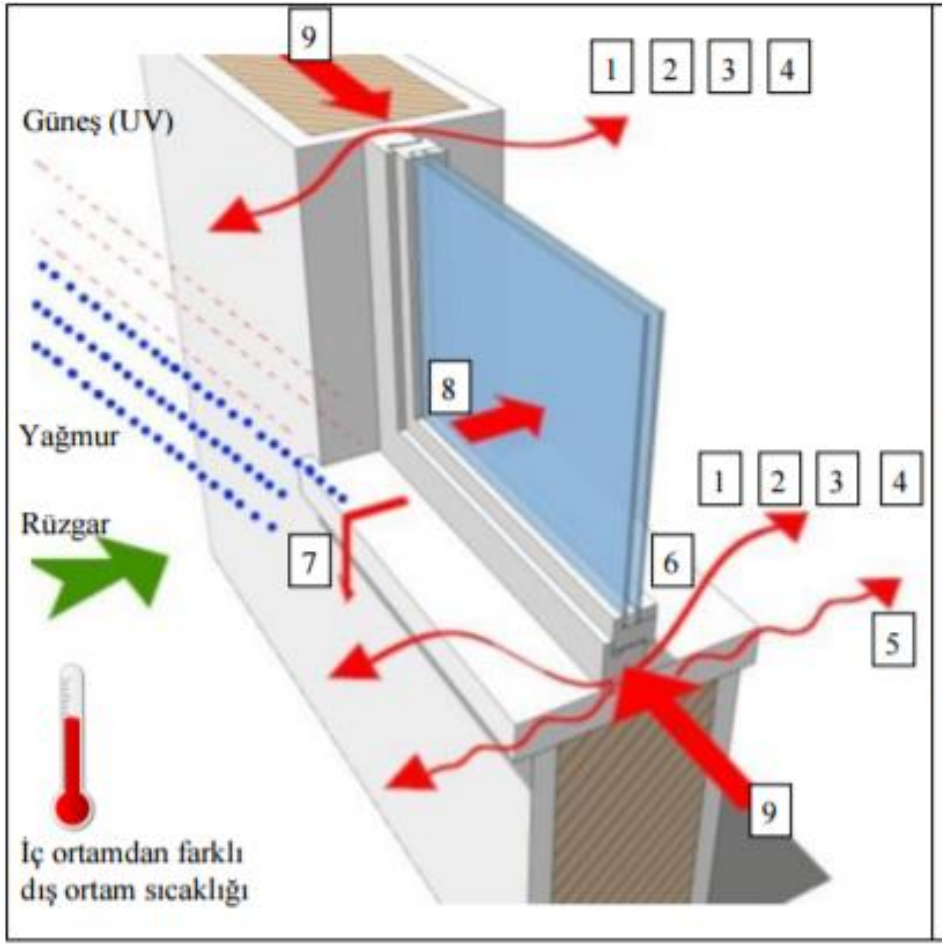
Cephe Akademi
Mesleki Gelişim Eğitimi

Cephe Sistemleri / CS
Nevin Güney TOK

DOĞRAMA TARİHİ

Doğramların temel işlevi, dış ortam etkilerinden korumak üzere iç ortam arasında kontrollü bölme görevidir.



-Güneş (UV) etkeni
-Yağmur-su etkeni
-Rüzgar etkeni
-Ortamlar arasında ısı farkı etkeni
-Ortamlar arasında buhar basıncı (nem) farkı etkeni
-Ortamdaki büyük sıcaklık farkları (genleşme) etkeni
-Dış ortam gürültüsü-ses etkeni

1. Hava geçirimsizlik gereksinimi
2. Su geçirimsizlik gereksinimi
3. Isı yalıtım gereksinimi
4. Ses yalıtım gereksinimi
5. Isı köprüsünün engellenmesi gereksinimi
6. Yoğuşmanın önlenmesi gereksinimi
7. Yağmur suyunun uzaklaştırılma gereksinimi
8. Rüzgar basıncına dayanım gereksinimi
9. Isısal genleşmeden ve bina hareketinden (duvar ve doğrama) kaynaklı deformasyonların önlenmesi gereksinimi

Pencere

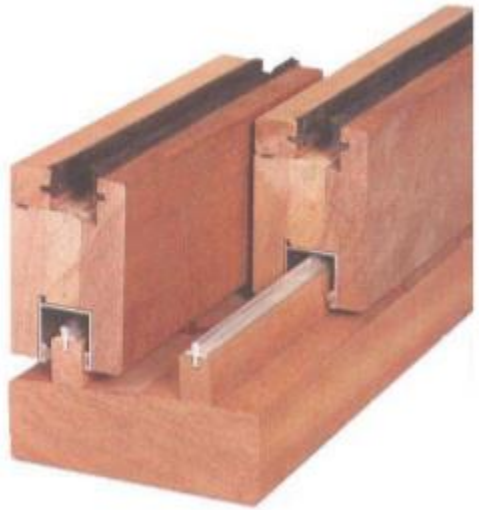
Bina içinin aydınlatılması, havalandırılması, pencere kanadı kapalı iken rüzgâr ve yağışın içeriye girmesini önleyen, aynı anda dışarıyı da görmemize yarayan yapı elemanına pencere denir.

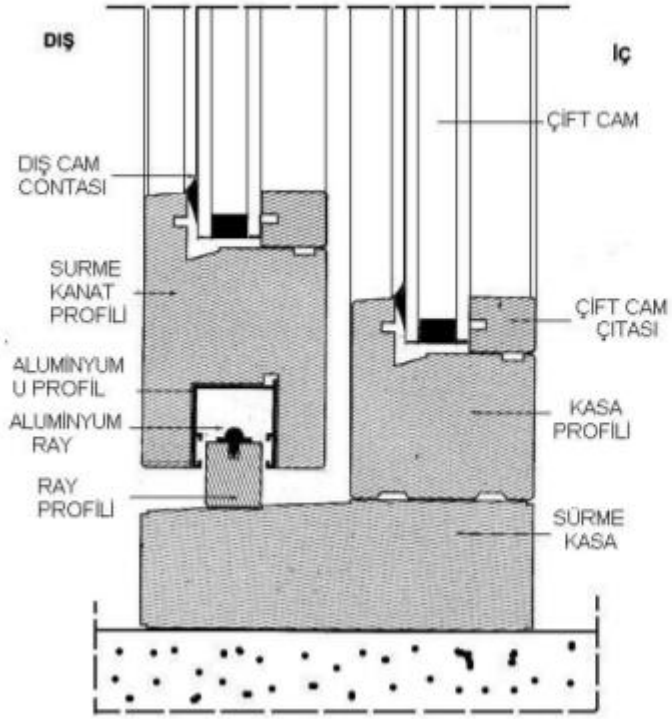
Kapı

Duvarlarda bırakılan ve geçmeye yarayan boşlukları istenildiğinde kolayca açılabilecek şekilde örtmeye yarayan yapı elemanlarına kapı denir.

Malzemeye Göre Doğrama

- Ahşap
- Pvc
- Alüminyum
- Demir

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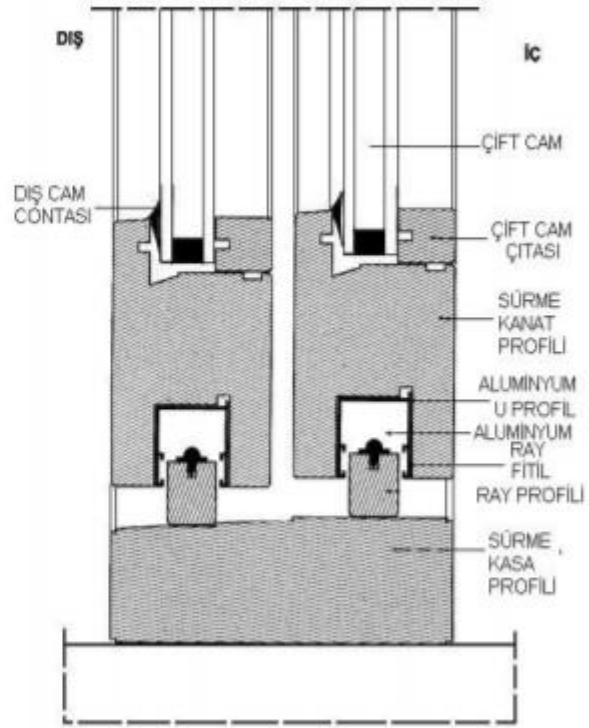
ÇİFT CAM ÇITASI
ALUMİNYUM U PROFİL
ALUMİNYUM RAY
KASA PROFİLİ
RAY PROFİLİ
SÜRME KASA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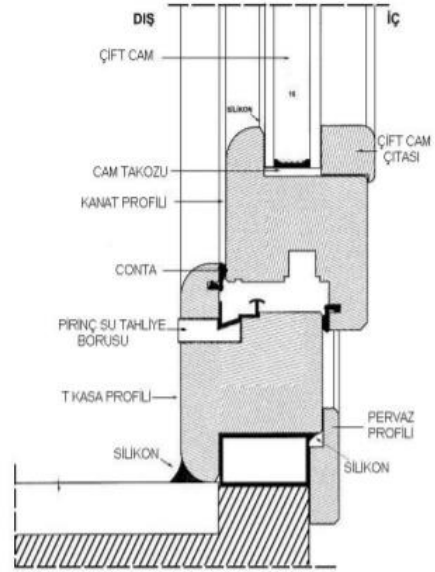
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SİLİKON
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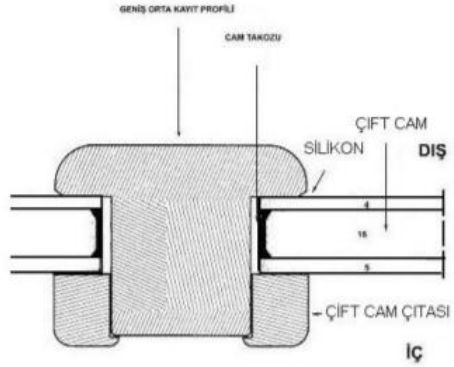
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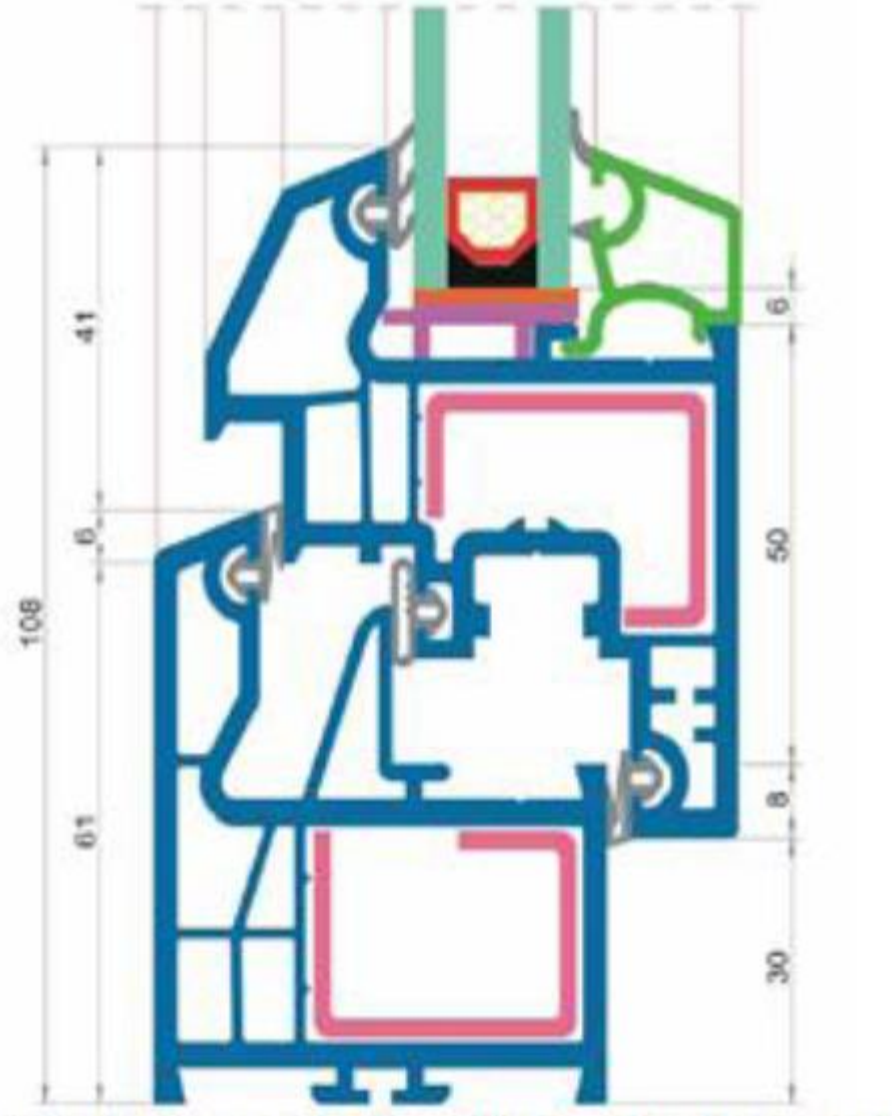
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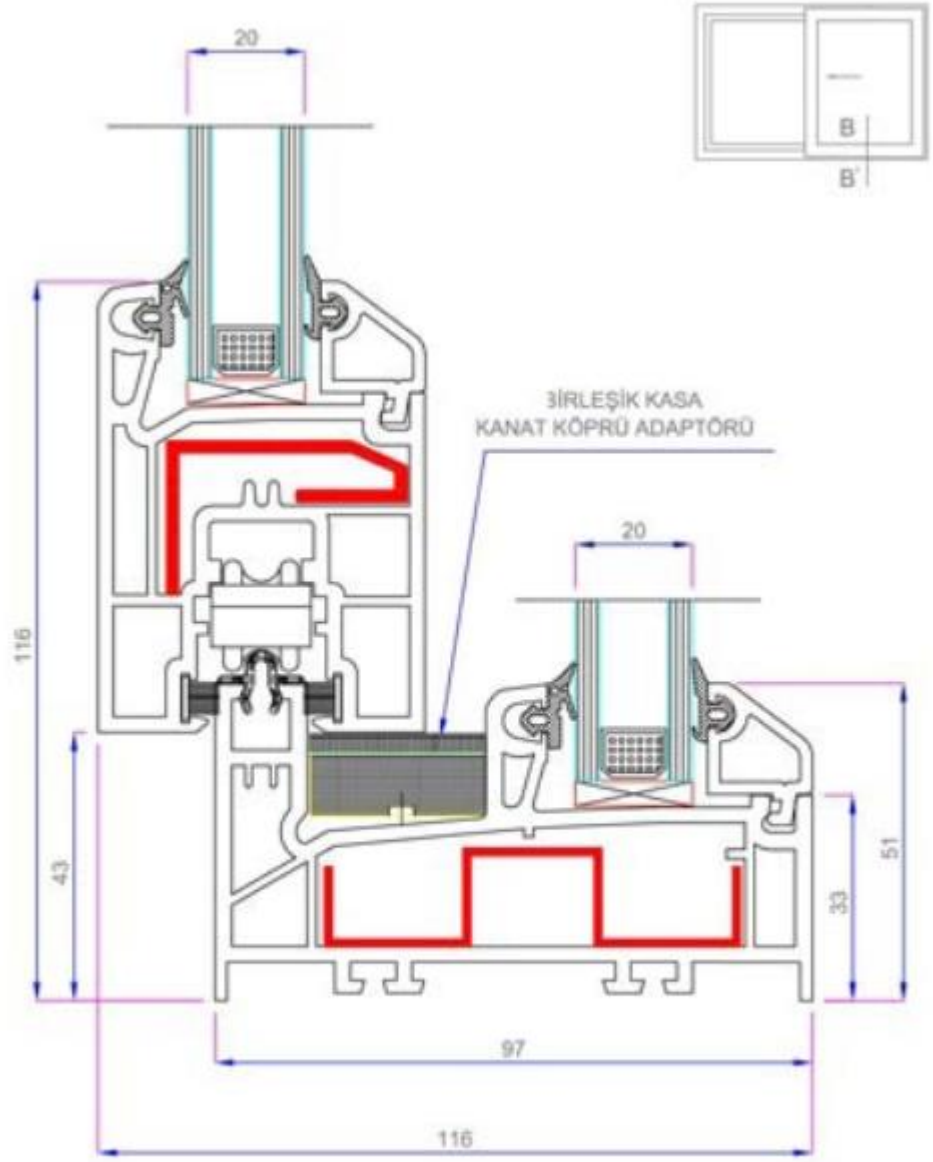
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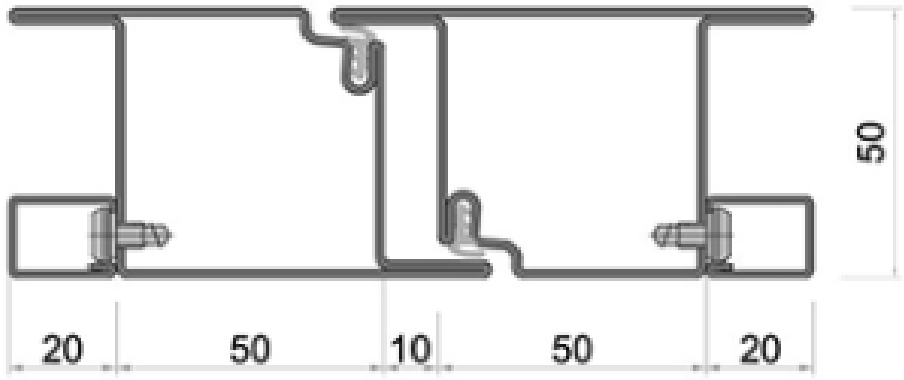
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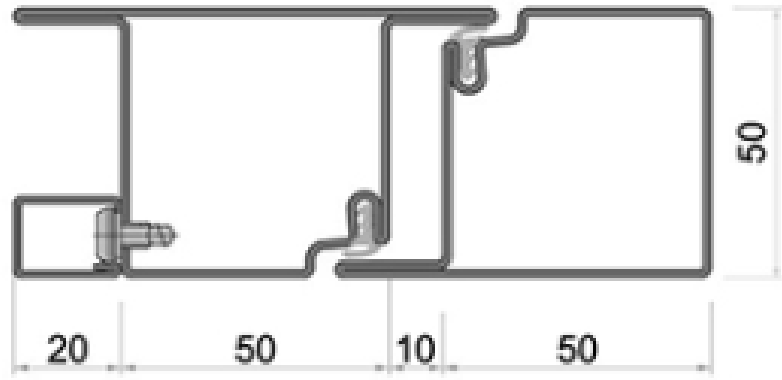
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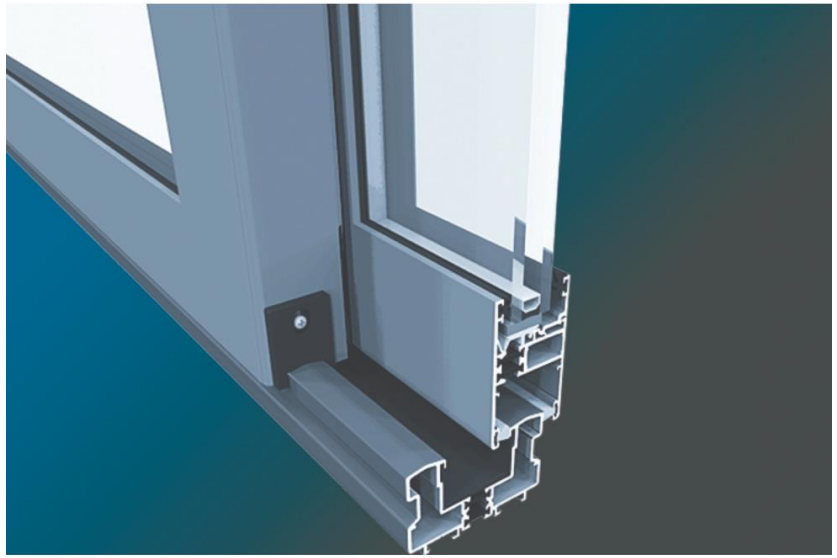
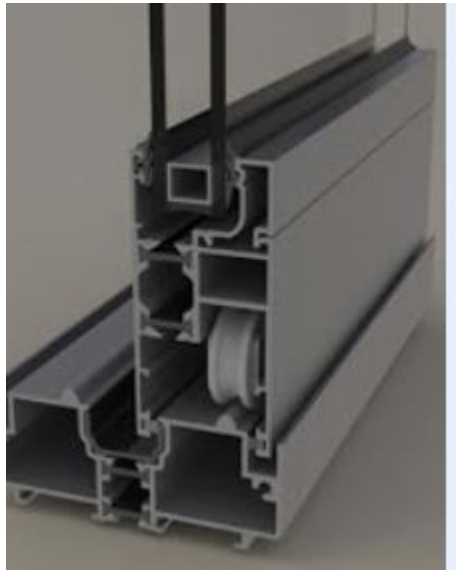
Kullanıldığı Yere Göre :

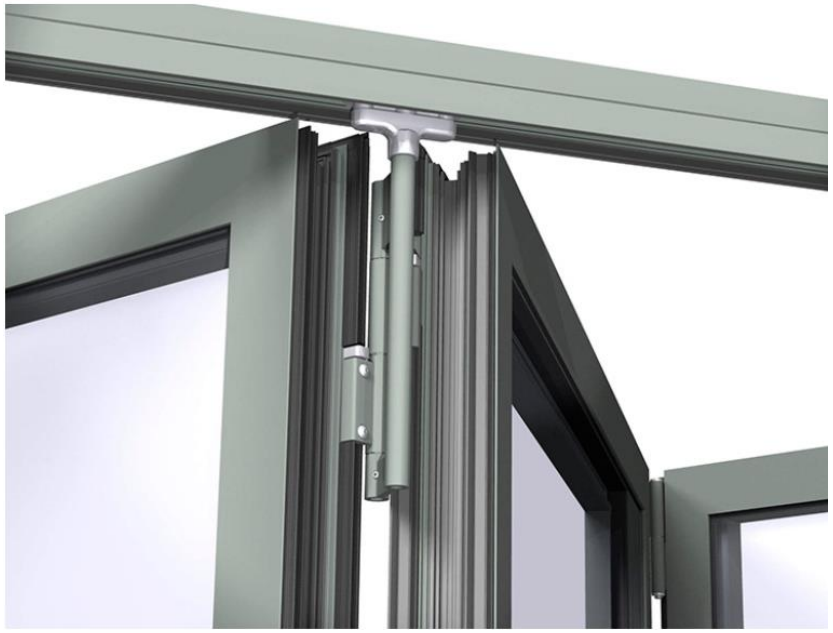
- Oda Doğraması Bina cephesinde duvarı olan tüm mekânlara uygulanır.
- Banyo-wc Doğraması: İçerinin görünmemesi ve mekânın darlığı açısından küçük yapılır. Kafaya çarpmayacak şekilde yukarı takılıp düşer kanat (vasistaslı) uygulaması yapılır. Bir nevi havalandırma penceresidir.
- Depo ve Havalandırma Doğramaları Banyo-wc penceresiyle benzerlik gösterir.
- Balkon Kapısıyla Bitişik Yapılan (topal) Pencereler: Odaların balkona bakan duvarlarında balkon kapısı ile pencereyi ayıran duvar olmayabilir. Bu gibi durunlarda pencere kasası ile balkon kapı kasası birleşik yapılır. Kapının zeminden, pencerenin ise ortalama 80cm'den başlaması alt çizginin düzgünlüğünü bozar. Biri aşağıda diğeri yukarıda olduğu için topal pencere olarak bilinir.

Doğrama Tipleri

- Tek kanatlı
- Çift kanatlı
- Çarpma/ Pivot kanatlı
- Sürme kanatlı
- Katlanır kanatlı



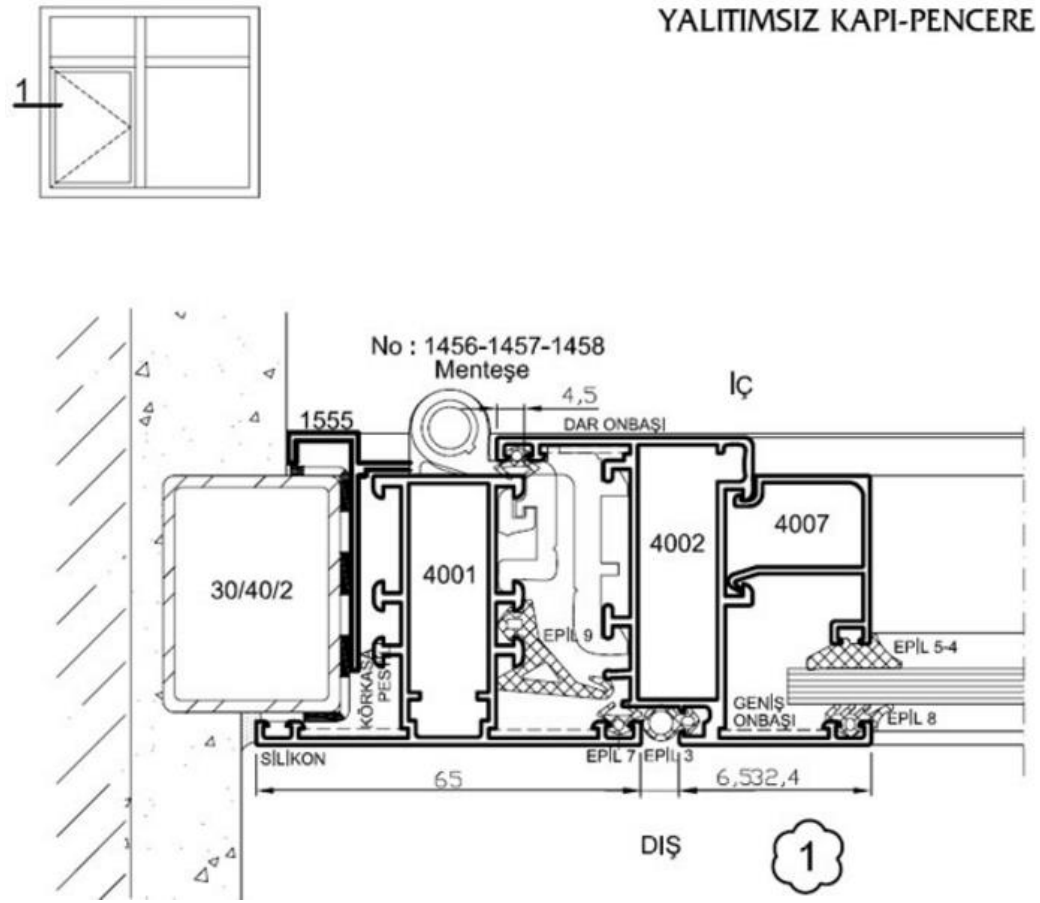




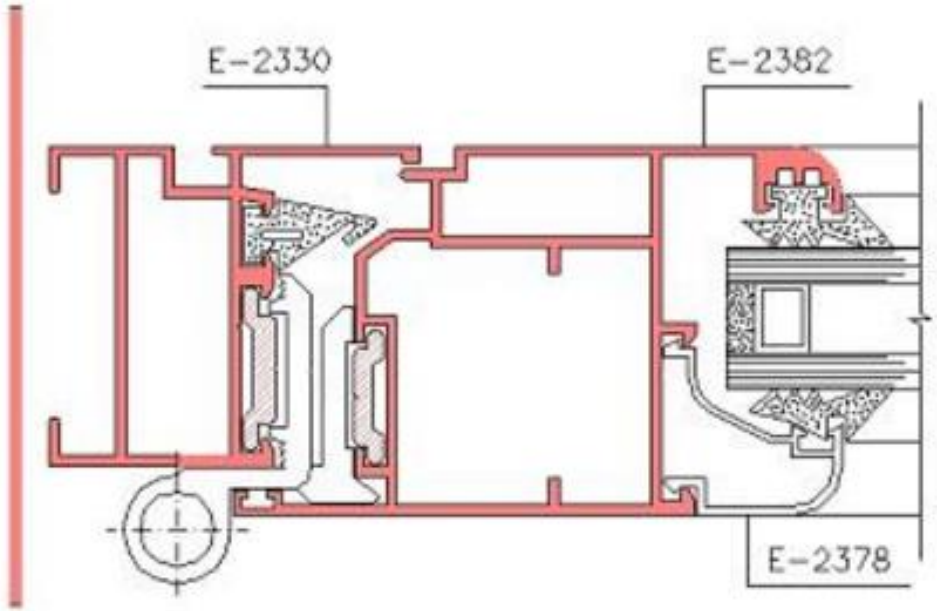
Doğrama Detaylarını Oluşturuken ;

- Statik Hesap
- Isı Yalıtımı
- Hava ve Su Yalıtımı
- Bağlantı Elemanları ve Birleşim

YALITIMSIZ PENCERE



TEK CAM UYGULAMASI

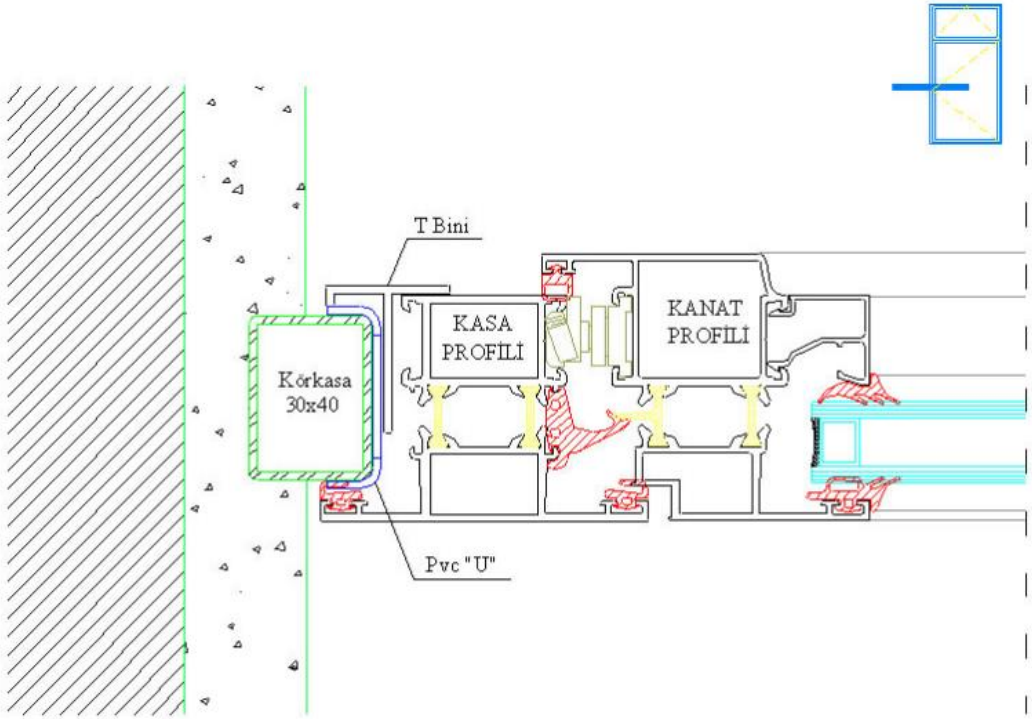


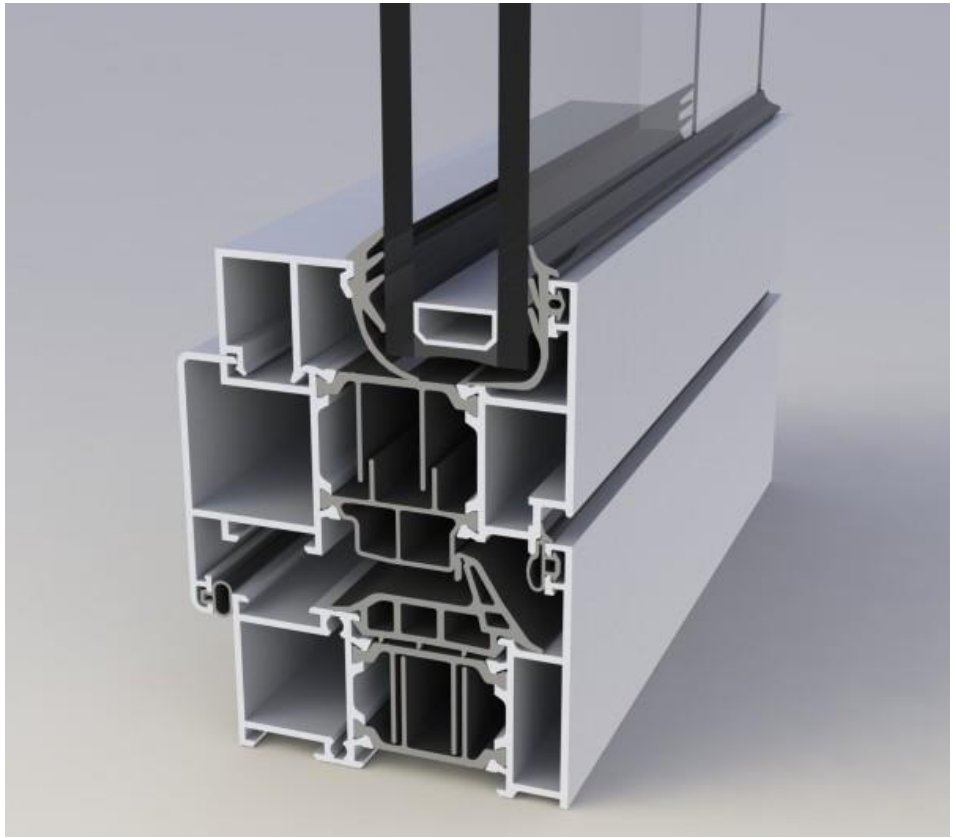
ÇİFT CAM UYGULAMASI

YALITIMSIZ PENCERE

ÇİFT CAM UYGULAMASI

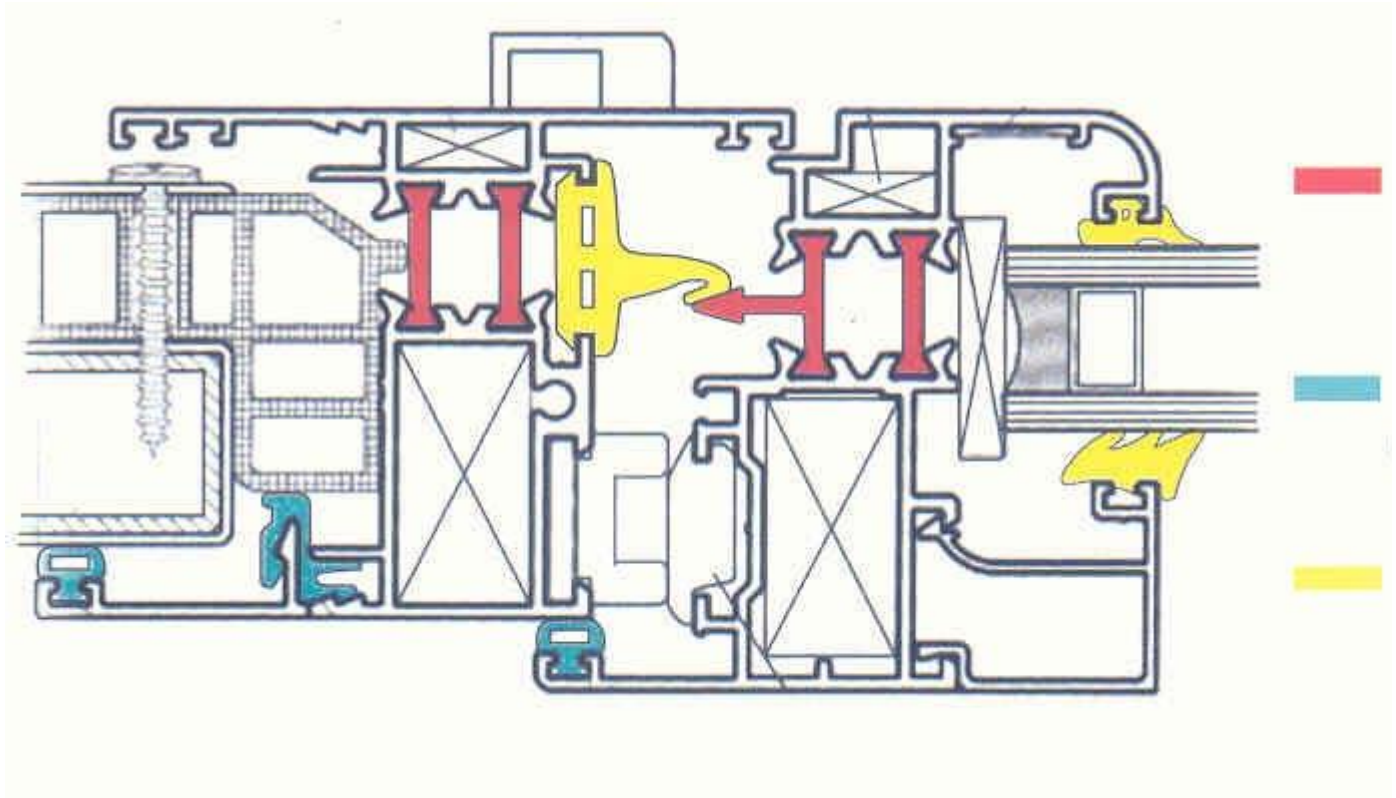
YALITIMLI PENCERE





- ISI YALITIMLI PENCERE DETAYI

YALITIMLI DOĞRAMA MALZEMELERİ



mid Poliamid Isə Bariyer %25 cam elyaf takviyeli poliamid 6.6

tech EPDM veya diger plastik ve termoplastik ftil profiller

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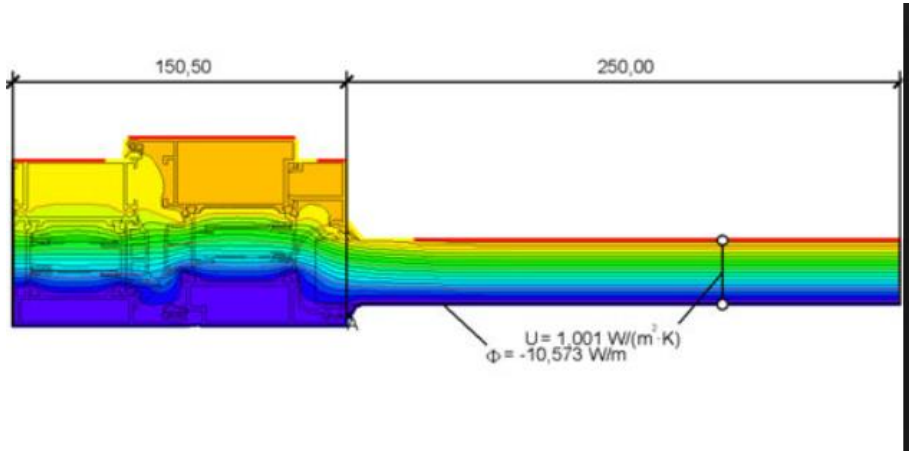
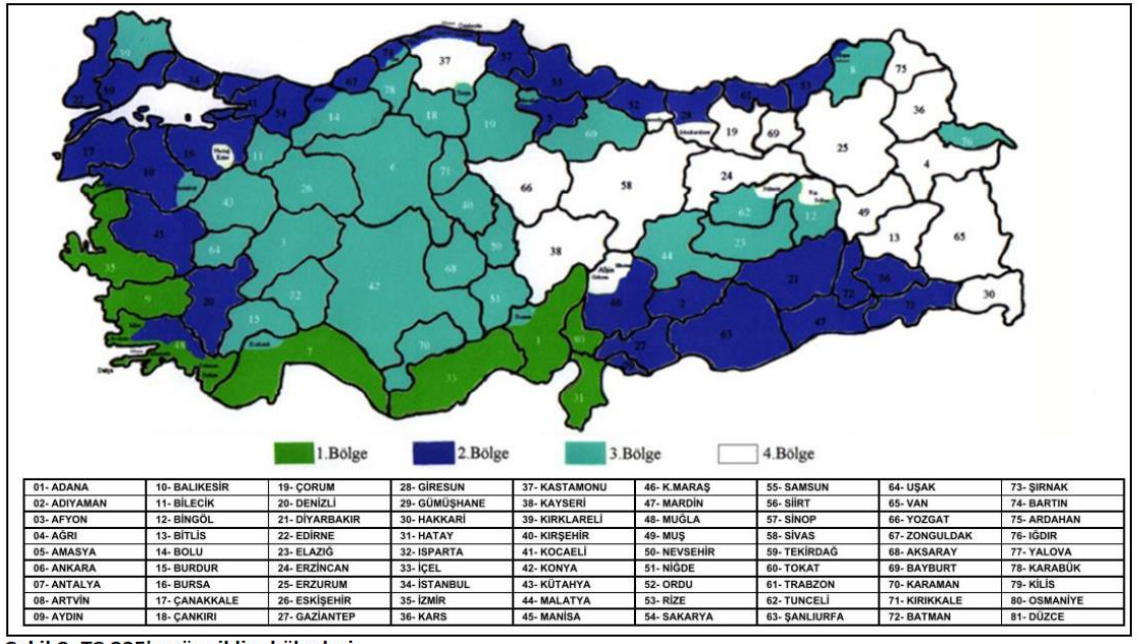
ISI HESAP





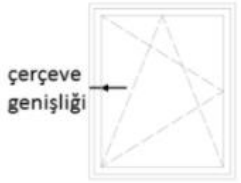
01- ADANA	10- BALIKESİR	19- ÇORUM	28- GİRESUN	37- KASTAMONU	46- K.MARAŞ	55- SAMSUN	64- UŞAK	73- ŞIRNAK
02- ADIYAMAN	11- BİLECİK	20- DENİZLİ	29- GÜMÜŞHANE	38- KAYSERİ	47- MARDİN	56- SİİRT	65- VAN	74- BARTIN
03- AFYON	12- BİNGÖL	21- DİYARBAKIR	30- HAKKARİ	39- KIRKLARELİ	48- MUĞLA	57- SİNOP	66- YOZGAT	75- ARDAHAN
04- AĞRI	13- BİTLİS	22- EDİRNE	31- HATAY	40- KIRŞEHİR	49- MUŞ	58- SİVAS	67- ZONGULDAK	76- IĞDIR
05- AMASYA	14- BOLU	23- ELAZIĞ	32- ISPARTA	41- KOCAELİ	50- NEVSEHİR	59- TEKİRDAĞ	68- AKSARAY	77- YALOVA
06- ANKARA	15- BURDUR	24- ERZİNCAN	33- İÇEL	42- KONYA	51- NİĞDE	60- TOKAT	69- BAYBURT	78- KARABÜK
07- ANTALYA	16- BURSA	25- ERZURUM	34- İSTANBUL	43- KÜTAHYA	52- ORDU	61- TRABZON	70- KARAMAN	79- KİLİS
08- ARTVİN	17- ÇANAKKALE	26- ESKİŞEHİR	35- İZMİR	44- MALATYA	53- RİZE	62- TUNCELİ	71- KIRIKKALE	80- OSMANİYE
09- AYDIN	18- ÇANKIRI	27- GAZİANTEP	36- KARS	45- MANİSA	54- SAKARYA	63- ŞANLIURFA	72- BATMAN	81- DÜZCE

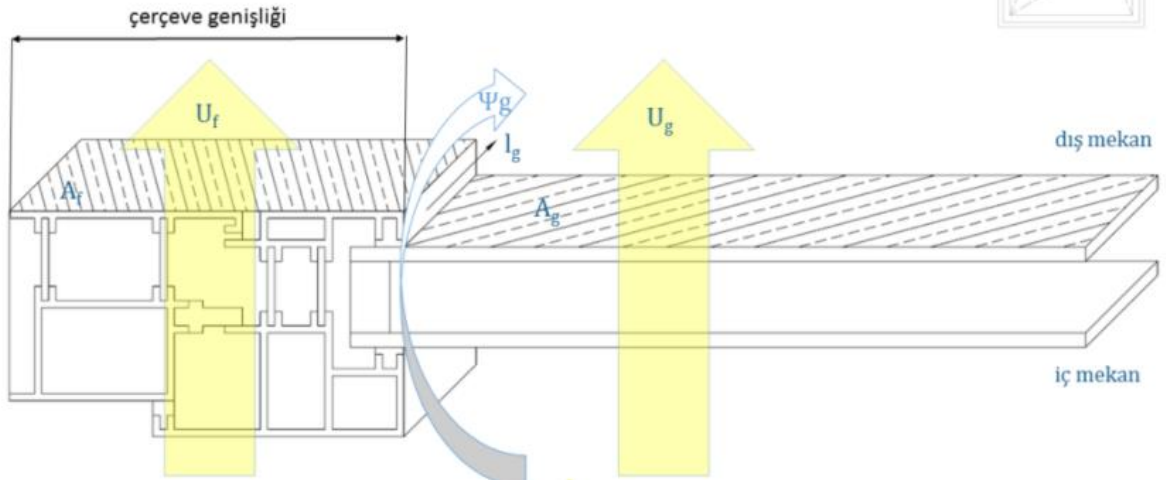
Şekil 8. TS 825'e göre iklim bölgeleri

TS 825 iklim bölgesi	Duvar [W/(m².K)]	Çatı [W/(m².K)]	Zemin [W/(m².K)]	Pencere [W/(m².K)]
1	0,7	0,45	0,7	2,4
2	0,6	0,4	0,6	2,4
3	0,5	0,3	0,45	2,4
4	0,4	0,25	0,4	2,4

ISI HESAP

$$U_w = \frac{A_g \cdot U_g + A_f \cdot U_f + l_g \cdot \psi_g}{A_g + A_f}$$



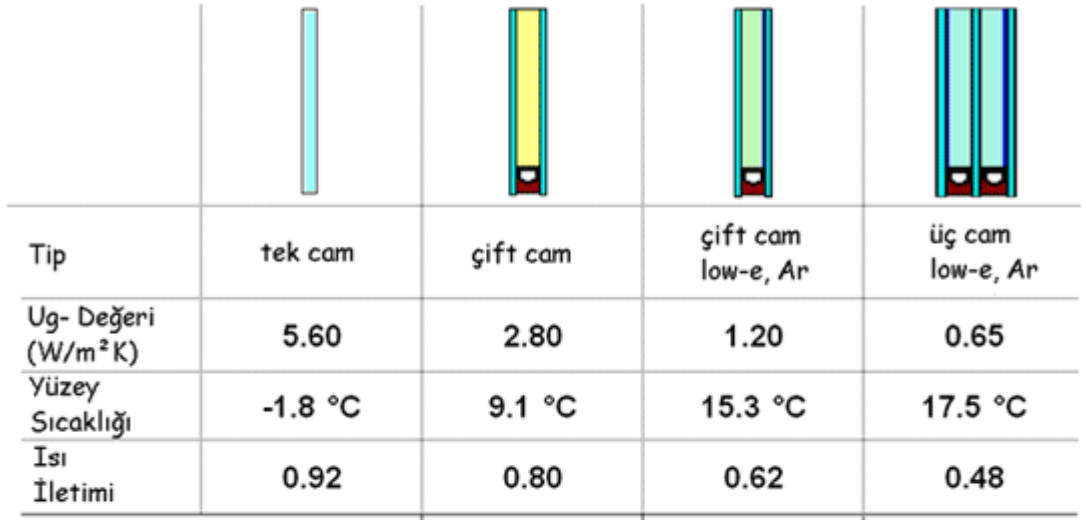


Ag = cam alanı (m²)
Ug = camın ısı iletim katsayısı (W/m².K)

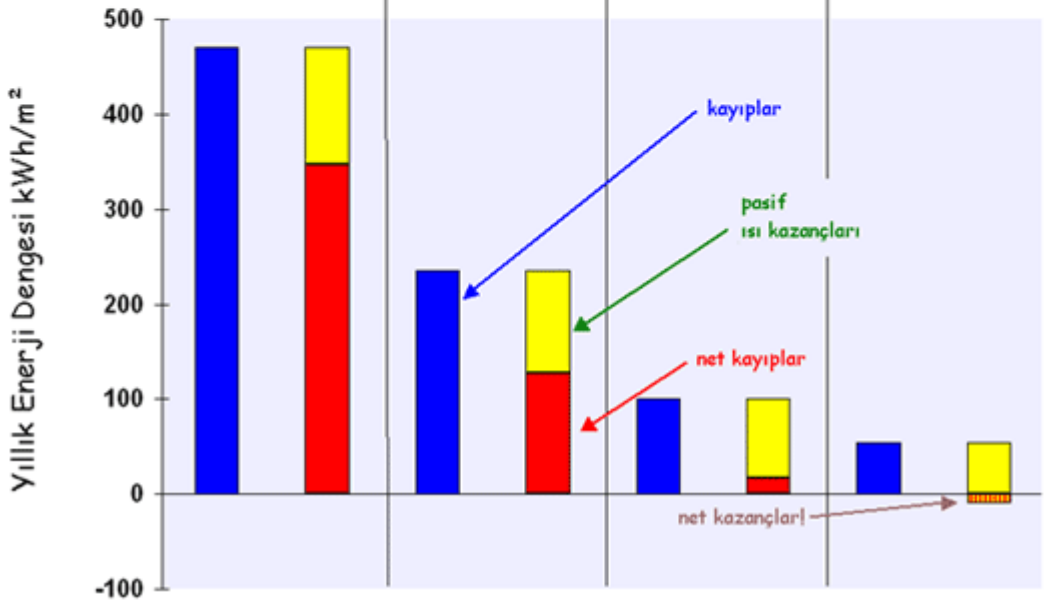
Af = çerçeve alanı (m²)
Uf = çerçevenin ısı iletim katsayısı (W/m².K)

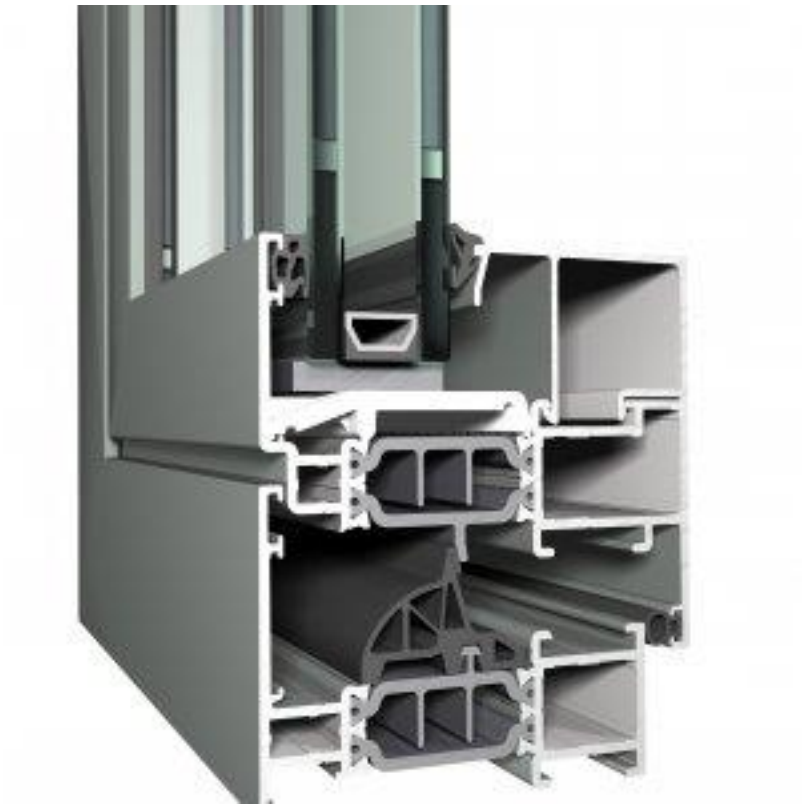
lg = camın görünür çevresi (m)
Ψg = yalıtımlı cam kenar çıtasının doğrusal ısı iletimi (W/m.K)

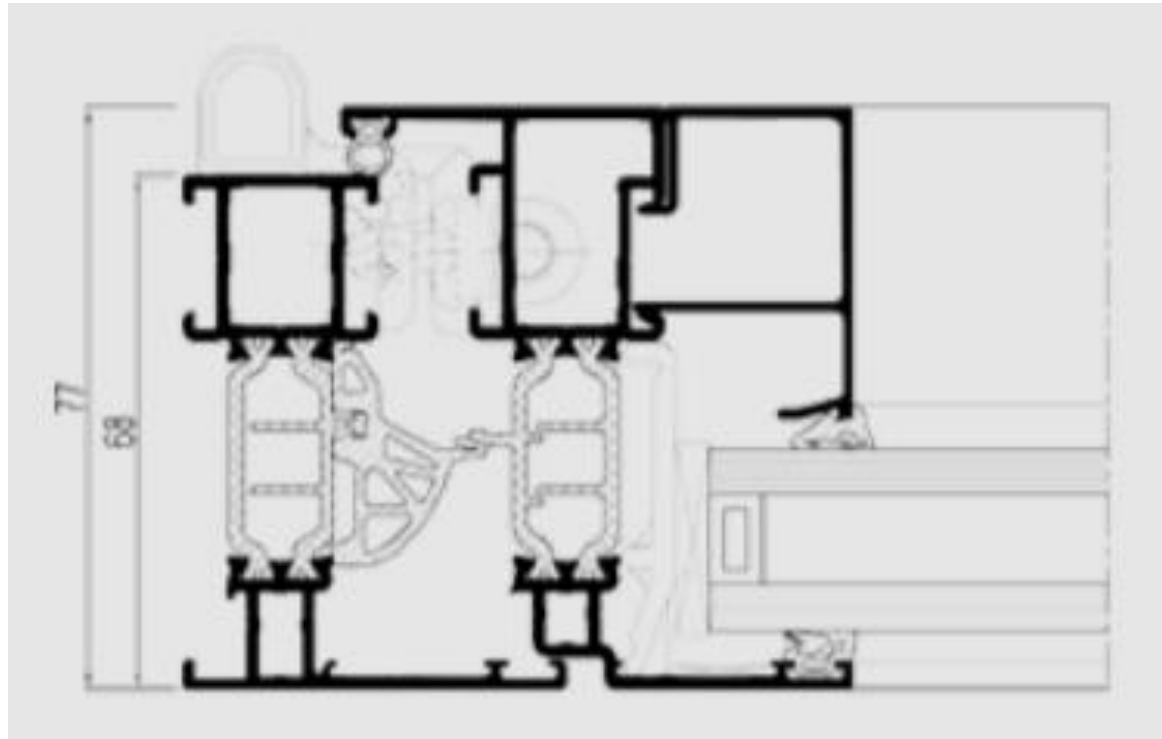
Aw = Ag + Af (m²)
Uw = pencerenin ısı iletim katsayısı (W/m².K)



Tip	tek cam	çift cam	çift cam low-e, Ar	üç cam low-e, Ar
Ug- Değeri (W/m²K)	5.60	2.80	1.20	0.65
Yüzey Sıcaklığı	-1.8 °C	9.1 °C	15.3 °C	17.5 °C
Isı İletimi	0.92	0.80	0.62	0.48



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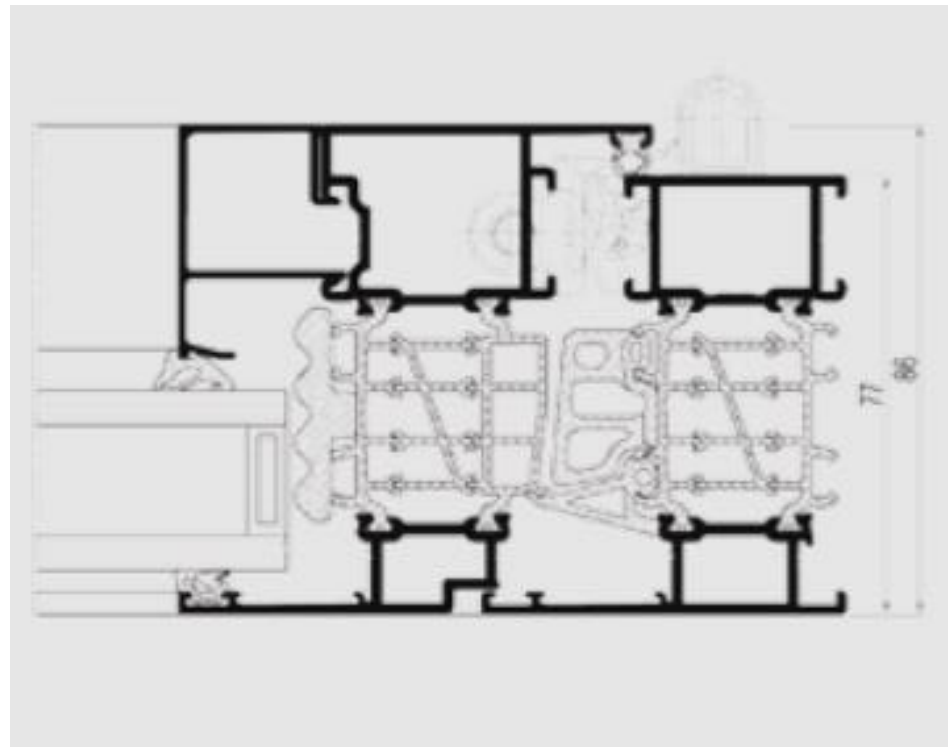
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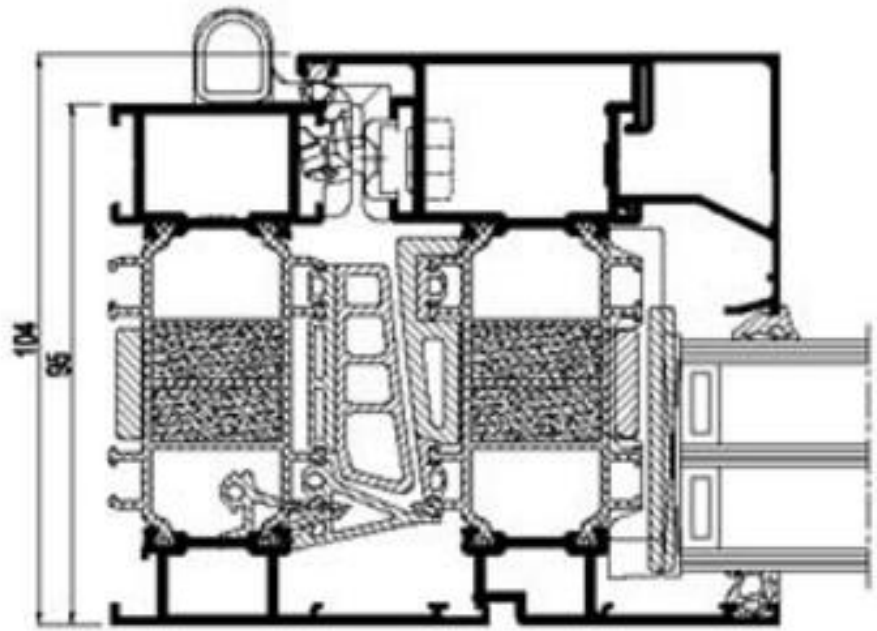
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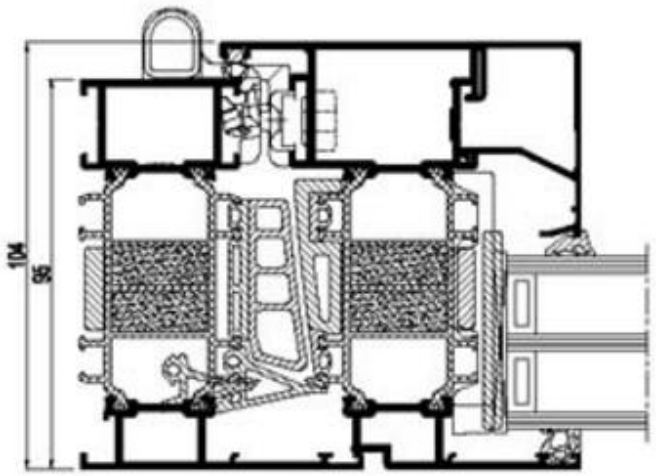
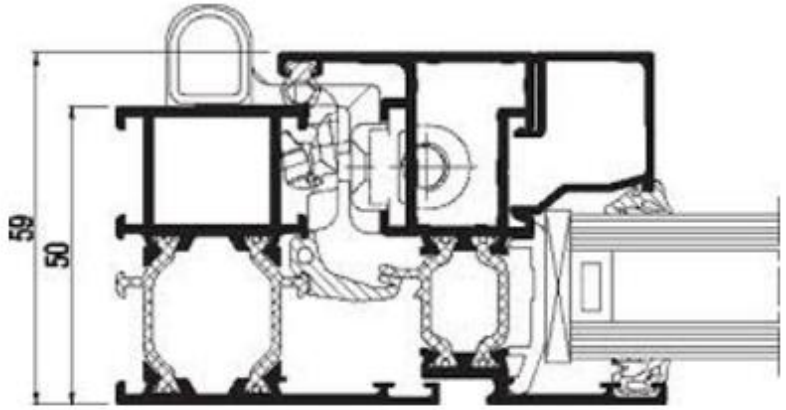
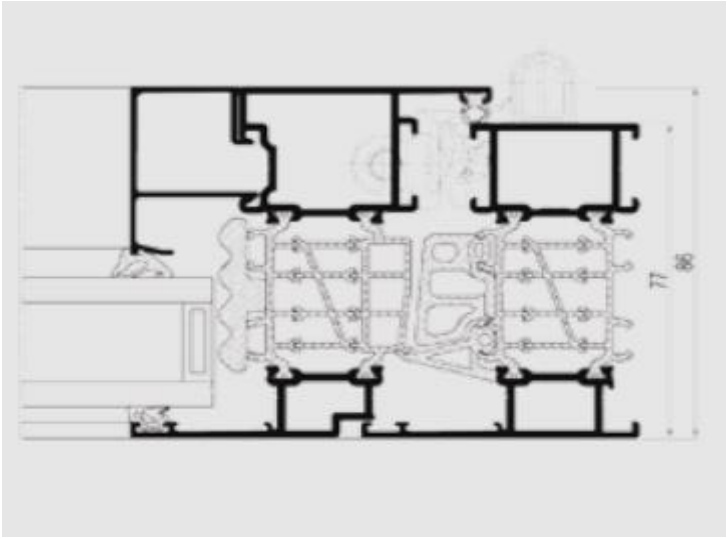
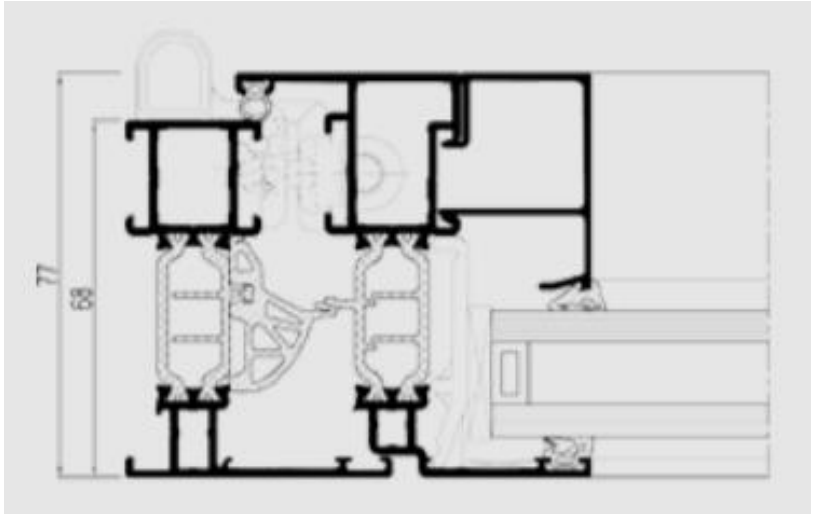
Pencerenin U değeri yani ‘ISI İLETİM KATSAYISI’









Pencerenin U değeri yani ‘ISI İLETİM KATSAYISI’

PENCERELERDE U DEĞERİ

U= 5,8 W/m²K	U= 2,9 W/m²K	U= 1,1 W/m²K	U= 0,6 W/m²K
			
TEK CAM	ÇİFT CAM	LOW-E ÇİFT CAM	LOW-E ÜÇLÜ CAM

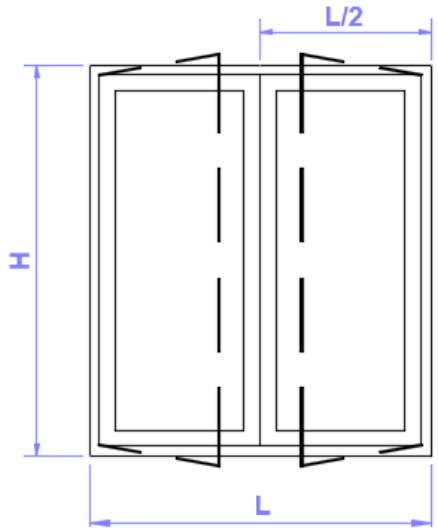
U Değeri= 1 m² pencere yüzeyinde içerisi ile dışarısı arasındaki her 1 derecelik ısı farkını karşılamak için harcanması gereken enerji miktarı (Watt)

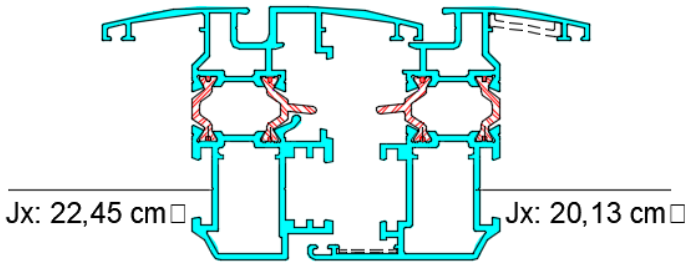
STATIK HESAP

	FONKSİYON	GENEL ETKİ	ETKİ	ÖZELLİK	YORUM
STATİK HESAP	• Stabilite • Mesnet noktaları ve tipi • Kat yüksekliği	Profil kesiti, ölçüleri ve ağırlığı belirlenir	• Rüzgar yükü • Strüktürel geometri • Binanın coğrafi durumu • Binanın yüksekliği • Alüminyum konstrüksiyon ağırlığı • Cam ağırlığı	• Profilin atalet momenti hesaplanan atalet momentinden eşit ya da büyük olmalıdır	DIN 1055, DIN18056, DIN 4113, DIN 1748 dikkate alınmalıdır.

KULLANIM LİMİTLERİ DİAGRAMI

(DIAGRAM FOR WIND LOAD)





Toplam Jx = 42,58 cm4

HESAPLARDA SEHİM KABULÜ:

Tek Camlarda;

Mesnet Açıklığı	*Müsade Edilen Sehim*
L< 3,0 m	f=L / 200
L> 3,0 m	f=L / 300

Çift Camlarda Ara Kayıt Yoksa ;

L ≥ 3,0 m	f = max 0,8 cm
L < 2,0 m	f = L / 200

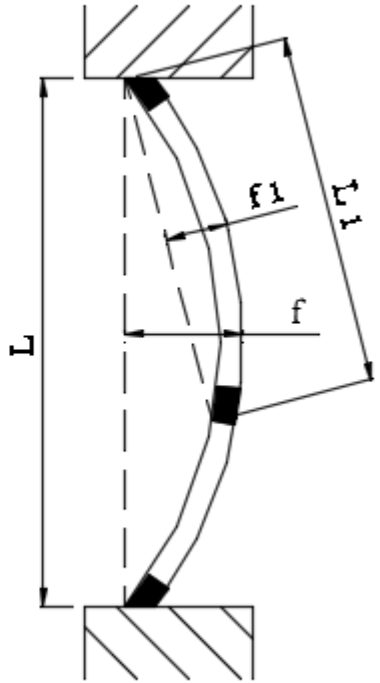
Ara Kayıt Varsa ;

a) Camların boyları L1 ise;

L ≤ 2,40 m	f1≤ L1/300
L > 2,40 m	f1≤ 0,80 cm

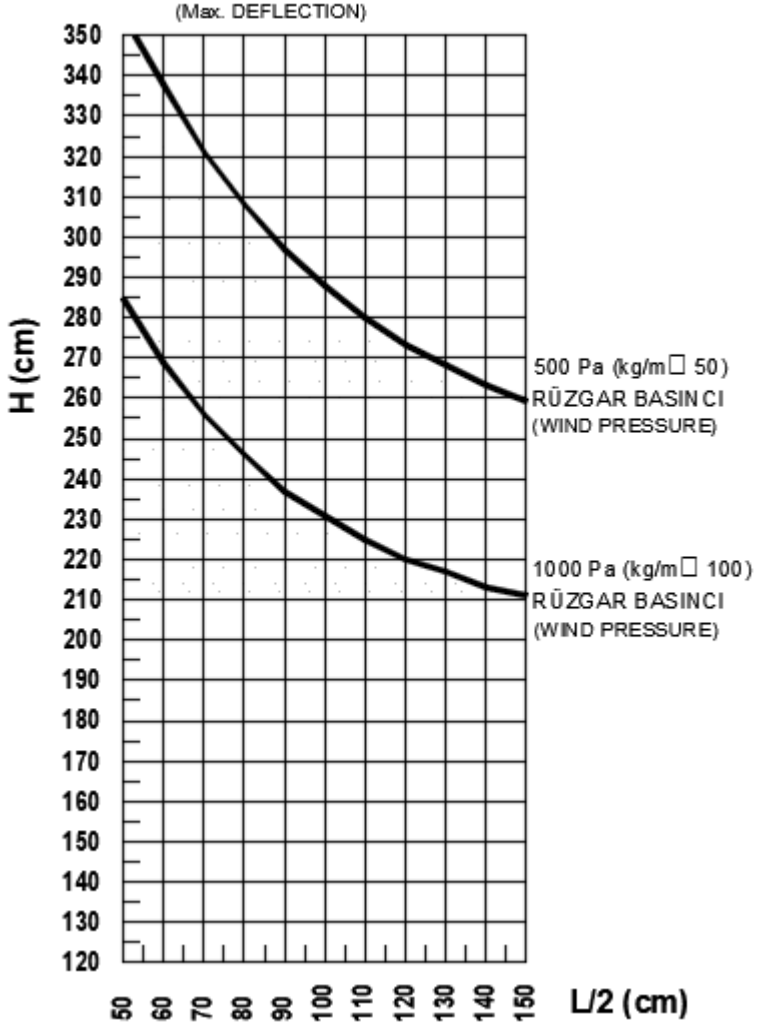
b) Profillerin boyları L ise;

L ≤ 3,00 m	f1≤ L/200
L > 3,00 m	f1≤ L/300



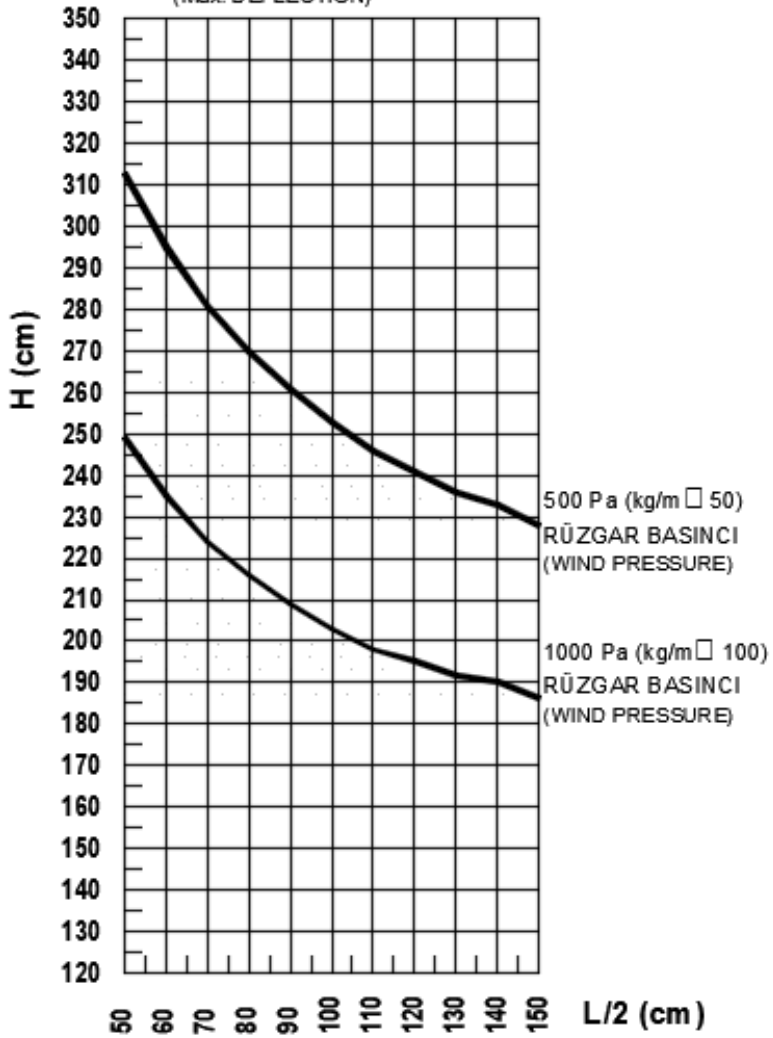
Max. Sehim = L / 200

(Max. DEFLECTION)



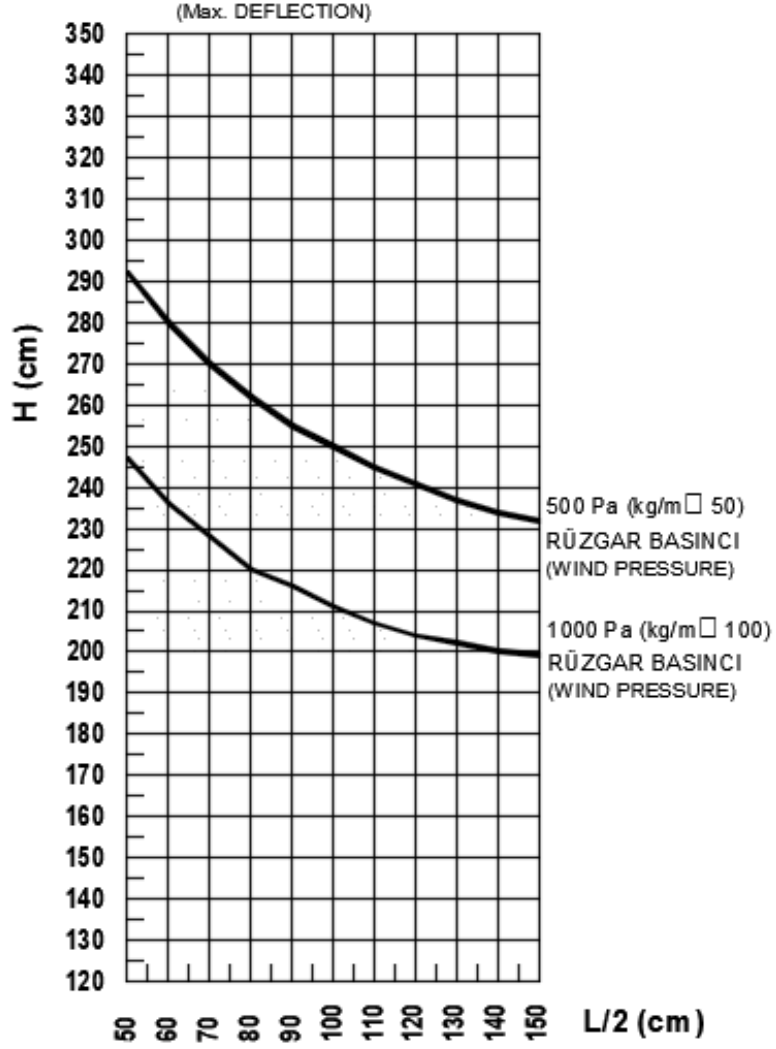
Max. Sehim = L / 300

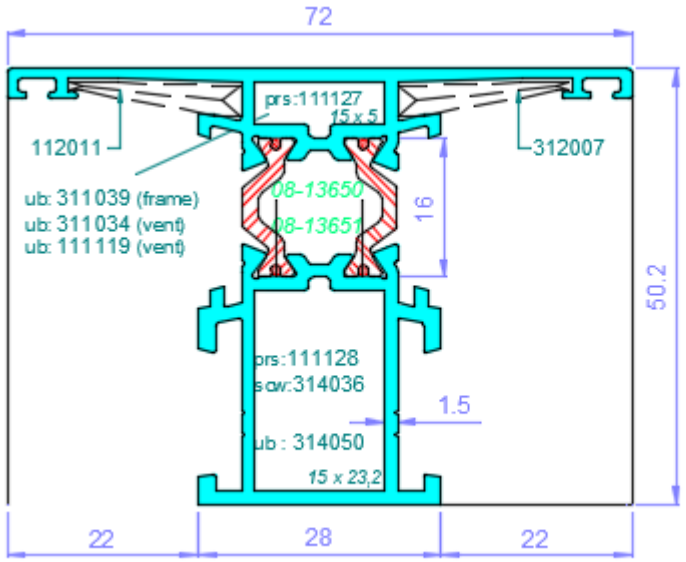
(Max. DEFLECTION)



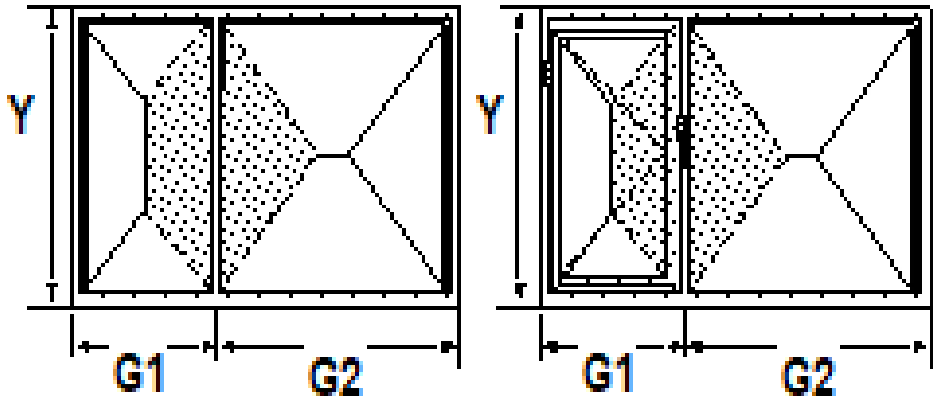
Max. Sehim = 0,80 cm.

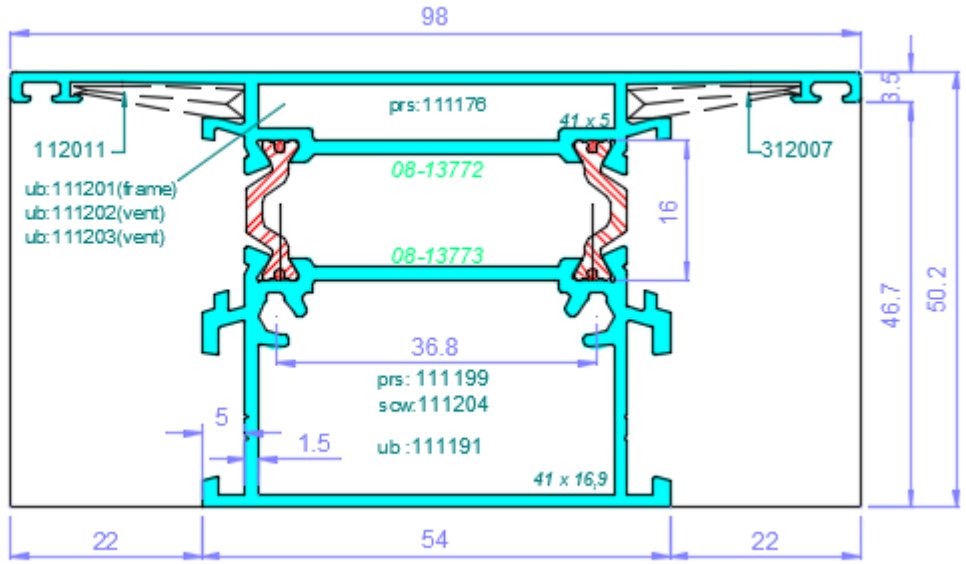
(Max. DEFLECTION)





FS-90199
1,200 kg/m
Jx: 12,67 cm□
Jy: 7,92 cm□

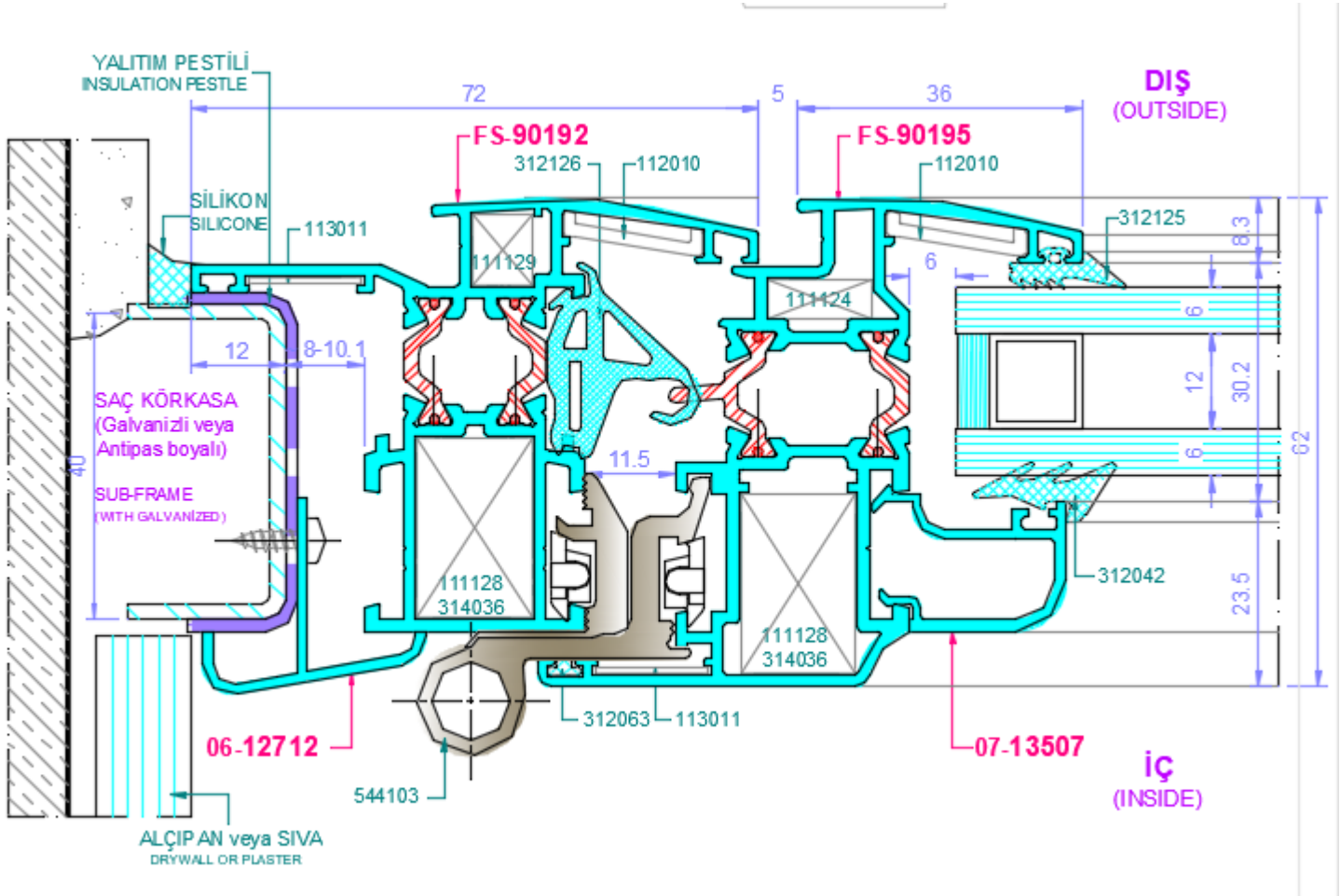




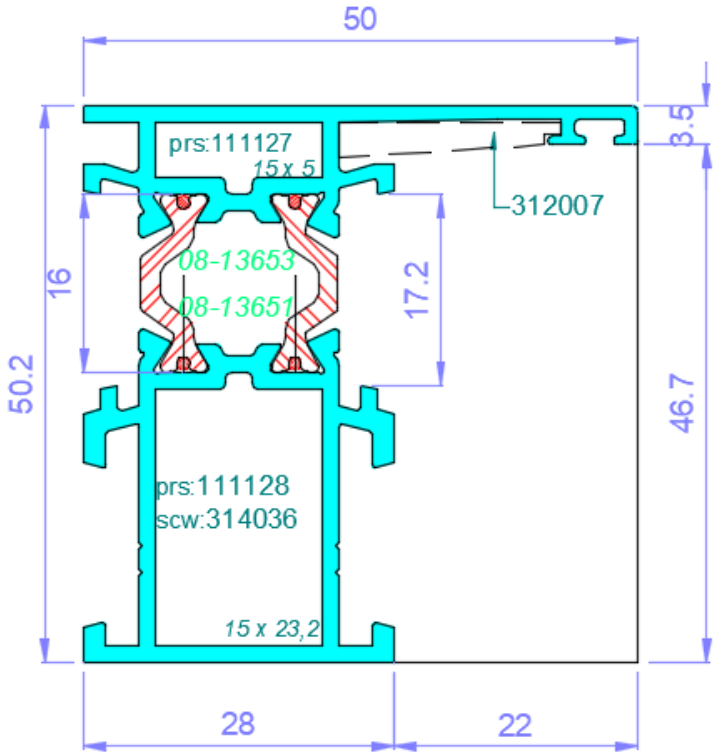
FS-90202
1,685 kg/m
Jx: 18,27 cm□
Jy: 30,74 cm□

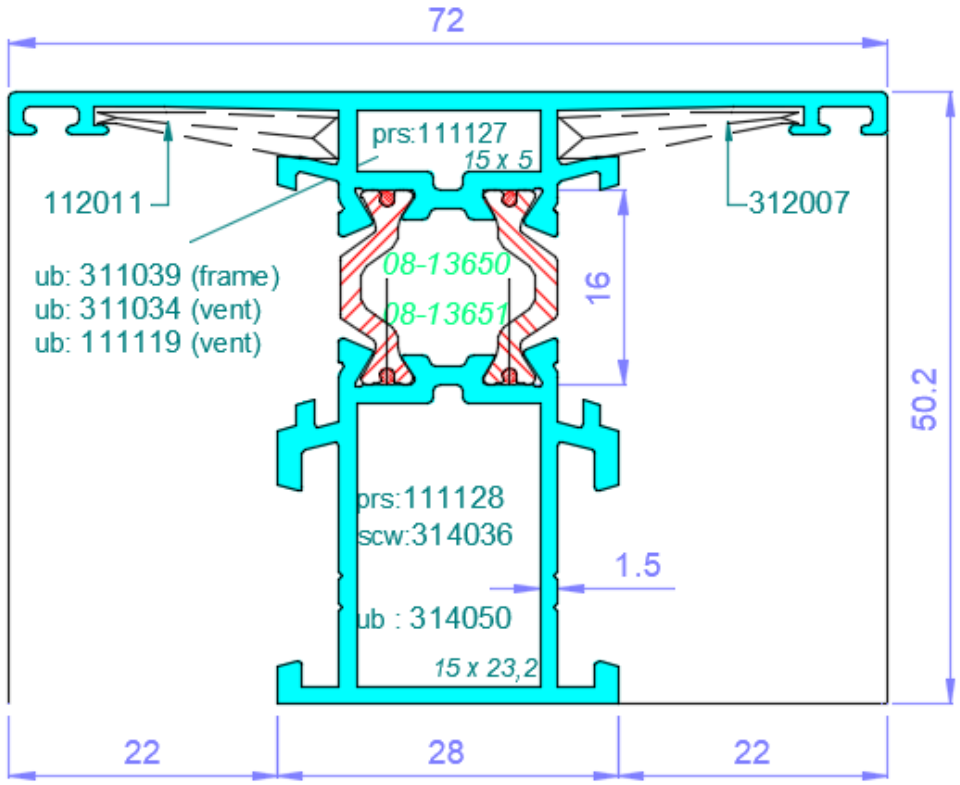
Y =	100 cm
G1 =	250 cm
G2 =	250 cm
W =	80 Kg/m2
Jx =	1,19 cm^4

Pencere Detayları

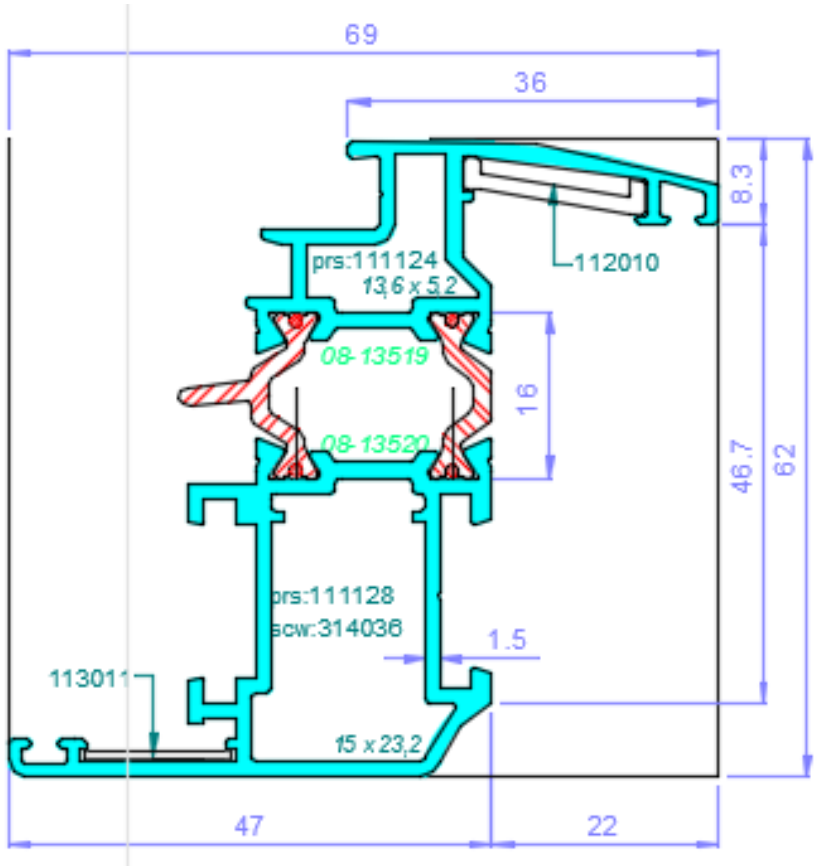


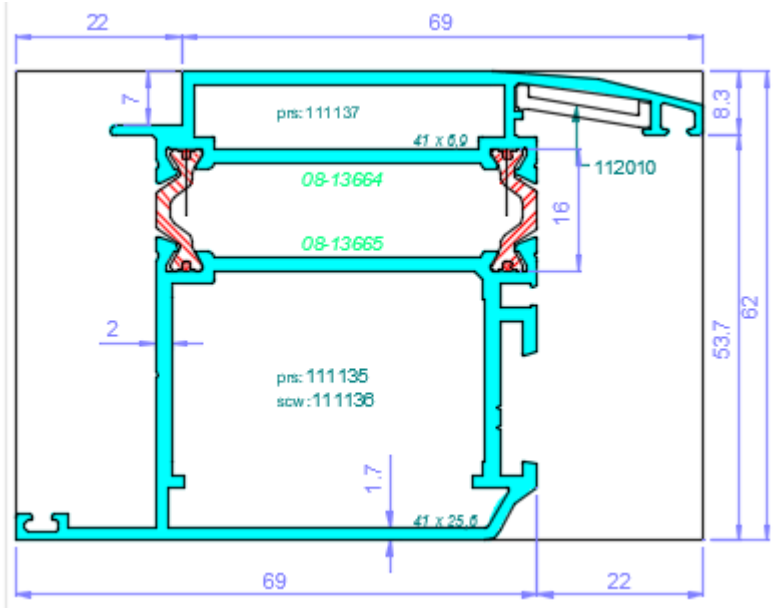
Kasa

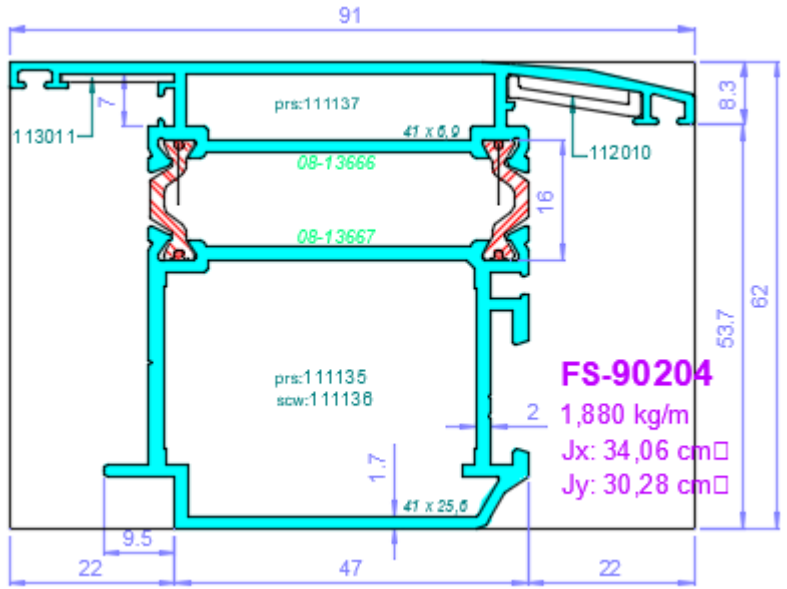

50
3.5
prs:111127
15 x 5
312007
16
17.2
08-13653
08-13651
50.2
46.7
prs:111128
scw:314036
15 x 23,2
28
22


72
prs:111127
15 x 5
112011
312007
ub: 311039 (frame)
ub: 311034 (vent)
ub: 111119 (vent)
08-13650
08-13651
16
50.2
prs:111128
scw:314036
1.5
ub : 314050
15 x 23,2
22
28
22

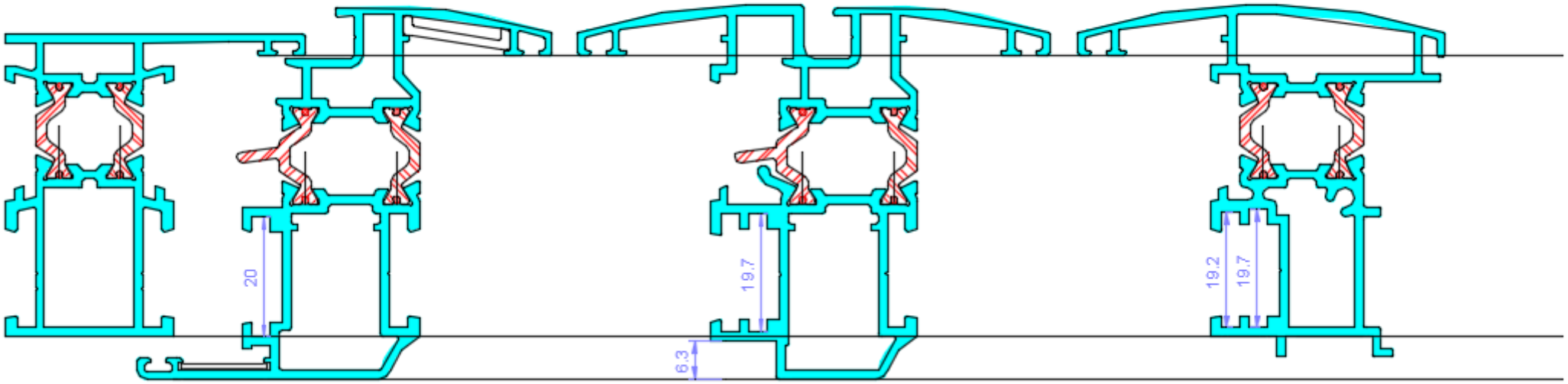
Kanat


69
36
8.3
prs:111124
13,6 x 5,2
112010
08-13519
16
08-13520
46,7
62
prs:111128
scw:314036
1.5
113011
15 x 23,2
47
22

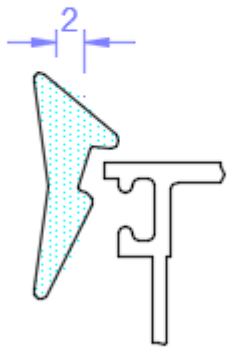
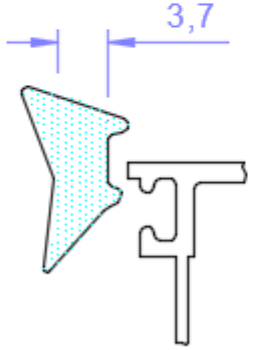
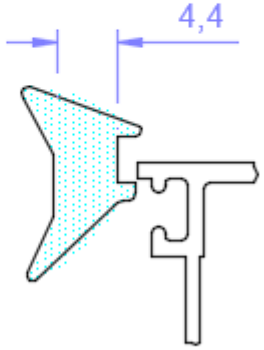

22
69
7
prs:111137
41 x 6,9
8.3
112010
08-13664
16
08-13665
2
prs:111135
scw:111136
53,7
62
1.7
41 x 25,6
69
22

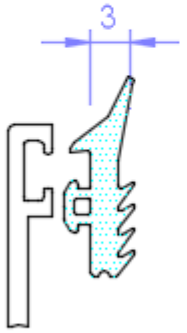
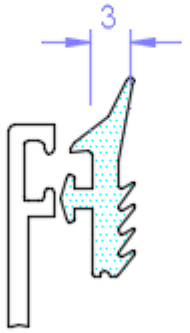
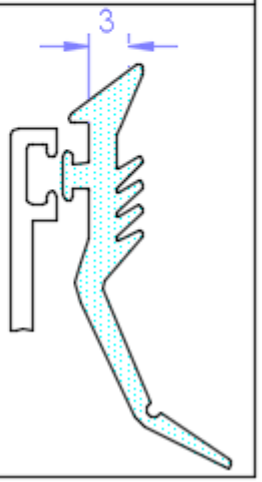

91
113011
7
prs:111137
41 x 6,9
8.3
112010
08-13666
16
08-13667
prs:111135
scw:111136
2
1.7
41 x 25,6
53,7
62
FS-90204
1,880 kg/m
Jx: 34,06 cm
Jy: 30,28 cm
9.5
22
47
22

Kanat

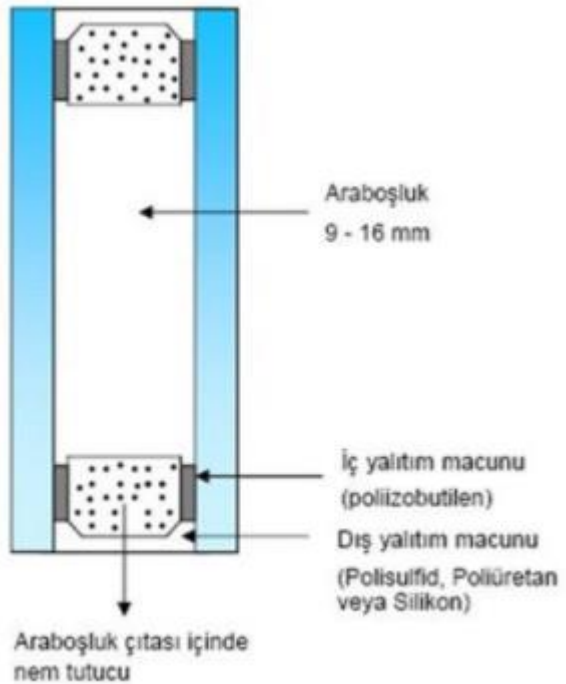


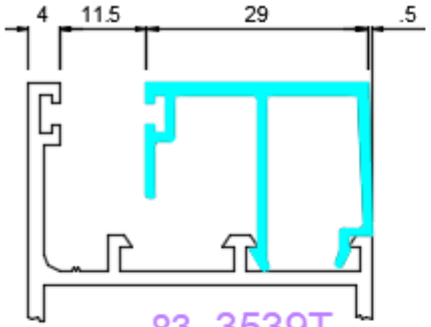
Cam Çıtası

İTHAL EPDM İÇ CAM FİTİLLERİ ***IMPORTED*** EPDM INNER GLAZING GASKETS		
312055	**312056**	**312057**
		

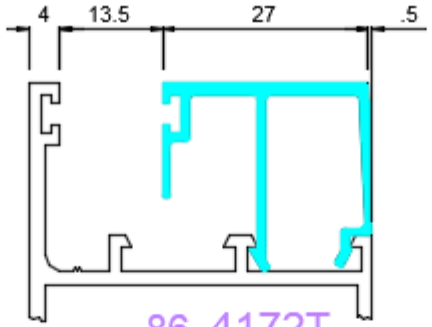
EPDM DIŞ CAM FİTİLİ - AKSESUAR NO EPDM OUTER GLAZING GASKETS ACCESSORY CODE		
312125	**312046**	**312097**
 ***ipli fitil***		

Cam Çıtası

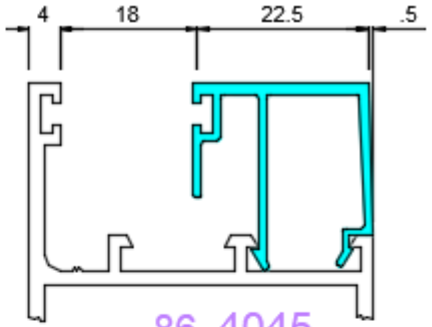




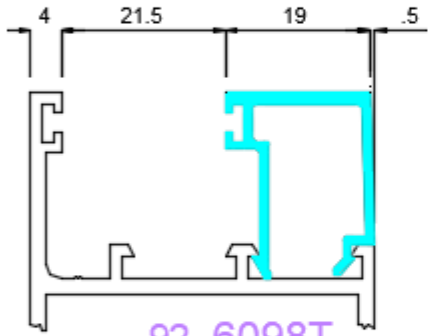
83- 3539T
0,319 kg/m.



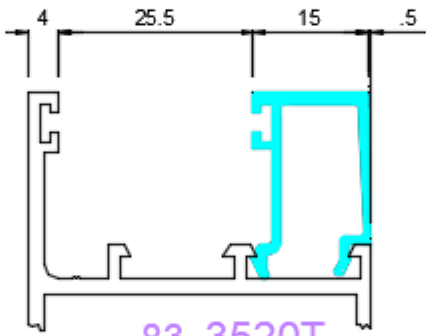
86- 4172T
0,313 kg/m.



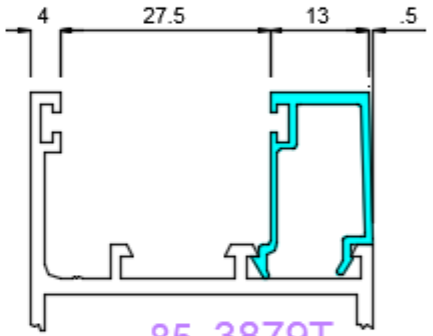
86- 4045
0,294 kg/m.



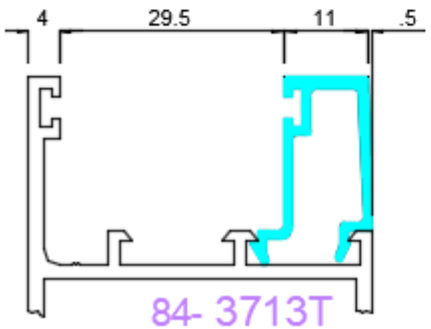
92- 6098T
0,242 kg/m.



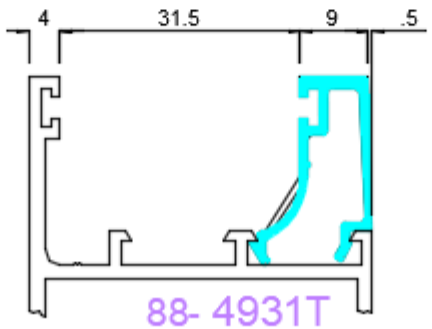
83- 3520T
0,238 kg/m.



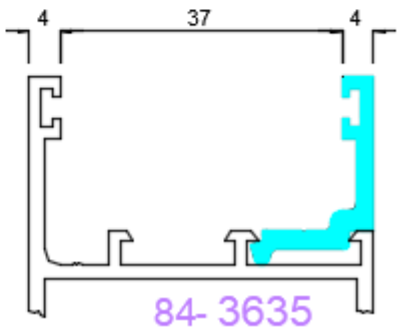
85- 3879T
0,230 kg/m.



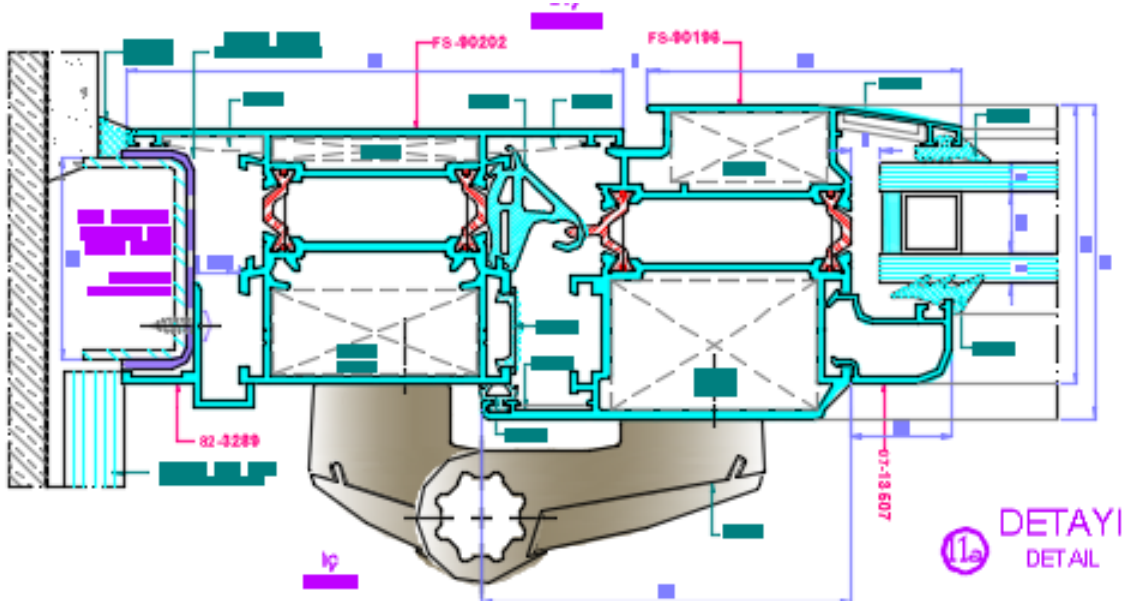
84- 3713T
0,229 kg/m.



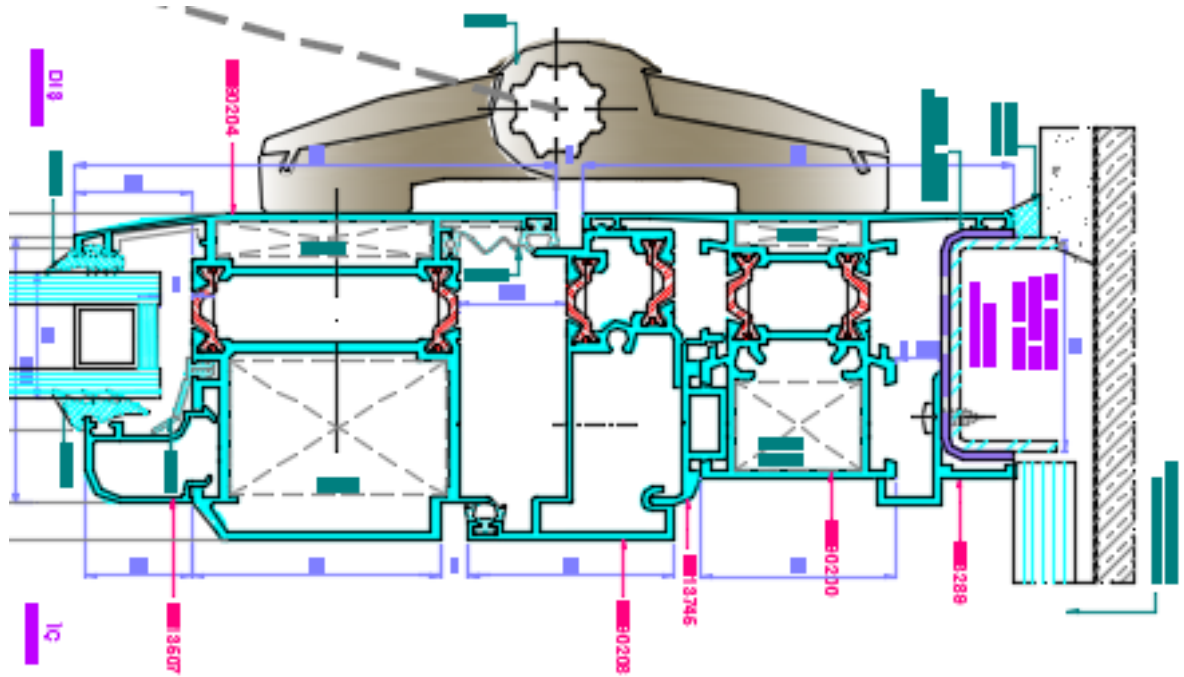
88- 4931T
0,204 kg/m.

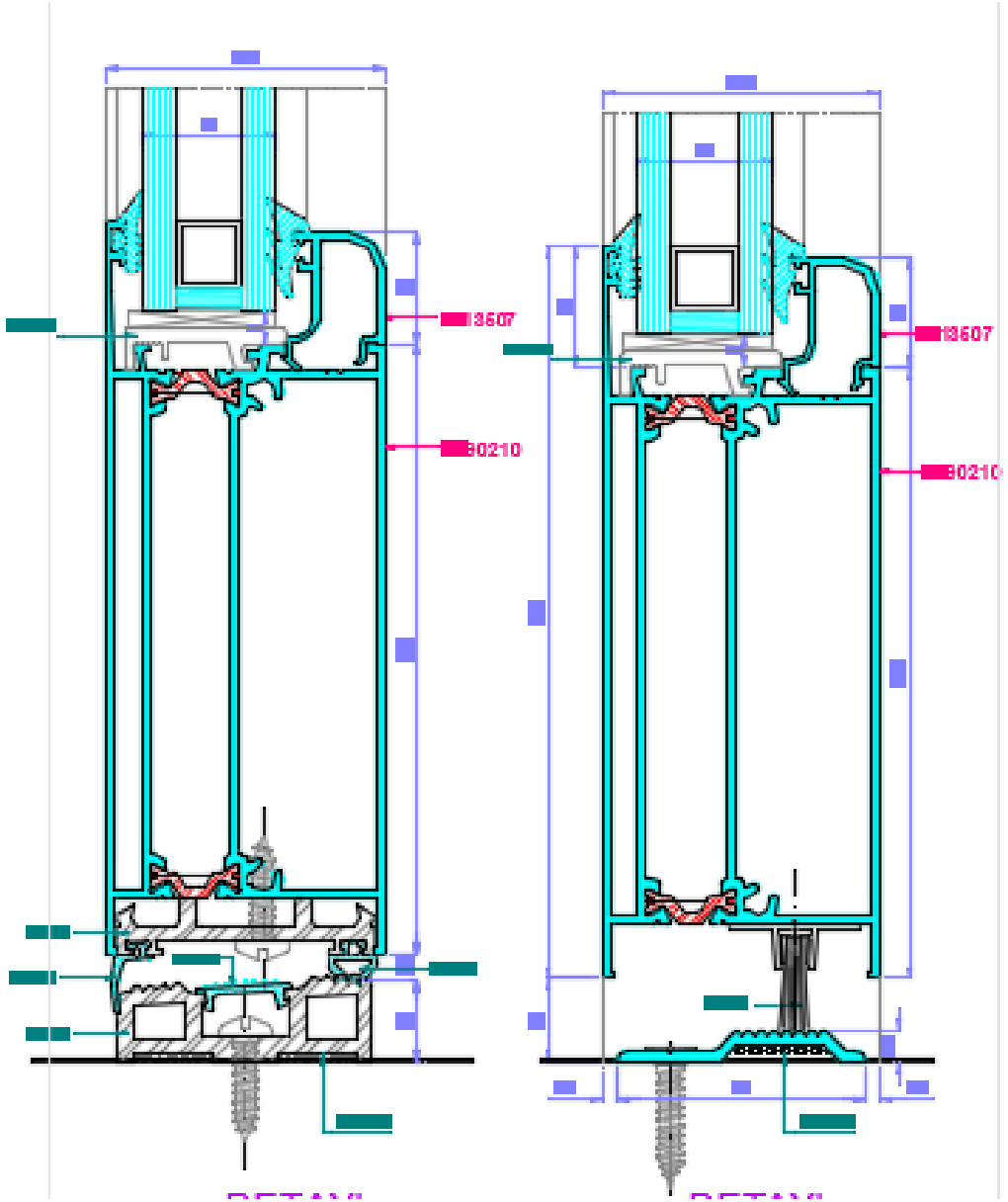


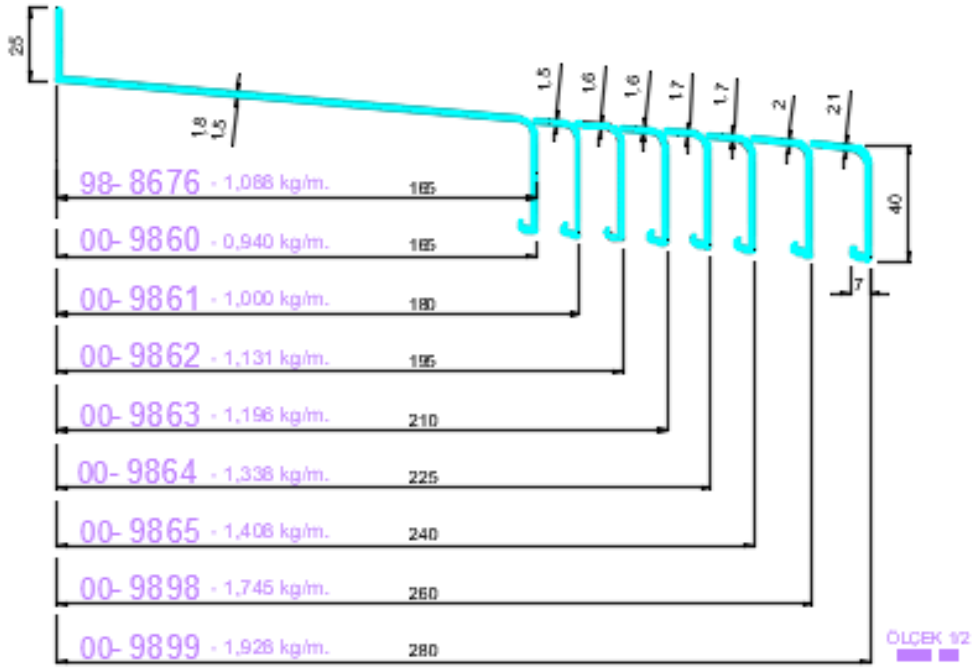
84- 3635
0,238 kg/m.

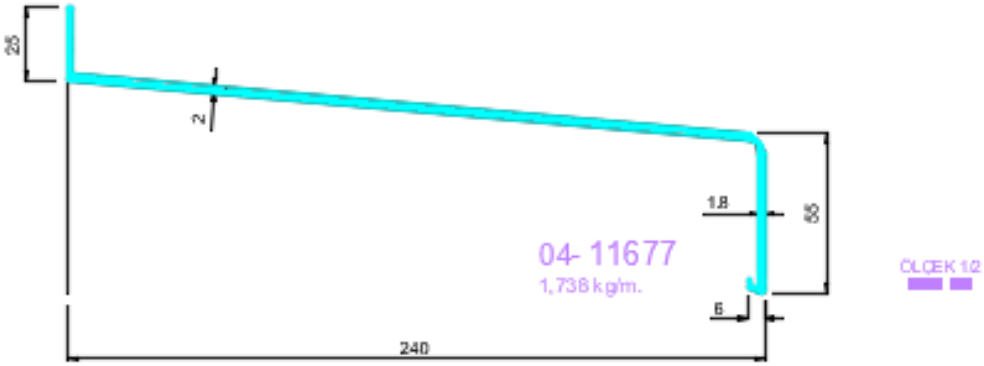


11a DETAYI
DETAIL




3607
90210
3607
90210


25
1,8
1,5
1,5
1,6
1,6
1,7
1,7
2
21
40
7
98- 8676 - 1,088 kg/m. 185
00- 9860 - 0,940 kg/m. 165
00- 9861 - 1,000 kg/m. 180
00- 9862 - 1,131 kg/m. 195
00- 9863 - 1,196 kg/m. 210
00- 9864 - 1,336 kg/m. 225
00- 9865 - 1,406 kg/m. 240
00- 9898 - 1,745 kg/m. 260
00- 9899 - 1,926 kg/m. 280
ÖLÇEK 1/2


25
2
1,8
55
6
240
04- 11677
1,738 kg/m.
ÖLÇEK 1/2