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DENEY SERTİFİKASI / Test Certificate



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

AB-0531-T

020.529.1 / 2016

03 / 2016



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

Orta Mah.Hamdi Efendi Sk. No:16 D:32 Iztower - 34880 Soğanlık-Kartal / İstanbul / TÜRKİYE

Referans No / Reference No: 2016.558

Numunenin Adı ve Tanımı / Sample's Name & Description: BM 60 Window System

Numunenin Kabul Tarihi / Receipt Date of Test Item: 24 / 02 / 2016

Uygulanan Normlar / Norms Applied: TS EN 14351-1+ A1, TS EN 1026, TS EN 1027, TS 4644 EN 12211

Sonuçlar / Results: TS EN 12207 - Air Permeability : Class 4 (600 Pa)
TS EN 12208 - Watertightness : Class E1500 (1500 Pa)
TS EN 12210 - Resistance to Wind Load : Class C5 (2000 Pa)
TS EN 12210 - Resistance to Safety Load : OK (3000 Pa)

Test Tarihi / Date of Test

26 & 29 / 02 / 2016

Sayfa Sayısı / Number of Pages

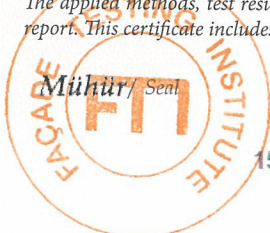
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Türk Akreditasyon Kurumu (TÜRKAK) deney raporlarının tanınması konusunda Avrupa Akreditasyon Birliği (EA) ve Uluslararası Laboratuvar Akreditasyon Birliği (ILAC) ile karşılıklı tanınma anlaşması imzalamıştır.

The Turkish Accreditation Agency (TURKAK) is signatory to the multilateral agreements of the European co-operation for the Accreditation (EA) and of the International Laboratory Accreditation (ILAC) for the Mutual recognition of test reports.

Uygulanan metodlar, test sonuçları ve genişletilmiş ölçüm belirsizlikleri (talep edilirse), 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 applied methods, test results and the uncertainties (if requested) with confidence probability are given on the following pages which are part of this report. This certificate includes the test specimen which is identified above and its valid with the related test report which is presented as annex.



Tarih / Date

15 / 03 / 2016

Test Faaliyetleri Yöneticisi

Testing Manager

S. Çoban

F.15.22 REV NO: D TEMMUZ 2015

Laboratuvar Müdürü

Laboratory Manager

Öner ARSLAN



TEST REPORT

Report Number : 020.529.1 / 2016

Report Date : 15 / 03 / 2016

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

Product : BM 60 Window System

Client : Burak Alüminyum San ve Tic. A.Ş.

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:60/A 34540 Çatalca – İstanbul / TURKIYE. Test sample is a window system which name is BM 60 Window which has been produced and designed by Burak Alüminyum San ve Tic. A.Ş. Tests were carried out on 26 & 29 / 02 / 2016 for the determination of air infiltration, water penetration (under static pressure) and wind resistance performances.

Test sample has been sent to FTI Façade Testing Institute's testing laboratories on 24 / 02 / 2016.

2. CLIENT

Burak Alüminyum San. ve Tic. A.Ş.

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

Soğanlık-Kartal / İstanbul / TÜRKİYE

3. TEST METHODS

The above mentioned tests have been carried out as per the test methods provided in project specifications and classified on the standards indicated below. Tests have been reported as the number of 020.529.1/2016.

Test report has been prepared by Miss Nilay Bulut.

TS EN 14351-1+ A1	* Windows and Doors – Product Standard
TS EN 1026	* Windows and Doors – Air Permeability – Test Method
TS EN 12207	* Windows and Doors – Air Permeability –Classification
TS EN 1027	* Windows and Doors – Watertightness – Laboratory Tests under Static Pressure
TS EN 12208	* Windows and Doors – Watertightness – Classification
TS 4644 EN 12211	* Windows and Doors – Resistance to Wind Load – Test Method
TS EN 12210	* Windows and Doors – Resistance to Wind load – Classification

4. TEST DATE AND PARTICIPANTS

Test was performed on 26&29 / 02 / 2016 with the following participants:

Mr. Öner ARSLAN	FTI	Laboratory Manager
Mr. Serhat ÇOLAK	FTI	Testing Manager
Mr. Sinan BAYRAKTAR	FTI	Testing Engineer
Mr. Murat GÖL	FTI	Testing Engineer
Miss Nilay BULUT	FTI	Testing Engineer
And,		
Hüseyin GÜRSOY	Burak Alüminyum San. ve Tic. A.Ş.	

5. DESCRIPTION OF TEST SAMPLE

Type of sample	Single Sashed, Window System
System Name	BM 60
Dimension of Sample (L x H)	1200 mm x 1200 mm
Surface area of Sample	1,44 m ²
Dimension of Sash (L x H)	567 mm x 1152 mm
Surface area of Sash	0,65 m ²
Operable joint length	3,44 m
Number of operable part(s)	1
Sash Glass Type	6 mm Float Transparent Glass + 16 mm air space + 6 mm Float Transparent Glass
Fixed Glass Type	6 mm Float Transparent Glass + 16 mm air space + 6 mm Float Transparent Glass

6. CONDITIONS

	26.02.2016	29.02.2016
Local Temperature	15 °C	15 °C
Humidity	69%	70%
Atmospheric Pressure	1013 Mbar	1023 Mbar

7. TEST PERFORMANCE

7.1 Pressure Sequence

Related to EN 14351-1 + A1 standard, process are shown in Table 1 below.

STEPS		POSITIVE PRESSURE (Pa)	NEGATIVE PRESSURE (Pa)
1	PA	600	600
2	PW	1500	-
3	PD	2000	2000
4	PE	3000	3000

Table 1. Pressure sequence

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

PD: Design Pressure ; PE: Extreme Pressurre

7.2 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 measurements of air permeability based on overall area and operable joint length are shown as below.

Air permeability measurements based on overall area;

POSITIVE PRESSURE			
ϕ_1	Test Pressure (Pa)	Air Leakage (m ³ /h)	Air Leakage (m ³ /h/m ²)
ϕ_1	50	1,40	0,97
ϕ_1	100	1,99	1,38
ϕ_1	150	2,41	1,67
ϕ_1	200	2,85	1,98
ϕ_1	250	3,34	2,32
ϕ_1	300	3,80	2,64
ϕ_1	450	4,58	3,18
ϕ_1	600	5,40	3,75

Test No : 2016.558.02 / 26.02.2016

NEGATIVE PRESSURE			
ϕ_2	Test Pressure (Pa)	Air Leakage (m ³ /h)	Air Leakage (m ³ /h/m ²)
ϕ_2	50	0,98	0,68
ϕ_2	100	1,47	1,02
ϕ_2	150	1,96	1,36
ϕ_2	200	2,25	1,57
ϕ_2	250	2,85	1,98
ϕ_2	300	3,15	2,18
ϕ_2	450	4,03	2,80
ϕ_2	600	4,76	3,31

Test No : 2016.558.03 / 26.02.2016

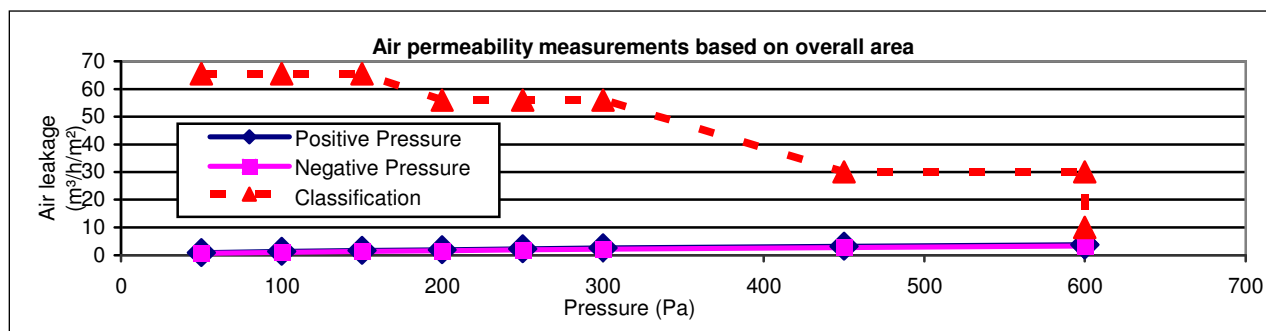
Air permeability measurements based on operable joint length;

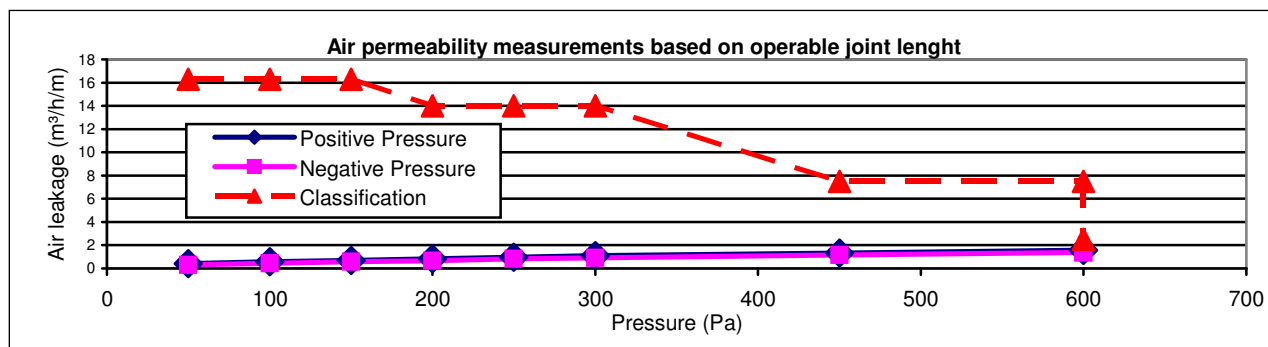
POSITIVE PRESSURE			
ϕ_3	Test Pressure (Pa)	Air Leakage (m ³ /h)	Air Leakage (m ³ /h/m)
ϕ_3	50	1,40	0,41
ϕ_3	100	1,99	0,58
ϕ_3	150	2,41	0,70
ϕ_3	200	2,85	0,83
ϕ_3	250	3,34	0,97
ϕ_3	300	3,80	1,11
ϕ_3	450	4,58	1,33
ϕ_3	600	5,40	1,57

Test No : 2016.558.02 / 26.02.2016

NEGATIVE PRESSURE			
ϕ_4	Test Pressure (Pa)	Air Leakage (m ³ /h)	Air Leakage (m ³ /h/m)
ϕ_4	50	0,98	0,29
ϕ_4	100	1,47	0,43
ϕ_4	150	1,96	0,57
ϕ_4	200	2,25	0,66
ϕ_4	250	2,85	0,83
ϕ_4	300	3,15	0,91
ϕ_4	450	4,03	1,17
ϕ_4	600	4,76	1,39

Test No : 2016.558.03 / 26.02.2016





7.3. Watertightness Under Static Pressure

Before starting the test, 3 pulses at 1650 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 facade = 2,0 l/min x 1,44 m² = 2,88 l/min.

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.
1350	5	No water leakage was observed.
1500	5	No water leakage was observed.

Test No : 2016.558.06 / 26.02.2016

7.4. Resistance to Wind Load

Before starting the test, 3 pulses at 2200 Pa for positive and negative design load test. Waiting duration between each impacts were 3 seconds. During the tests, the test pressure values are applied for 30 seconds.

Acceptable proportion at resistance to wind load:

Position: Vertical distance for mullion at middle axis

Scale: **Vertical** **1200 mm**

The measured frontal deflection between points of the structural support should not exceed the minimum of 1/300 or 1/200 or 1/150 of the framing member's span. The limit values are as below:

L=1200 mm *L/ 300 = 4,00 mm *L/200 = 6,00 mm *L/150 = 8,00 mm

Specimen dimensions and sensor replacement coordinates;

	X coordinates (mm)	Y coordinates (mm)
External Dimensions	1200	1200
Sensor 1 Replacement	585	100
Sensor 2 Replacement	585	600
Sensor 3 Replacement	585	1100

Frontal deflection measurement results on the profile;

Positive Pressure (Pa)	Point 1 (mm)	Point 2 (mm)	Point 3 (mm)	Frontal Deflection λ_1 (mm)	Negative Pressure (Pa)	Point 1 (mm)	Point 2 (mm)	Point 3 (mm)	Frontal Deflection λ_2 (mm)
0	0,0	0,0	0,0	0,0	0	0,0	0,0	0,0	0,0
2000	0,43	1,34	0,28	0,98	2000	0,36	1,35	0,27	1,04
0	0,04	0,04	0,04	0	0	0,02	0,00	0,01	0,01

Test No : 2016.558.07/ 26.02.2016

Test No : 2016.558.08/ 26.02.2016

Relevant to limit values, the specimen's frontal deflection values are suitable according to requirements of EN 12210 standard as seen above table. As a consequence, no damage was observed at ± 2000 Pa on the sample at the end of the wind resistance test.

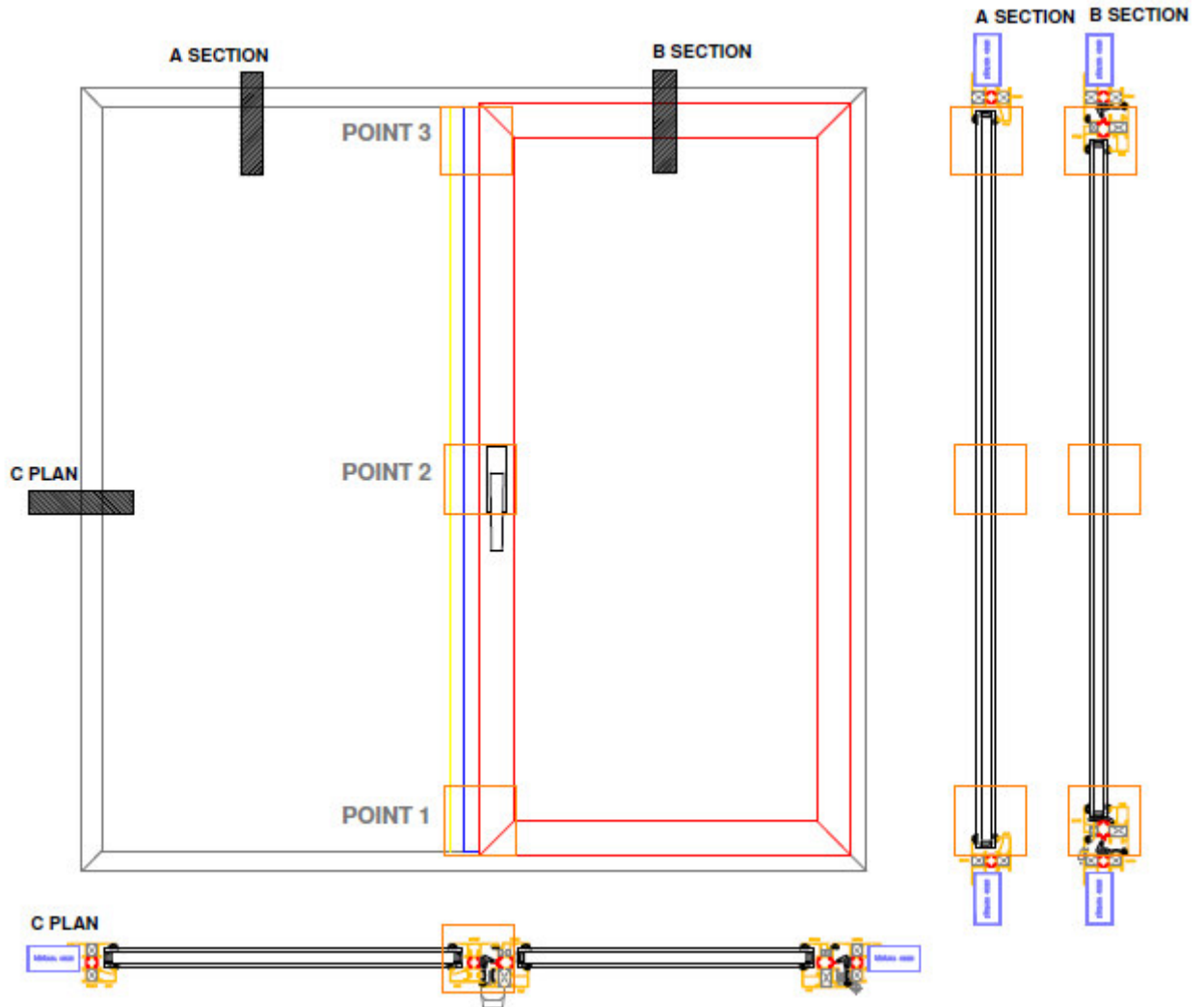
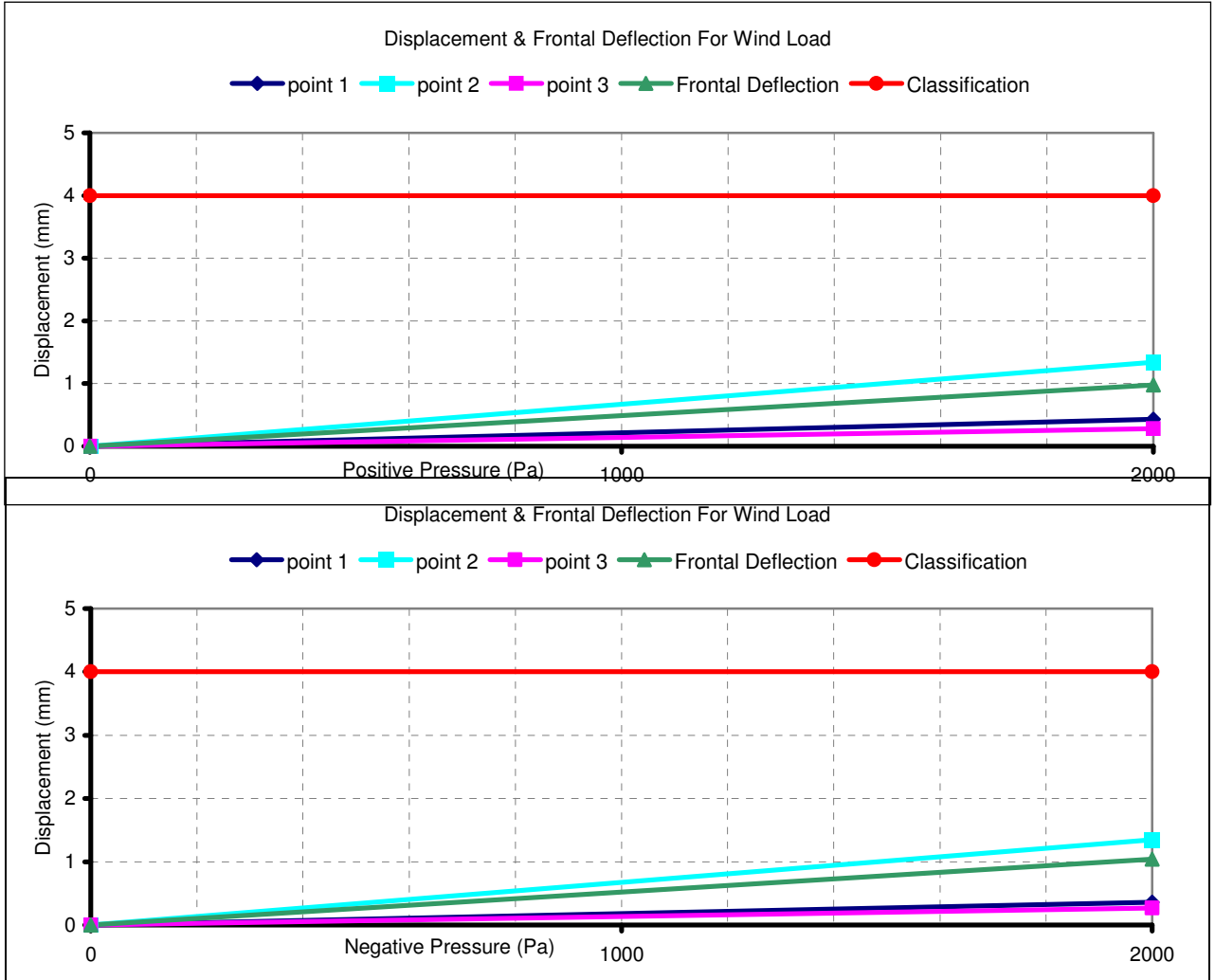
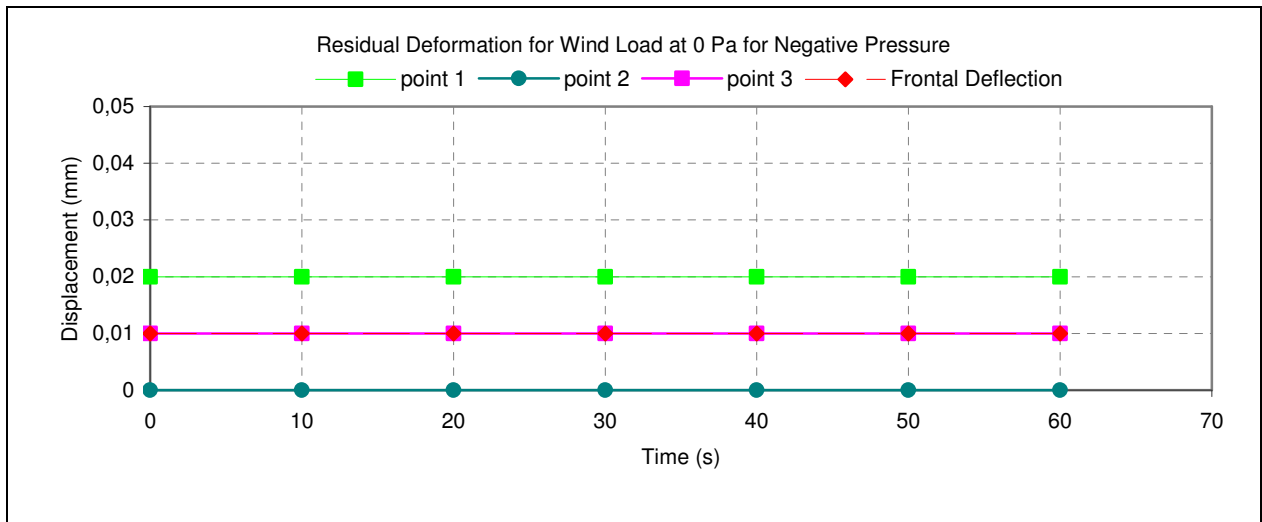
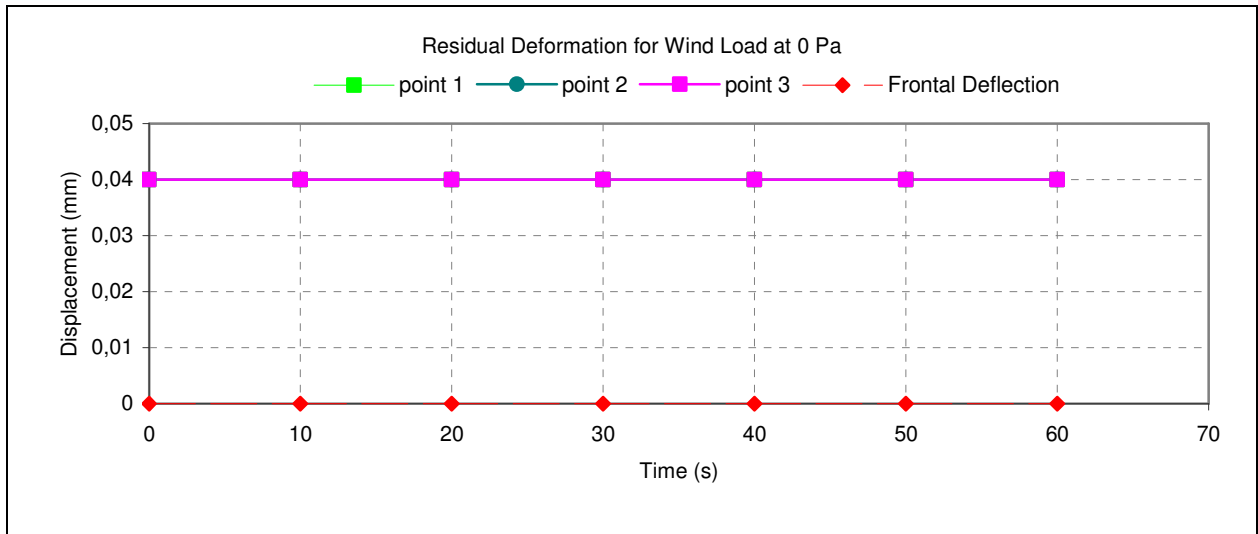


Figure 1. The view of specimen's sensor points





7.5 Cycle

The test specimen was subjected to 50 cycles including negative and positive pressures, with the following features:

- Test pressure equal 1000 Pa ;
- First step was negative, next was positive as was the last sequence of 50 impulses;
- Value ± 1000 Pa was maintained at for 5 s.

After completion of the 50 cycles, there was no damage observed on the sample at the end of the test. ± 1000 Pa were applied for 50 cycle. (**Test no: 2016.558.09/** 26.02.2016)

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.

Air permeability measurements based on overall area ;

POSITIVE PRESSURE			
ϕ_5	Test Pressure (Pa)	Air Leakage (m ³ /h)	Air Leakage (m ³ /h/m ²)
ϕ_5	50	1,06	0,73
ϕ_5	100	1,29	0,90
ϕ_5	150	1,71	1,19
ϕ_5	200	1,90	1,32
ϕ_5	250	1,93	1,34
ϕ_5	300	2,43	1,69
ϕ_5	450	2,81	1,95
ϕ_5	600	3,48	2,42

Test No : 2016.558.10 / 29.02.2016

NEGATIVE PRESSURE			
ϕ_6	Test Pressure (Pa)	Air Leakage (m ³ /h)	Air Leakage (m ³ /h/m ²)
ϕ_6	50	0,73	0,51
ϕ_6	100	0,96	0,67
ϕ_6	150	1,09	0,75
ϕ_6	200	1,55	1,07
ϕ_6	250	1,64	1,14
ϕ_6	300	1,96	1,36
ϕ_6	450	2,62	1,82
ϕ_6	600	3,23	2,24

Test No : 2016.558.11 / 29.02.2016

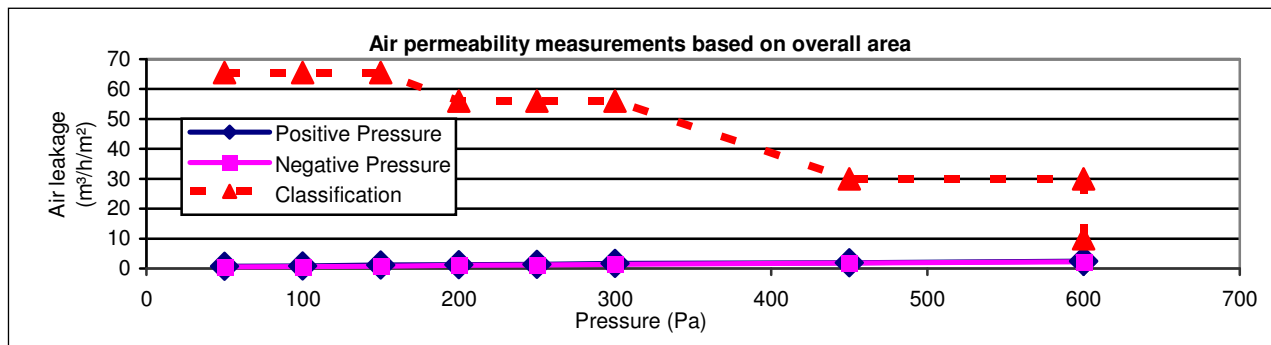
Air permeability measurements based on operable joint length;

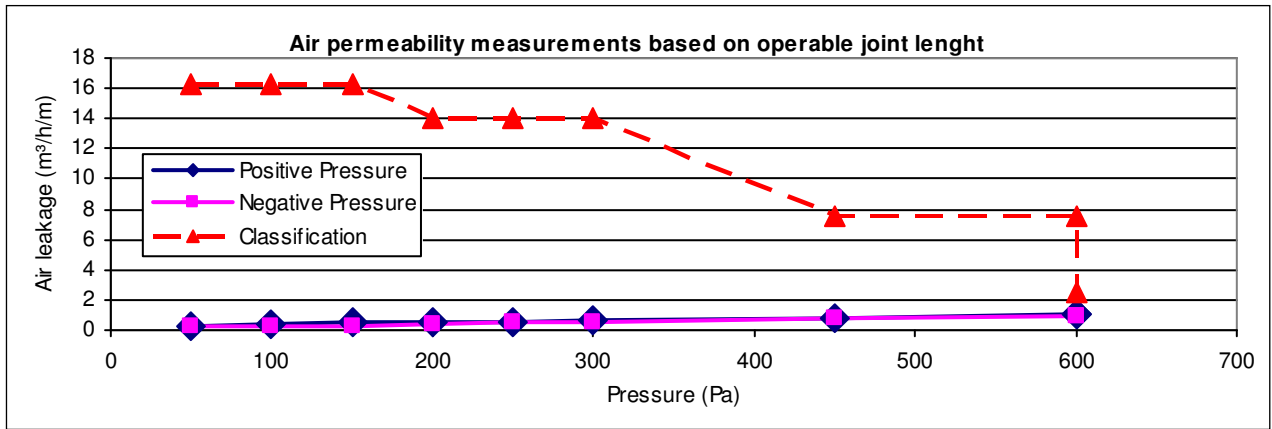
POSITIVE PRESSURE			
ϕ_7	Test Pressure (Pa)	Air Leakage (m ³ /h)	Air Leakage (m ³ /h/m)
ϕ_7	50	1,06	0,31
ϕ_7	100	1,29	0,38
ϕ_7	150	1,71	0,50
ϕ_7	200	1,90	0,55
ϕ_7	250	1,93	0,56
ϕ_7	300	2,43	0,71
ϕ_7	450	2,81	0,82
ϕ_7	600	3,48	1,01

Test No : 2016.558.10 / 29.02.2016

NEGATIVE PRESSURE			
ϕ_8	Test Pressure (Pa)	Air Leakage (m ³ /h)	Air Leakage (m ³ /h/m)
ϕ_8	50	0,73	0,21
ϕ_8	100	0,96	0,28
ϕ_8	150	1,09	0,32
ϕ_8	200	1,55	0,45
ϕ_8	250	1,64	0,48
ϕ_8	300	1,96	0,57
ϕ_8	450	2,62	0,76
ϕ_8	600	3,23	0,94

Test No : 2016.558.11 / 29.02.2016





7.7 Increased Load Test (Safety Test – Secure Load)

Test Pressure	Applied		Observations
	Positive	Negative	
PE = 3000 Pa	3000	3000	No damage was observed on the sample

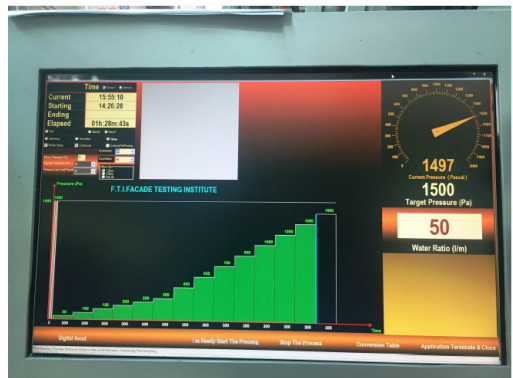
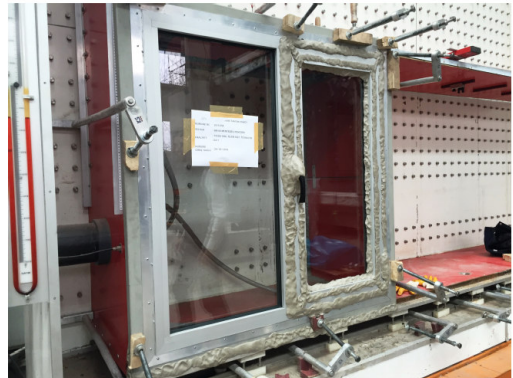
Test No : 2016.558.12 / 29.02.2016

8. RESULTS

	CONDITIONS	RESULT		CLASSIFICATION	FINAL
AIR PERMEABILITY EN 12207	at 600 Pa $\phi_1 < 10 \text{ m}^3/(\text{h.m}^2)$ at 600 Pa $\phi_2 < 2,5 \text{ m}^3/(\text{h.m})$	Positive Pressure	$\phi_1=3,75$ $\phi_2=1,57$	Class 4	Class 4
	at 600 Pa $\phi_3 < 10 \text{ m}^3/(\text{h.m}^2)$ at 600 Pa $\phi_4 < 2,5 \text{ m}^3/(\text{h.m})$	Negative Pressure	$\phi_3=3,31$ $\phi_4=1,39$	Class 4	
WATER-TIGHTNESS (Static Pressure) EN 12208	There should be no water leakage at 1500 Pa	There was no water leakage		E1500	
RESISTANCE TO WIND LOAD (design load) EN 12210	2000 Pa, $C = L/300 = 4,0 \text{ mm}$ $\lambda_1 < C$	Positive Pressure	$\lambda_1 = 0,99 \text{ mm}$	Class C5	
	2000 Pa, $C = L/300 = 4,0 \text{ mm}$ $\lambda_2 < C$	Negative Pressure	$\lambda_2 = 1,04 \text{ mm}$		
CYCLE TEST	There should be no damage during the test + 1000 Pa and - 1000 Pa for 50 cycle	No damage was observed on the sample.		OK	
AIR PERMEABILITY EN 12207 (repeat)	at 600 Pa $\phi_5 < 10 \text{ m}^3/(\text{h.m}^2)$ at 600 Pa $\phi_6 < 2,5 \text{ m}^3/(\text{h.m})$	Positive Pressure	$\phi_5=2,42$ $\phi_6=1,01$	Class 4	
	at 600 Pa $\phi_7 < 10 \text{ m}^3/(\text{h.m}^2)$ at 600 Pa $\phi_8 < 2,5 \text{ m}^3/(\text{h.m})$	Negative Pressure	$\phi_7=2,24$ $\phi_8=0,94$	Class 4	
AIR PERMEABILITY EN 12207 (compare)	at 600 Pa $\phi_5 < 4,50 \text{ m}^3/(\text{h.m}^2)$ at 600 Pa $\phi_6 < 1,88 \text{ m}^3/(\text{h.m})$	Positive Pressure	$\phi_5=2,42$ $\phi_6=1,01$	OK	
	at 600 Pa $\phi_7 < 3,97 \text{ m}^3/(\text{h.m}^2)$ at 600 Pa $\phi_8 < 1,66 \text{ m}^3/(\text{h.m})$	Negative Pressure	$\phi_7=2,24$ $\phi_8=0,94$	OK	
RESISTANCE TO SAFETY LOAD EN 12210	There should be no damage at +3000 Pa and -3000 Pa.	There was no damage on the sample.		OK	

9. TEST PHOTOS

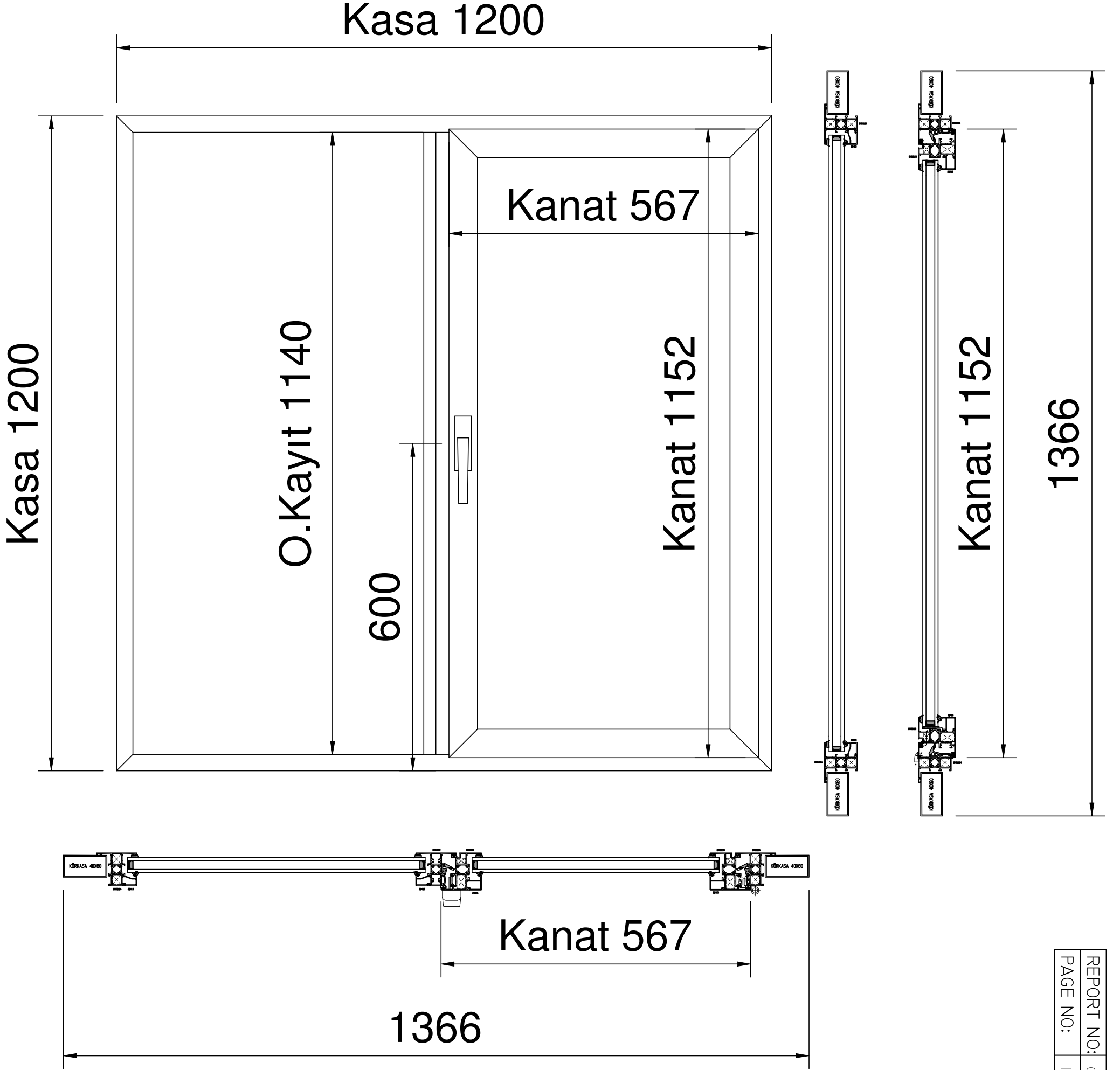
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Date: 29.02.2016

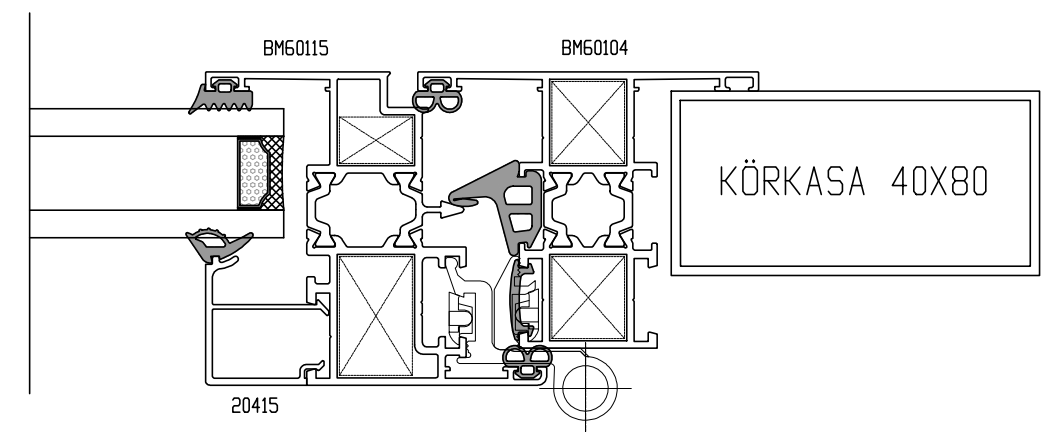
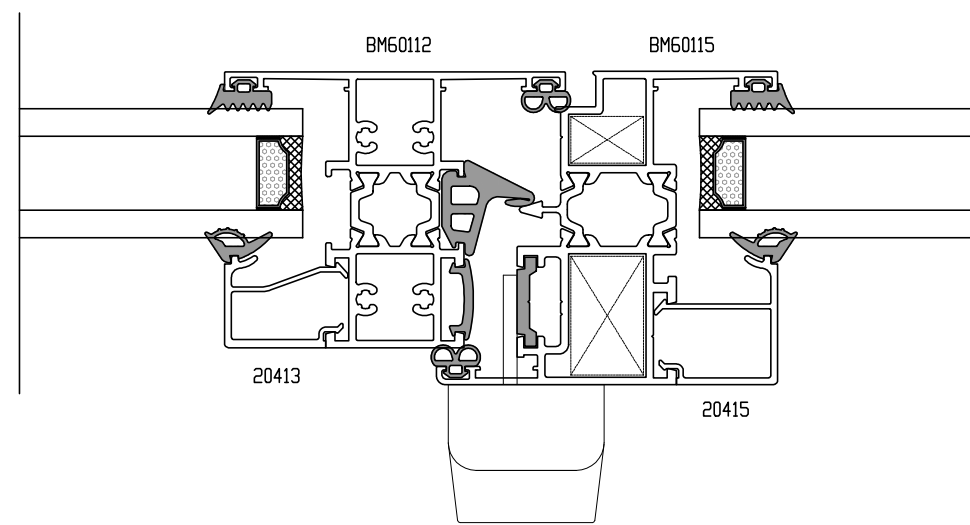
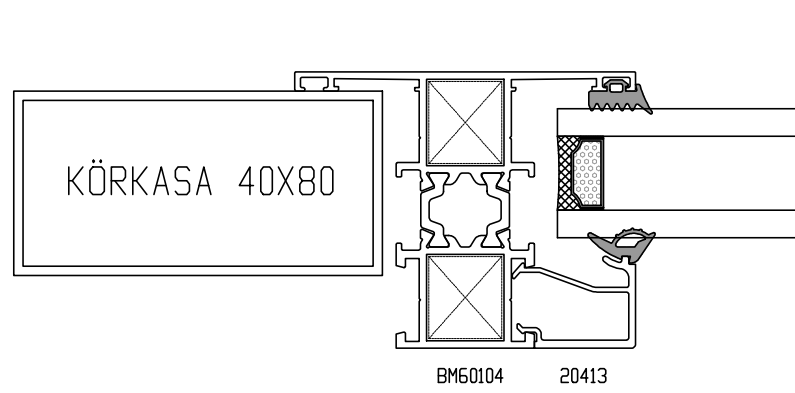
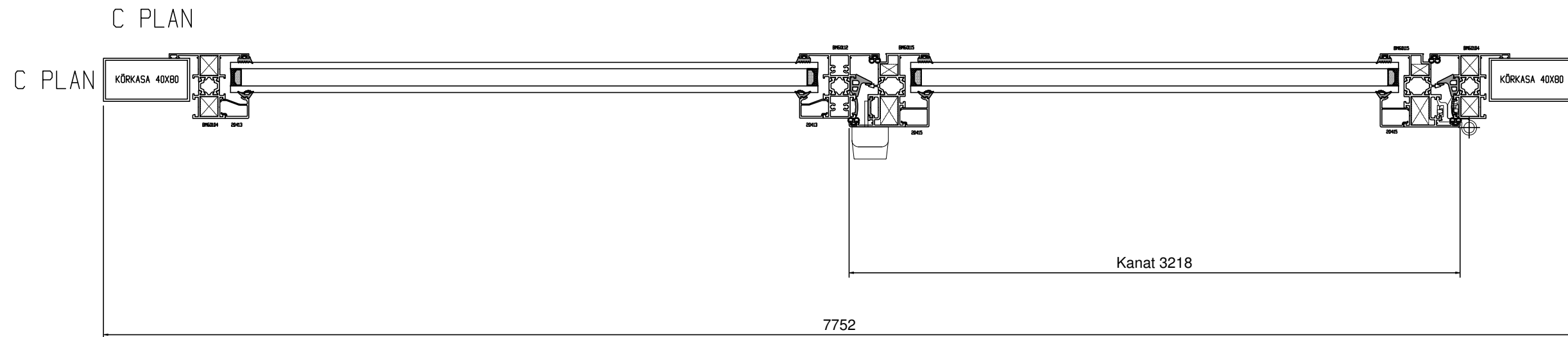
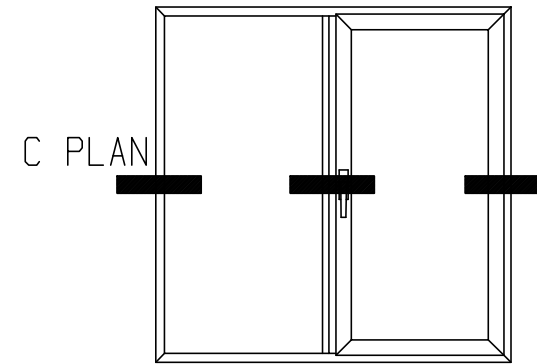




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NOTIFIED BODY NO:	NB-2547	PROJECT	BM 60 WINDOW SYSTEM		
ACCREDITATION NO:	AB-0531-T		GENERAL PROFILE DETAILS		
REPORT NO:	020.529.1 / 2016	PROJECT CODE:	2016.558	DATE:	15.03.2016
PREPARED BY:	N. BULUT	CLIENT:	BURAK ALUMINYUM SAN. VE TIC. AS.	REV.NO:	A
CONTROL BY:	S. ÇOLAK	EXPLANATION:	AIR PERMEABILITY, WATERTIGHTNESS AND RESISTANCE TO WIND LOAD		

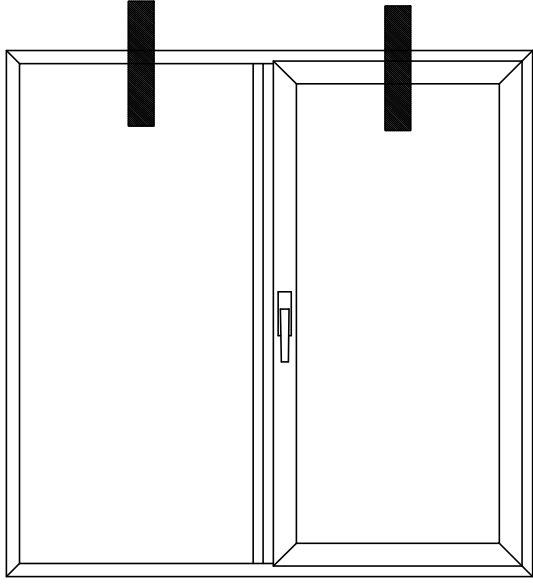




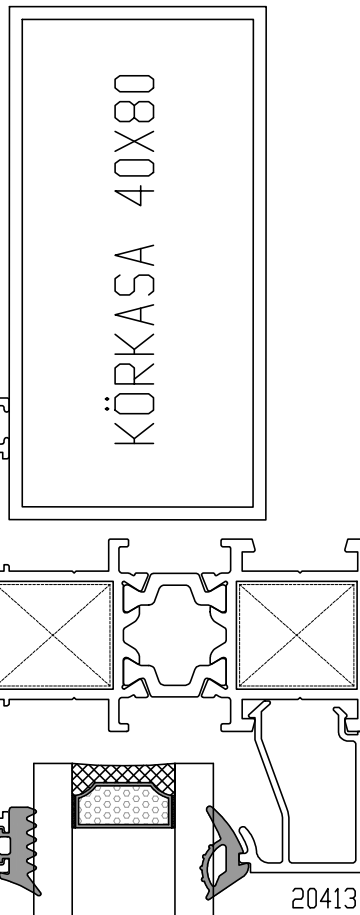
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ACCREDITATION NO	AB-0531-T	SAMPLE NO	2016.558	DATE	15.03.2016
REPORT NO	020.529.1/2016	CLIENT	BURAK ALUMINYUM SAN. VE TIC. AS.	REV.NO	A
PREPARED BY	N. BULUT	EXPLANATION	AIR PERMEABILITY, WATERTIGHTNESS AND RESISTANCE TO WIND LOAD		
CONTROL BY	S. ÇOLAK				



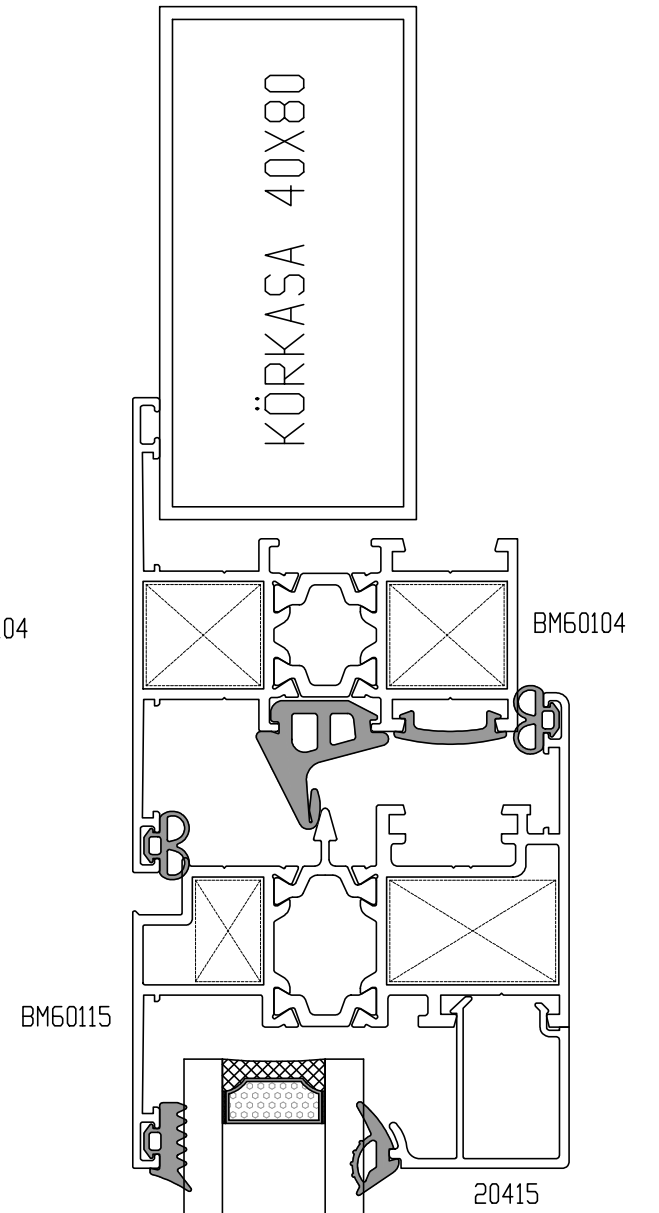
A SECTION B SECTION



A SECTION

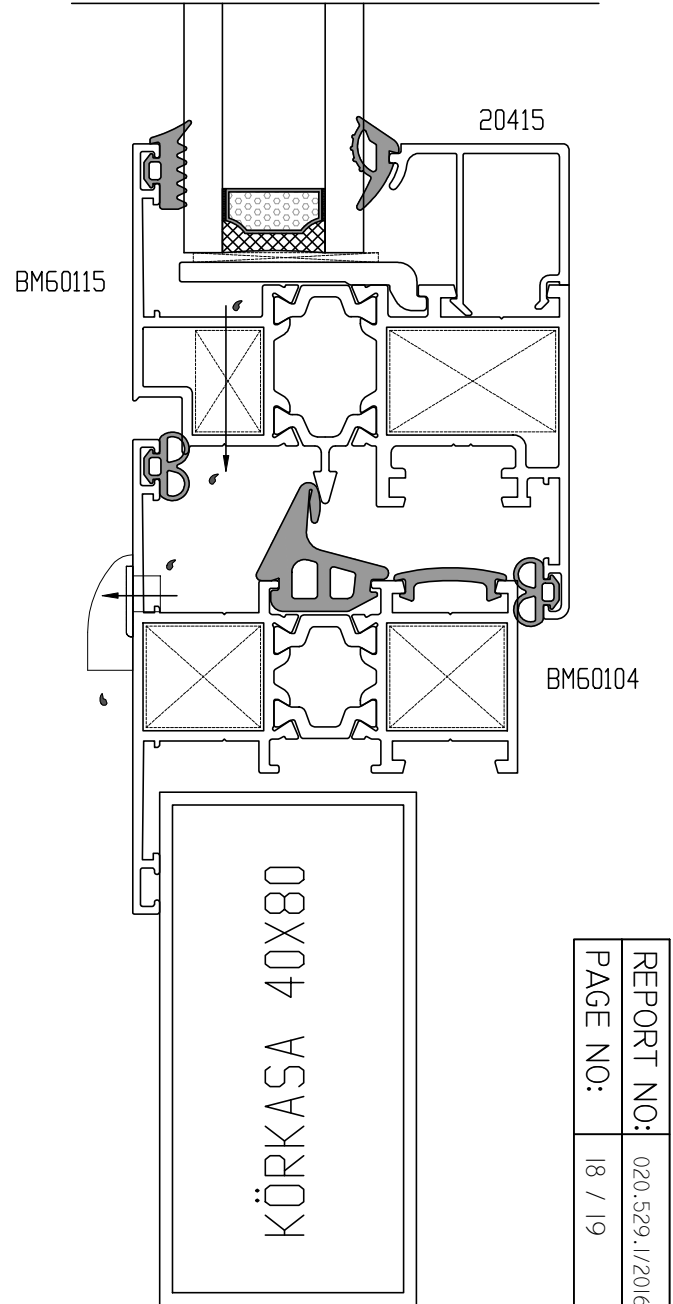
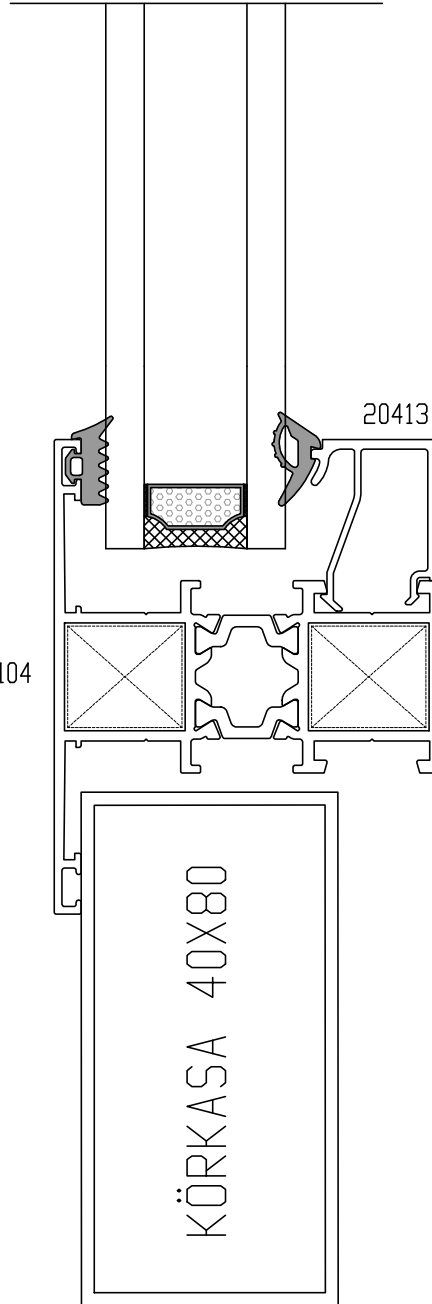
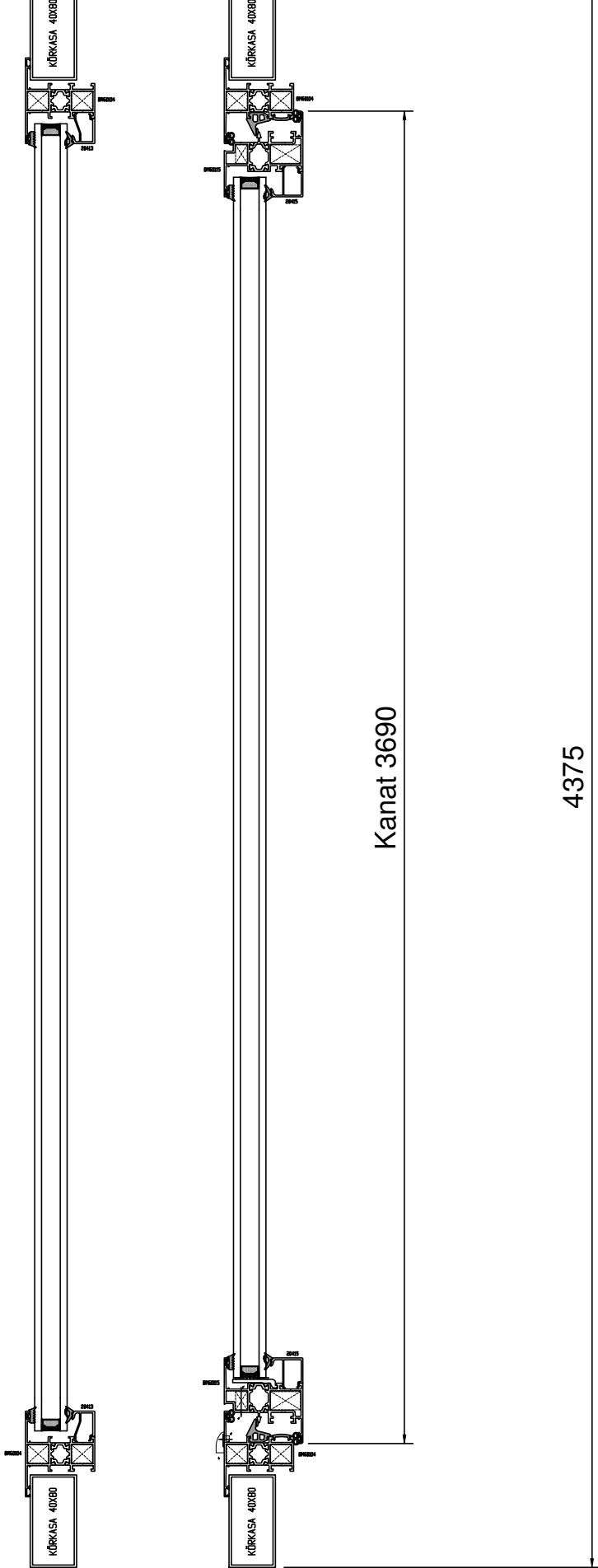


B SECTION



A SECTION

B SECTION

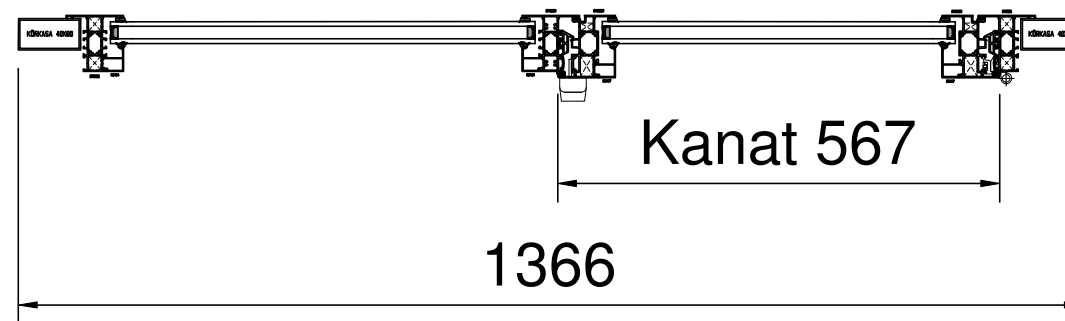
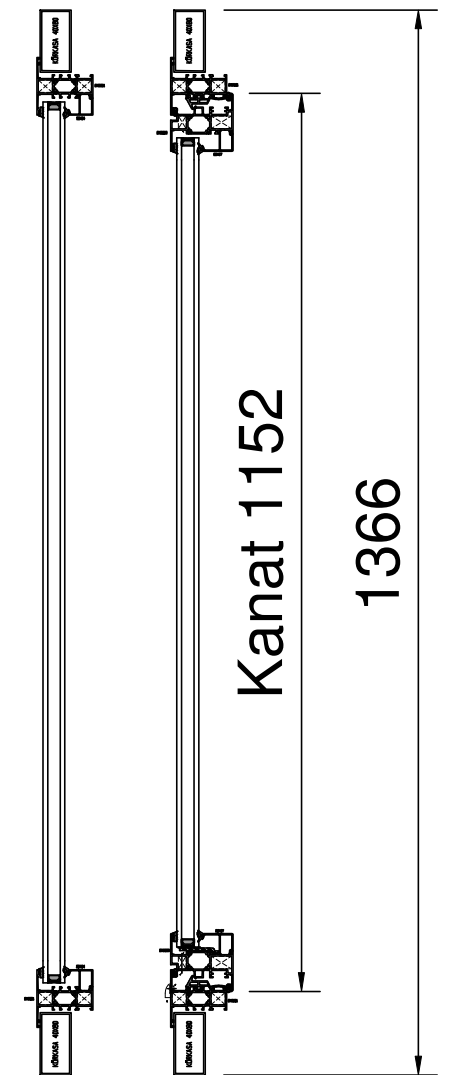
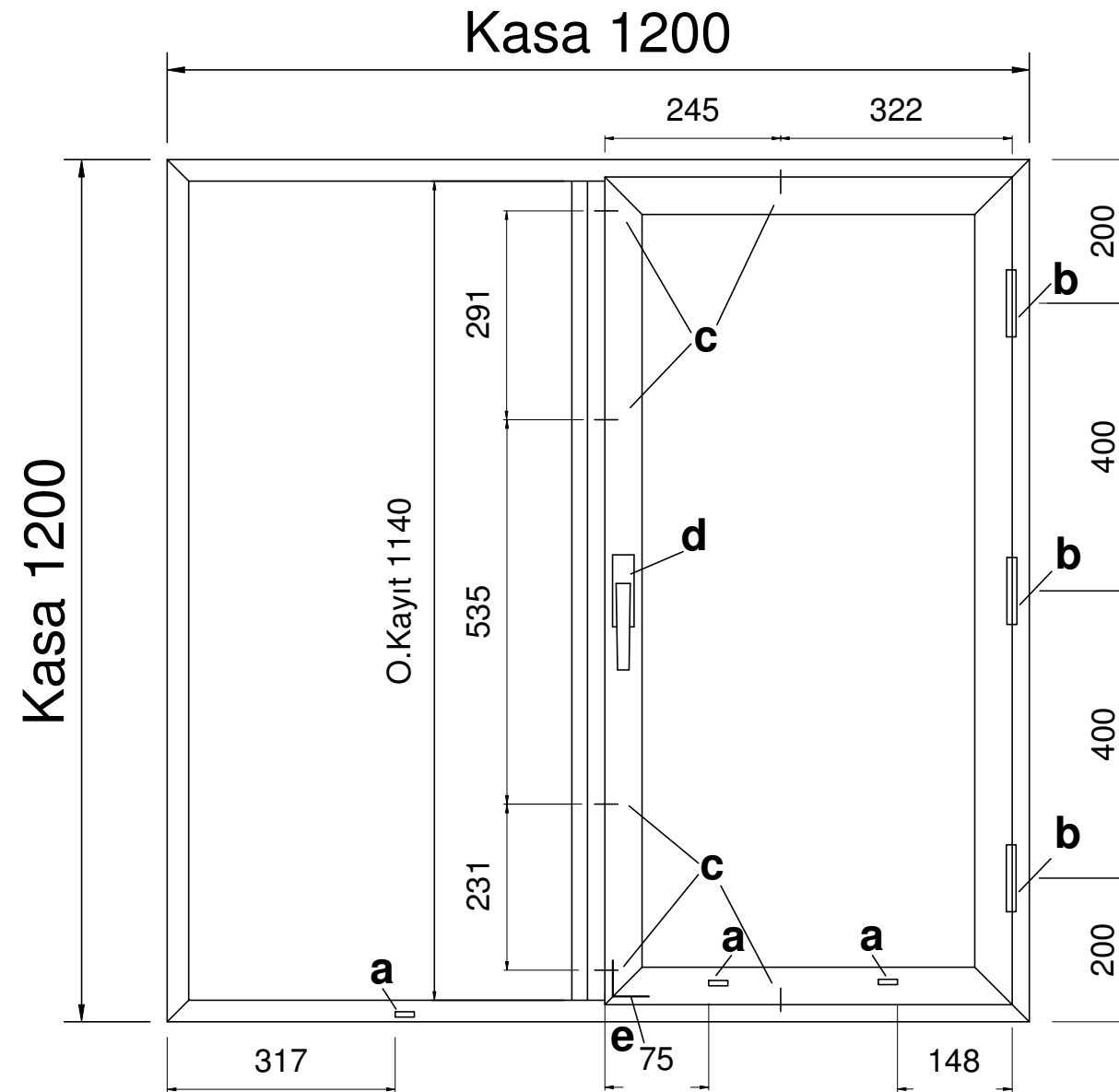


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PAGE NO: 18 / 19

NOTIFIED BODY NO:	NB-2547	DETAIL: BM 60 WINDOW SYSTEM			
ACCREDITATION NO:	AB-0531-T	FIXED AND SASH SECTION DETAILS			
REPORT NO:	020.529.1/2016	PROJECT CODE:	2016.558	DATE:	15.03.2016
PREPARED BY:	N. BULUT	CLIENT:	BURAK ALUMINYUM SAN. VE TIC. AS.	REV.NO:	A
CONTROL BY:	S. ÇOLAK	EXPLANATION:	AIR PERMEABILITY, WATERTIGHTNESS AND RESISTANCE TO WIND LOAD		



a- 6x25mm drainage hole
b- 413004 Giesse Flash Base Window hinge
c- locking points 733002-pin 733009-locking part
d- handle
e- 733003 - corner mechanism



NOTIFIED BODY NO	NB-2547	DETAIL:	BM 60 WINDOW SYSTEM SASH MECHANISM DETAILS		
ACCREDITATION NO	AB-0531-T	SAMPLE NO	2016.558	DATE	15.03.2016
REPORT NO	020.529.1/2016	CLIENT	BURAK ALUMINYUM SAN. VE TIC. AS.	REV.NO	A
PREPARED BY	N. BULUT	EXPLANATION	AIR PERMEABILITY, WATERTIGHTNESS AND RESISTANCE TO WIND LOAD		
CONTROL BY	S. ÇOLAK				

