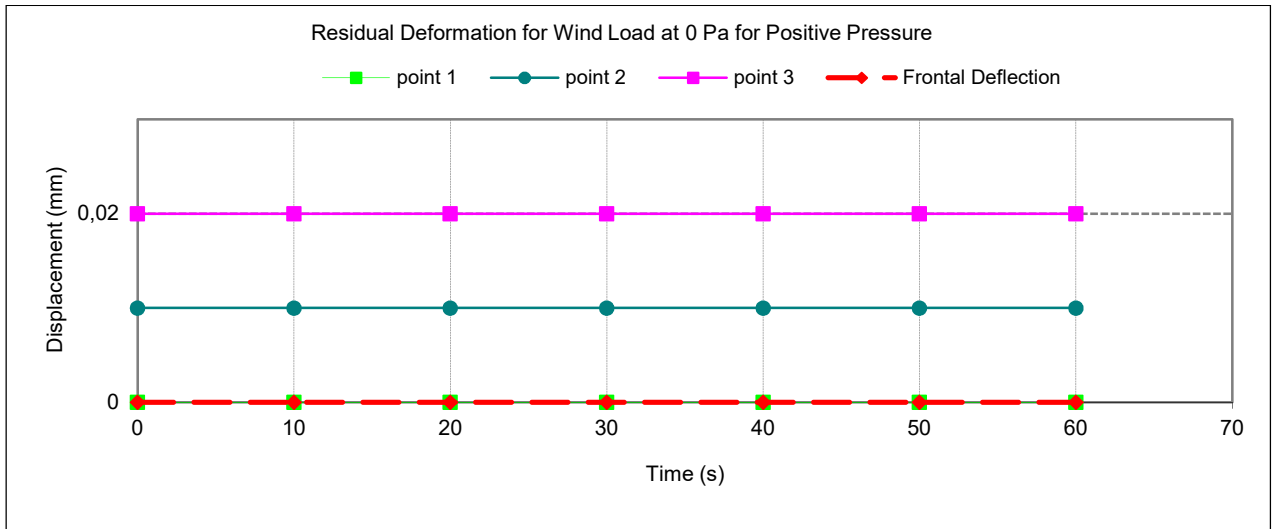
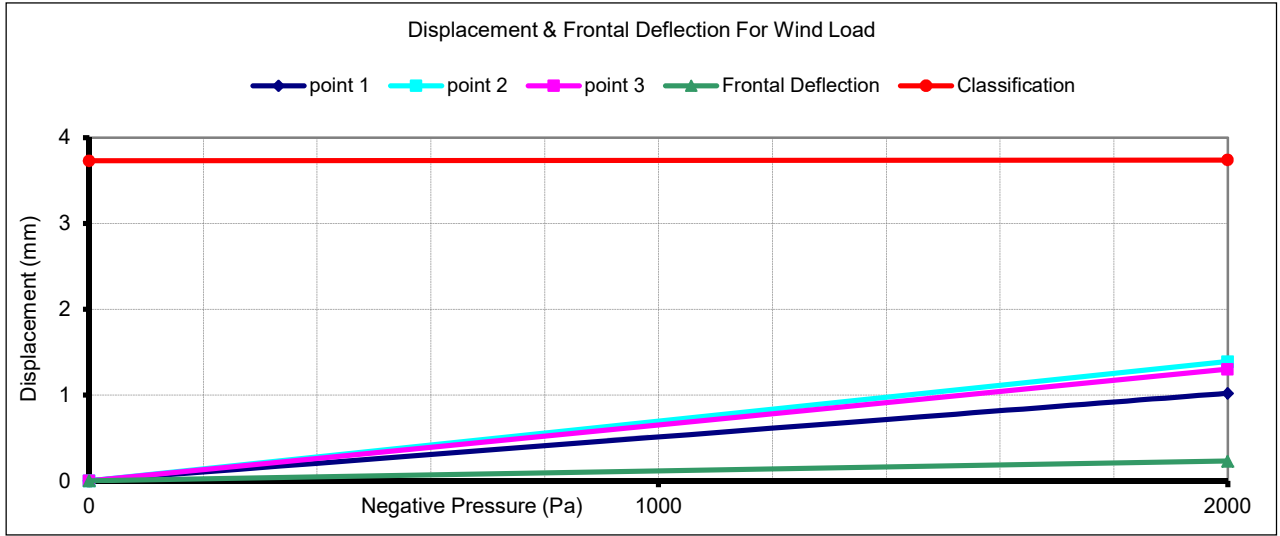
**Test No : 2017.884.08 / 27.09.2017**

Negative Pressure (Pa)	Point 1 (mm)	Point 2 (mm)	Point 3 (mm)	Frontal Deflection (mm)
2000	1,02	1,39	1,30	<b>0,23</b>
0	0,01	0,01	0,01	0,00

**Test No : 2017.884.09 / 27.09.2017**







### 7.5. Cycle Test

+ 1000 Pa and -1000 Pa were applied for 50 cycle.

There was no damage observed on the sample at the end of the test. (**Test No: 2017.884.10 / 27.09.2017**)

### 7.6. Air Permeability ( Repeat )

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 <sup>3</sup> /h)	Air Leakage (m <sup>3</sup> /h/m <sup>2</sup> )
50	2,52	1,63
100	3,90	2,52
150	5,02	3,24
200	5,87	3,80
250	6,88	4,45
300	7,61	4,92
450	10,34	6,68
600	10,82	<b>6,99</b>

**Test No : 2017.884.11 / 27.09.2017**

NEGATIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m <sup>3</sup> /h)	Air Leakage (m <sup>3</sup> /h/m <sup>2</sup> )
50	2,20	1,42
100	3,36	2,17
150	4,04	2,61
200	4,79	3,09
250	5,36	3,46
300	5,75	3,71
450	6,93	4,48
600	7,69	<b>4,97</b>

**Test No : 2017.884.12 / 27.09.2017**

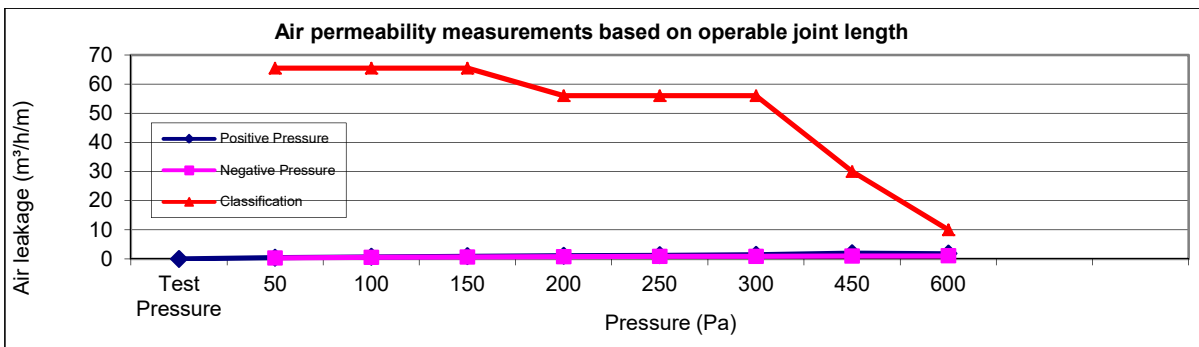
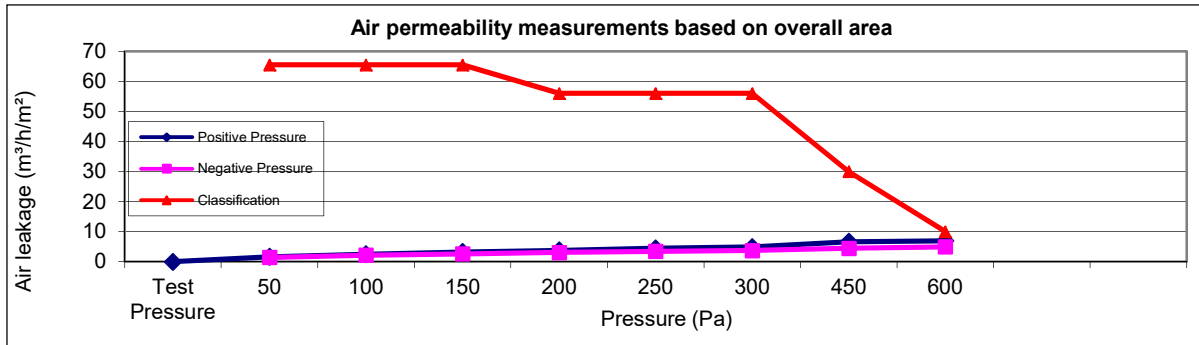
**Air permeability measurements based on opening joint length;**

POSITIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m <sup>3</sup> /h)	Air Leakage (m <sup>3</sup> /h/m)
50	1,33	0,42
100	2,23	0,70
150	3,04	0,95
200	3,60	1,13
250	4,13	1,29
300	4,53	1,42
450	6,26	1,96
600	5,84	<b>1,83</b>

**Test No : 2017.884.05 / 27.09.2017**

NEGATIVE PRESSURE		
Test Pressure (Pa)	Air Leakage (m <sup>3</sup> /h)	Air Leakage (m <sup>3</sup> /h/m)
50	1,02	0,32
100	1,72	0,54
150	2,12	0,66
200	2,43	0,76
250	2,76	0,86
300	2,75	0,86
450	3,18	0,99
600	3,41	<b>1,07</b>

**Test No : 2017.884.06 / 27.09.2017**



7.7. Extreme Load Test

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

Test No: 2017.884.13 / 27.09.2015

There was no damage observed on the sample at the end of the test.

## 8. RESULTS

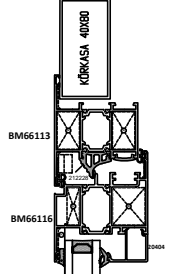
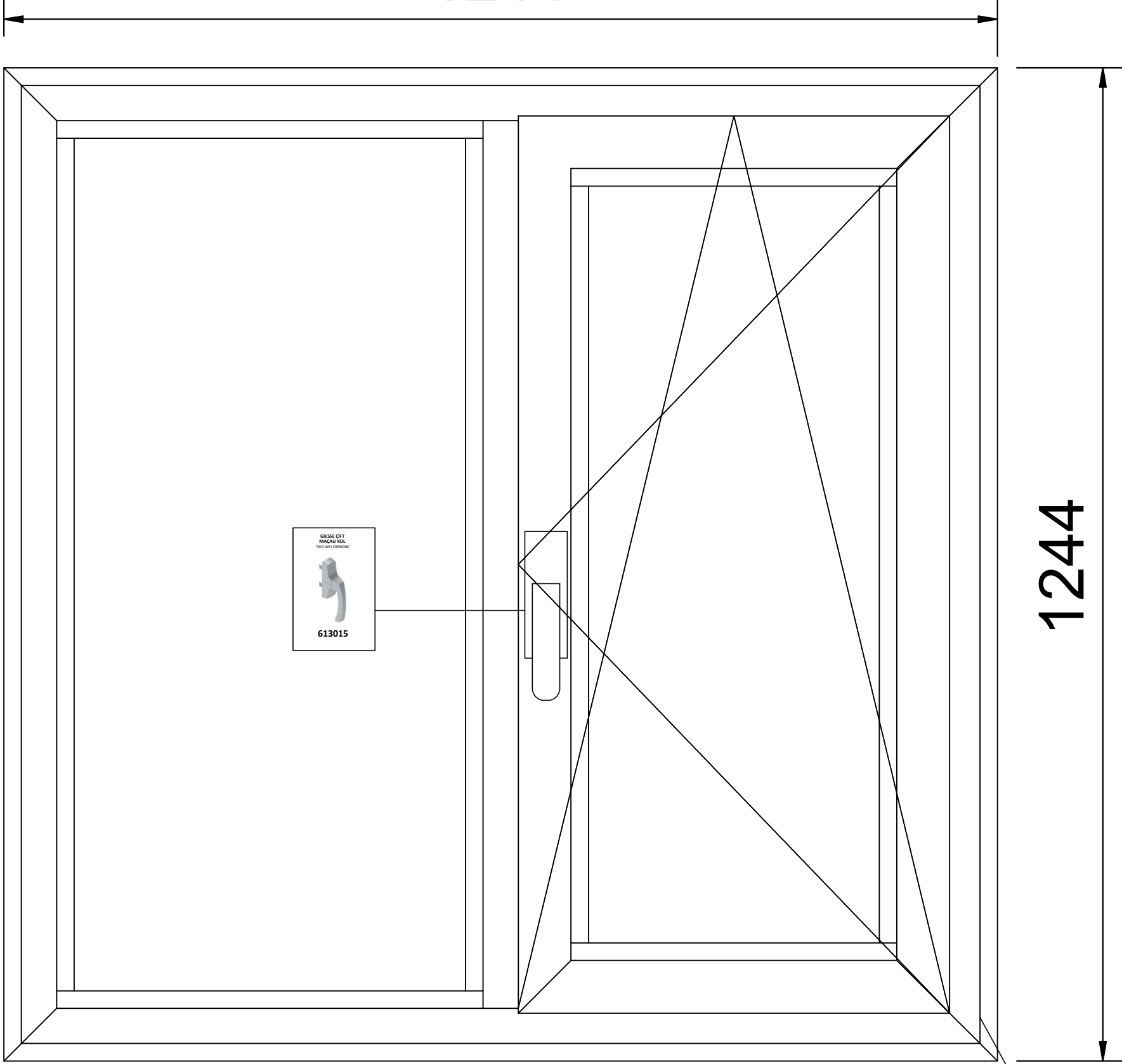
	CONDITIONS	RESULTS		CLASSIFICATION
<b>AIR PERMEABILITY EN 12207</b>	at 600 Pa $\phi < 10 \text{ m}^3/\text{h},\text{m}^2$ at 600 Pa $\phi < 2,5 \text{ m}^3/\text{h},\text{m}$	Positive Pressure	5,73 1,22	<b>Class 4</b> for overall area <b>Class 4</b> for opening j. I.
	at 600 Pa $\phi < 10 \text{ m}^3/\text{h},\text{m}^2$ at 600 Pa $\phi < 2,5 \text{ m}^3/\text{h},\text{m}$	Negative Pressure	5,53 1,34	<b>Class 4</b> for overall area <b>Class 4</b> for opening j. I.
<b>WATER-TIGHTNESS (Static Pressure) EN 12208</b>	There should be no water leakage at 1200 Pa	There was no water leakage		<b>Class E1200</b>
<b>RESISTANCE TO WIND LOAD (design load) EN 12210</b>	Deflection < limit value at +2000 Pa	max. 0,29 mm < 3,73 mm		<b>Class C 5</b>
	Deflection < limit value at -2000 Pa	max. 0,23 mm < 3,73 mm		<b>Class C 5</b>
<b>CYCLE TEST</b>	There should be no damage during the test ( + 1000 Pa and – 1000 Pa x 50 cycle )	No damage was observed		<b>OK</b>
<b>AIR PERMEABILITY EN 12207 (repeat)</b>	at 600 Pa $\phi < 10 \text{ m}^3/\text{h},\text{m}^2$ at 600 Pa $\phi < 2,5 \text{ m}^3/\text{h},\text{m}$	Positive Pressure	6,99 1,83	<b>Class 4</b> for overall area <b>Class 4</b> for opening j. I.
	at 600 Pa $\phi < 10 \text{ m}^3/\text{h},\text{m}^2$ at 600 Pa $\phi < 2,5 \text{ m}^3/\text{h},\text{m}$	Negative Pressure	4,97 1,07	<b>Class 4</b> for overall area <b>Class 4</b> for opening j. I.
<b>RESISTANCE TO SAFETY LOAD EN 12210</b>	There should be no damage at +3000 Pa and -3000 Pa.	There was no damage observed at +3000 Pa and -3000 Pa (extreme loads)		<b>OK</b>

9. TEST PHOTOS

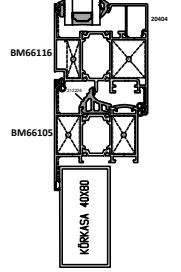
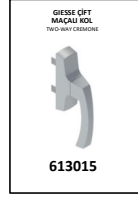




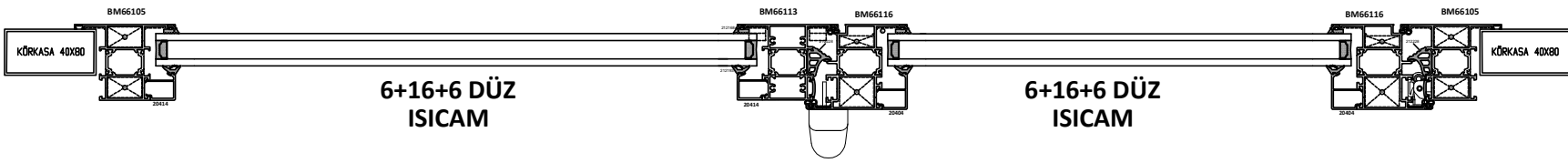
1244



1244



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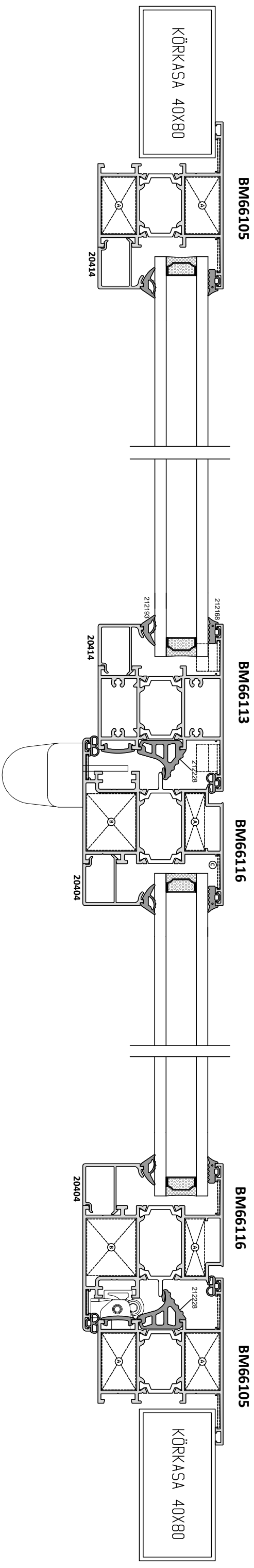
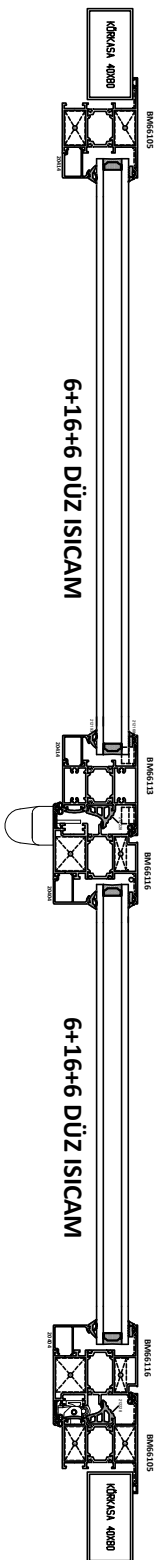
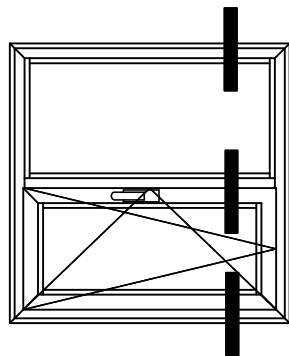


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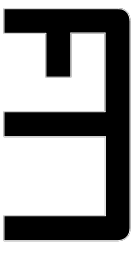
NOTIFIED BODY NO:	NB-2547	PROJECT	BM 66 WINDOW SYSTEM		
ACCREDITATION NO:	AB-0531-T		GENERAL PROFILE DETAILS		
REPORT NO:	020.969.1 / 2017	PROJECT CODE:	2017.884	DATE:	22.11.2017
PREPARED BY:	A.DINCEL	CLIENT:	BURAL ALUMINYUM SAN. VE TIC. A.S.	REV.NO:	A
CONTROL BY:	Ö.ARSLAN	EXPLANATION:	AIR PERMEABILITY, WATERTIGHTNESS AND RESISTANCE TO WIND LOAD		



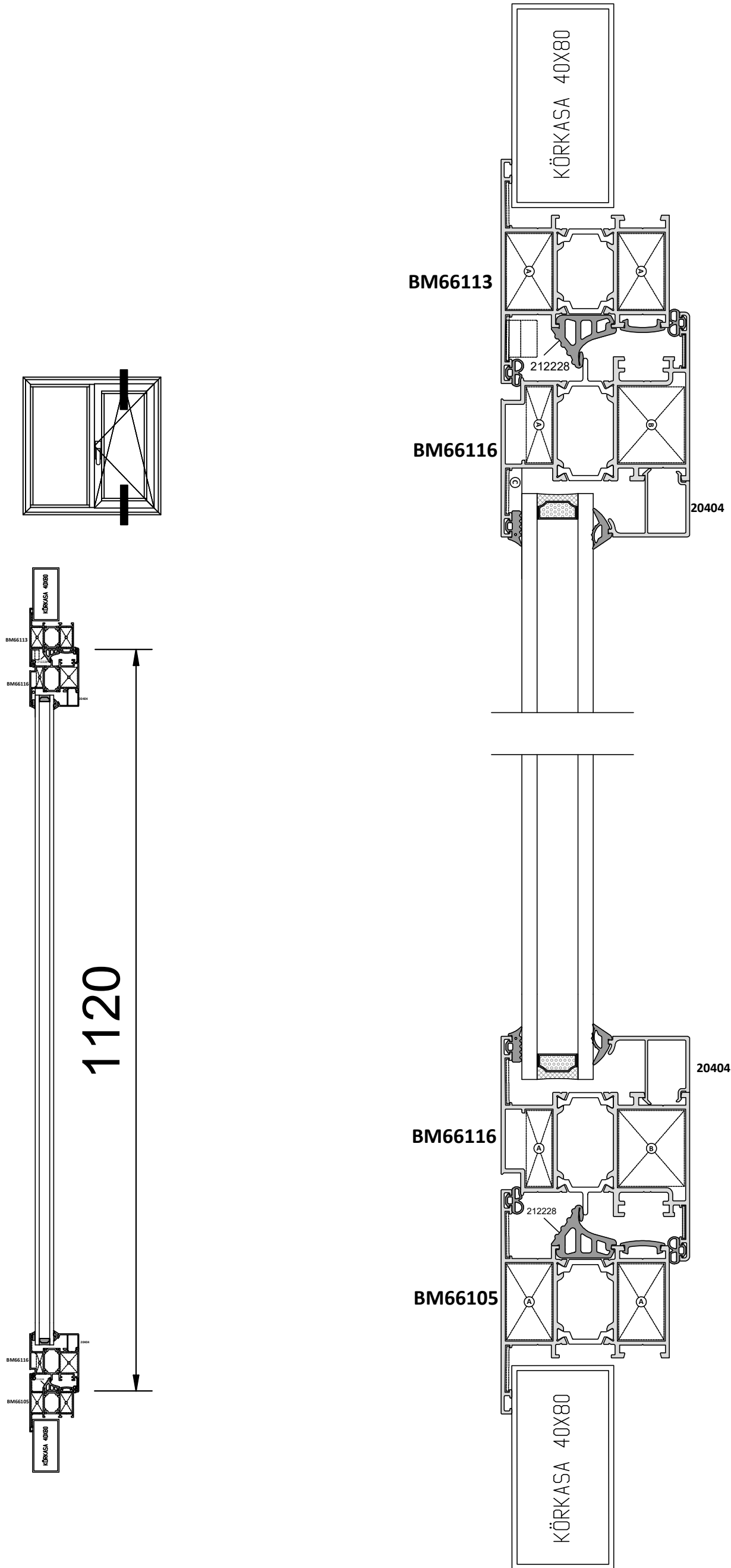
F.15.21 REV.NO:A OCAK 2012



NOTIFIED BODY NO	NB-254,7	DETAIL:	BM 66 WINDOW SYSTEM		
ACCREDITATION NO	AB-0531-T	PLAN DETAILS			
REPORT NO	020.969.1 / 2017	SAMPLE NO	2017.884	DATE	22.11.2017
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		







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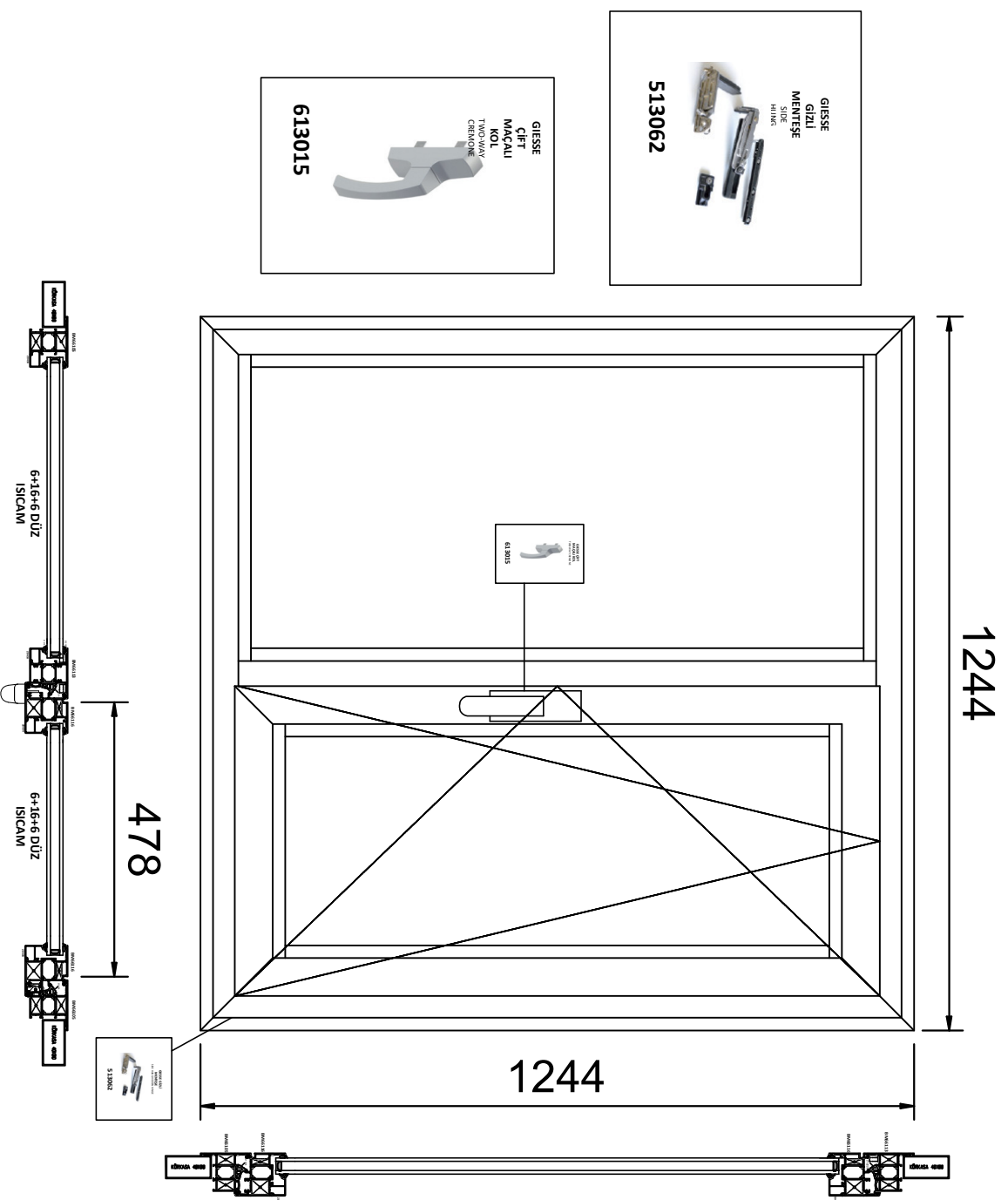
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ACCREDITATION NO:	AB-0531-T				
REPORT NO:	020.969.1 / 2017	PROJECT CODE:	2017.884	DATE:	22.11.2017
PREPARED BY:	A.DINCEL	CLIENT:	BURAK ALUMINYUM SAN. VE TIC. A.S.	REV.NO:	A
CONTROL BY:	Ö.ARSLAN	EXPLANATION:	AIR PERMEABILITY, WATERTIGHTNESS AND RESISTANCE TO WIND LOAD		



# BM 66

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## İçer Açılır Kanat (Inside Opening Vent)



NOTIFIED BODY NO	NB-2547	DETAIL:	BM 66 WINDOW SYSTEM		
ACCREDITATION NO	AB-0531-T	SAMPLE NO	2017.884	DATE	22.11.2017
REPORT NO	020.969.1 / 2017	CLIENT	BURAK ALUMINYUM SAN. VE TIC. A.S.	REV.NO	A
PREPARED BY	A.DINCEL	EXPLANATION	AIR PERMEABILITY, WATERIGHTNESS AND RESISTANCE TO WIND LOAD		
CONTROL BY	Ö.ARSLAN				

**FTI**

F.15.21 REV.NO:4 OCAK 2012