

FTI FASAD TEKNOLOJİ MERKEZİ / FTI Façade Testing Institute

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

AB-0531-T

020.1056.1/2018

29/03/2018



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: Burak BG60 Curtain Wall Stick System

Hidden Inward Sash

Numune Kabul Tarihi : 22 / 03 / 2018

Acceptance Date of Item

Referans No : 2018.964

Reference No

Uygulanan Normlar / Norms Applied: TS EN 13830, TS EN 12153, TS EN 1026, TS EN 12155
TS EN 12179

Sonuçlar / Results: TS EN 12152 Air Permeability : Class A4 (± 600 Pa)
TS EN 12207 Air Permeability : Class 4 (Sash) (± 600 Pa)
TS EN 12154 Watertightness (Static Pressure) : RE1350 (1350 Pa)
TS EN 13830 Resistance to Wind Load : OK (Criteria 5mm + L/300) (± 2000 Pa)
TS EN 13830 Resistance to Extreme Load : OK (± 3000 Pa)

Test Tarihi / Date of Test

22-23 / 03 / 2018

Sayfa Sayısı / Number of Pages

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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.



Tarih / Date

29 / 03 / 2018

Test Faaliyetleri Yöneticisi

Testing Manager

Sinan BAYRAKTAR

Laboratuvar Müdürü

Laboratory Manager

Öner ARSLAN

F.15.22 REV NO: F MART 2017



TEST REPORT

Testing Reference : TS EN 13830 Curtain Walling - Product Standard

Product : BG60 Curtain Wall Stick System Hidden Inward Sash

Prepared by : Sinan BAYRAKTAR

Accreditation Nr. AB-0531-T

Report Nr. 020.1056.1 / 2018

Date 29.03.2018

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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 / TÜRKİYE.

Test sample name is “ BG60 Curtain Wall Stick System Hidden Inward Sash “ which has been designed and constructed by Burak Alüminyum San. ve Tic. A.Ş.

Tests were carried out on 22-23 / 03 / 2018 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 Façade Testing Institute's testing laboratories on 22 / 03 / 2018.

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 tests have been carried out and classified on the standard indicated below.

<u>Document No</u>	<u>Date of Press</u>	<u>Subject of Document</u>
TS EN 13830	10.2015	Curtain Walling – Product Standard
TS EN 12153	11.2006	Curtain Walling – Air Permeability – Test Method
TS EN 12152	12.2004	Curtain Walling – Air Permeability – Performance Requirement and Classification
TS EN 1026	07.2016	Windows and doors - Air permeability - Test method
TS EN 12207	03.2004	Windows and doors – Air Permeability - Classification
TS EN 12155	03.2005	Curtain Walling – Watertightness – Laboratory Tests Under Static Pressure
TS EN 12154	04.2004	Curtain Walling – Watertightness – 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 / 03 / 2018 by the followings:

Öner ARSLAN	FTI	Laboratory Manager
Sinan BAYRAKTAR	FTI	Testing Engineer
Nilay BULUT	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	BG60 Stick System Hidden Inward Sash
Dimensions of sample	2100 mm x 3800 mm
Surface area of sample	7,98 m ²
Fixed joint length	50,72 m
Dimensions of sash 1	700 mm x 1500 mm
Area of sash 1	1,05 m ²
Operable joint length	4,40 m
Glass Type	
Vision & Sash Glass Type	6mm Float Transparent Glass + 20 mm Air Space + 6 mm Float Transparent Glass

* Please refer to the annexes for the system details.

6. CONDITIONS

Date	:	22 / 03 / 2018	23 / 03 / 2018
Local Temperature (°C)	:	19	18
Atmospheric Pressure (Mbar)	:	1014	1016
Ambient Humidity (%)	:	63	65

7. TEST PERFORMANCE

7.1. Pressure Sequence

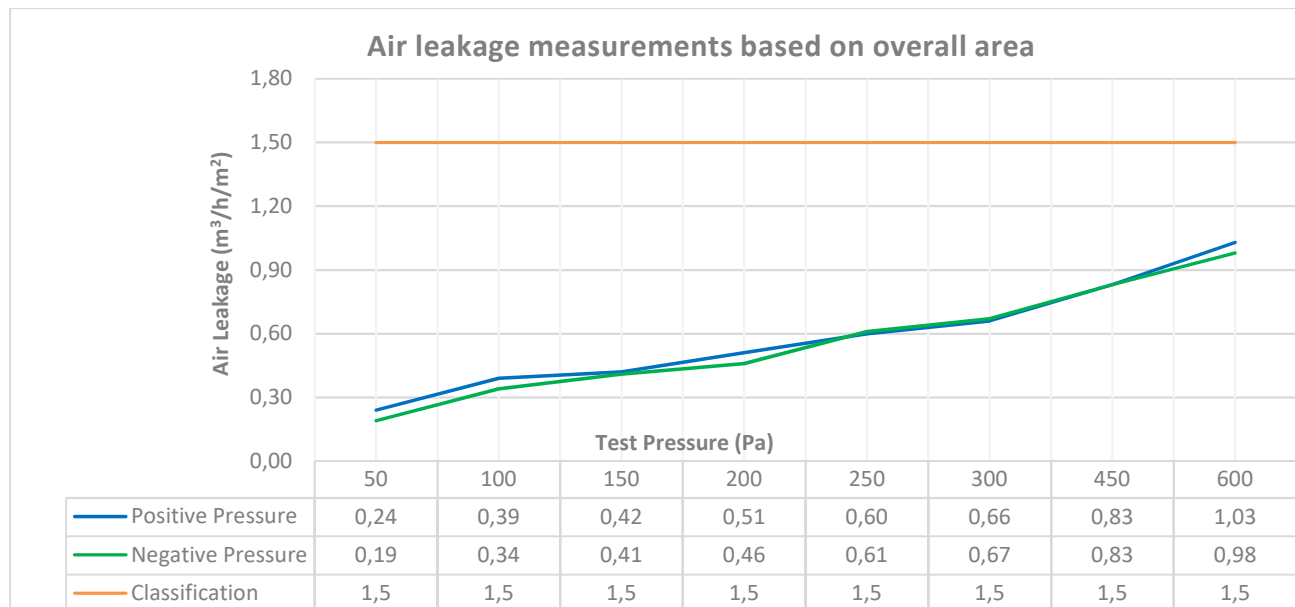
STEPS		POSITIVE PRESSURE (Pa)	NEGATIVE PRESSURE (Pa)
1	PA	600	600
2	PW	1500	-
3	PD	2000	2000
5	PE	3000	3000

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

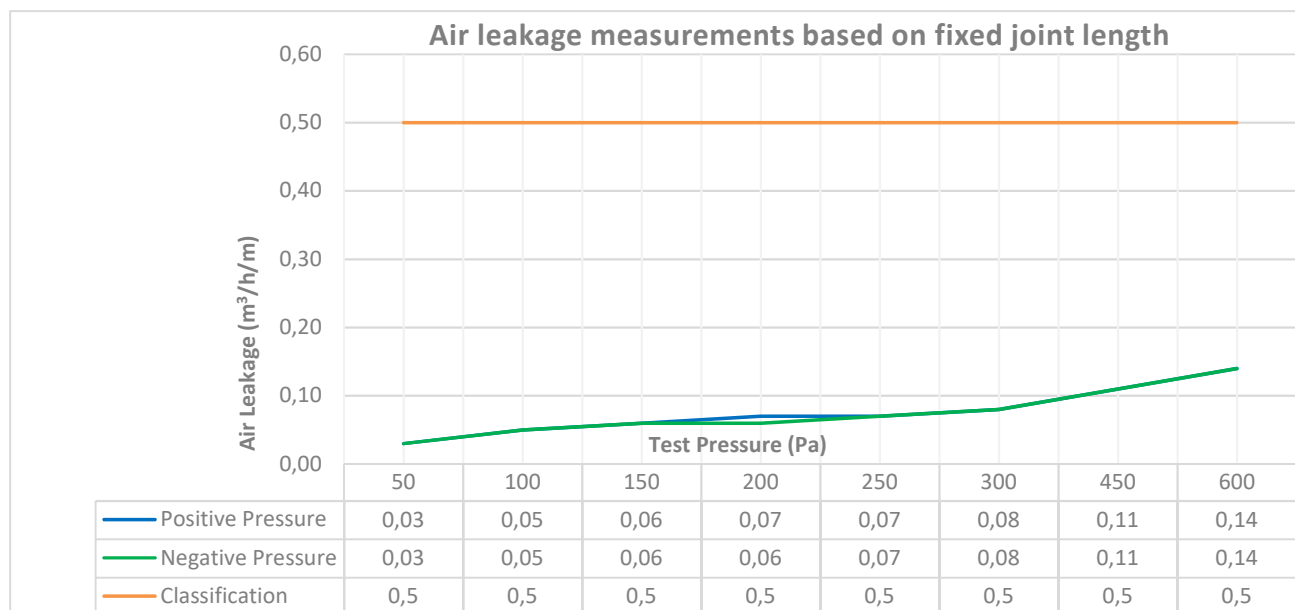
PD: Design Pressure ; PE: Extreme Pressure

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 following data includes the values of the system after tare.

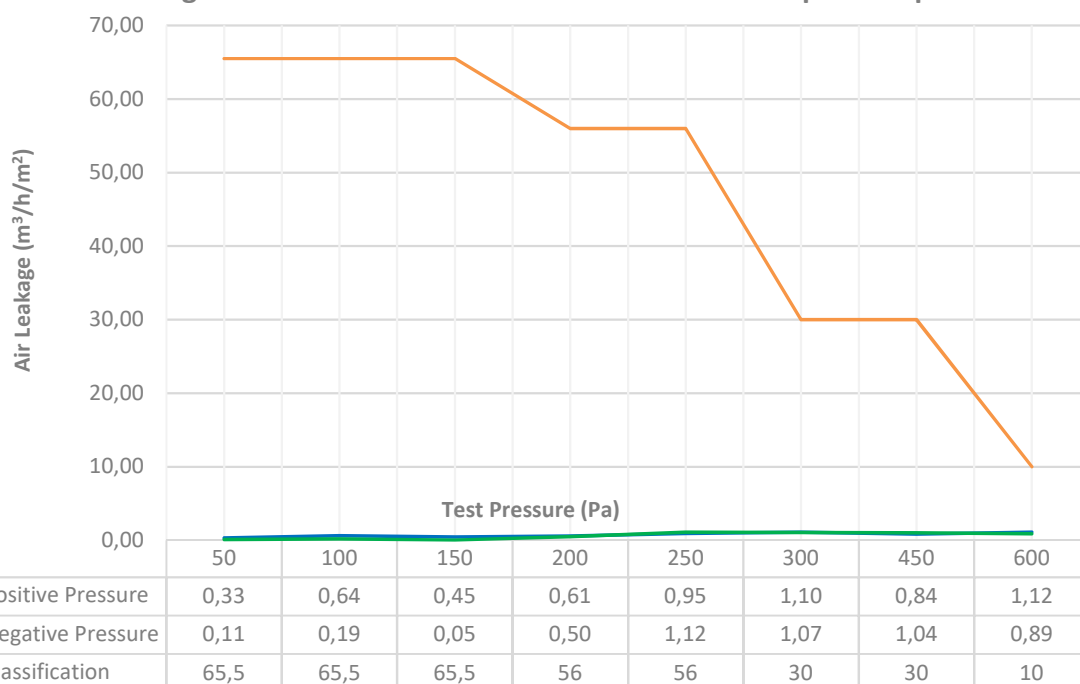


Test No: 2018.964.09-10 / 22.03.2018 (positive & negative pressure)



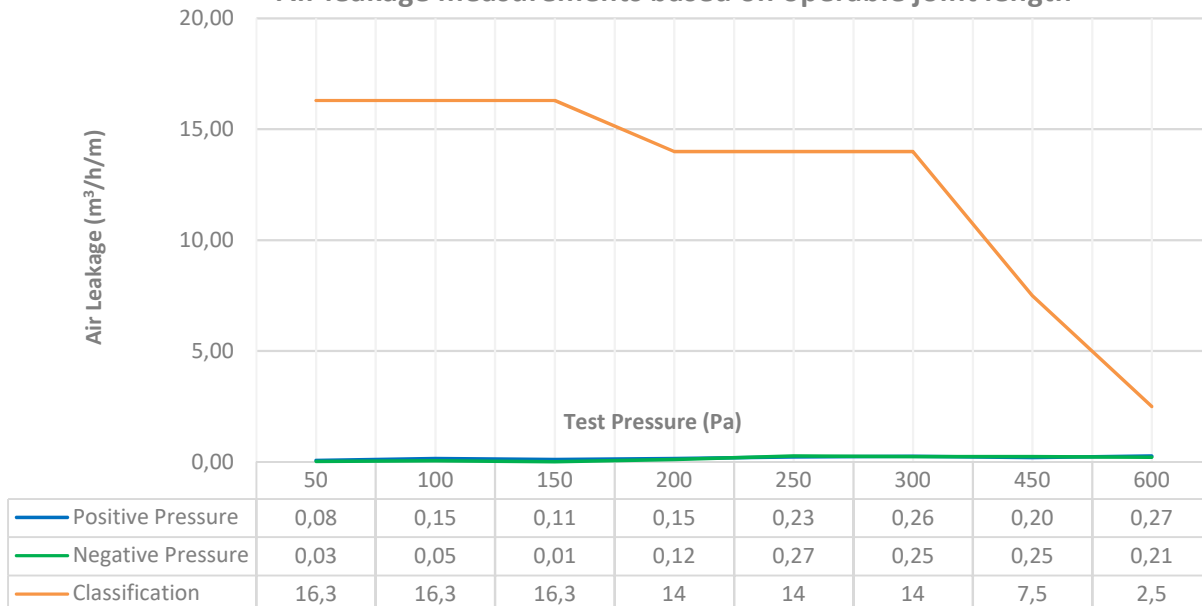
Test No: 2018.964.09-10 / 22.03.2018 (positive & negative pressure)

Air leakage measurements based on overall area for operable parts



Test No: 2018.964.11-12 / 22.03.2018 (positive & negative pressure)

Air leakage measurements based on operable joint length



Test No: 2018.964.11-12 / 22.03.2018 (positive & negative pressure)

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 façade = 2,0 l/min x 7,98 m² =15,96 (l.m² /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.
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: 2018.964.14 / 23.03.2018

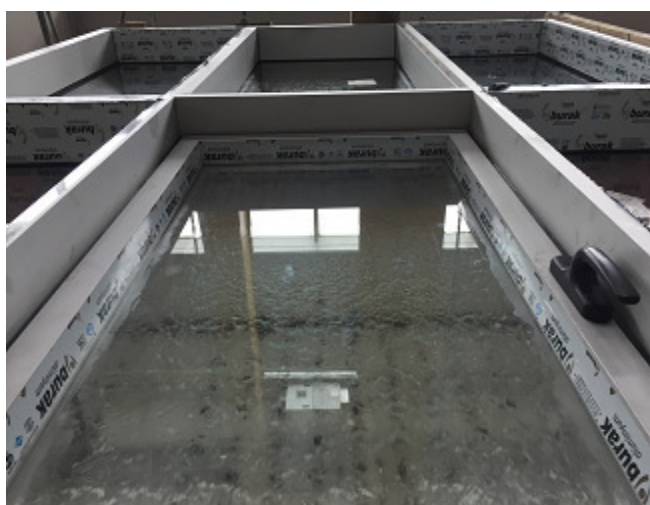


Photo 01. A view of the specimen while watertightness testing



Photo 02. A view of the specimen while watertightness testing

7.4. Resistance to Wind Load

Design loads of the specimen is 2000 Pa for positive and negative pressure. So, the preload pulses was 1000 Pa and the pressure steps were 500 Pa, 1000 Pa, 1500 Pa and 2000 Pa for positive and negative pressures. Sensor placements are shown below Figure 1.

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

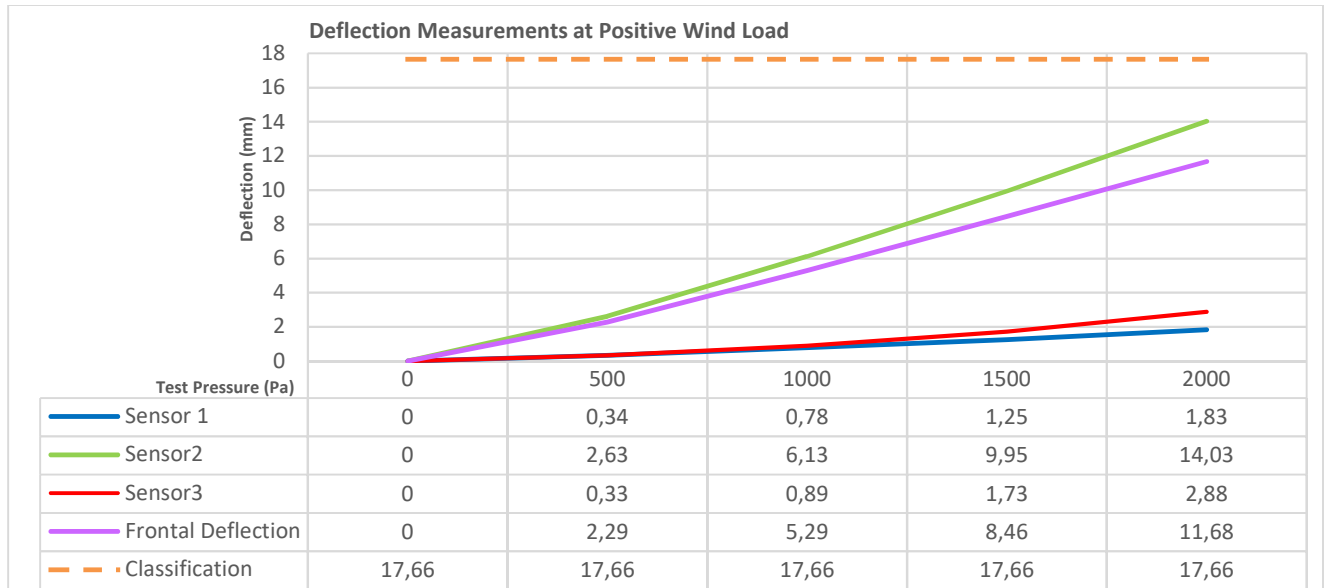
Under the imposed wind loads only the maximum frontal deflection (d) of the curtain walling's framing members shall not exceed the following limits:

- ☐ $d \leq L / 200$, 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

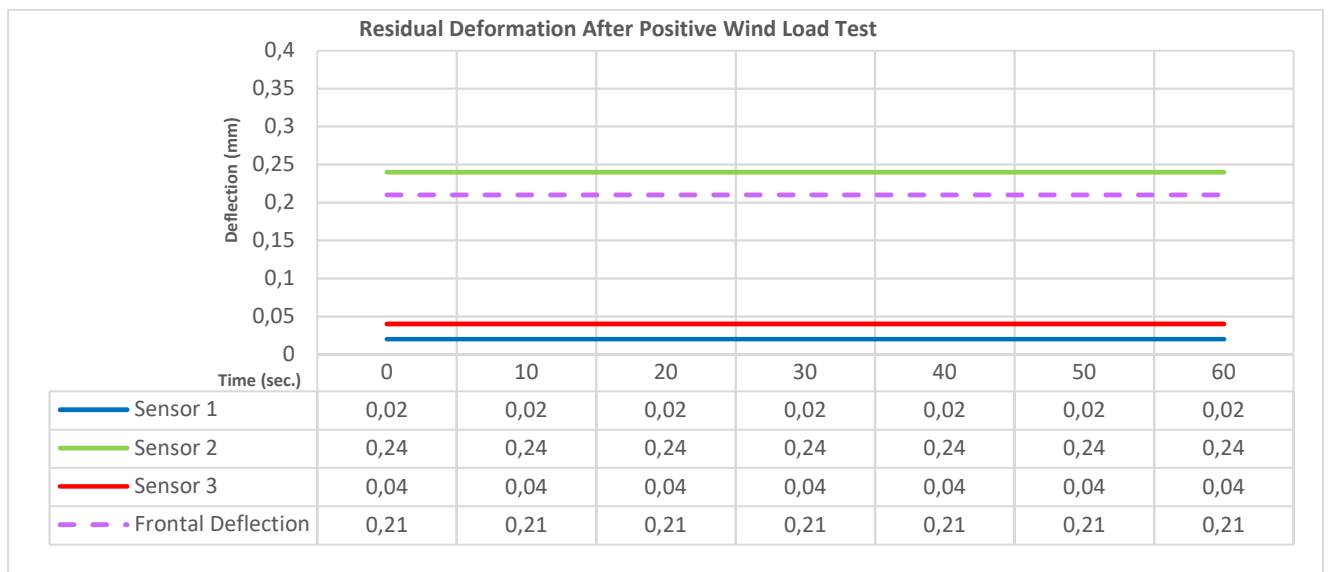
Vertical **$d = [(3800 / 300) \text{ mm} + 5 \text{ mm}] = \underline{17,66 \text{ mm}}$**

λ_1 (for positive pressure) & λ_2 (for negative pressure) deflection values shall be smaller then d limit value.

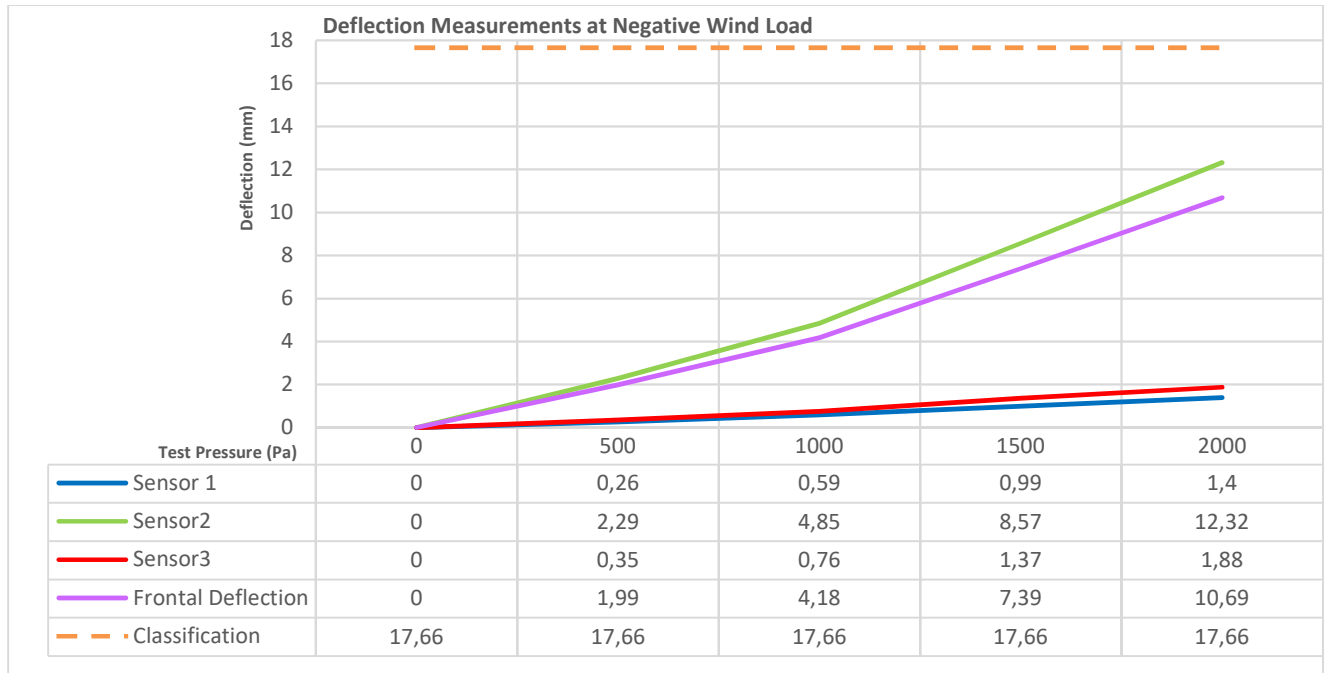
Related results are in below tables.



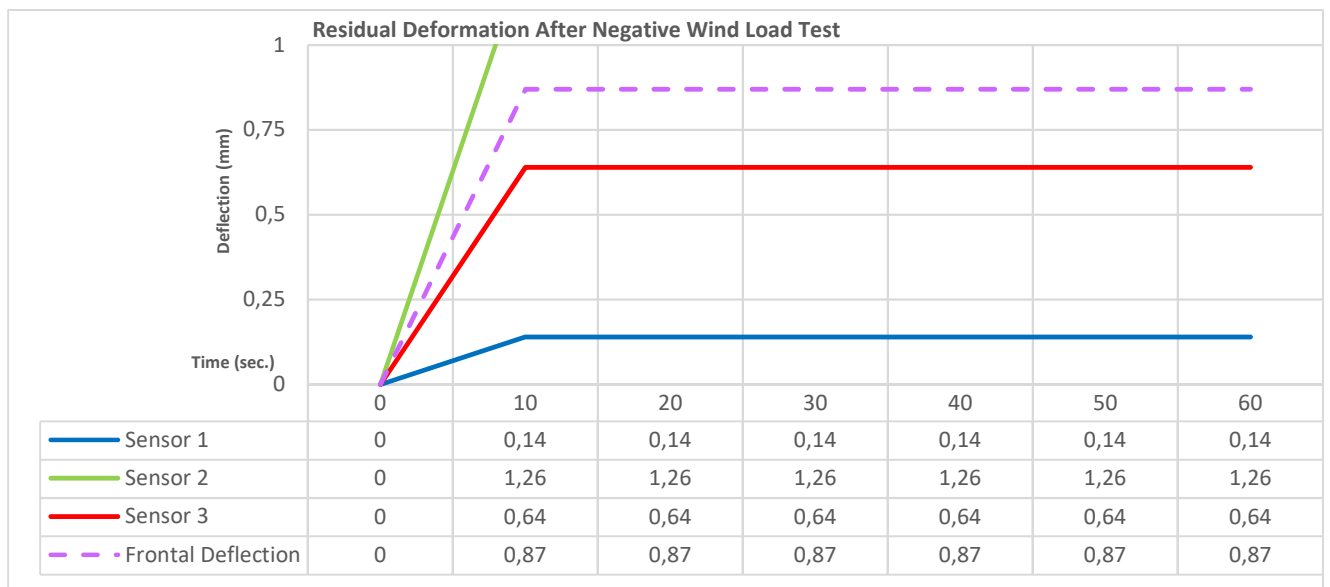
Test No: 2018.964.15 / 23.03.2018



Test No: 2018.964.15 / 23.03.2018



Test No: 2018.964.16 / 23.03.2018



Test No: 2018.964.16 / 23.03.2018

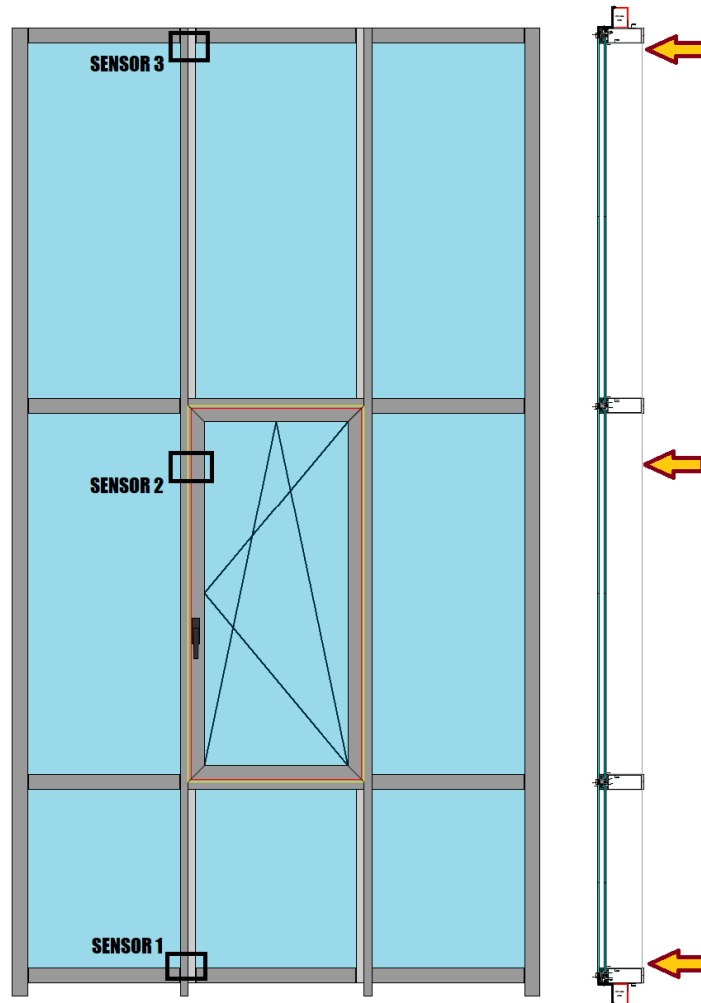


Figure 1. The view of sample with sensor placements (Internal View)



Photo 3. A view of Sensor-1



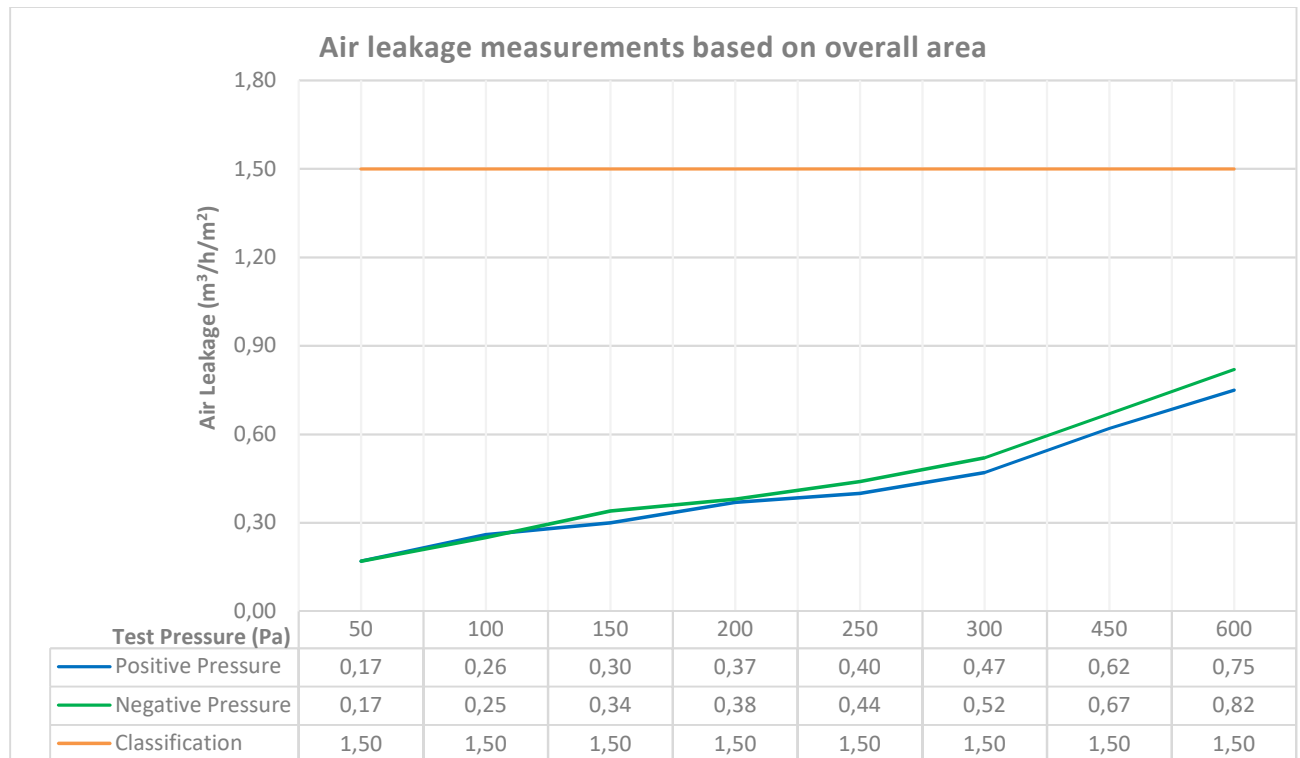
Photo 4. A view of Sensor-2



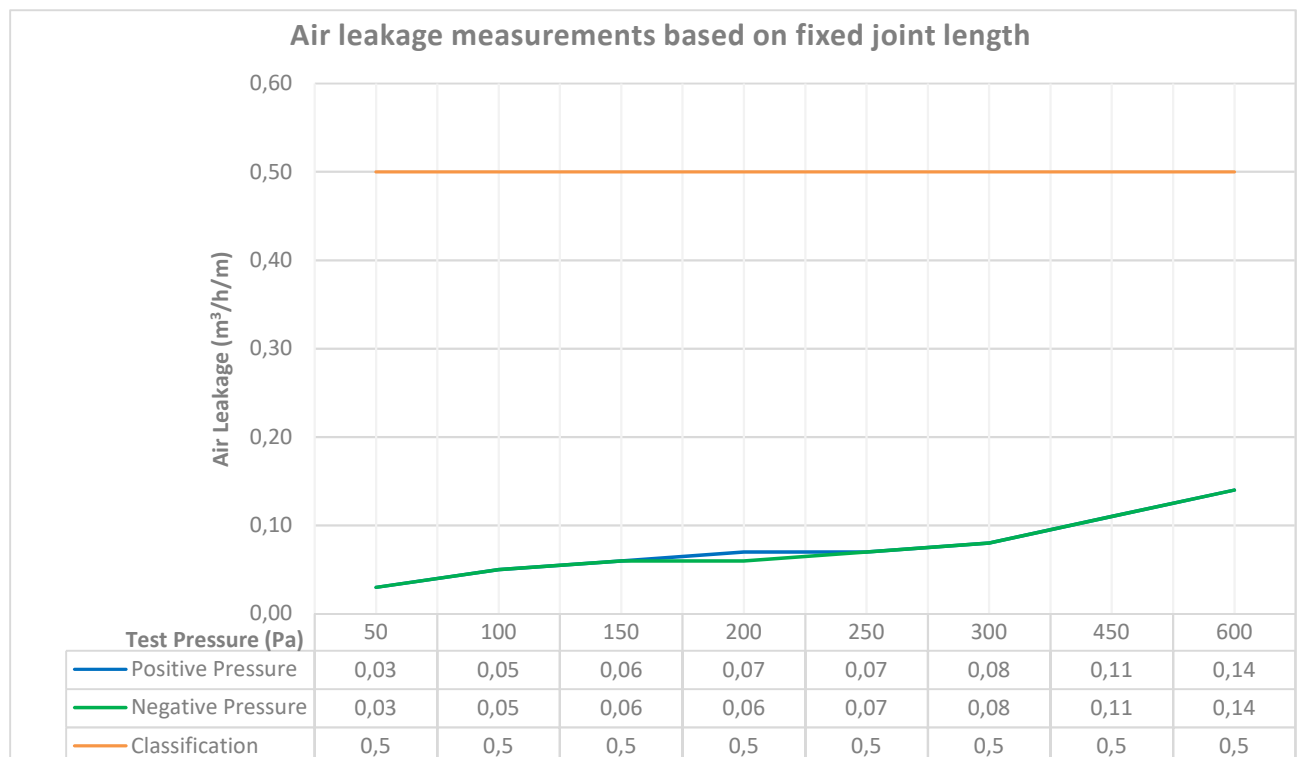
Photo5. A view of Sensor-3

7.5. 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 values of the system after tare.

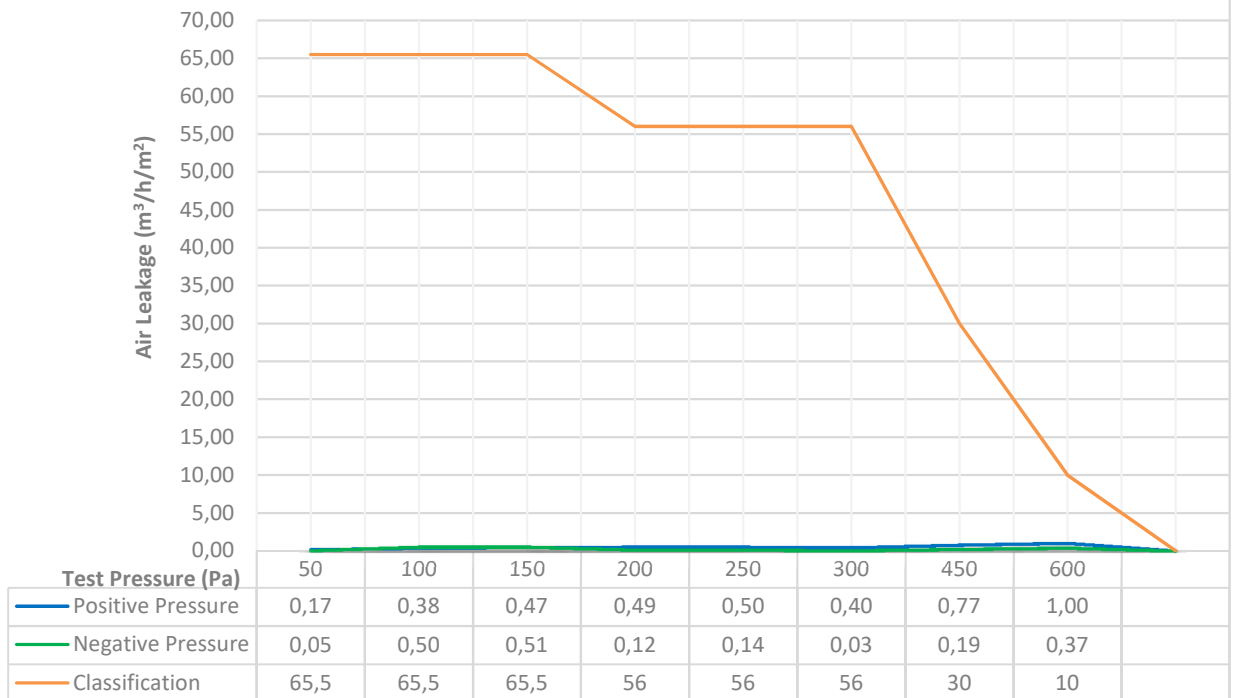


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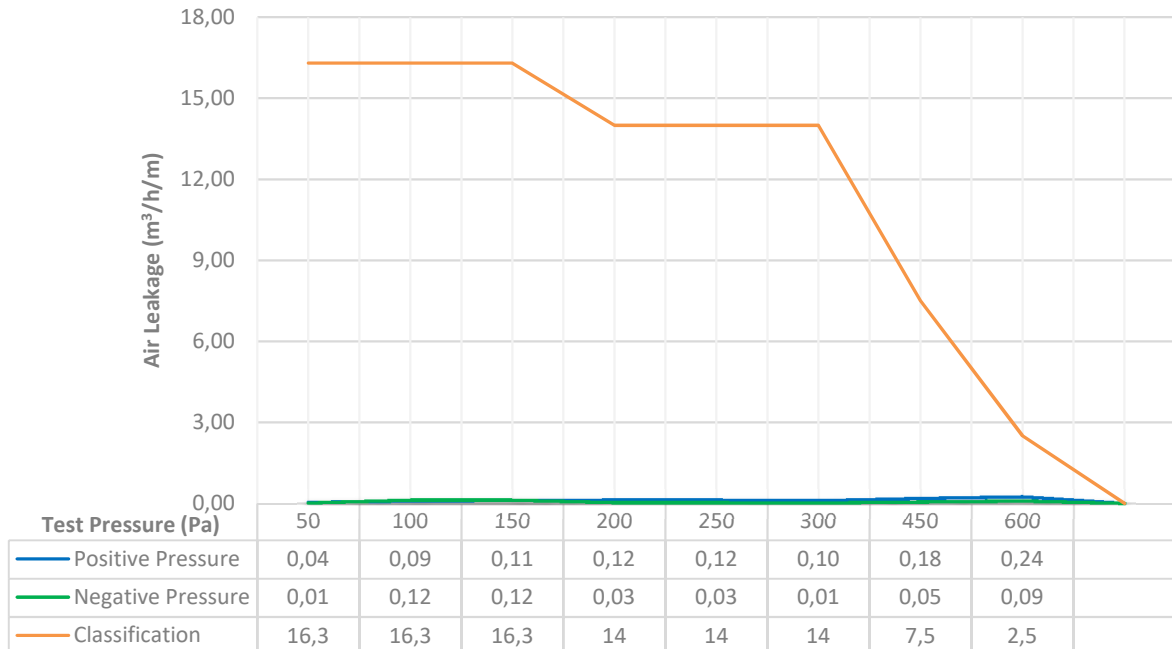
Test No: 2018.964.17-18 / 23.03.2018 (positive & negative pressure)

Air leakage measurements based on overall area for operable parts



Test No: 2018.964.11-12 / 22.03.2018 (positive & negative pressure)

Air leakage measurements based on operable joint length



Test No: 2018.964.11-12 / 22.03.2018 (positive & negative pressure)

7.6. Watertightness - Static Pressure (Repeat)

Before starting the test, 3 pulses at 1350 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/min x 7,98 m² =15,96 (l.m² /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.
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.

Test No: 2018.964.19 / 23.03.2018

7.7. Extreme Load

In this test, 1,5 times design load was applied to the sample.

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

Test No: 2018.964.20 / 23.03.2018

8. RESULT

	CONDITIONS	RESULTS		CLASS	FINAL
AIR PERMEABILITY TS EN 12152	at 600 Pa < 1,5 m³/(h.m²) overall area at 600 Pa < 0,5 m³/(h.m) fixed joint length	Positive Pressure	1,03 0,14	A4	A4
	at 600 Pa < 1,5 m³/(h.m²) overall area at 600 Pa < 0,5 m³/(h.m) fixed joint length	Negative Pressure	0,98 0,14	A4	
AIR PERMEABILITY TS EN 12207	at 600 Pa < 10 m³/(h.m²) overall area for operable parts at 600 Pa < 2,5 m³/(h.m) operable joint length	Positive Pressure	1,12 0,27	Class 4	Class 4
	at 600 Pa < 10 m³/(h.m²) overall area for operable parts at 600 Pa < 2,5 m³/(h.m) operable joint length	Negative Pressure	0,89 0,21	Class 4	
WATER-TIGHTNESS (Static Pressure) TS EN 12154	There should be no water leakage at 1500 Pa	There was no water leakage.		RE 1500	
RESISTANCE TO WIND LOAD TS EN 13830 (Design Load)	+1200 Pa d = (L / 300 mm + 5 mm) = 17,66 , λ1 < d	Positive Pressure	λ1 = 11,68 mm	OK	
	-1200 Pa d = (L / 300 mm + 5 mm) = 17,66 , λ2 < d	Negative Pressure	λ2 =10,69 mm		
AIR PERMEABILITY TS EN 12152 (Repeat)	at 600 Pa < 1,5 m³/(h.m²) overall area at 600 Pa < 0,5 m³/(h.m) fixed joint length	Positive Pressure	0,75 0,14	A4	A4
	at 600 Pa < 1,5 m³/(h.m²) overall area at 600 Pa < 0,5 m³/(h.m) fixed joint length	Negative Pressure	0,82 0,14	A4	
AIR PERMEABILITY TS EN 12207	at 600 Pa < 10 m³/(h.m²) overall area for operable parts at 600 Pa < 2,5 m³/(h.m) operable joint length	Positive Pressure	1,00 0,24	Class 4	Class 4
	at 600 Pa < 10 m³/(h.m²) overall area for operable parts at 600 Pa < 2,5 m³/(h.m) operable joint length	Negative Pressure	0,37 0,09	Class 4	
WATER-TIGHTNESS (Static Pressure) TS EN 12154 (Repeat)	There should be no water leakage at 1350 Pa.	There was no water leakage		RE 1350	
RESISTANCE TO SAFETY LOAD TS EN 12179	There should be no damage at +3000 Pa and -3000 Pa.	There was no damage on the sample.		OK	

9. TEST PHOTOS



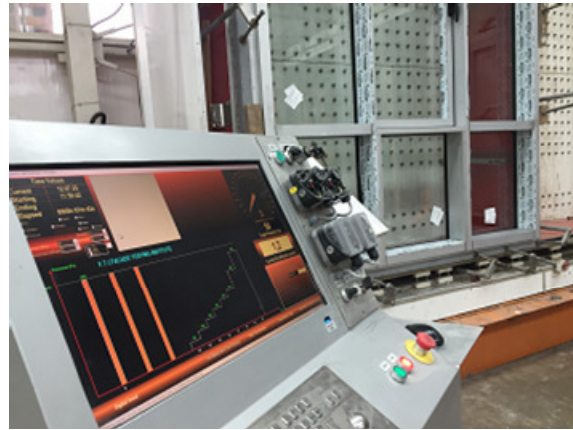
Preparation process of sample



Preparation process of sample



Testing process



Testing process



Testing process



Testing process



Testing process



Testing process



Testing process



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Testing process



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İÇE AÇILIR SİLİKON CEPHE İMALATI

Marka / Renk

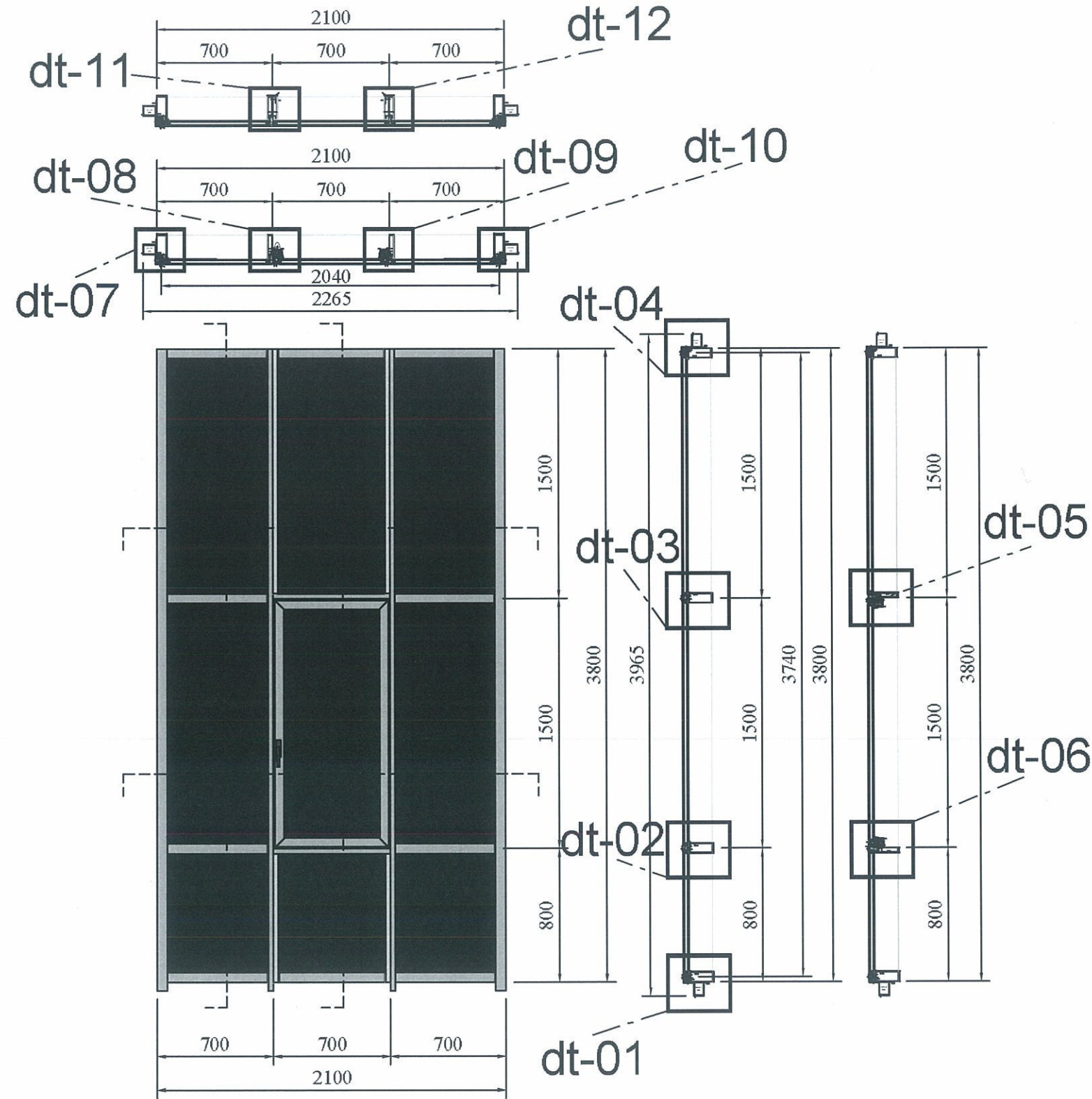
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Tarih

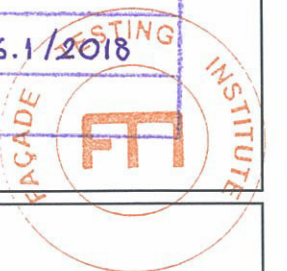
03.01.2018

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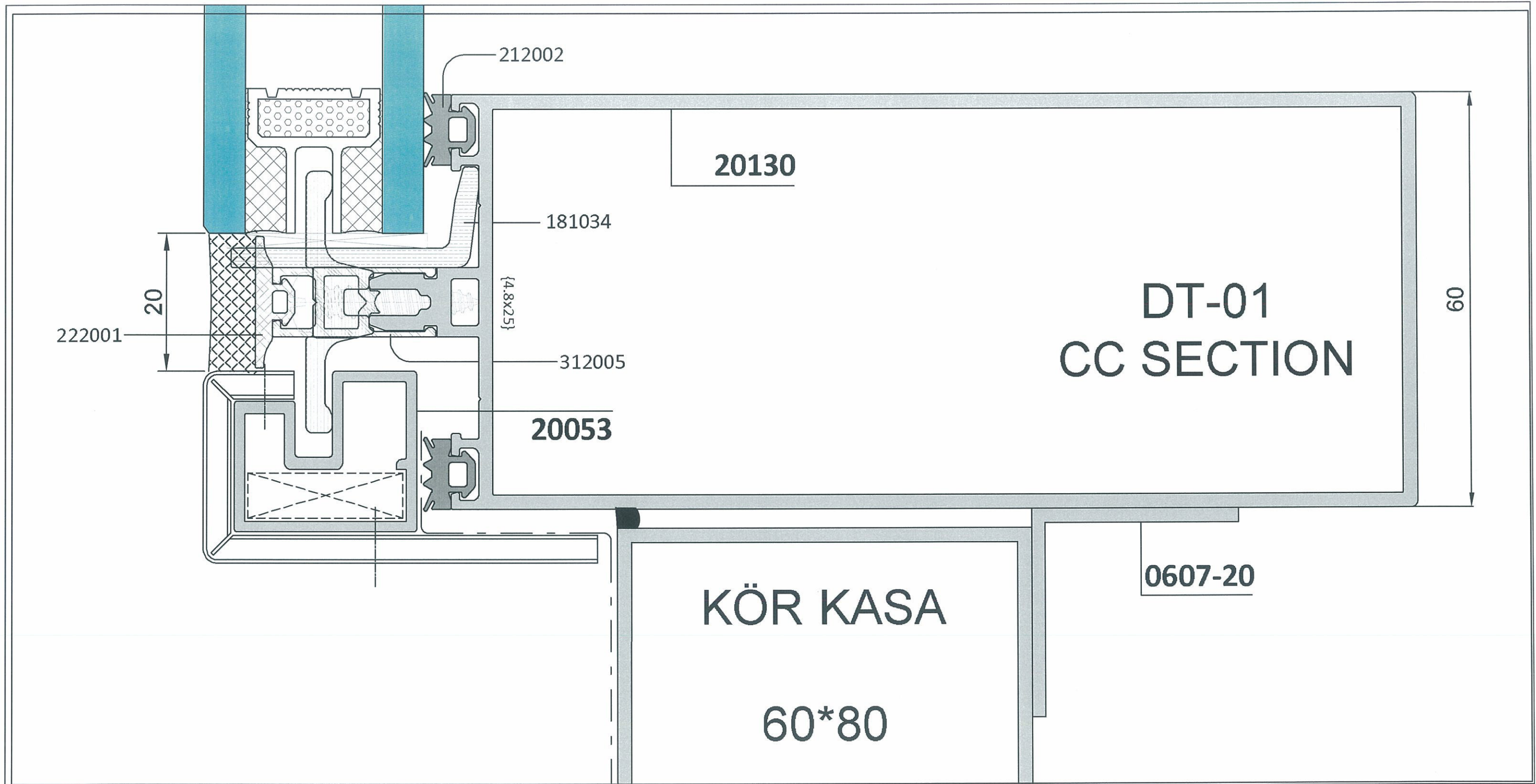
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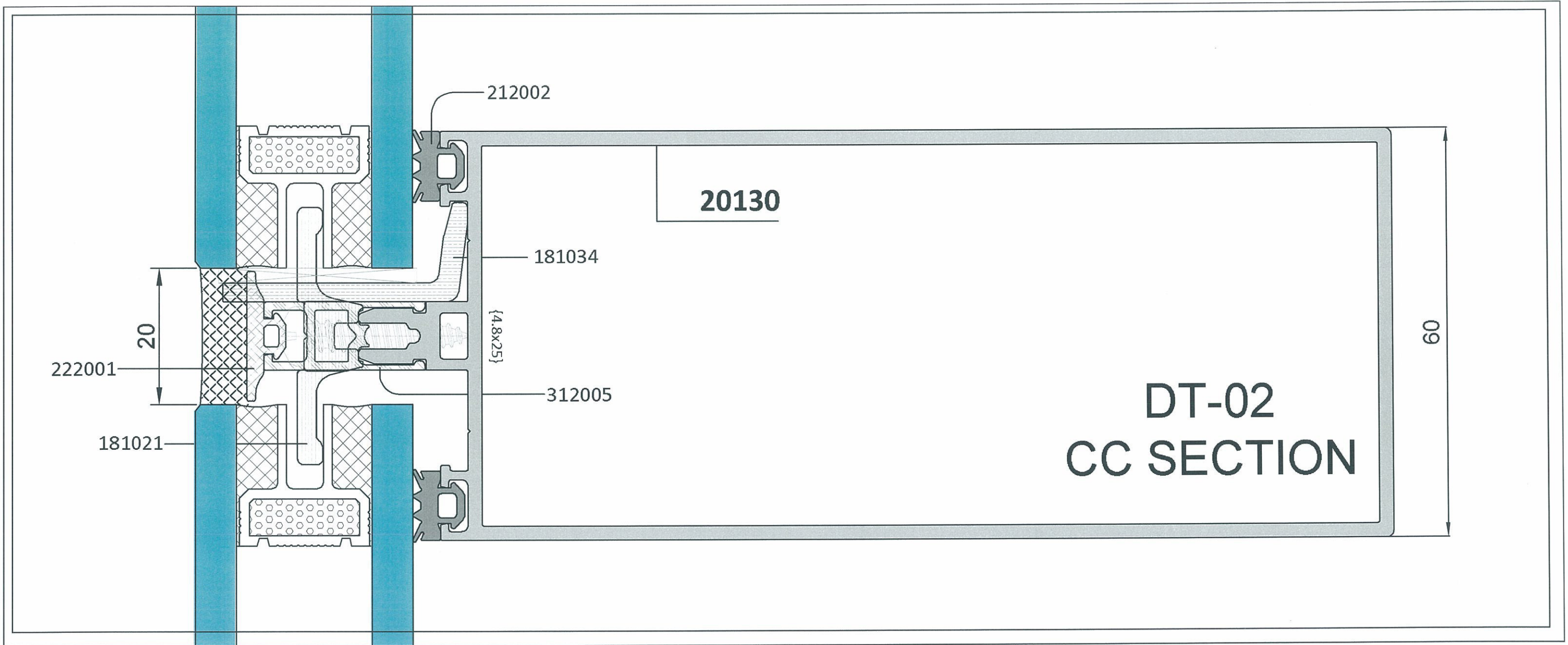


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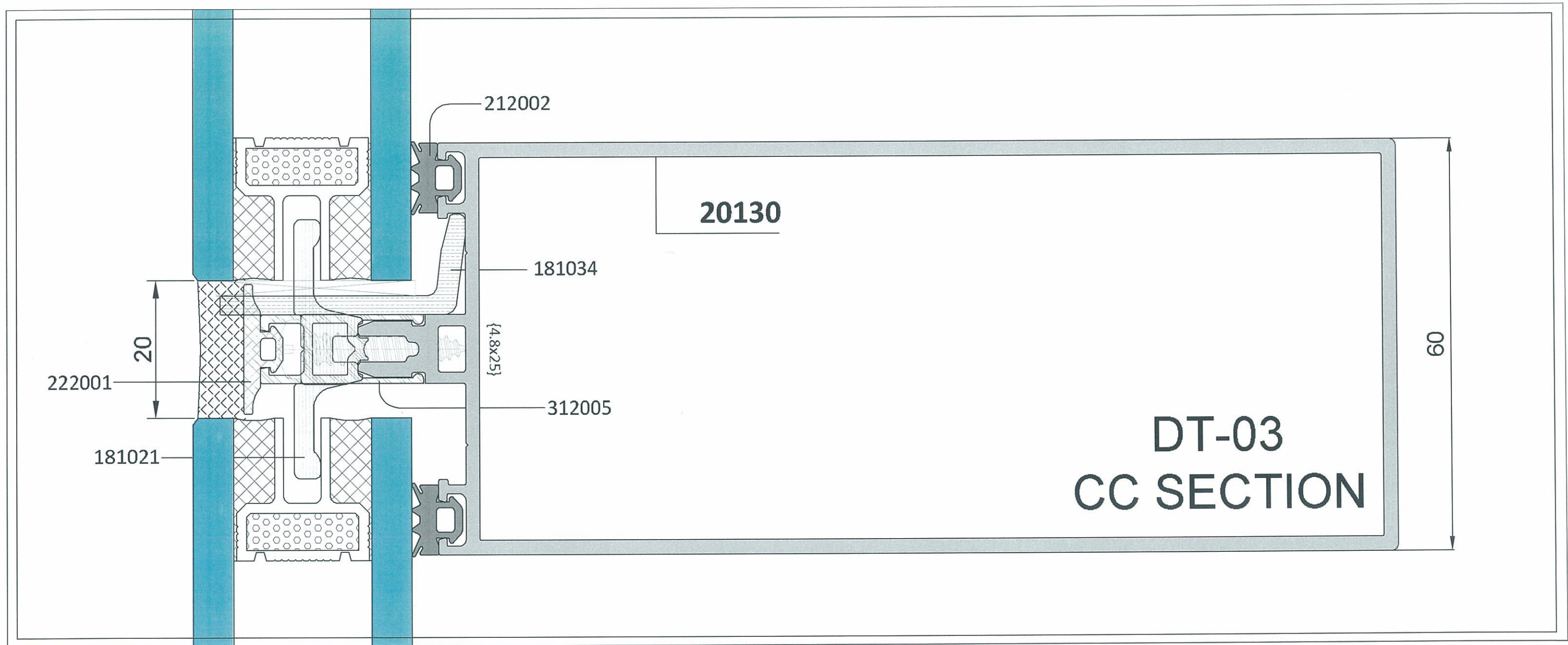
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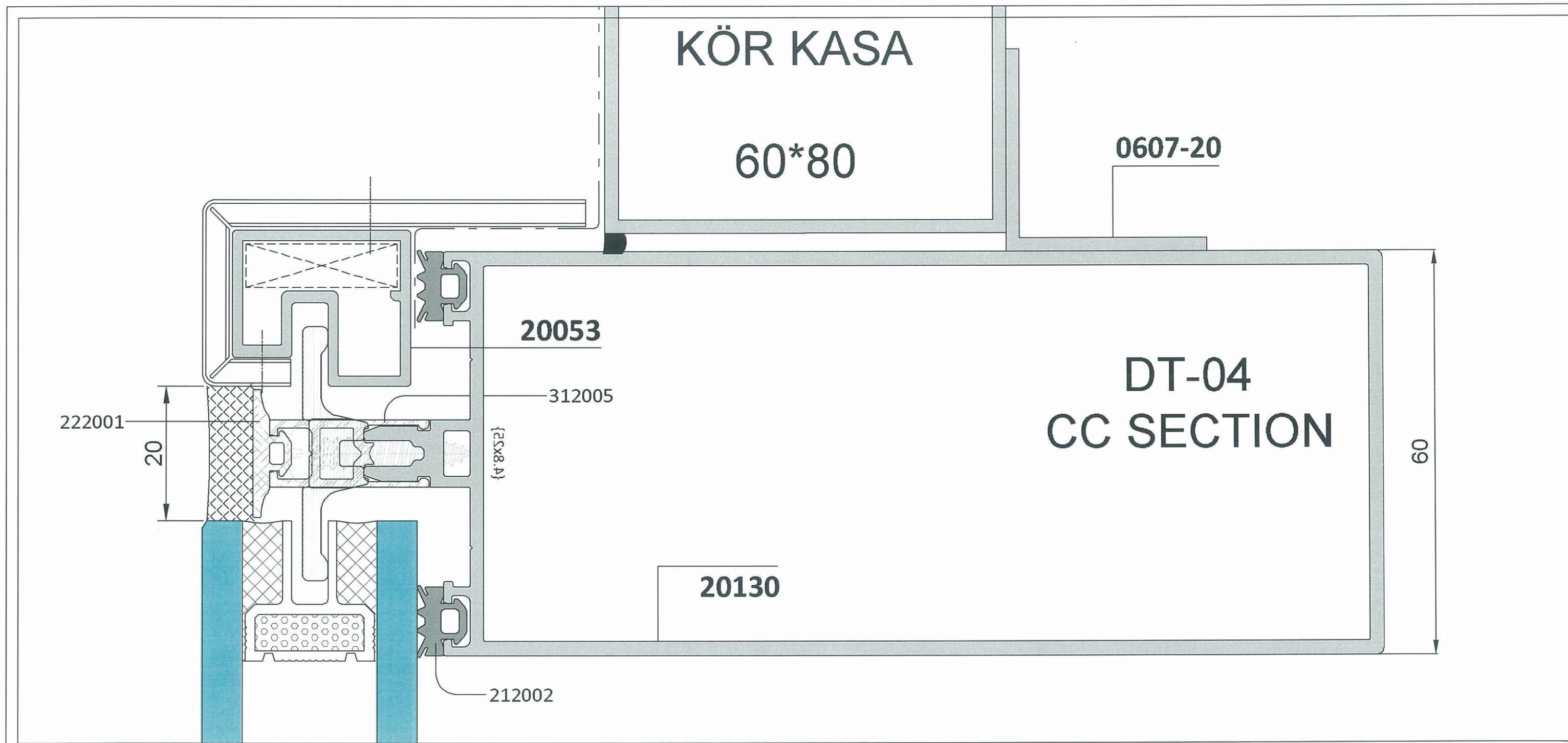
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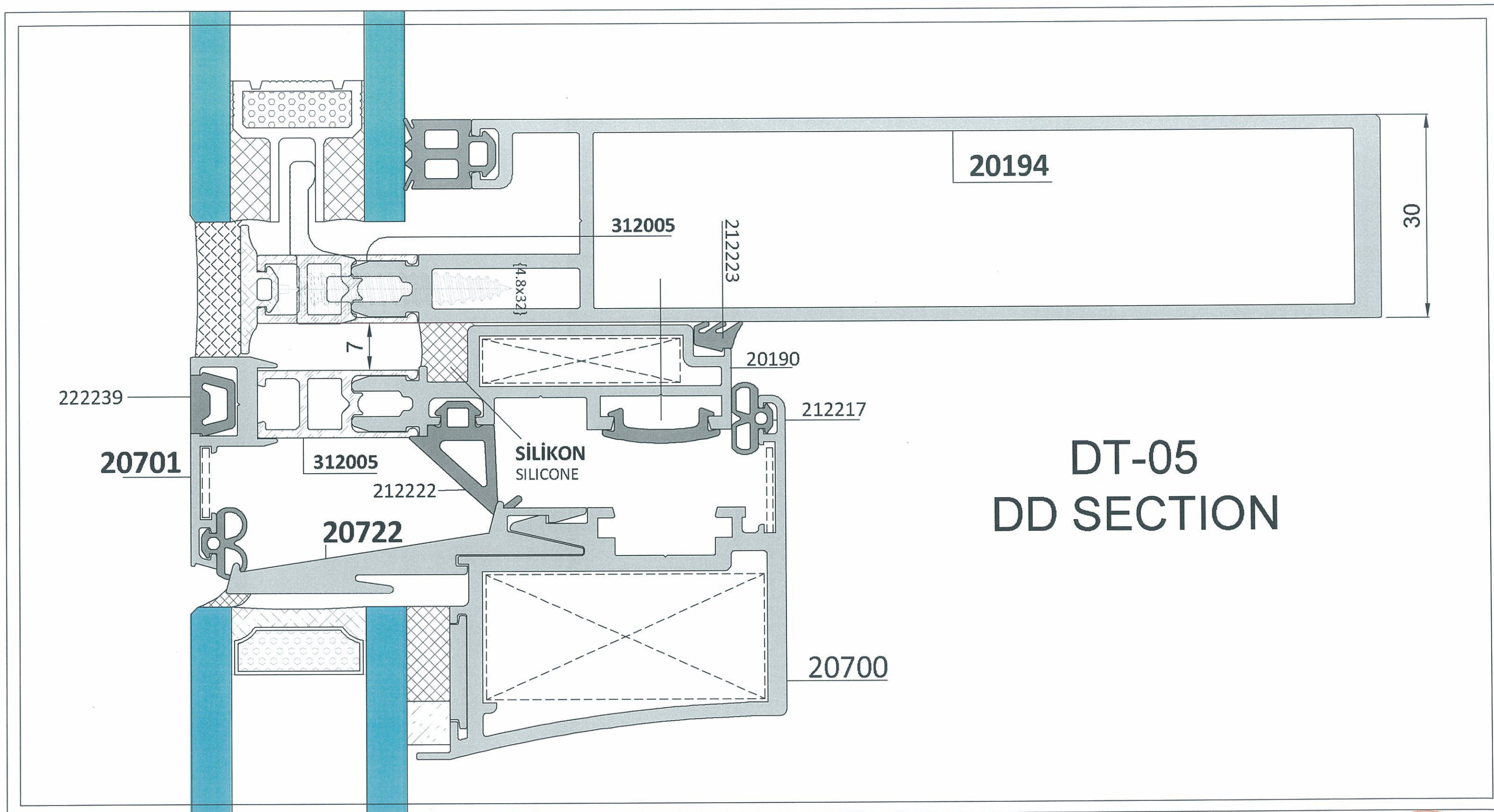
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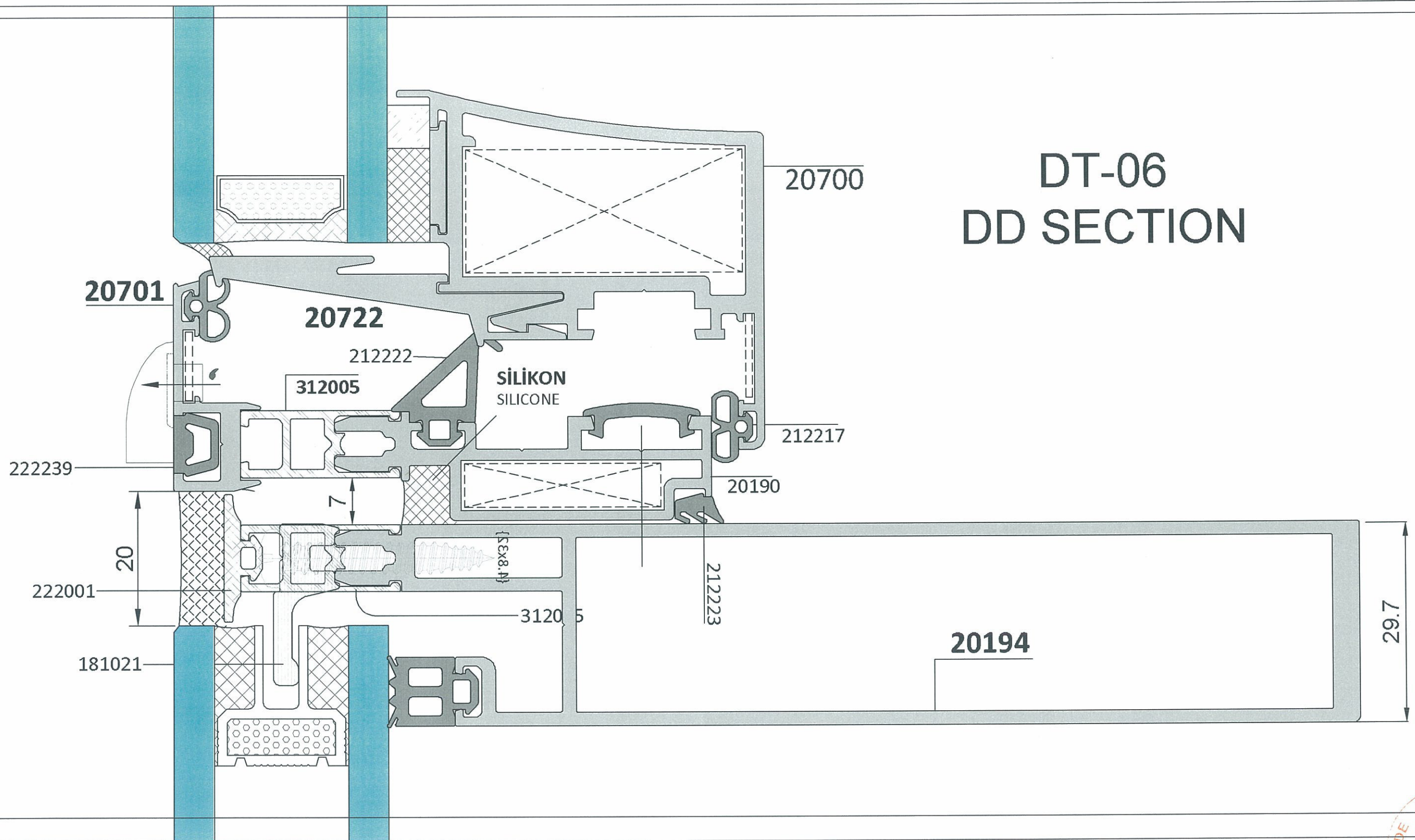
TESTING INSTITUTE
FTI



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DT-06 DD SECTION



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DT-07
BB SECTION

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KÖR KASA

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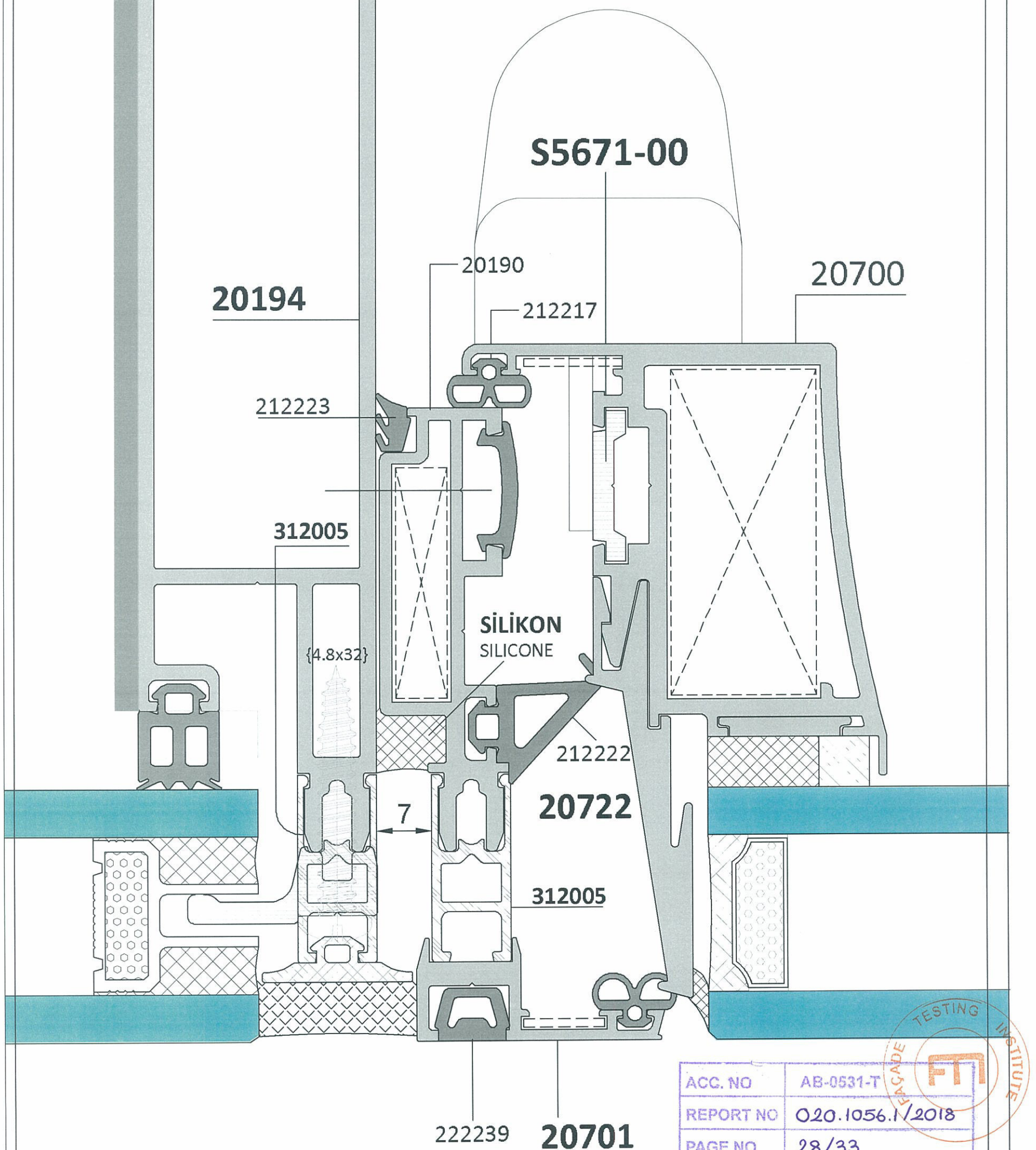
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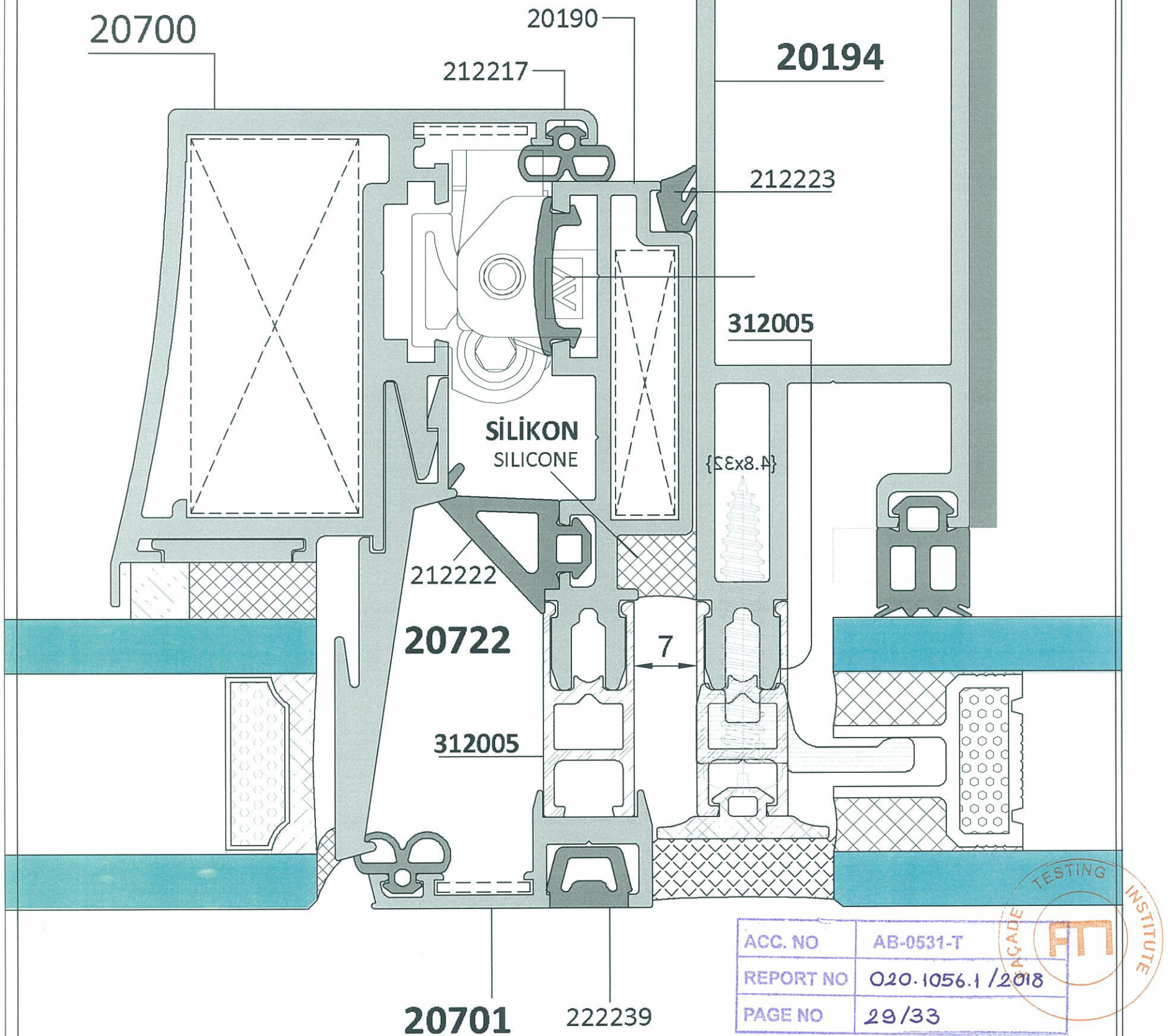


DT-08 BB SECTION



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DT-09 BB SECTION



DT-10 BB SECTION

0607-20

KÖR KASA
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20x3mm Butil Bant
(Çift Taraflı Yapışkanlı)
Double Sided Butyl Band

60

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DT-11 AA SECTION

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{4.8x32}

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20x3mm Butil Bant
(Çift Taraflı Yapışkanlı)
Double Sided Butyl Band

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DT-12 AA SECTION

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