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**n15 000**  
sistema de fachadas



# 1. perfis | características técnicas

**n15 000**  
sistema de fachadas

n15 000



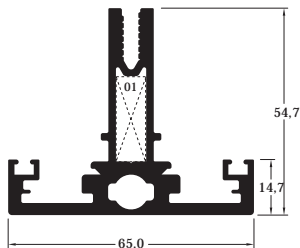
esta página foi intencionalmente deixada em branco

ref: n15 101  
momento de inércia:  
 $I_x = 19.986 \text{ cm}^4$   
 $I_y = 17.891 \text{ cm}^4$   
módulo de resistência:  
 $W_x = 5.244 \text{ cm}^3$   
 $W_y = 5.504 \text{ cm}^3$   
esquadros:  
01 - Esq. 0001

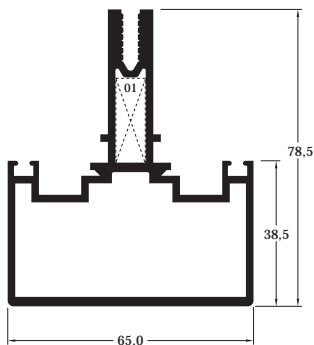
ref: n15 002  
momento de inércia:  
 $I_x = 42.922 \text{ cm}^4$   
 $I_y = 26.838 \text{ cm}^4$   
módulo de resistência:  
 $W_x = 9.348 \text{ cm}^3$   
 $W_y = 8.257 \text{ cm}^3$   
esquadros:  
01 - Esq. 0001

ref: n15 003  
momento de inércia:  
 $I_x = 135.885 \text{ cm}^4$   
 $I_y = 43.314 \text{ cm}^4$   
módulo de resistência:  
 $W_x = 21.463 \text{ cm}^3$   
 $W_y = 13.323 \text{ cm}^3$   
esquadros:  
01 - Esq. 0001

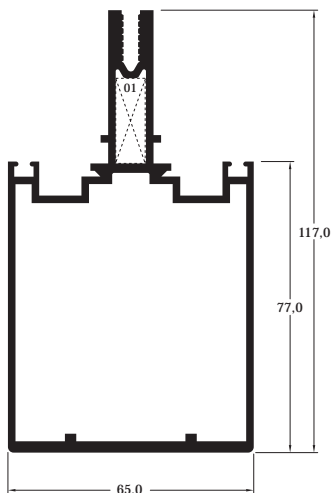
nota: quando travessas encontrarem como montante os perfis n15 101, n15 103 e n15 104, deve ser considerada a chapa de fixação div. 0287.



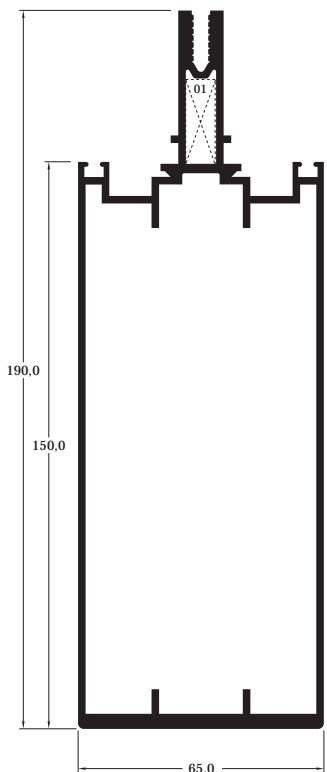
ref: n15 101



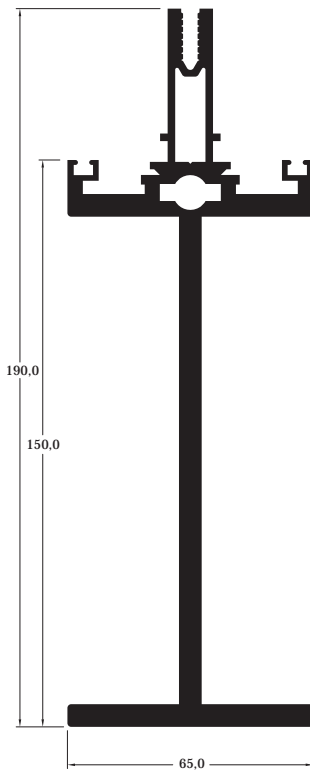
ref: n15 002



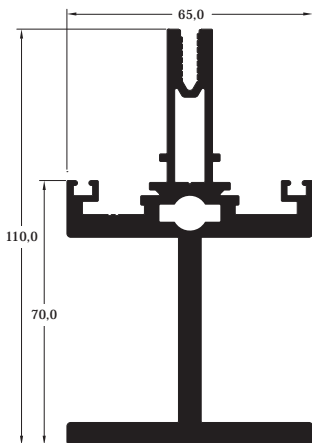
ref: n15 003



ref: n15 004



ref: n15 009



ref: n15 109

ref: n15 004  
momento de inércia:  
 $I_x = 572.314 \text{ cm}^4$   
 $I_y = 74.711 \text{ cm}^4$   
módulo de resistência:  
 $W_x = 57.711 \text{ cm}^3$   
 $W_y = 22.483 \text{ cm}^3$   
esquadros:  
01 - Esq. 0001

ref: n15 009  
momento de inércia:  
 $I_x = 750.134 \text{ cm}^4$   
 $I_y = 35.943 \text{ cm}^4$   
módulo de resistência:  
 $W_x = 74.458 \text{ cm}^3$   
 $W_y = 11.052 \text{ cm}^3$

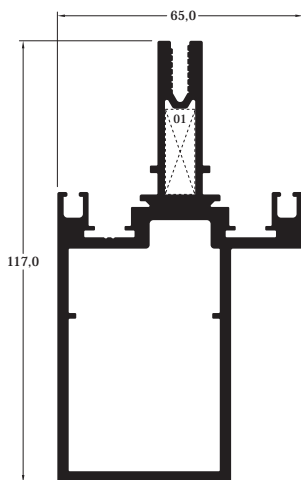
ref: n15 109  
momento de inércia:  
 $I_x = 154.696 \text{ cm}^4$   
 $I_y = 35.799 \text{ cm}^4$   
módulo de resistência:  
 $W_x = 23.785 \text{ cm}^3$   
 $W_y = 11.013 \text{ cm}^3$

nota: quando travessas encontrarem como montante os perfis n15 101, n15 103 e n15 104, deve ser considerada a chapa de fixação div. 0287.

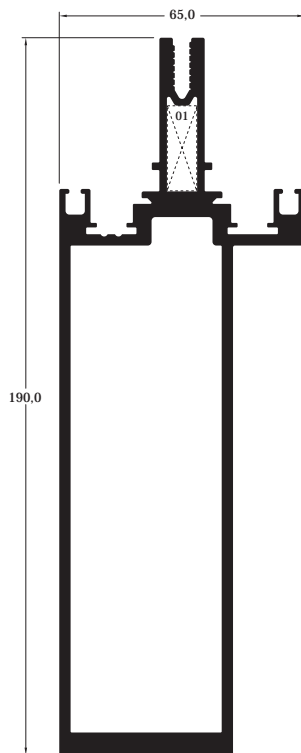
ref: n15 103  
momento de inércia:  
 $I_x = 129.058 \text{ cm}^4$   
 $I_y = 41.159 \text{ cm}^4$   
módulo de resistência:  
 $W_x = 21.391 \text{ cm}^3$   
 $W_y = 11.322 \text{ cm}^3$   
esquadros:  
01 - Esq. 0001

ref: n15 104  
momento de inércia:  
 $I_x = 644.001 \text{ cm}^4$   
 $I_y = 64.238 \text{ cm}^4$   
módulo de resistência:  
 $W_x = 66.444 \text{ cm}^3$   
 $W_y = 18.860 \text{ cm}^3$   
esquadros:  
01 - Esq. 0001

nota: quando travessas encontrarem como montante os perfis n15 101, n15 103 e n15 104, deve ser considerada a chapa de fixação div. 0287.

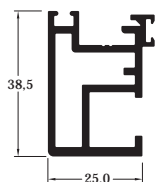


ref: n15 103

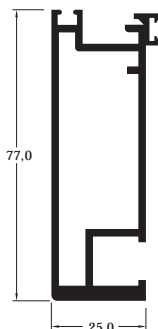


ref: n15 104

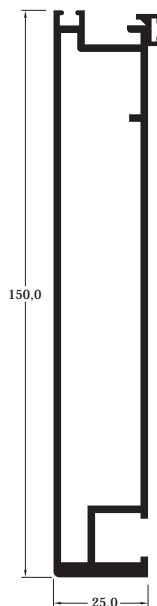




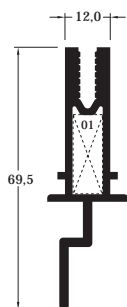
ref: n15 102



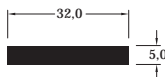
ref: n15 005



ref: n15 006



ref: n15 007



ref: n30 146

ref: n15 102  
momento de inércia:  
 $I_x = 5.003 \text{ cm}^4$   
 $I_y = 2.640 \text{ cm}^4$   
módulo de resistência:  
 $W_x = 2.566 \text{ cm}^3$   
 $W_y = 1.686 \text{ cm}^3$

ref: n15 005  
momento de inércia:  
 $I_x = 36.093 \text{ cm}^4$   
 $I_y = 4.800 \text{ cm}^4$   
módulo de resistência:  
 $W_x = 8.865 \text{ cm}^3$   
 $W_y = 3.065 \text{ cm}^3$

ref: n15 006  
momento de inércia:  
 $I_x = 206.380 \text{ cm}^4$   
 $I_y = 8.672 \text{ cm}^4$   
módulo de resistência:  
 $W_x = 26.271 \text{ cm}^3$   
 $W_y = 5.527 \text{ cm}^3$

ref: n15 007  
momento de inércia:  
 $I_x = 13.081 \text{ cm}^4$   
 $I_y = 0.823 \text{ cm}^4$   
módulo de resistência:  
 $W_x = 3.177 \text{ cm}^3$   
 $W_y = 0.710 \text{ cm}^3$

ref: n30 146  
momento de inércia:  
 $I_x = 0.033 \text{ cm}^4$   
 $I_y = 1.365 \text{ cm}^4$   
nota:  
prancheta para juntas de dilatação  
ver montagem pág. 8.1.1  
esquadros:  
01 - Esq. 0001

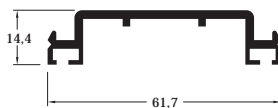
ref: n15 011  
momento de inércia:  
 $I_x = 0.340 \text{ cm}^4$   
 $I_y = 8.414 \text{ cm}^4$

ref: n15 012  
momento de inércia:  
 $I_x = 0.428 \text{ cm}^4$   
 $I_y = 8.923 \text{ cm}^4$

ref: n15 013  
momento de inércia:  
 $I_x = 0.071 \text{ cm}^4$   
 $I_y = 6.319 \text{ cm}^4$   
nota:  
capa de cobertura



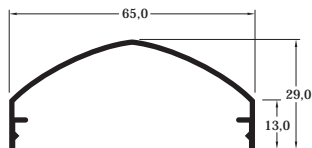
ref: n15 011



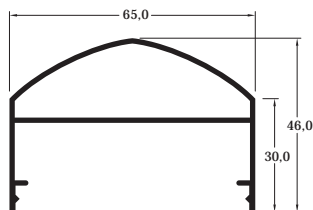
ref: n15 012



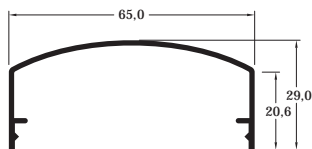
ref: n15 013



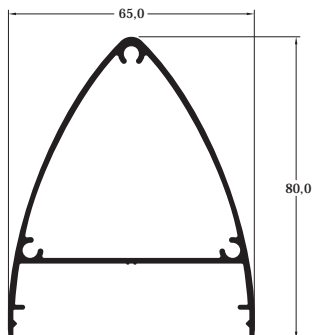
ref: n15 022



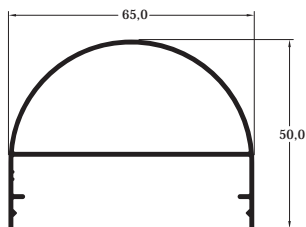
ref: n15 023



ref: n15 024



ref: n15 029



ref: n15 121

ref: n15 022  
momento de inércia:  
 $I_x = 1.101 \text{ cm}^4$   
 $I_y = 8.582 \text{ cm}^4$

ref: n15 023  
momento de inércia:  
 $I_x = 4.190 \text{ cm}^4$   
 $I_y = 16.204 \text{ cm}^4$

ref: n15 024  
momento de inércia:  
 $I_x = 1.369 \text{ cm}^4$   
 $I_y = 10.459 \text{ cm}^4$

ref: n15 029  
momento de inércia:  
 $I_x = 20.736 \text{ cm}^4$   
 $I_y = 18.812 \text{ cm}^4$

ref: n15 121  
momento de inércia:  
 $I_x = 5.203 \text{ cm}^4$   
 $I_y = 14.772 \text{ cm}^4$

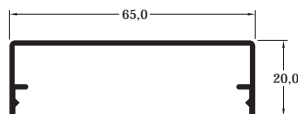
ref: n15 025  
momento de inércia:  
 $I_x = 0.554 \text{ cm}^4$   
 $I_y = 8.839 \text{ cm}^4$

ref: n15 026  
momento de inércia:  
 $I_x = 2.119 \text{ cm}^4$   
 $I_y = 12.957 \text{ cm}^4$

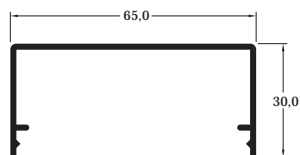
ref: n15 027  
momento de inércia:  
 $I_x = 21.965 \text{ cm}^4$   
 $I_y = 28.237 \text{ cm}^4$

ref: n15 028  
momento de inércia:  
 $I_x = 2.220 \text{ cm}^4$   
 $I_y = 25.463 \text{ cm}^4$

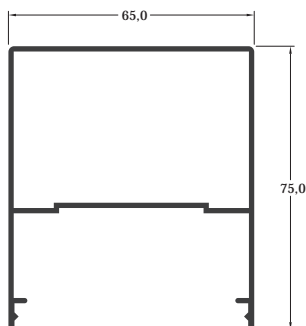
ref: n15 021  
momento de inércia:  
 $I_x = 8.908 \text{ cm}^4$   
 $I_y = 0.433 \text{ cm}^4$   
nota:  
capa para travessas



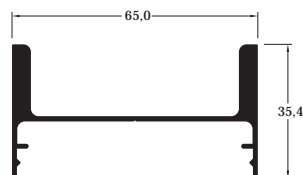
ref: n15 025



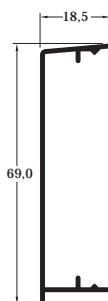
ref: n15 026



ref: n15 027

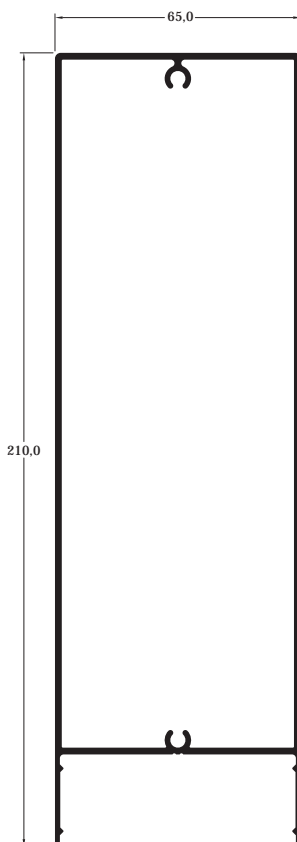


ref: n15 028



ref: n15 021

ref: n15 030  
momento de inércia:  
 $I_x = 482.133 \text{ cm}^4$   
 $I_y = 80.800 \text{ cm}^4$



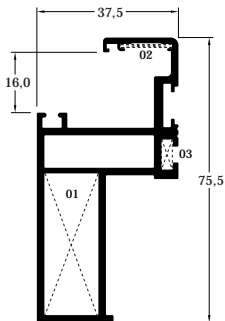
ref: n15 030

ref: n15 132  
momento de inércia:  
 $I_x = 22.530 \text{ cm}^4$   
 $I_y = 7.941 \text{ cm}^4$   
esquadros:  
01 - Esq. 0039  
02 - Esq. 0060  
03 - Esq. 0002,  
Esq. 0071\*

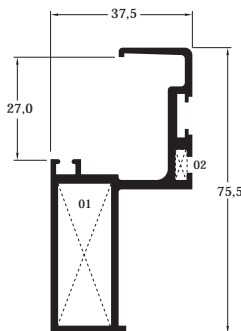
ref: n15 033  
momento de inércia:  
 $I_x = 20.718 \text{ cm}^4$   
 $I_y = 7.205 \text{ cm}^4$   
esquadros:  
01 - Esq. 0039  
02 - Esq. 0002,  
Esq. 0071\*

ref: n15 038  
momento de inércia:  
 $I_x = 21.302 \text{ cm}^4$   
 $I_y = 7.658 \text{ cm}^4$   
esquadros:  
01 - Esq. 0068  
02 - Esq. 0060  
03 - Esq. 0002,  
Esq. 0071\*

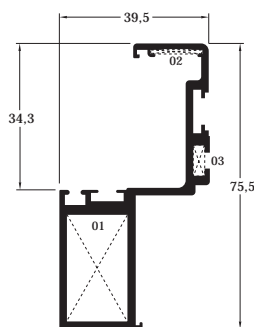
ref: n15 133  
momento de inércia:  
 $I_x = 43.438 \text{ cm}^4$   
 $I_y = 9.344 \text{ cm}^4$   
esquadros:  
01 - Esq. 0039  
02 - Esq. 0060



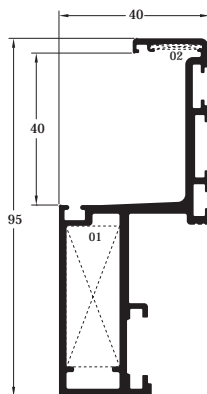
ref: n15 132



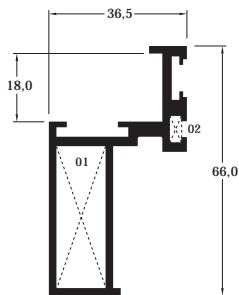
ref: n15 033



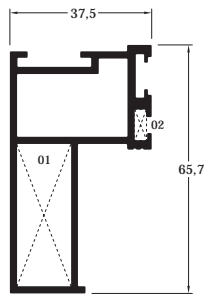
ref: n15 038



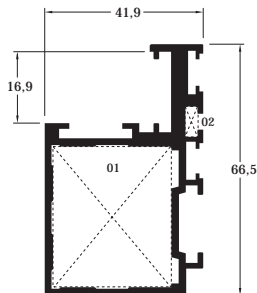
ref: n15 133



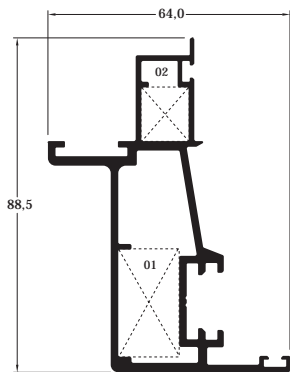
ref: n15 031



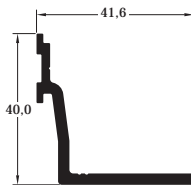
ref: n15 039



ref: n15 035



ref: n15 131



ref: n15 150

(perfil para vidro duplo com perfil n15 039)

ref: n15 031  
momento de inércia:  
 $I_x = 14.805 \text{ cm}^4$   
 $I_y = 6.528 \text{ cm}^4$   
esquadros:  
01 - Esq. 0039  
02 - Esq. 0002,  
Esq. 0071\*

ref: n15 039  
momento de inércia:  
 $I_x = 18.757 \text{ cm}^4$   
 $I_y = 7.150 \text{ cm}^4$   
esquadros:  
01 - Esq. 0039  
02 - Esq. 0002, Esq.  
0071\*

nota:  
perfil para vidro simples

ref: n15 035  
momento de inércia:  
 $I_x = 22.512 \text{ cm}^4$   
 $I_y = 11.397 \text{ cm}^4$   
esquadros:  
01 - Esq. 0040  
02 - Esq. 0002, Esq.  
0071\*

ref: n15 131  
momento de inércia:  
 $I_x = 45.119 \text{ cm}^4$   
 $I_y = 10.342 \text{ cm}^4$   
esquadros:  
01 - Esq. 0068  
02 - Esq. 0037

ref: n15 150  
momento de inércia:  
 $I_x = 3.387 \text{ cm}^4$   
 $I_y = 3.268 \text{ cm}^4$

(\*) Esq. 0071 é aplicado  
aquando da utilização da  
Dob. 0112, ou na utilização  
de perfis de dilatação.

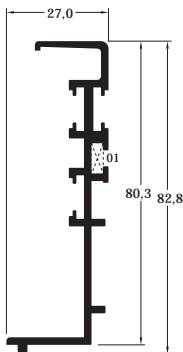
ref: n15 036  
momento de inércia:  
 $I_x = 24.377 \text{ cm}^4$   
 $I_y = 1.082 \text{ cm}^4$   
esquadros:  
01 - Esq. 0002

ref: n15 037  
momento de inércia:  
 $I_x = 33.566 \text{ cm}^4$   
 $I_y = 5.336 \text{ cm}^4$   
nota:  
perfil de remate  
esquadros:  
01 - Esq. 0002

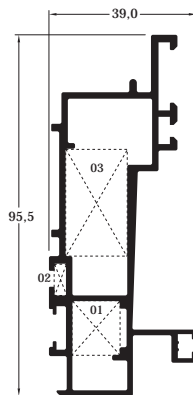
ref: n15 136  
momento de inércia:  
 $I_x = 45.265 \text{ cm}^4$   
 $I_y = 7.012 \text{ cm}^4$   
esquadros:  
01 - Esq. 0037  
02 - Esq. 0002, Esq.  
0071\*  
03 - Esq. 0068

ref: n15 040  
momento de inércia:  
 $I_x = 54.722 \text{ cm}^4$   
 $I_y = 4.947 \text{ cm}^4$

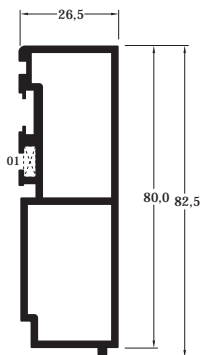
(\*) Esq. 0071 é aplicado  
aquando da utilização da  
Dob. 0112, ou na utilização  
de perfis de dilatação.



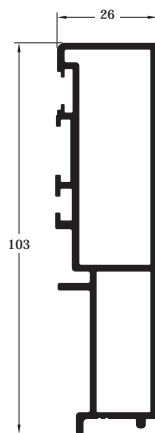
ref: n15 036



ref: n15 136

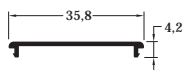


ref: n15 037



ref: n15 040





ref. n11 031



ref. n30 147

ref: n11 031  
momento de inércia:  
 $I_x = 0.005 \text{ cm}^4$   
 $I_y = 0.724 \text{ cm}^4$

ref: n30 147  
momento de inércia:  
 $I_x = 0.171 \text{ cm}^4$   
 $I_y = 4.267 \text{ cm}^4$

ref: n15 041  
momento de inércia:  
 $I_x = 0.275 \text{ cm}^4$   
 $I_y = 0.442 \text{ cm}^4$

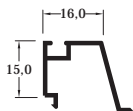
ref: n15 042  
momento de inércia:  
 $I_x = 0.799 \text{ cm}^4$   
 $I_y = 0.594 \text{ cm}^4$

ref: n15 043  
momento de inércia:  
 $I_x = 1.965 \text{ cm}^4$   
 $I_y = 0.790 \text{ cm}^4$

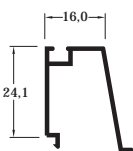
ref: n10 094  
momento de inércia:  
 $I_x = 0.004 \text{ cm}^4$   
 $I_y = 0.122 \text{ cm}^4$   
nota:  
para modelo VEC

ref: n15 051  
momento de inércia:  
 $I_x = 0.033 \text{ cm}^4$   
 $I_y = 0.636 \text{ cm}^4$

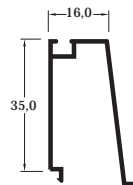
ref: n15 053  
momento de inércia:  
 $I_x = 0.119 \text{ cm}^4$   
 $I_y = 0.984 \text{ cm}^4$   
nota:  
inversor para porta VEC  
de 2 folhas com perfil  
n15 035.



ref: n15 041



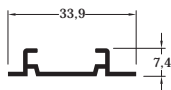
ref: n15 042



ref: n15 043



ref: n10 094



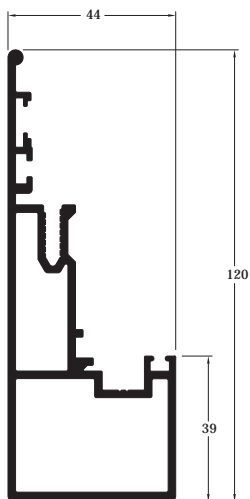
ref: n15 051



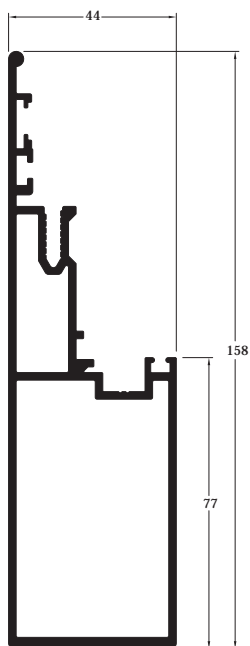
ref: n15 053

ref: n15 105  
momento de inércia:  
 $I_x = 79.749 \text{ cm}^4$   
 $I_y = 15.962 \text{ cm}^4$

ref: n15 106  
momento de inércia:  
 $I_x = 182.668 \text{ cm}^4$   
 $I_y = 23.876 \text{ cm}^4$



ref: n15 105



ref: n15 106

esta página foi intencionalmente deixada em branco

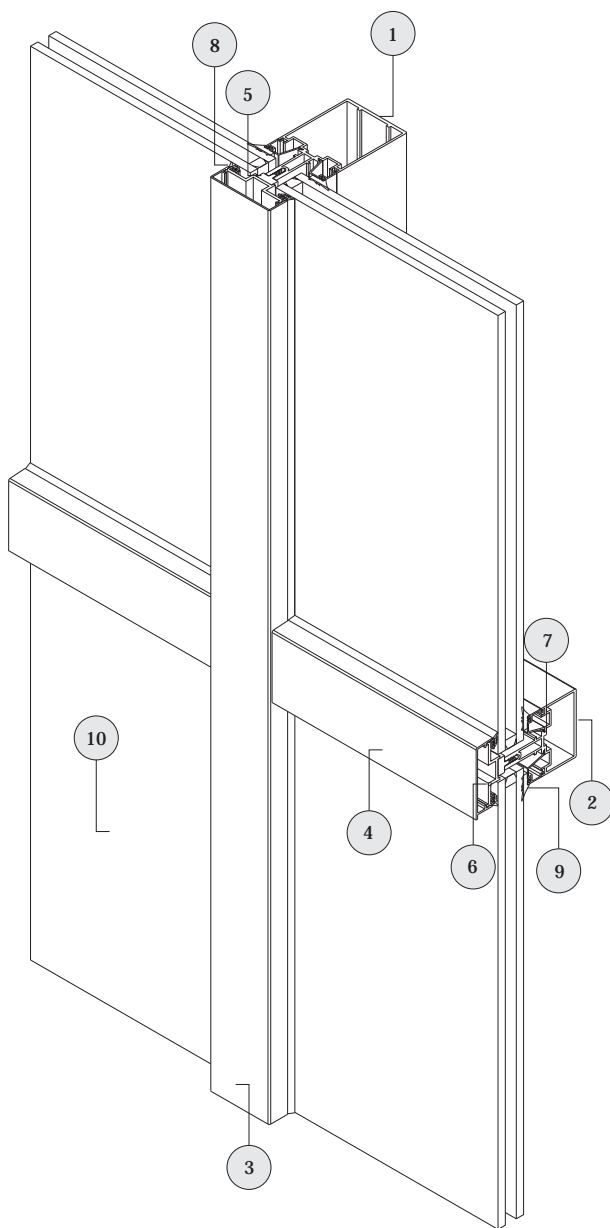
## 2. fachada cortina

### 2.1 cortes e pormenores de montagem

**n15 000**  
sistema de fachadas  
fachada cortina

n15 000





1. perfil de montante.
2. perfil de travessa.
3. capa de montante.
4. capa de travessa.
5. sub-capa do montante.
6. sub-capa da travessa.
7. bite.
8. vedante exterior de vidro.
9. vedante interior de vidro.
10. vidro.

# n15 000

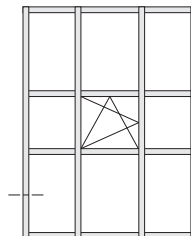
sistema de fachadas  
fachada cortina

cortes e pormenores de montagem

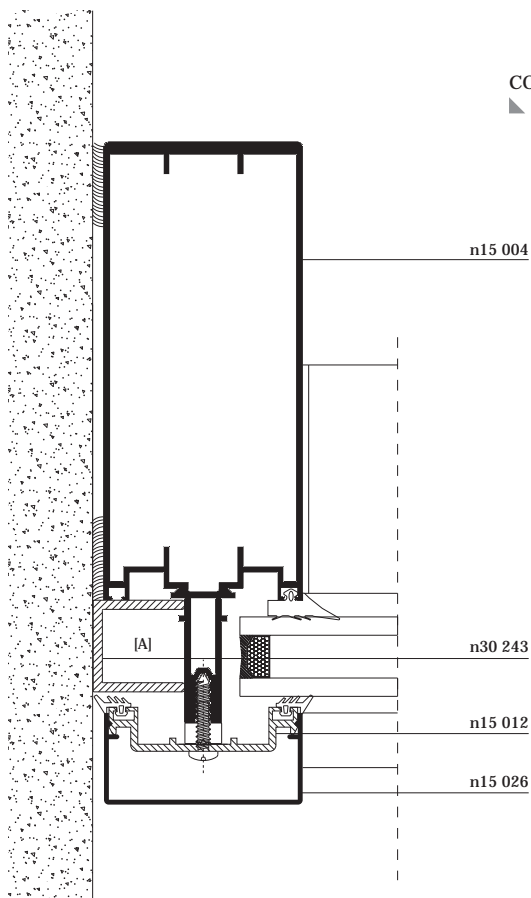
[A]  
a utilização do perfil  
n30 243 é uma solução  
opcional.



vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.

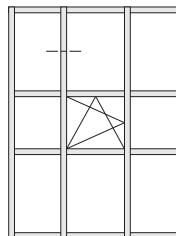


CORTE

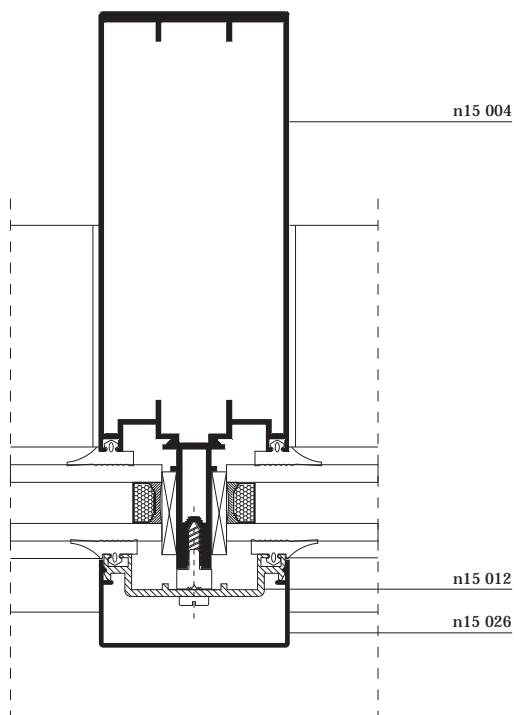




vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



**CORTE**



# n15 000

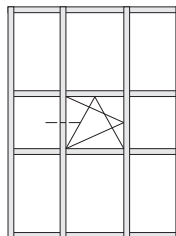
sistema de fachadas  
fachada cortina

cortes e pormenores de montagem

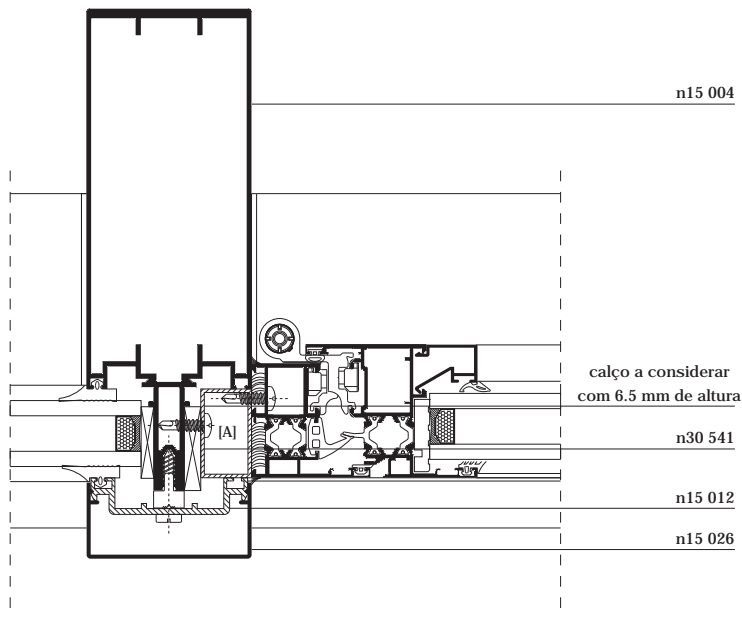
[A]  
a utilização do perfil  
n30 541 é uma solução  
opcional.



vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



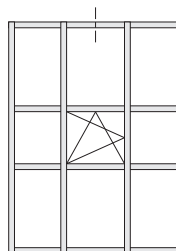
CORTE



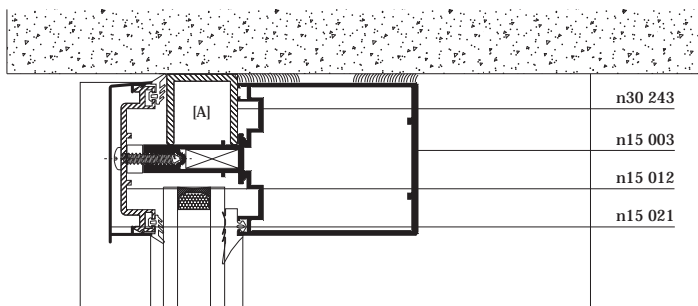
[A]  
a utilização do perfil  
n30 243 é uma solução  
opcional.



vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



**CORTE**



# n15 000

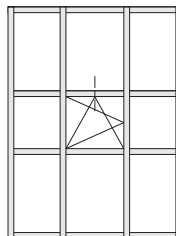
sistema de fachadas  
fachada cortina

cortes e pormenores de montagem

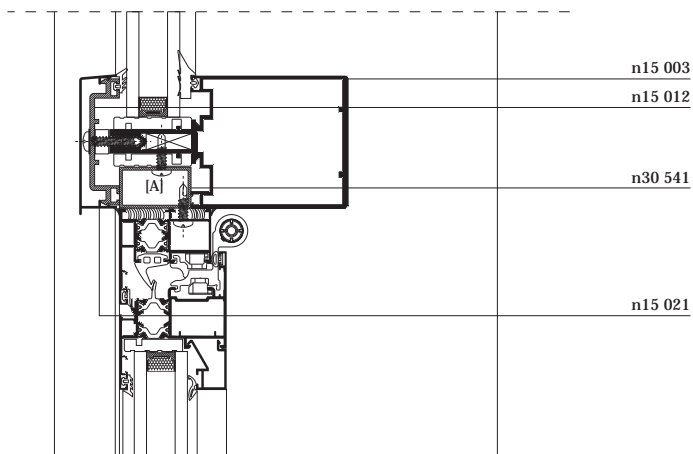
[A]  
a utilização do perfil  
n30 541 é uma solução  
opcional.



vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



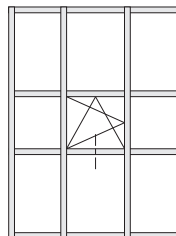
CORTE



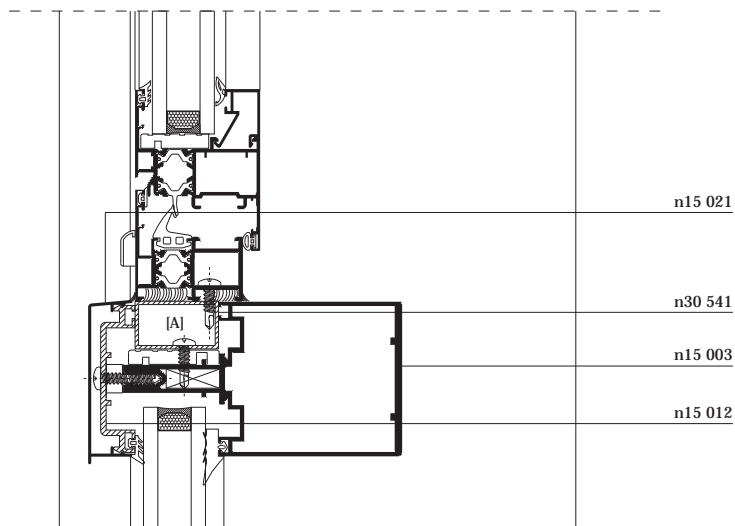
[A]  
a utilização do perfil  
n30 541 é uma solução  
opcional.



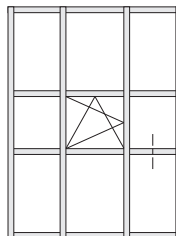
vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



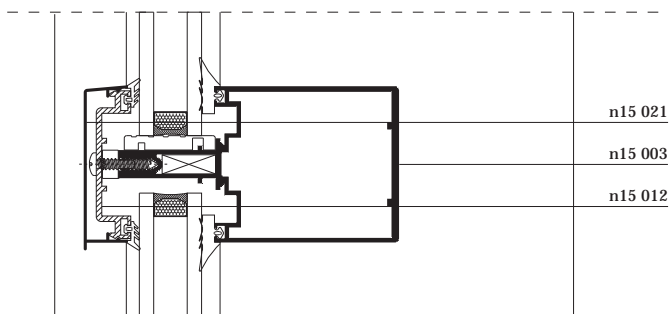
**CORTE**



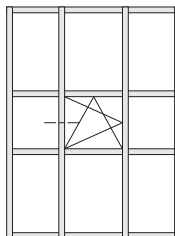
vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



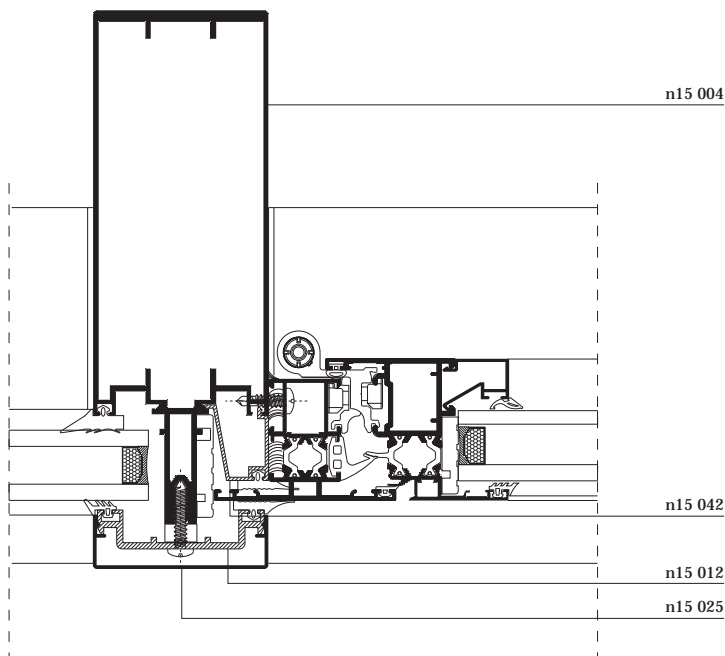
**CORTE**



vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



**CORTE**



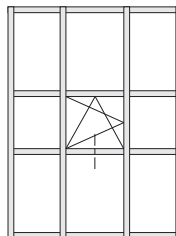
# n15 000

sistema de fachadas  
fachada cortina

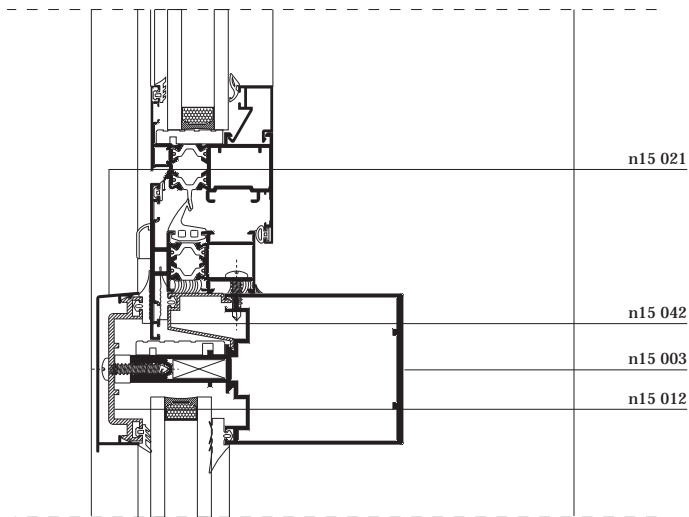
cortes e pormenores de montagem  
opções ligação sistema de batente

vedantes:

Consultar pág. 2.1.37 a  
2.1.40.



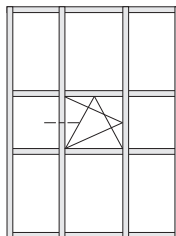
CORTE



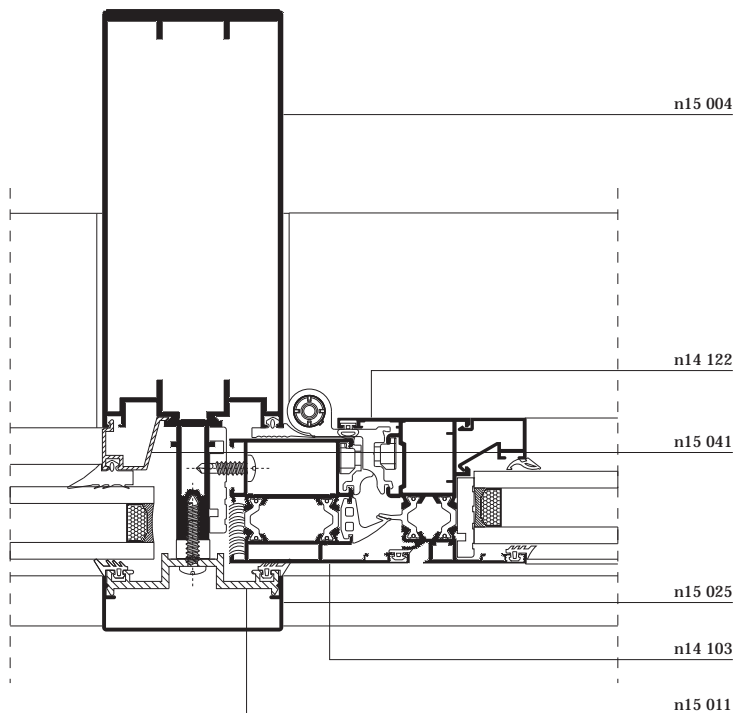


nota:  
bites variam em função  
da espessura dos vidros.  
Consultar pág. 2.1.37 a  
2.1.40.

vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.

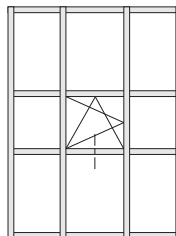


**CORTE**

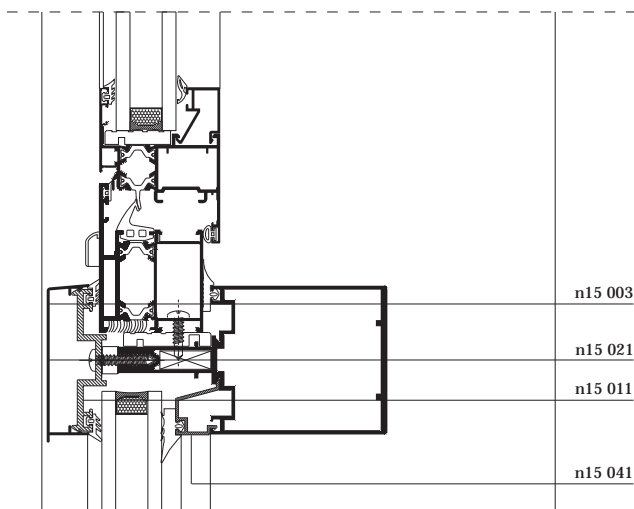


nota:  
bites variam em função  
da espessura dos vidros.  
Consultar pág. 2.1.37 a  
2.1.40.

vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.

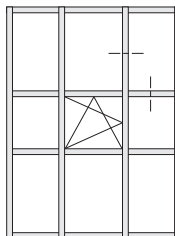


CORTE

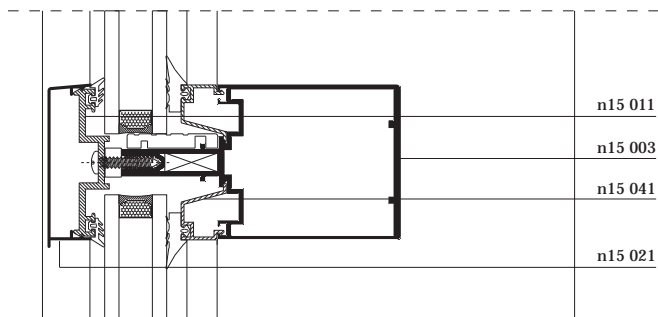
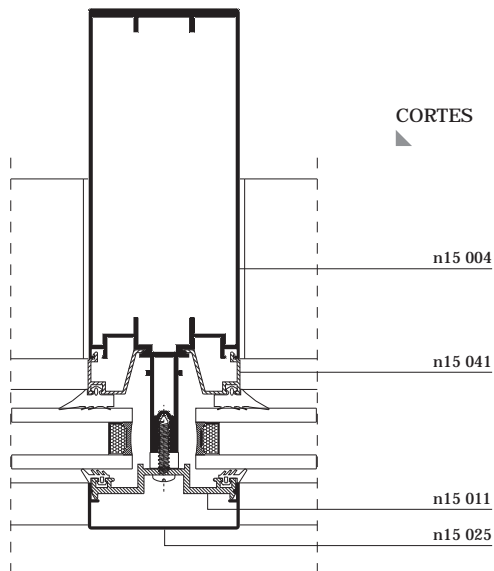


nota:  
bites variam em função  
da espessura dos vidros.  
Consultar pág. 2.1.37 a  
2.1.40.

vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



**CORTES**



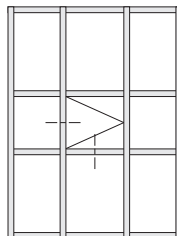
# n15 000

sistema de fachadas  
fachada cortina

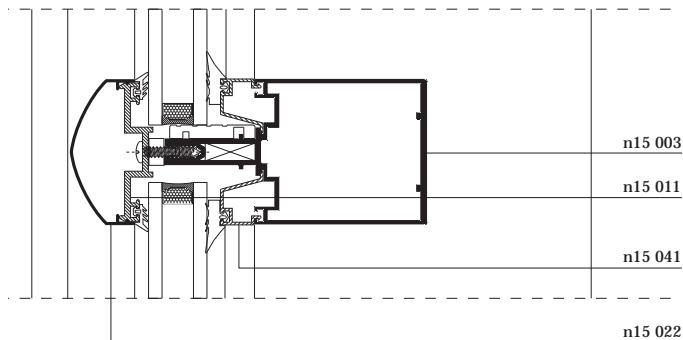
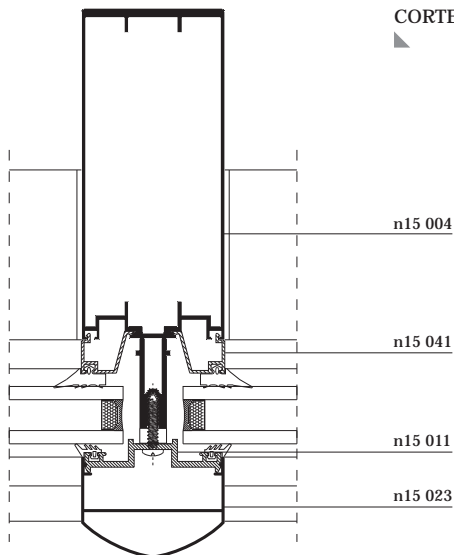
cortes e pormenores de montagem  
opção | utilização de capas diversas e bites

nota:  
bites variam em função  
da espessura dos vidros.  
Consultar pág. 2.1.37 a  
2.1.40.

vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.

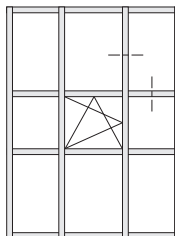


CORTES

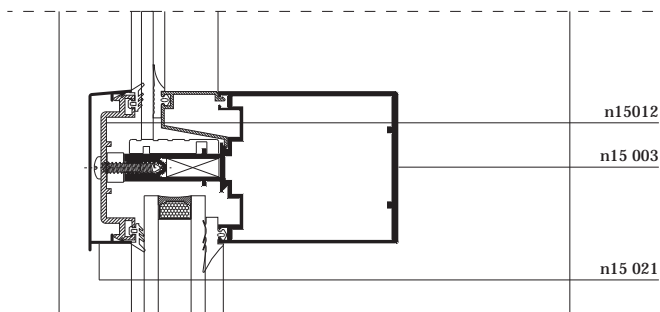
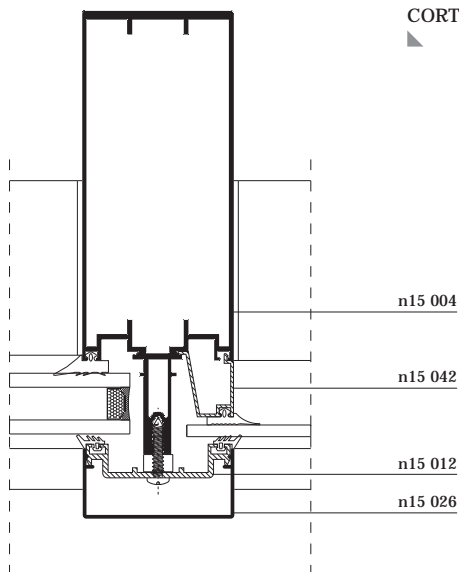


nota:  
bites variam em função  
da espessura dos vidros.  
Consultar pág. 2.1.37 a  
2.1.40.

vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



CORTE



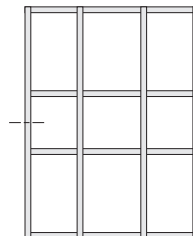
# n15 000

sistema de fachadas  
fachada cortina

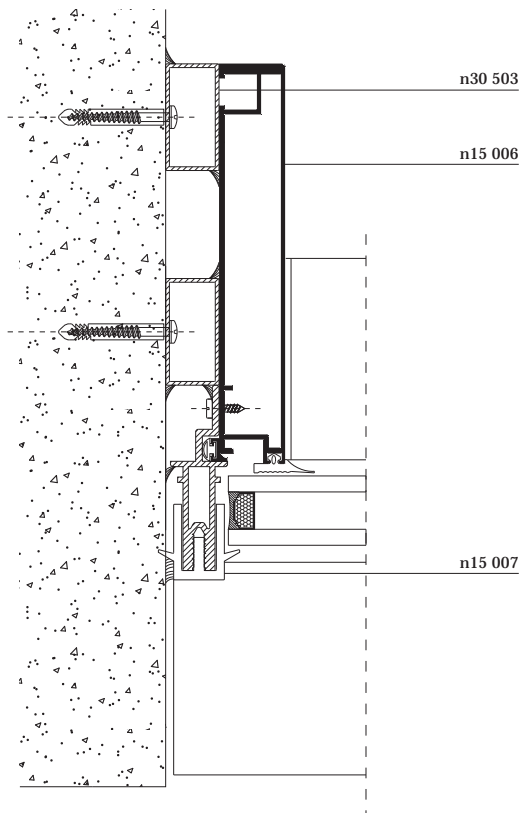
cortes e pormenores de montagem  
opções | tramo horizontal

vedantes:

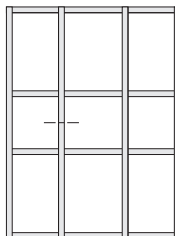
Consultar pág. 2.1.37 a  
2.1.40.



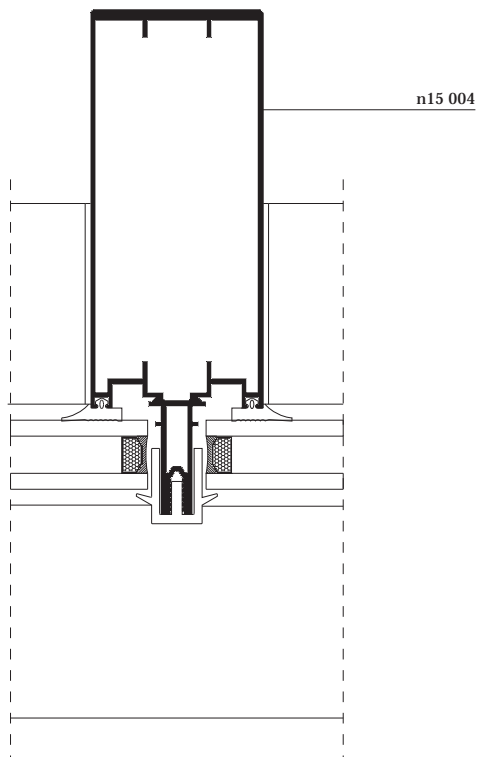
CORTE



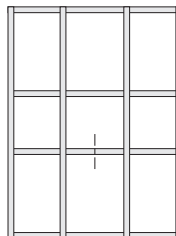
vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



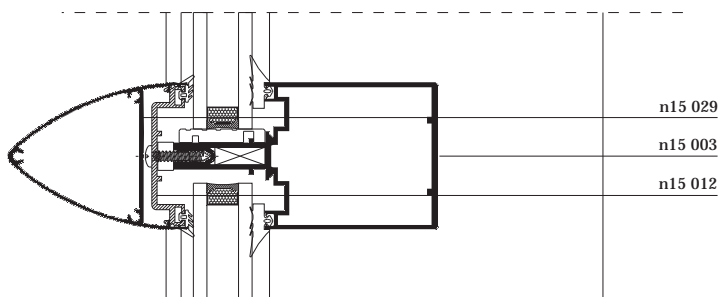
CORTE



vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.

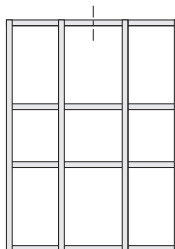


CORTE

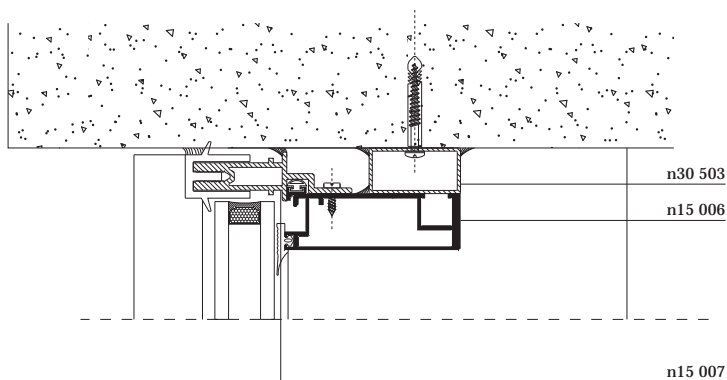




vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



**CORTE**

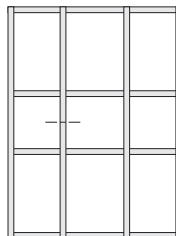


# n15 000

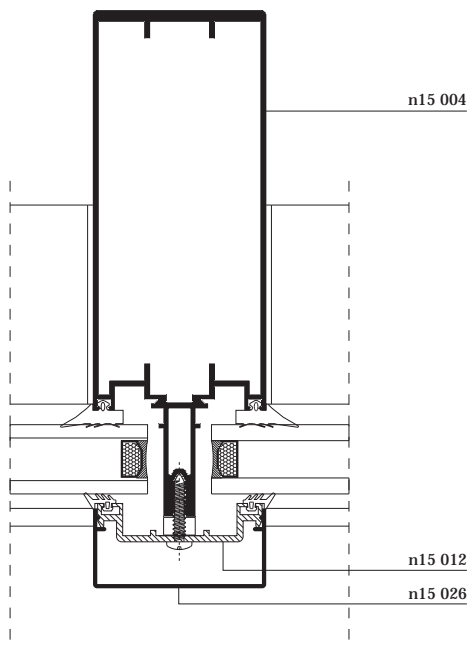
sistema de fachadas  
fachada cortina

cortes e pormenores de montagem  
opções | tramo vertical

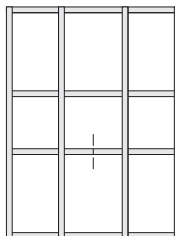
vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



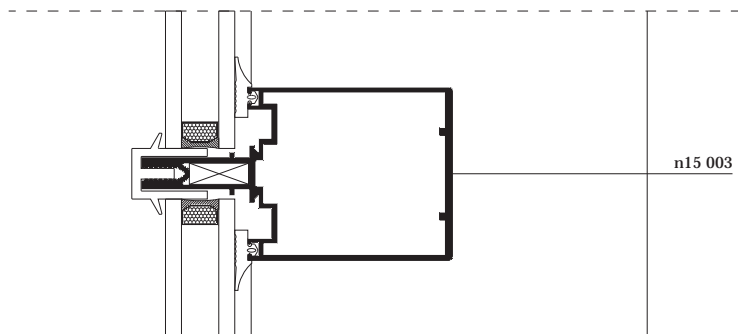
CORTE



vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



**CORTE**

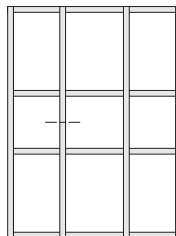


# n15 000

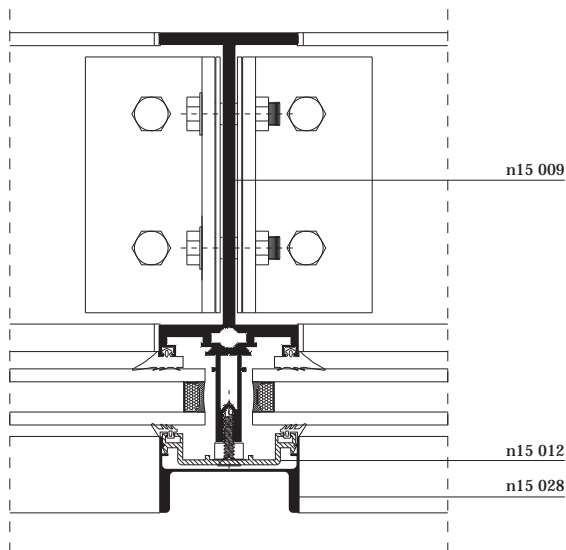
sistema de fachadas  
fachada cortina

cortes e pormenores de montagem  
opções

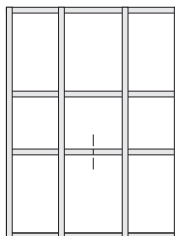
vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



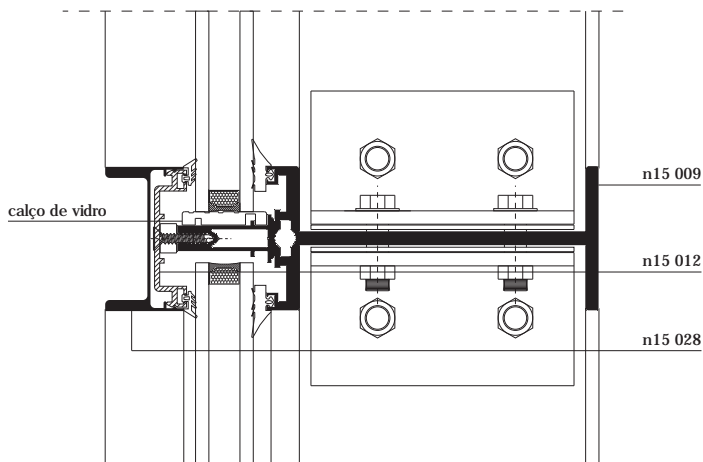
CORTE



vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



CORTE



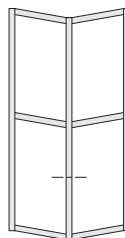
# n15 000

sistema de fachadas  
fachada cortina

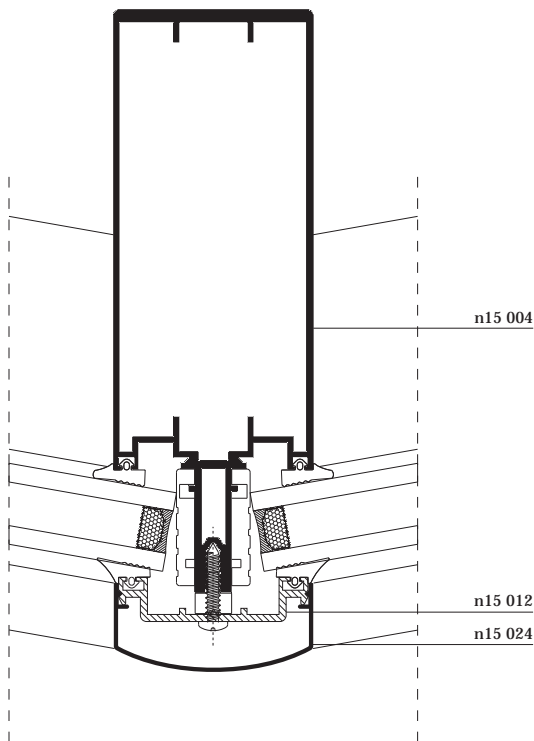
cortes e pormenores de montagem  
opções | fachada em ângulo

nota:  
fachada com um ângulo  
inferior a 10°.

vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.

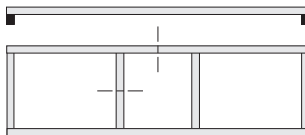


CORTE

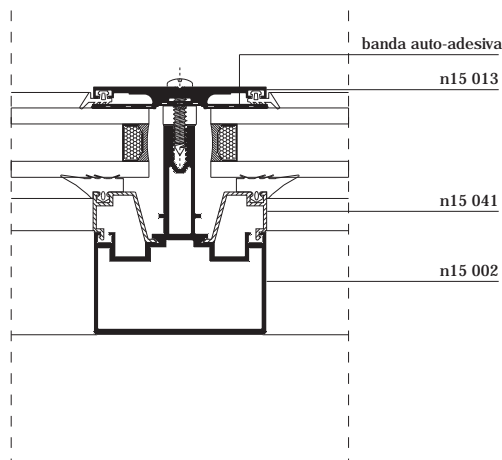
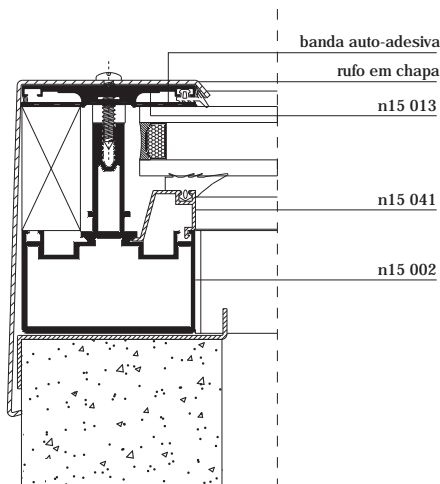


nota:  
bites variam em função  
da espessura dos vidros.  
Consultar pág. 2.1.37 a  
2.1.40.

vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



**CORTES**



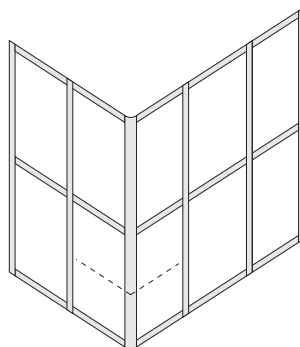
# n15 000

sistema de fachadas  
fachada cortina

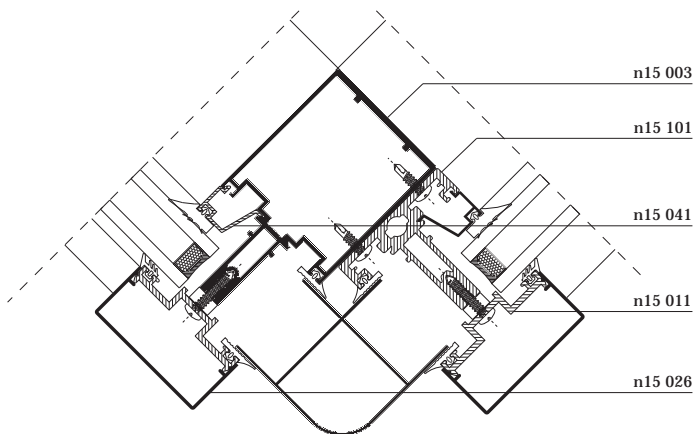
cortes e pormenores de montagem  
opções | canto 90° em fachada cortina

nota:  
bites variam em função  
da espessura dos vidros.  
Consultar pág. 2.1.31 a  
2.1.34.

vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.

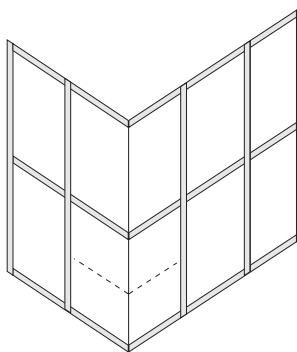


CORTE

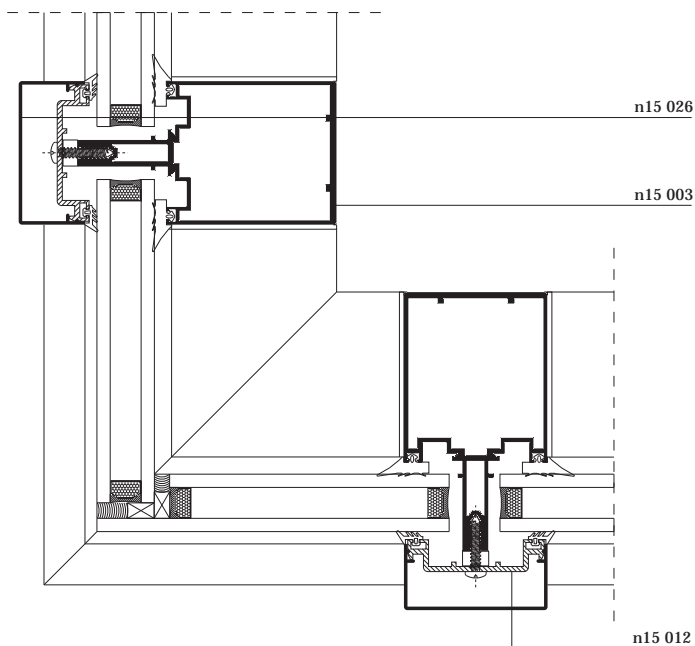




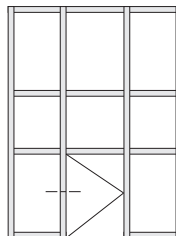
vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



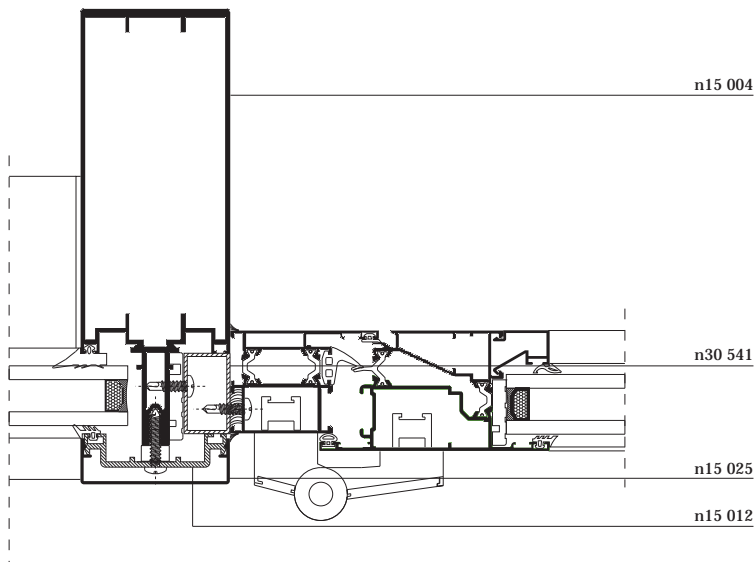
**CORTE**



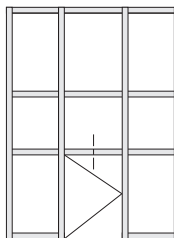
vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



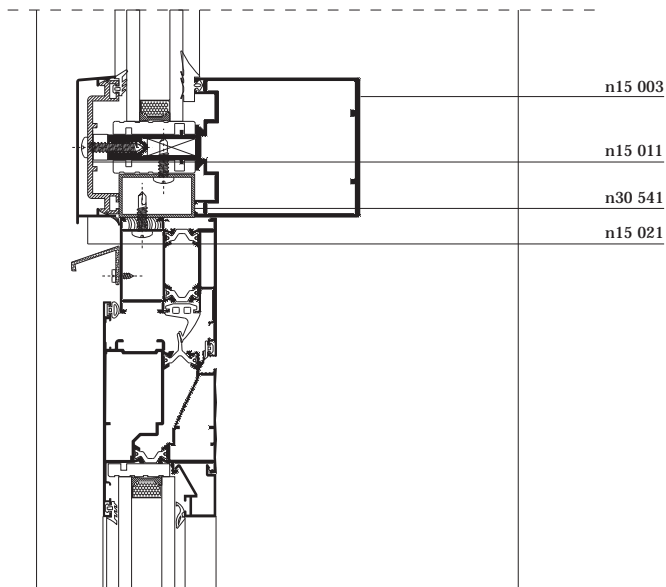
CORTE



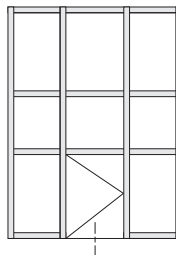
vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



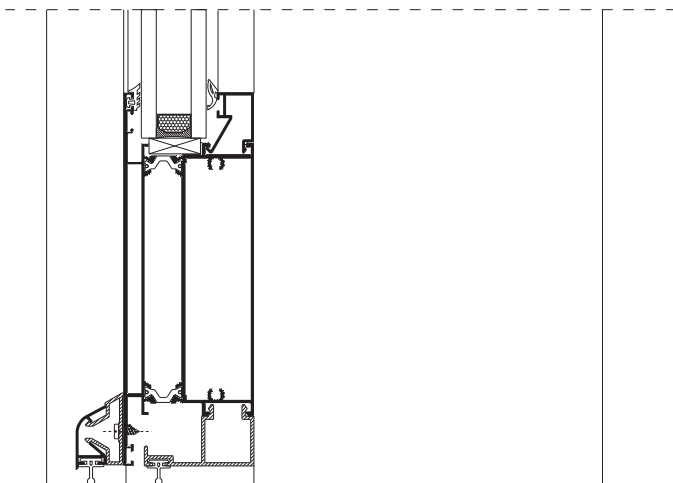
CORTE



vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.

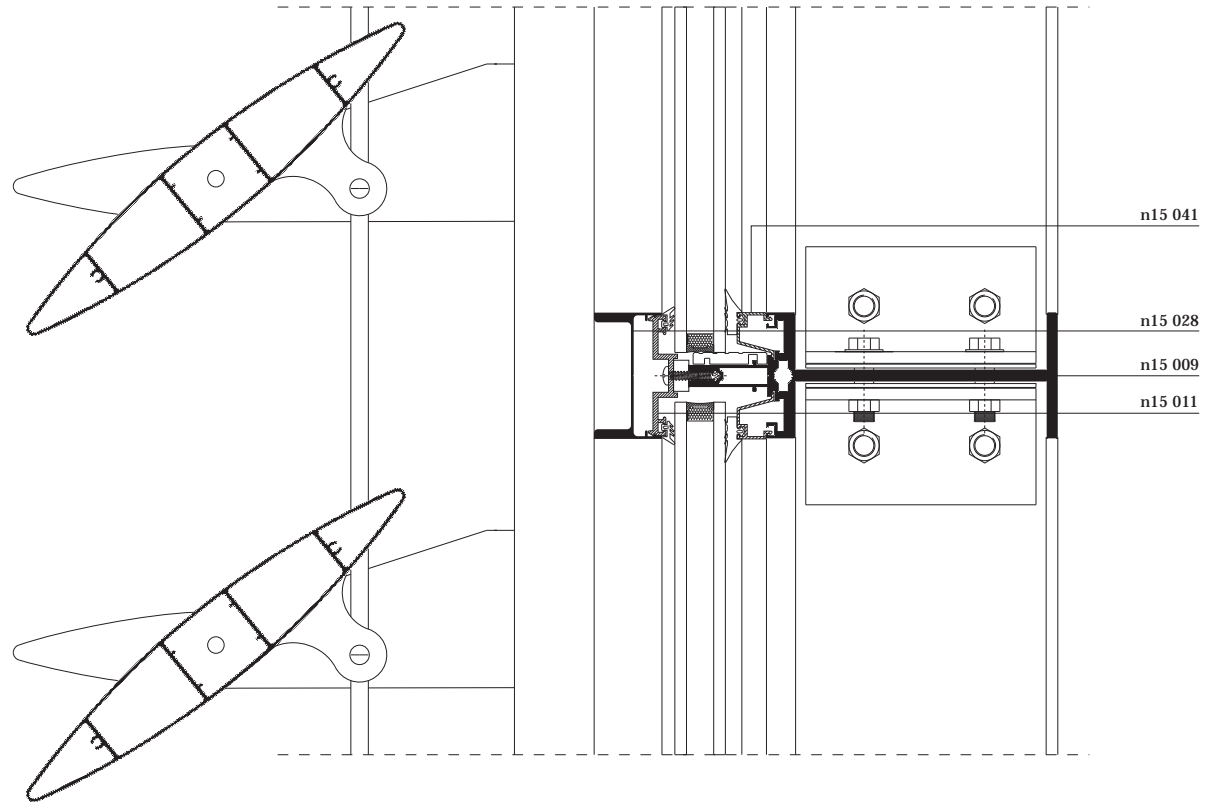
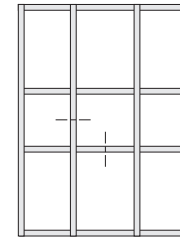
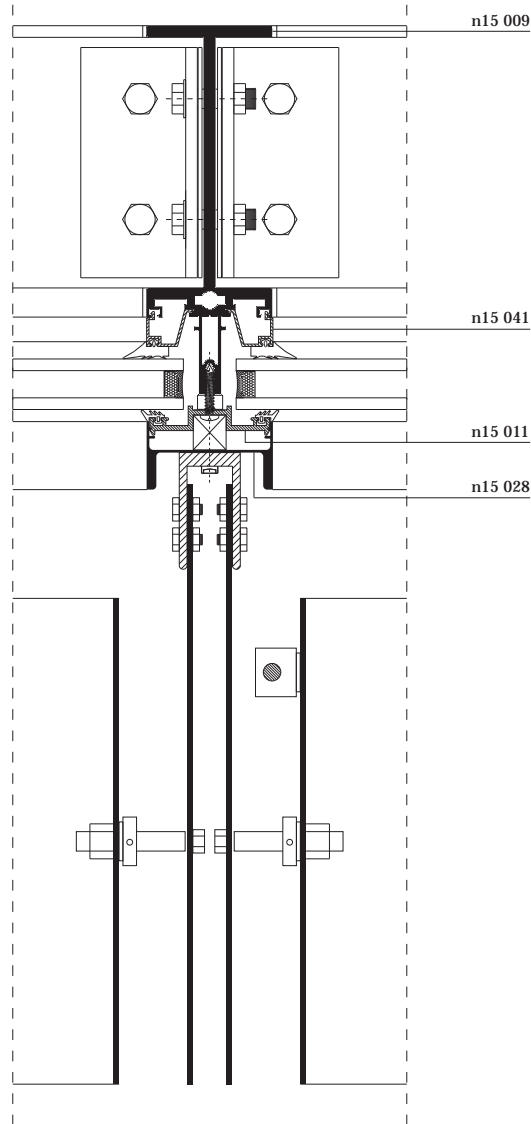


CORTE



vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.

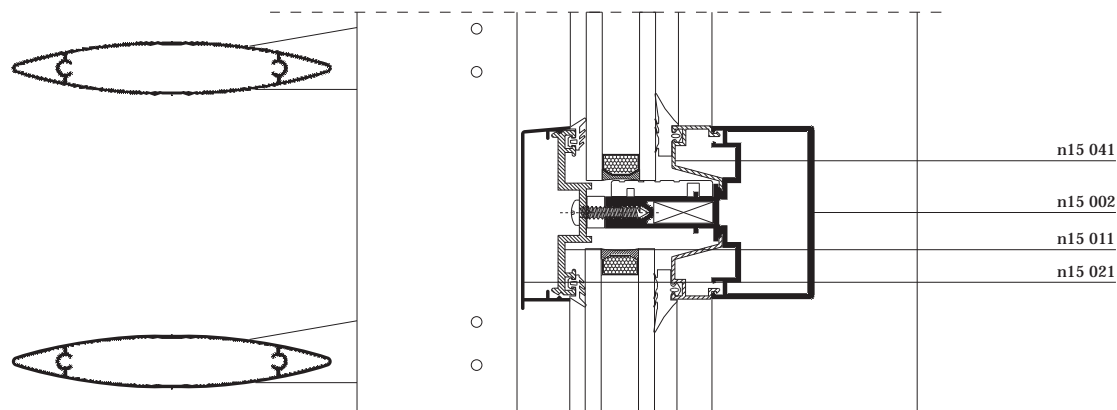
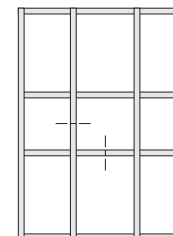
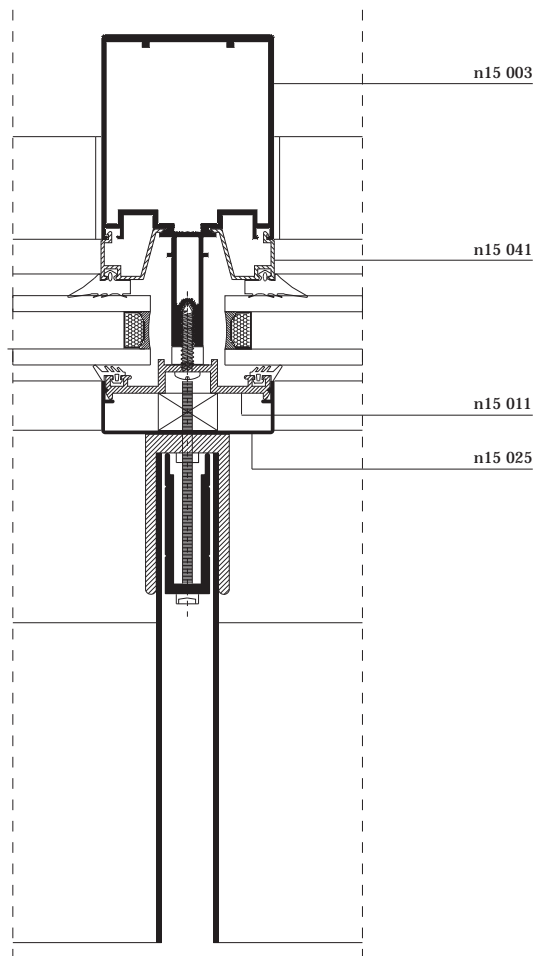
nota:  
soluções de lâminas e  
referências:  
Consultar catálogo de  
lâminas.



(exemplo de aplicação de lâmina quebra sol na fachada)

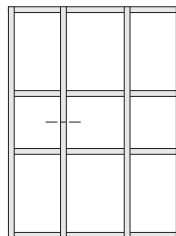
vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.

nota:  
soluções de lâminas e  
referências:  
Consultar catálogo de  
lâminas.

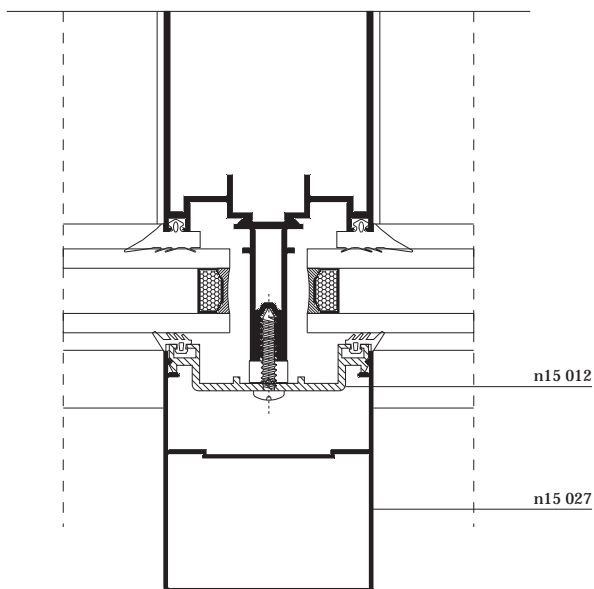


(exemplo de aplicação de lâmina quebra sol na fachada)

vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.



**CORTE**

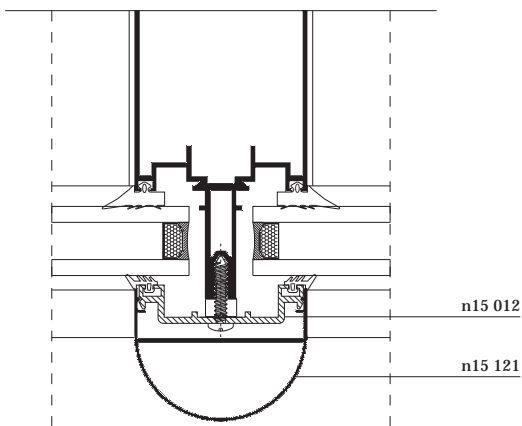
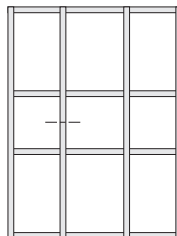


# n15 000

sistema de fachadas  
fachada cortina

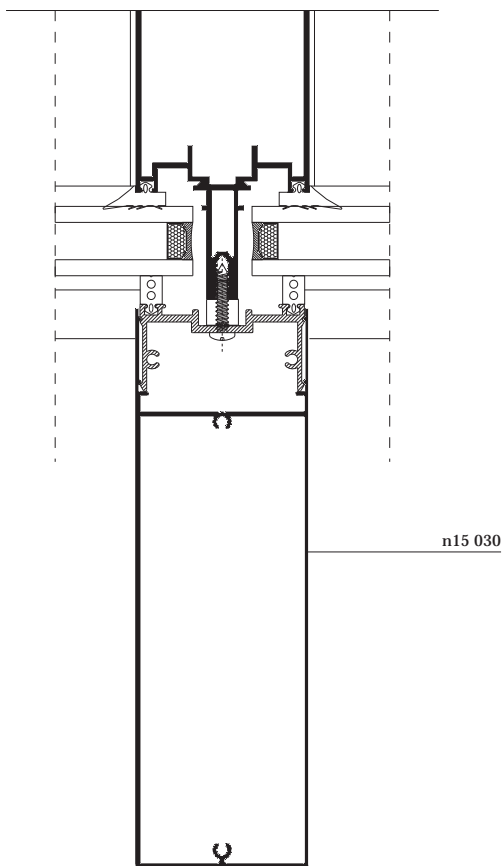
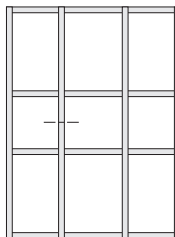
cortes e pormenores de montagem  
opções | capas de montantes

vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.





vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.

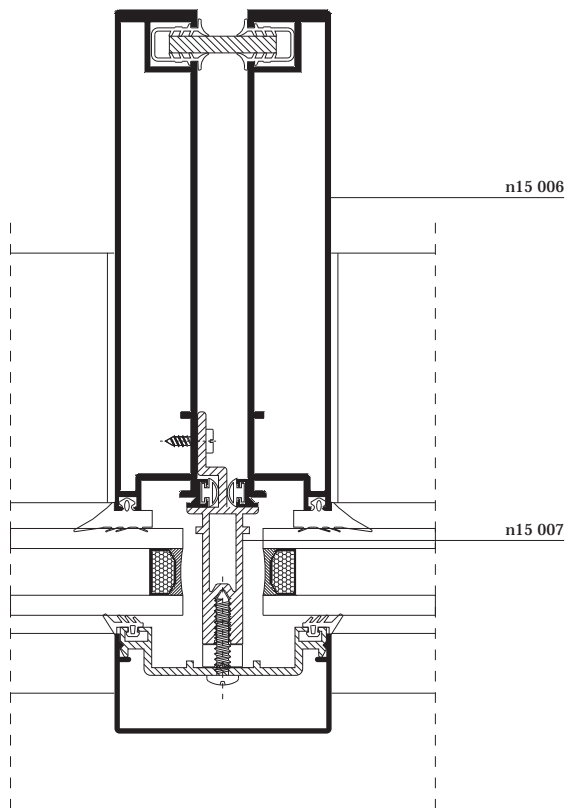
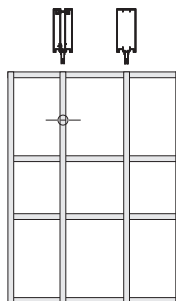


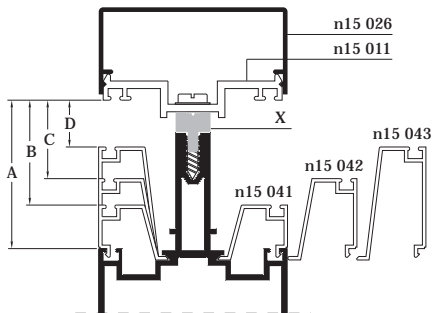
# n15 000

sistema de fachadas  
fachada cortina

cortes e pormenores de montagem  
construção de fachada cortina com inclusão de perfis de dilatação

vedantes:  
Consultar pág. 2.1.37 a  
2.1.40.





Ved. 0066





















Ved. 0023



Ved. 0024



espessura de enchimento (mm) sem vedantes	sem laco							X
		3 mm Ved. 0026	8 mm Ved. 0022	9 mm Ved. 0215	10 mm Ved. 0195	12 mm Ved. 0216	13 mm Ved. 0219	
9 - 22	9	12	17	18	19	21	22	D
	n15 043	n15 043	n15 043	n15 043	n15 043	n15 043	n15 043	bite
20 - 33	20	23	28	29	30	32	33	C
	n15 042	n15 042	n15 042	n15 042	n15 042	n15 042	n15 042	bite
29 - 42	29	32	37	38	39	41	42	B
	n15 041	n15 041	n15 041	n15 041	n15 041	n15 041	n15 041	bite
44 - 57	44	47	52	53	54	56	57	A
	s/bite	s/bite	s/bite	s/bite	s/bite	s/bite	s/bite	

espessura de vidro/ enchimento (mm)	vedante exterior	sem bite				vedante interior	
			n15 041	n15 042	n15 043		
sem laco		37	22	13	2	Ved. 0024	
		39	24	15	4	Ved. 0023	
Ved. 0026		40	25	16	5	Ved. 0024	
		42	27	18	7	Ved. 0023	
Ved. 0022		45	30	21	10	Ved. 0024	
		47	32	23	12	Ved. 0023	
Ved. 0215		46	31	22	11	Ved. 0024	
		48	33	24	13	Ved. 0023	
Ved. 0195		47	32	23	12	Ved. 0024	
		49	34	25	14	Ved. 0023	
Ved. 0216		49	34	25	14	Ved. 0024	
		51	36	27	16	Ved. 0023	
Ved. 0219		50	35	26	15	Ved. 0024	
		52	37	28	17	Ved. 0023	
espessura enchimentos com vedantes em mm							

# n15 000

sistema de fachadas  
fachada cortina

cortes e pormenores de montagem  
medidas de caixa de vidro

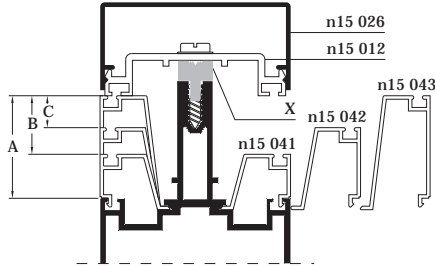
Ved. 0066



Ved. 0023

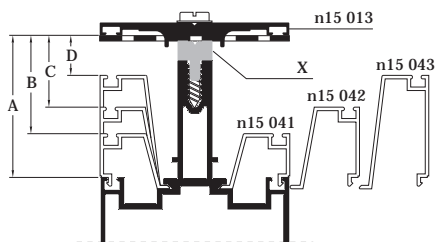


Ved. 0024



espessura de enchimento (mm) sem vedantes	sem taco							X
		3 mm Ved. 0026	8 mm Ved. 0022	9 mm Ved. 0215	10 mm Ved. 0195	12 mm Ved. 0216	13 mm Ved. 0219	
0 - 10						5	6	D
	n15 043	n15 043	n15 043	n15 043	n15 043	n15 043	n15 043	bite
8 - 21	4	7	12	13	14	16	17	C
	n15 042	n15 042	n15 042	n15 042	n15 042	n15 042	n15 042	bite
17 - 30	13	16	21	22	23	25	26	B
	n15 041	n15 041	n15 041	n15 041	n15 041	n15 041	n15 041	bite
32 - 45	28	31	36	37	38	40	41	A
	s/bite	s/bite	s/bite	s/bite	s/bite	s/bite	s/bite	

espessura de vidro/ enchimento (mm)	vedante exterior	sem bite				vedante interior	
			n15 041	n15 042	n15 043		
sem taco		25	10	1	-	Ved. 0024	
		27	12	3	-	Ved. 0023	
Ved. 0026		28	13	4	-	Ved. 0024	
		30	15	6	-	Ved. 0023	
Ved. 0022		33	18	9	-	Ved. 0024	
		35	20	11	-	Ved. 0023	
Ved. 0215		34	19	10	-	Ved. 0024	
		36	21	12	1	Ved. 0023	
Ved. 0195		35	20	11	-	Ved. 0024	
		37	22	13	2	Ved. 0023	
Ved. 0216		37	22	13	2	Ved. 0024	
		39	24	15	4	Ved. 0023	
Ved. 0219	38	23	14	3	Ved. 0024		
	40	25	16	5	Ved. 0023		
espessura enchimentos com vedantes em mm							



Ved. 0066



Ved. 0023



Ved. 0024



espessura de enchimento (mm) sem vedantes	sem taco							X
		Ved. 0026	Ved. 0022	Ved. 0215	Ved. 0195	Ved. 0216	Ved. 0219	
7 - 20	7	10	15	16	17	19	20	D
	n15 043	n15 043	n15 043	n15 043	n15 043	n15 043	n15 043	bite
18 - 31	18	21	26	27	28	30	31	C
	n15 042	n15 042	n15 042	n15 042	n15 042	n15 042	n15 042	bite
27 - 40	27	30	35	36	37	39	40	B
	n15 041	n15 041	n15 041	n15 041	n15 041	n15 041	n15 041	bite
42 - 55	42	45	50	51	52	54	55	A
	s/bite	s/bite	s/bite	s/bite	s/bite	s/bite	s/bite	

espessura de vidro/ enchimento (mm)	vedante exterior	sem bite				vedante interior	
			n15 041	n15 042	n15 043	Ved. 0023	Ved. 0024
sem taco		35	20	11	-	Ved. 0024	
		37	22	13	2	Ved. 0023	
Ved. 0026		38	23	14	3	Ved. 0024	
		40	25	16	5	Ved. 0023	
Ved. 0022		43	28	19	8	Ved. 0024	
		45	30	21	10	Ved. 0023	
Ved. 0215		44	29	20	9	Ved. 0024	
		46	31	22	11	Ved. 0023	
Ved. 0195		45	30	21	10	Ved. 0024	
		47	32	23	12	Ved. 0023	
Ved. 0216		47	32	23	12	Ved. 0024	
		49	34	25	14	Ved. 0023	
Ved. 0219		48	33	24	13	Ved. 0024	
		50	35	26	15	Ved. 0023	
		espessura enchimentos com vedantes em mm					

# n15 000

sistema de fachadas  
fachada cortina

cortes e pormenores de montagem  
medidas de caixa de vidro

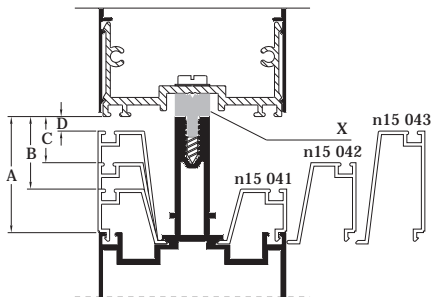
Ved. 0066















Ved. 0023



Ved. 0024



espessura de enchimento (mm) sem vedantes	sem taco							X
		3 mm Ved. 0026	8 mm Ved. 0022	9 mm Ved. 0215	10 mm Ved. 0195	12 mm Ved. 0216	13 mm Ved. 0219	
0 - 6			1	2	3	5	6	D
	n15 043	n15 043	n15 043	n15 043	n15 043	n15 043	n15 043	bite
4 - 17	4	7	12	13	14	16	17	C
	n15 042	n15 042	n15 042	n15 042	n15 042	n15 042	n15 042	bite
13 - 26	13	16	21	22	23	25	26	B
	n15 041	n15 041	n15 041	n15 041	n15 041	n15 041	n15 041	bite
28 - 41	28	31	36	37	38	40	41	A
	s/bite	s/bite	s/bite	s/bite	s/bite	s/bite	s/bite	s/bite

espessura de vidro/ enchimento (mm)	vedante exterior	sem bite				vedante interior	
			n15 041	n15 042	n15 043		
sem taco		21	6	-	-	Ved. 0024	
		23	8	-	-	Ved. 0023	
Ved. 0026		24	9	-	-	Ved. 0024	
		26	11	2	-	Ved. 0023	
Ved. 0022		29	14	5	-	Ved. 0024	
		31	16	7	-	Ved. 0023	
Ved. 0215		30	15	6	-	Ved. 0024	
		32	16	8	-	Ved. 0023	
Ved. 0195		31	16	7	-	Ved. 0024	
		33	18	9	-	Ved. 0023	
Ved. 0216	33	18	9	-	Ved. 0024		
	35	20	11	-	Ved. 0023		
Ved. 0219	34	19	10	-	Ved. 0024		
	26	21	12	1	Ved. 0023		
espessura enchimentos com vedantes em mm							

## 2. fachada cortina

### 2.2 fabricação e montagem

**n15 000**  
sistema de fachadas  
fachada cortina

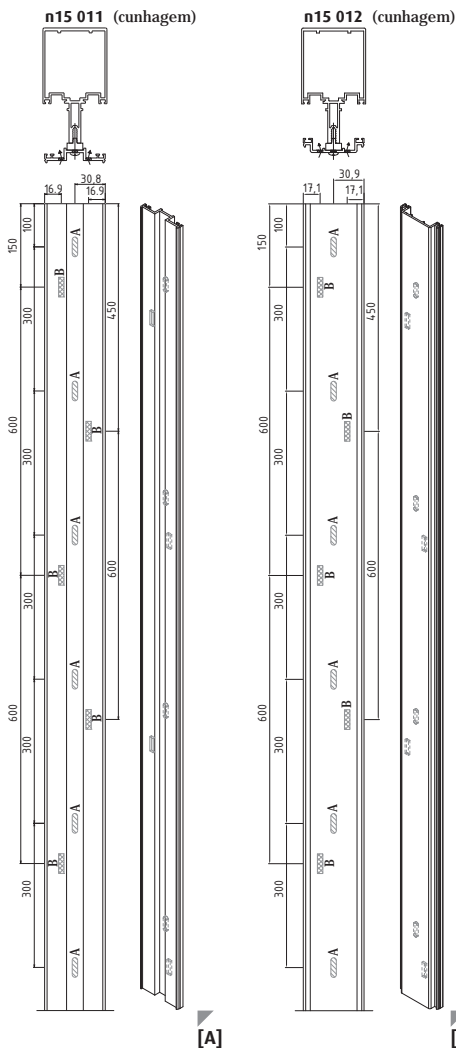
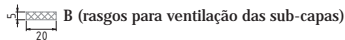
n15 000





[A]  
rasgos para  
aparafusamento e  
ventilação.

nota:  
furação aplicável com o  
cunho Cun. 0018 para os  
perfis n15 011  
e n15 012.



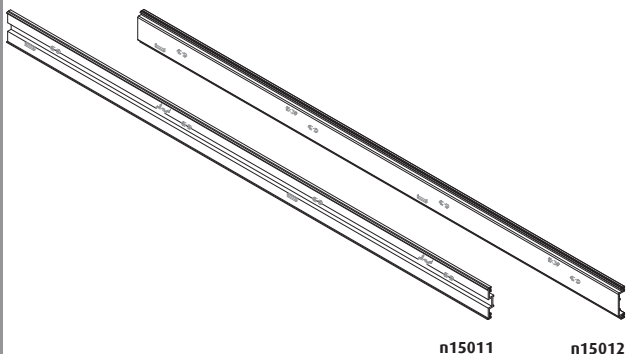
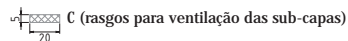
# n15 000

sistema de fachadas  
fachada cortina

fresagens  
sub-capas/travessas

[A]  
rasgos para drenagem,  
aparafusamento e  
ventilação.

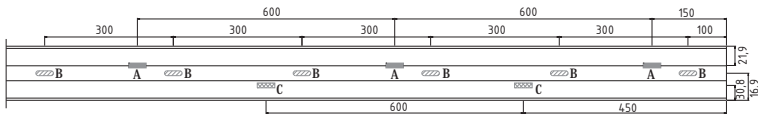
nota:  
furação aplicável com o  
cunho Cun. 0018 para os  
perfis n15 011  
e n15 012.



n15011

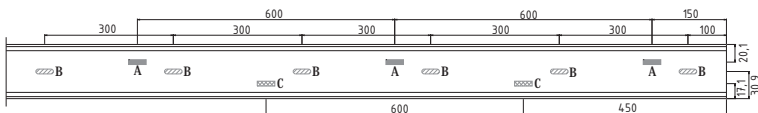
n15012

n15 011 (cunhagem)

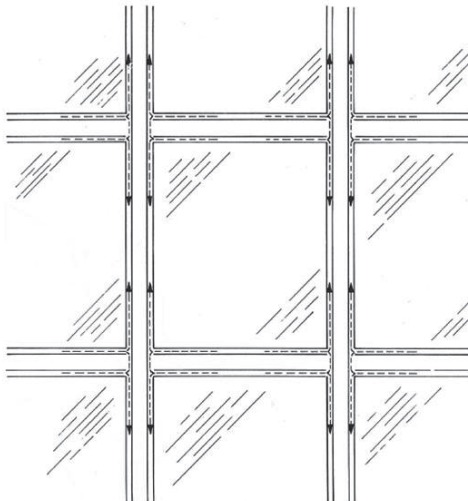
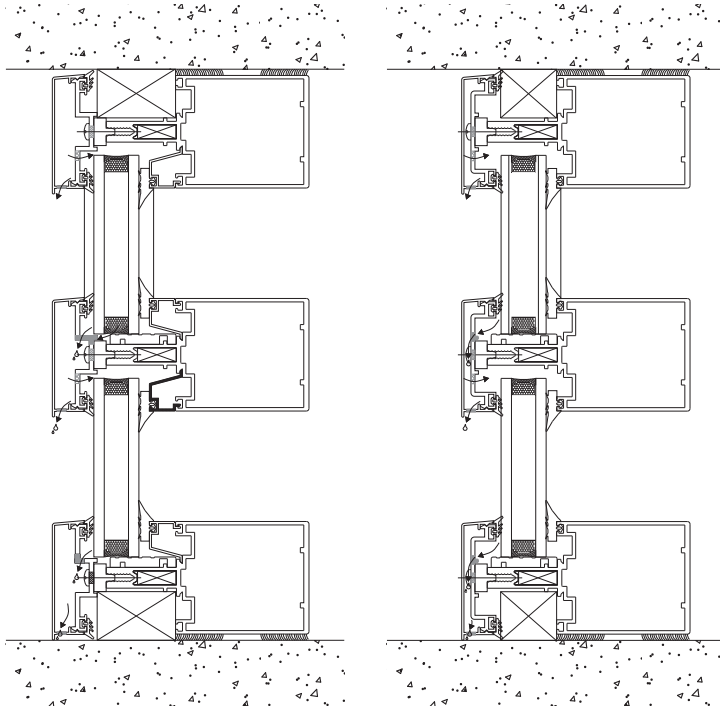


[A]

n15 012 (cunhagem)



[A]



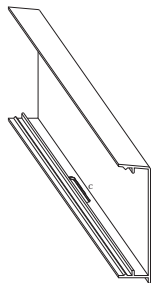
(ventilação da fachada)

# n15 000

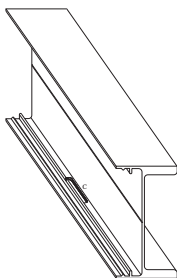
sistema de fachadas  
fachada cortina

fresagens  
horizontais

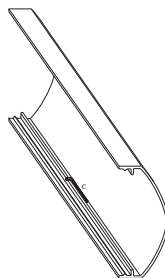
[A]  
rasgos de drenagem.  
nota:  
furação efectuada com o  
cunho Cun. 0018.



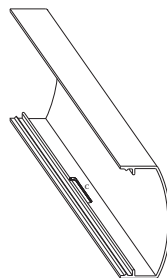
n15 021



n15 028



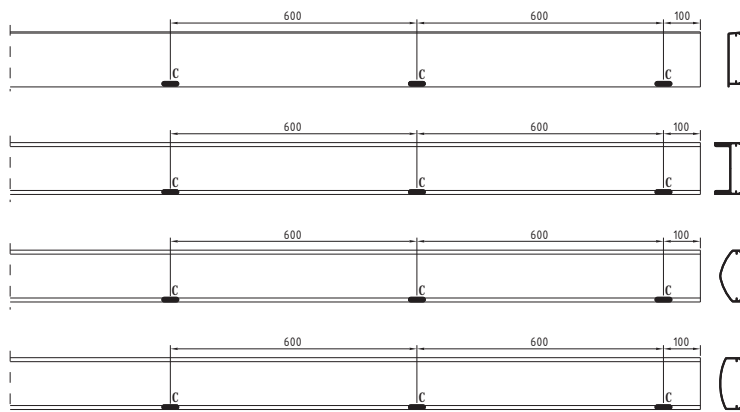
n15 022



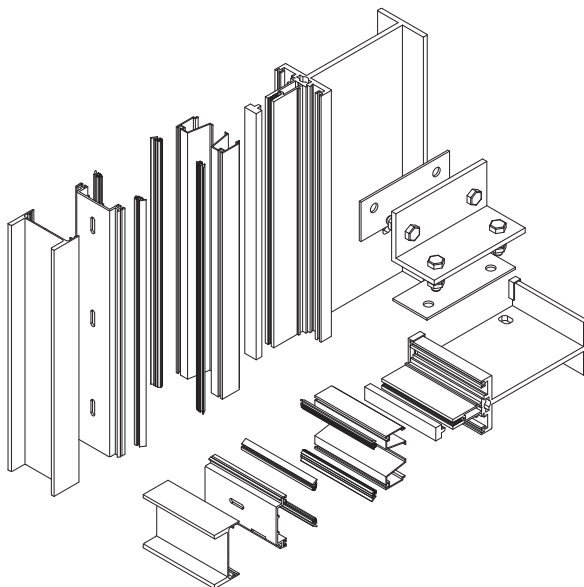
n15 024

[A]

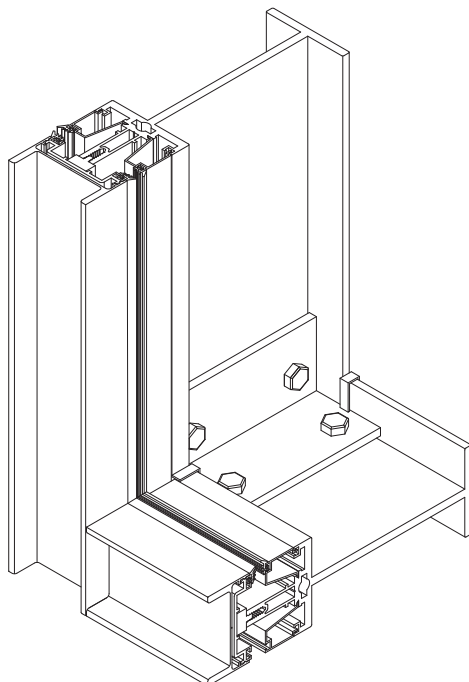
capas  
travessas



[A]  
exemplo de montagem de  
fachada cortina.



[A]



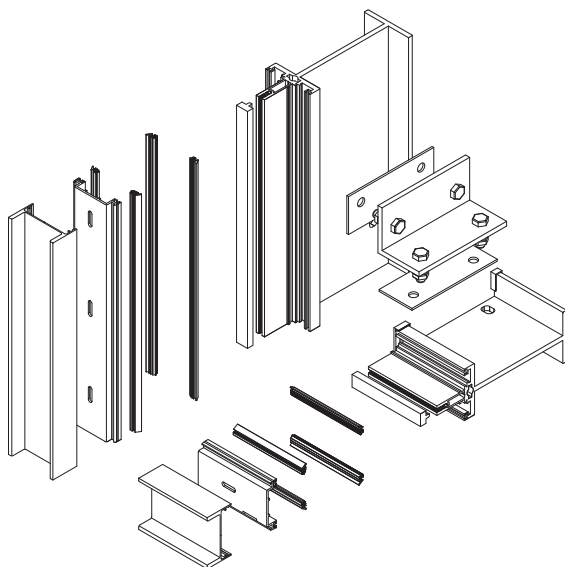
[A]

# n15 000

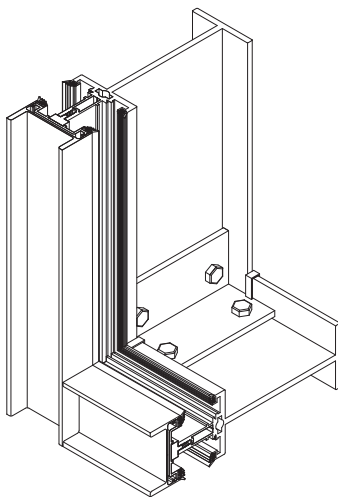
sistema de fachadas  
fachada cortina

esquema de montagem  
opção sem bite

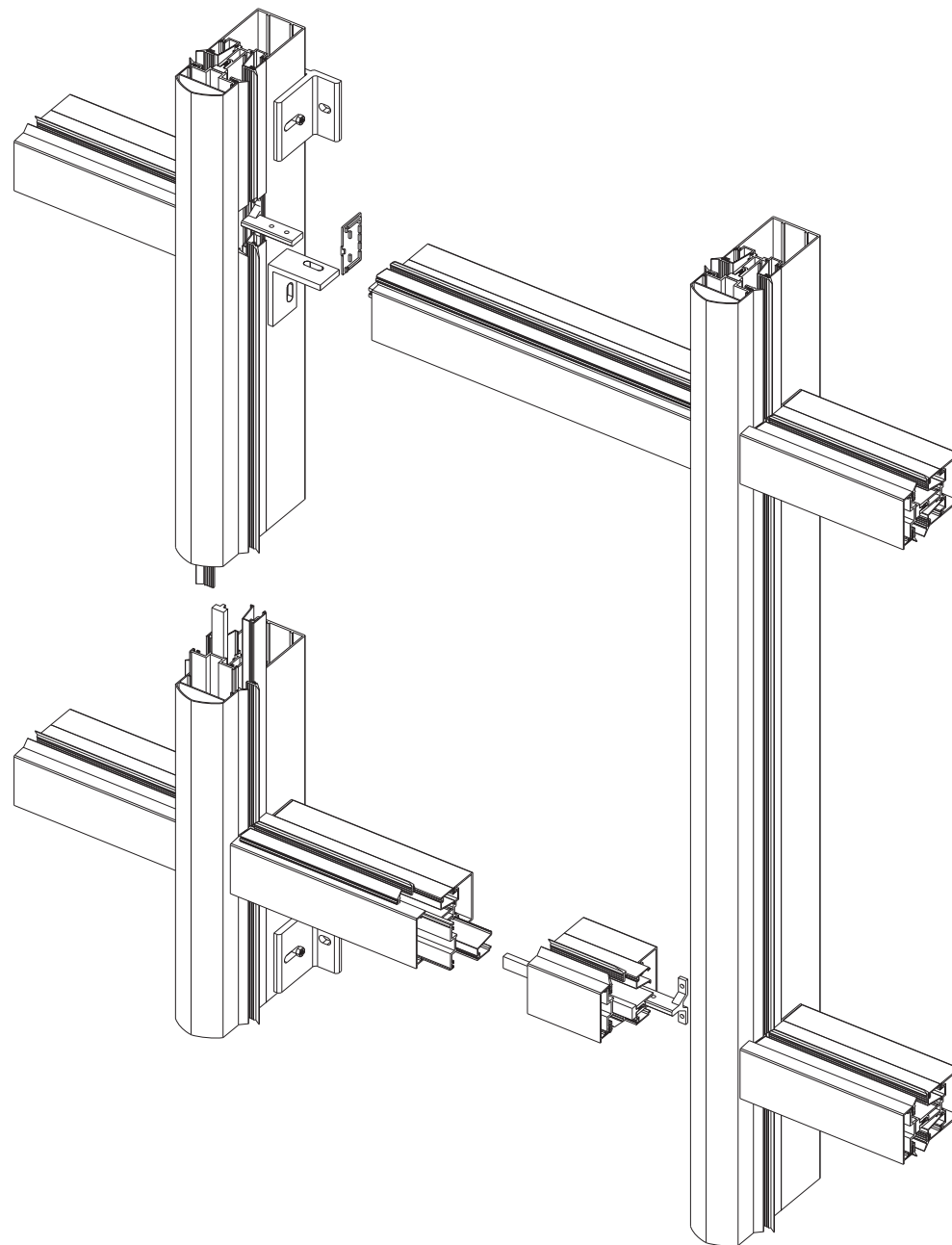
[A]  
exemplo de montagem de  
fachada cortina opção sem  
bite.

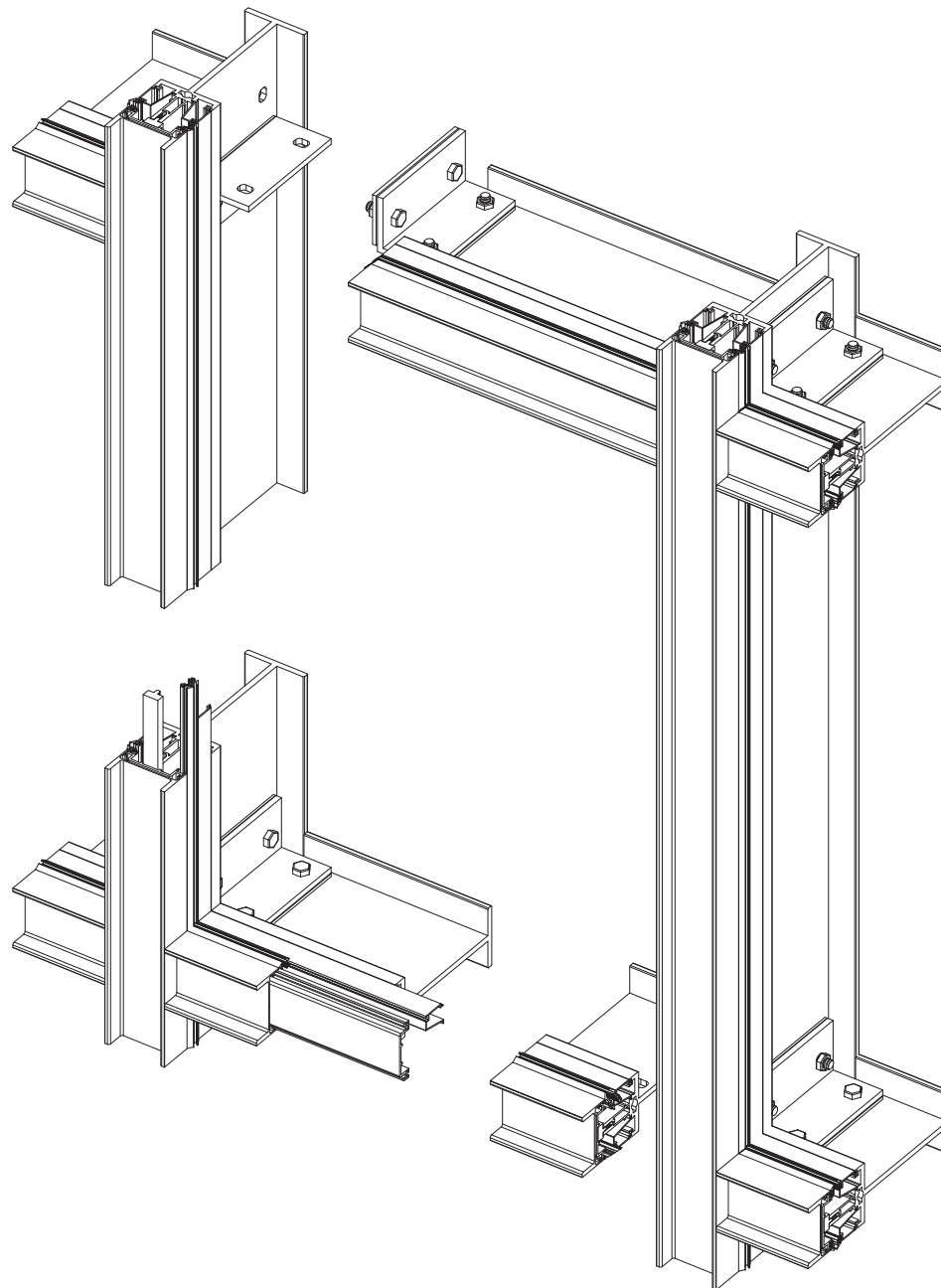


[A]



[A]







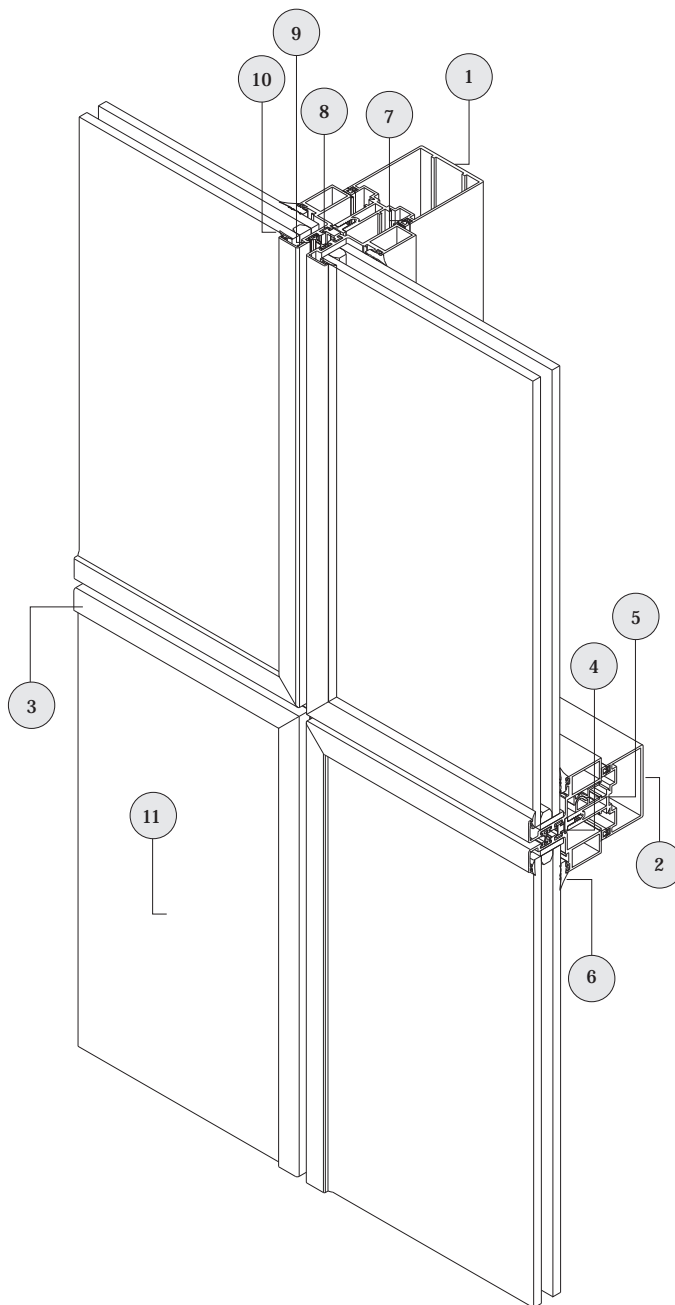
### 3. fachada VEP

#### 3.1 cortes e pormenores de montagem

**n15 000**  
sistema de fachadas  
fachada VEP

n15 000

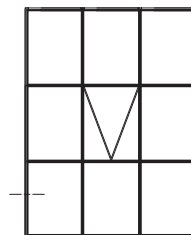




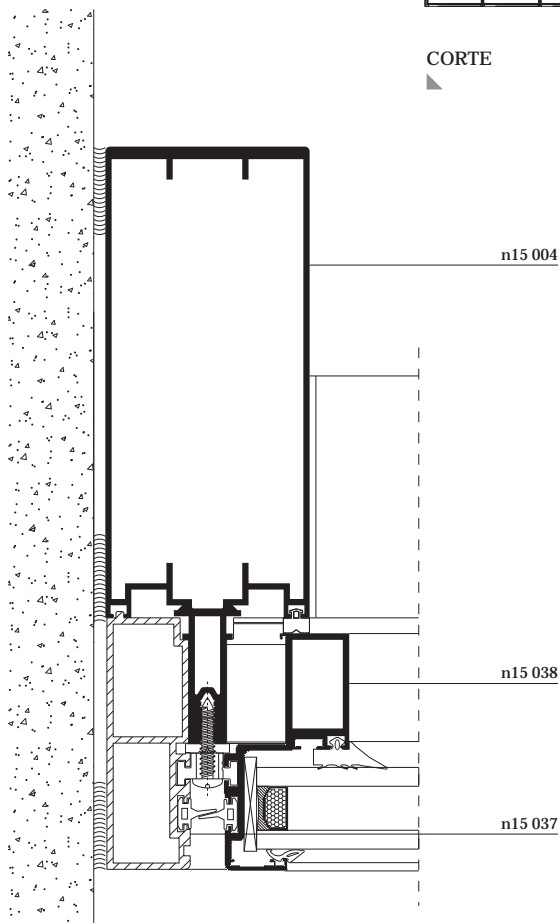
1. perfil de montante.
2. perfil de travessa.
3. perfil de vidro preso.
4. fixador de quadro.
5. apoio de quadro.
6. vedante interior de vidro.
7. calço de eixo.
8. calço de apoio ao quadro.
9. vedante quadro.
10. vedante exterior de vidro.
11. vidro.

vedantes:

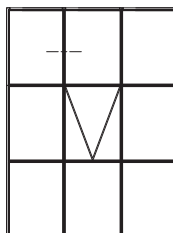
Consultar pág. 3.1.33 a  
3.1.38.



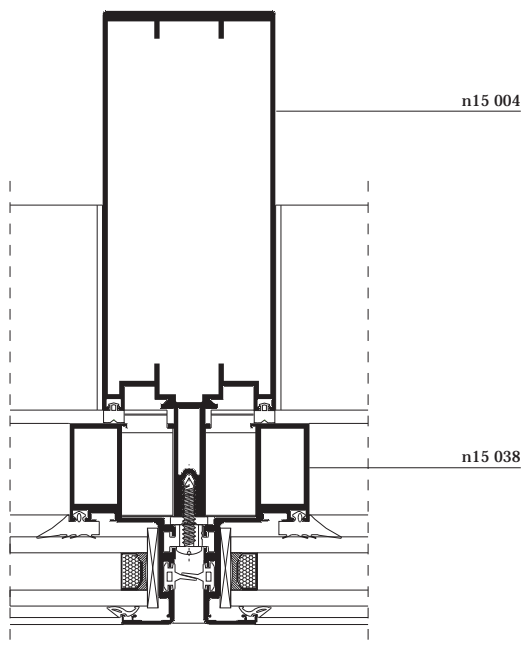
CORTE



vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.

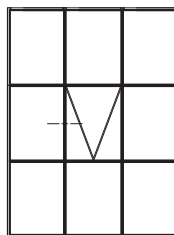


CORTE

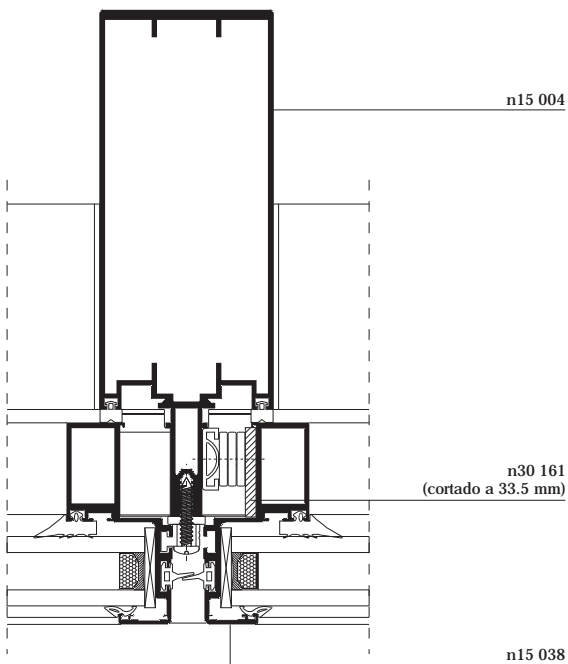


vedantes:

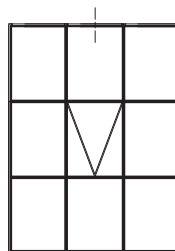
Consultar pág. 3.1.33 a  
3.1.38.



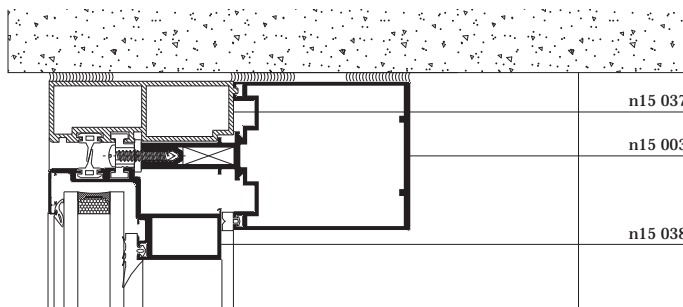
CORTE



vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.



CORTE



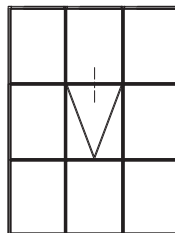
n15 037

n15 003

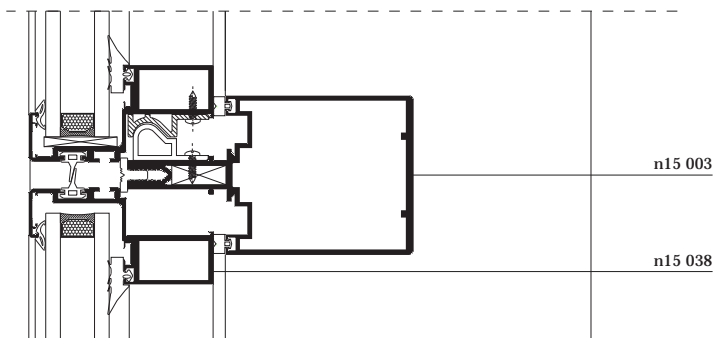
n15 038

vedantes:

Consultar pág. 3.1.33 a  
3.1.38.

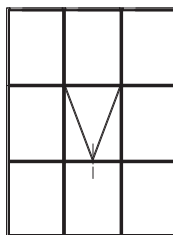


CORTE

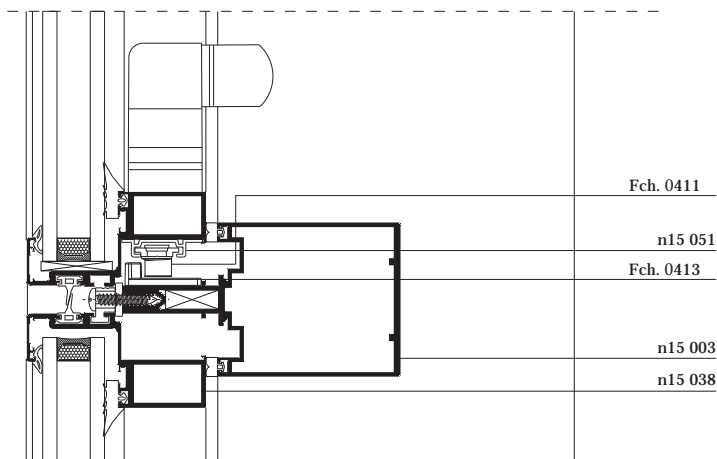




vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.

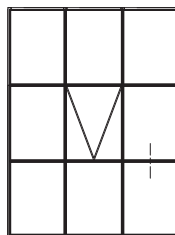


CORTE

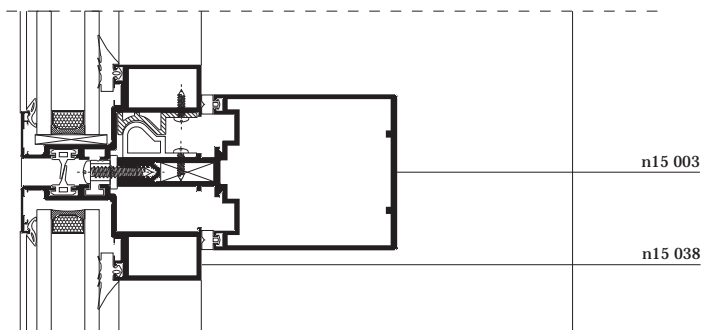


vedantes:

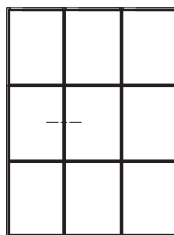
Consultar pág. 3.1.33 a  
3.1.38.



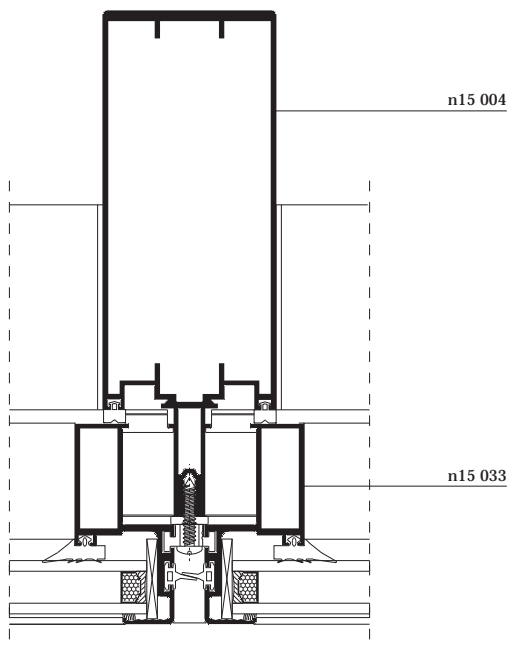
CORTE



vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.



CORTE

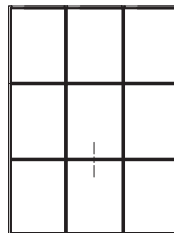


vedantes:

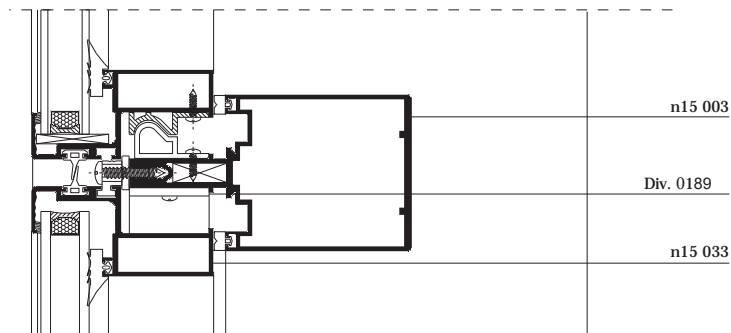
Consultar pág. 3.1.33 a  
3.1.38.

nota:

o Div. 0189 é aplicado de  
ambos os lados, sempre  
debaixo da travessa.



CORTE

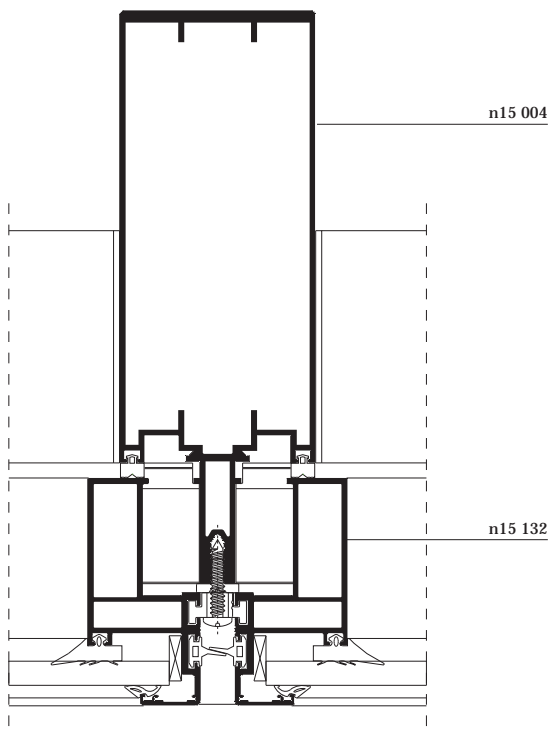
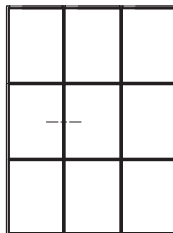




# n15 000

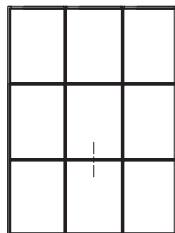
sistema de fachadas  
fachada VEP

vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.

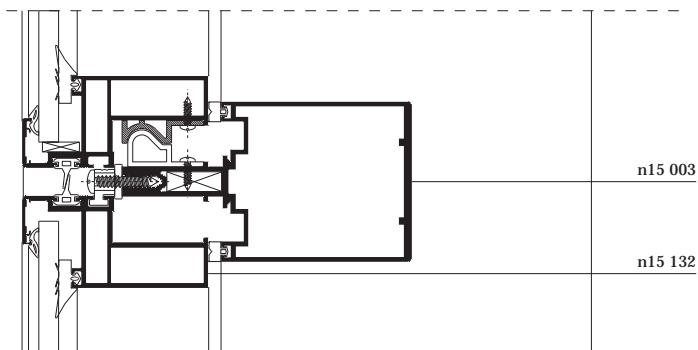


vedantes:

Consultar pág. 3.1.33 a  
3.1.38.

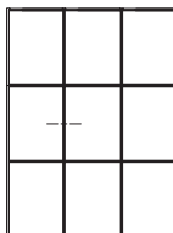


CORTE

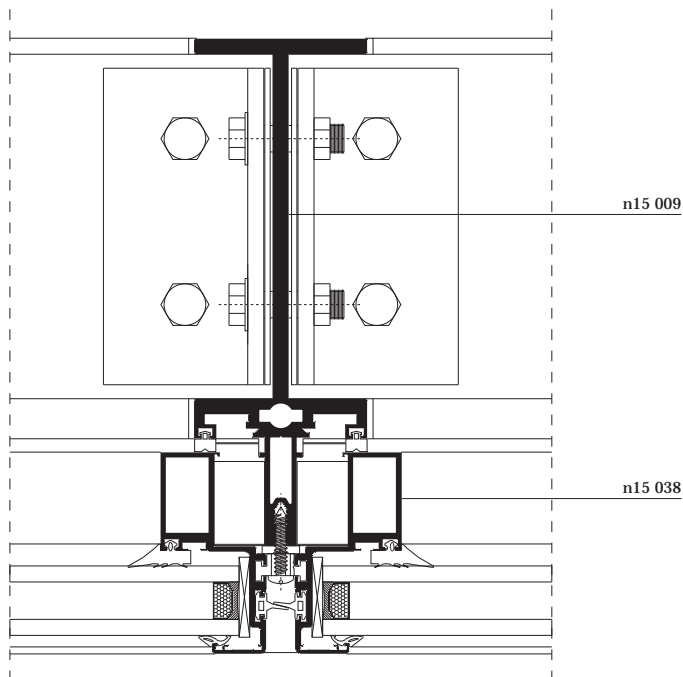




vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.

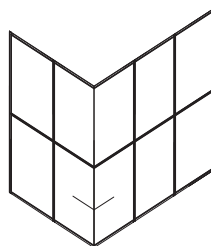


CORTE

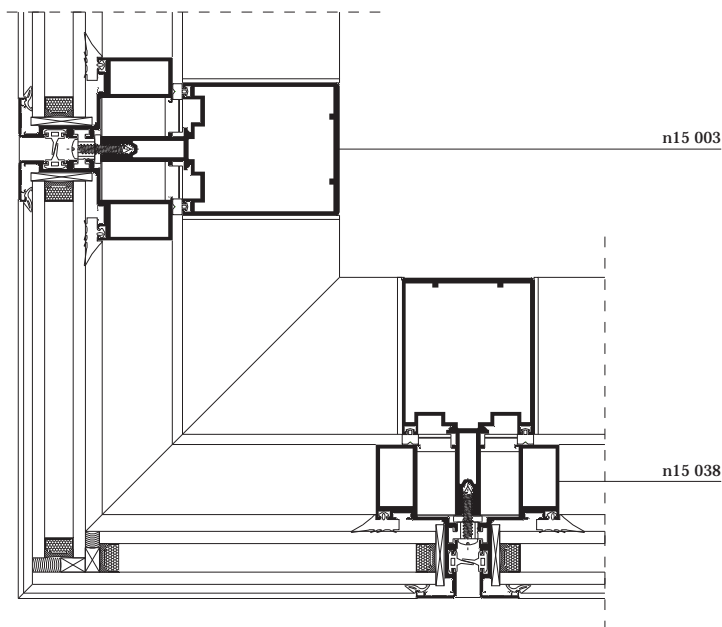


vedantes:

Consultar pág. 3.1.33 a  
3.1.38.



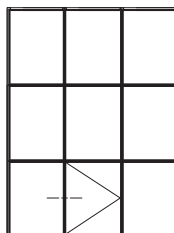
CORTE



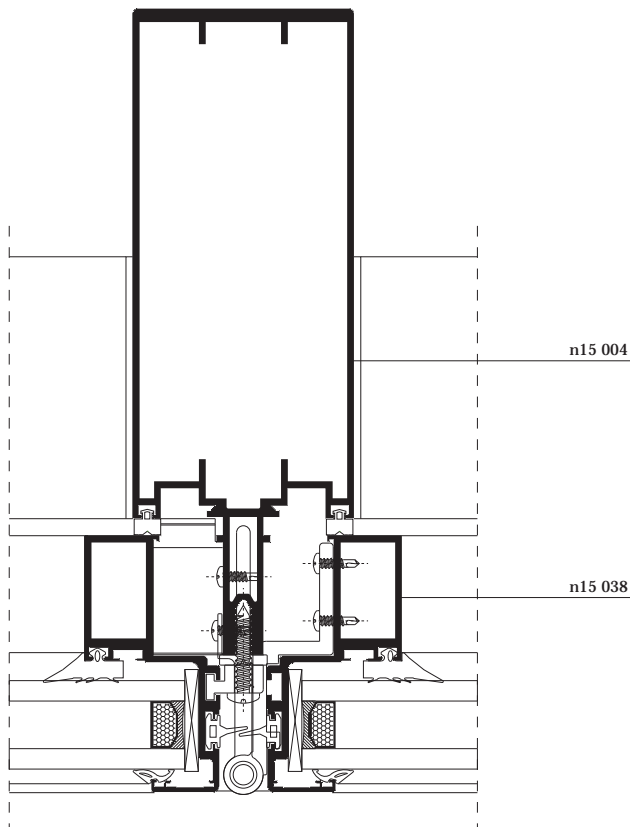
nota:  
só funciona com  
cremone.

nota:  
para portas utilizar  
Esq. 0002 com 13 mm.

vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.

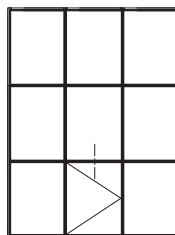


CORTE

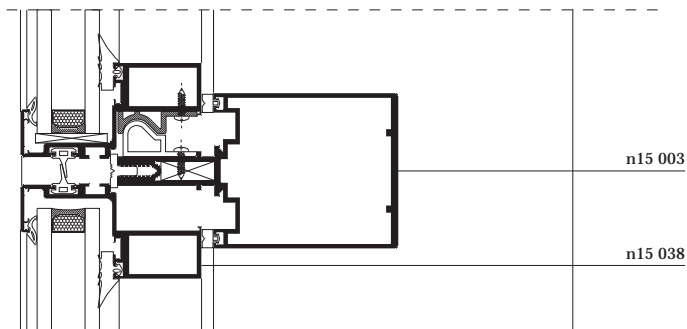


vedantes:

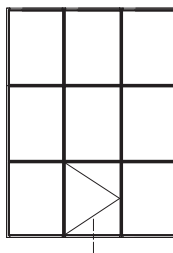
Consultar pág. 3.1.33 a  
3.1.38.



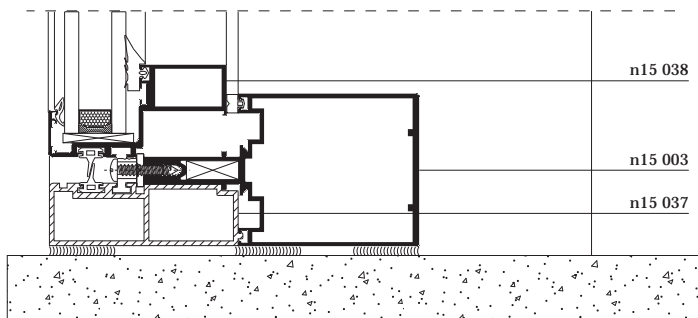
CORTE



vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.

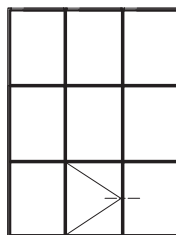


CORTE

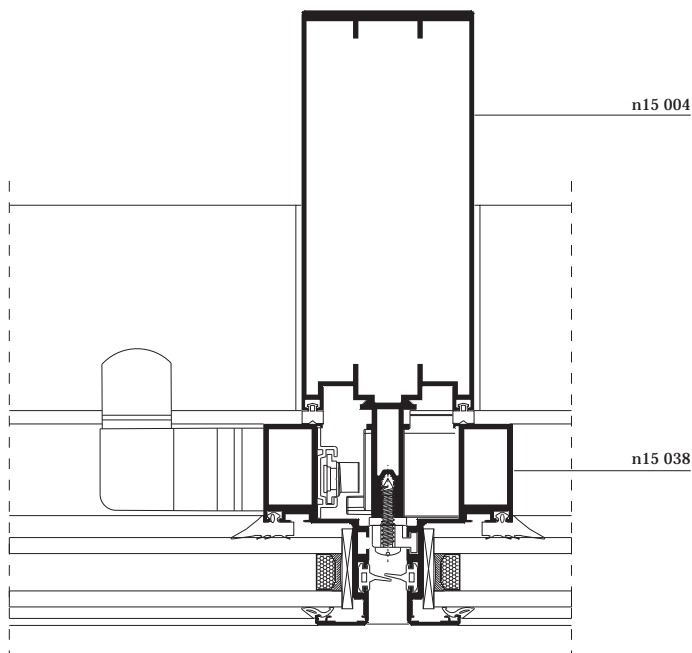


vedantes:

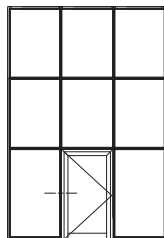
Consultar pág. 3.1.33 a  
3.1.38.



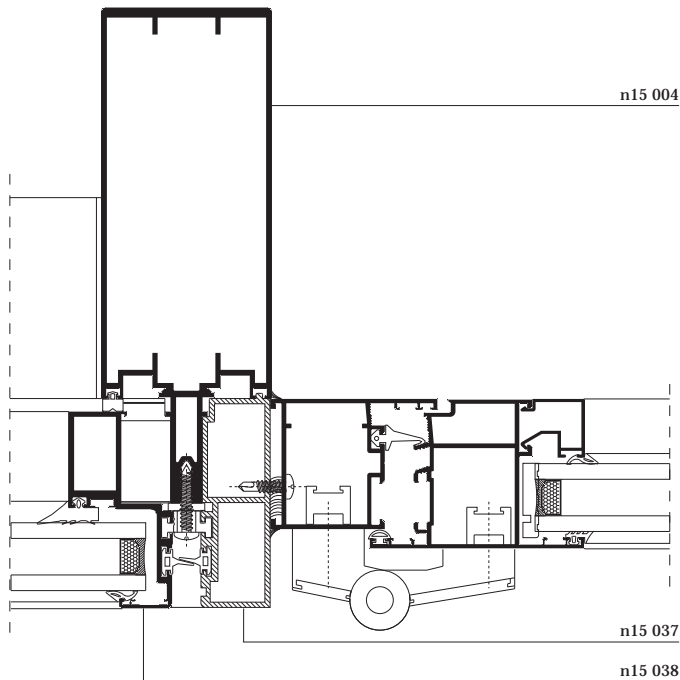
CORTE



vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.



CORTE



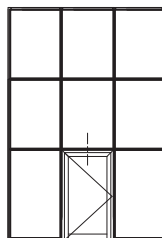
# n15 000

sistema de fachadas  
fachada VEP

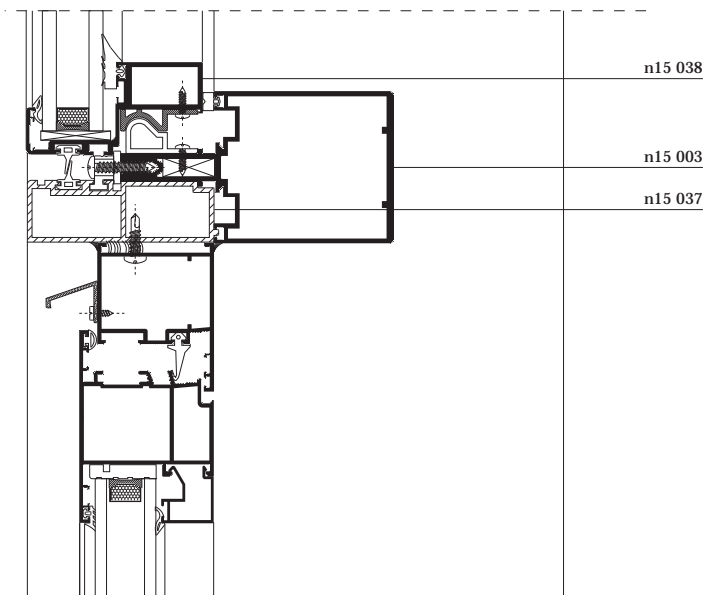
cortes e pormenores de montagem  
opções | pormenor porta série de abrir inserida em fachada VEP

nota:  
série de abrir com  
abertura exterior.

vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.

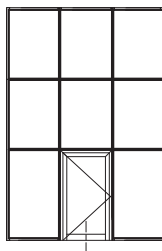


CORTE

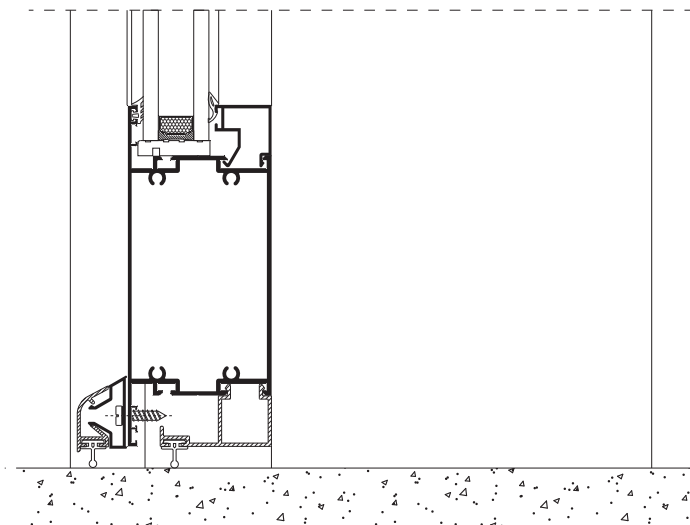




vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.

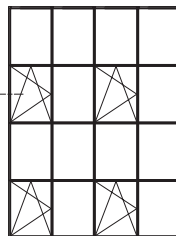


CORTE

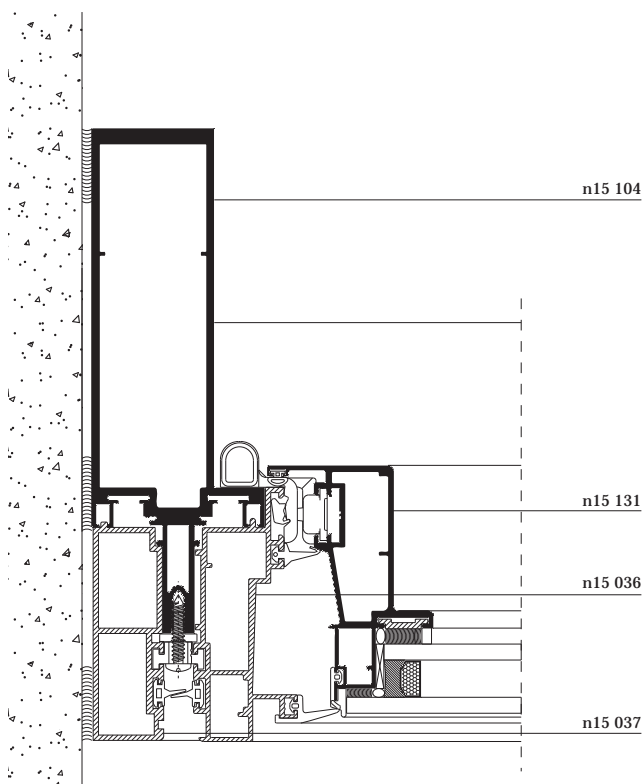


nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.

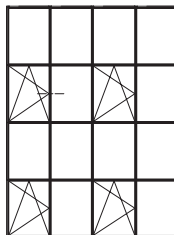


CORTE

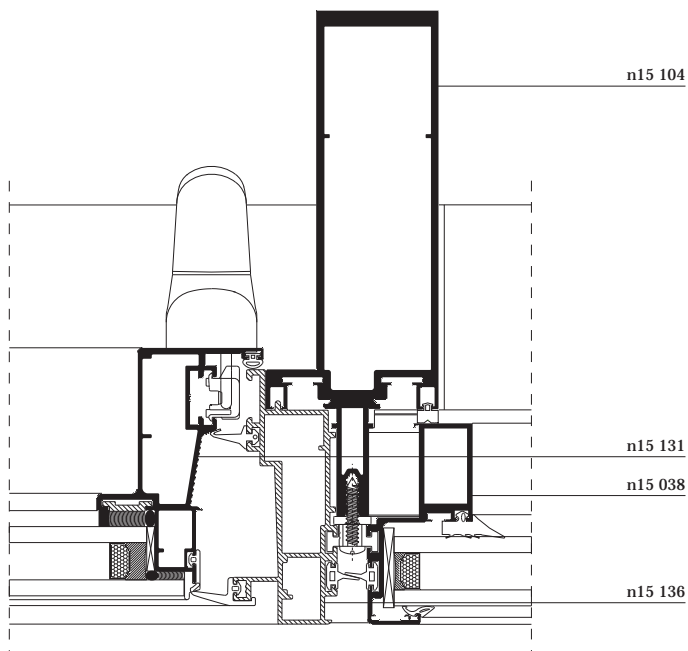


nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.

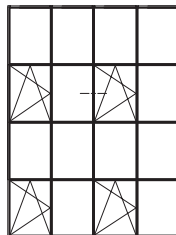


CORTE

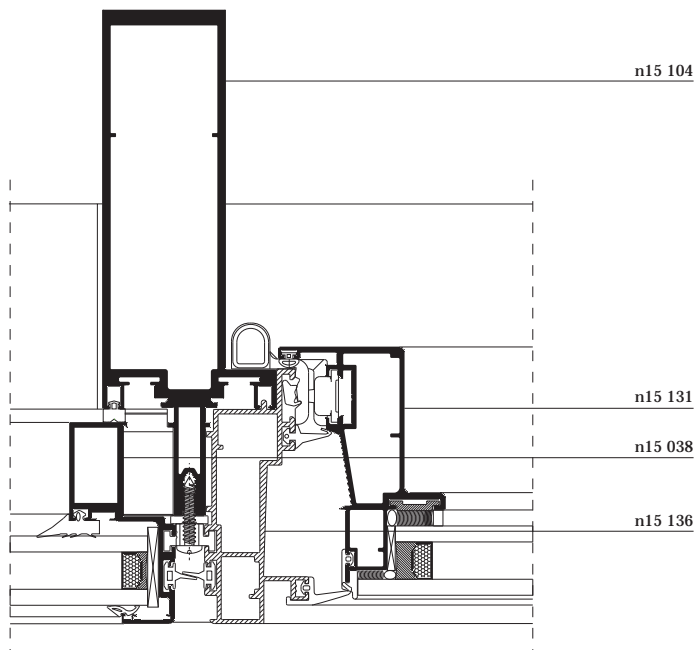


nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.

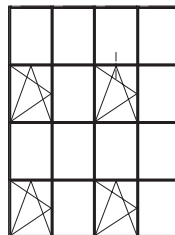


CORTE

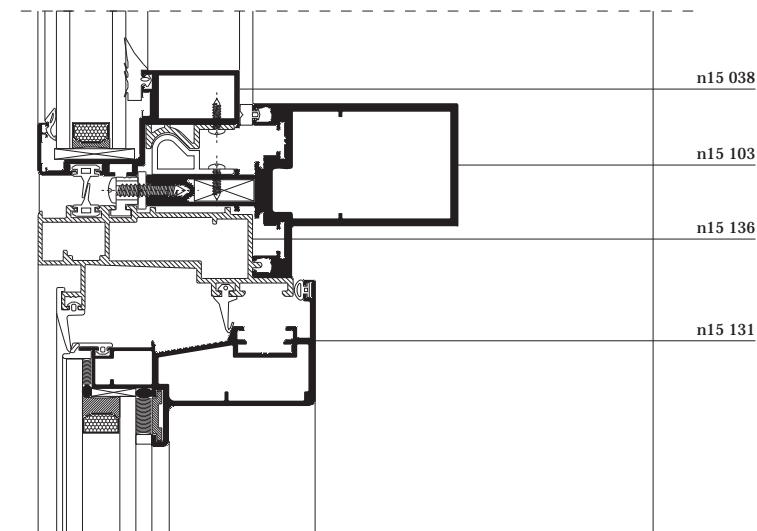


nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.

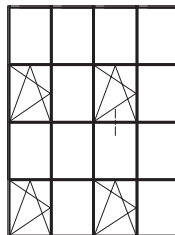


**CORTE**

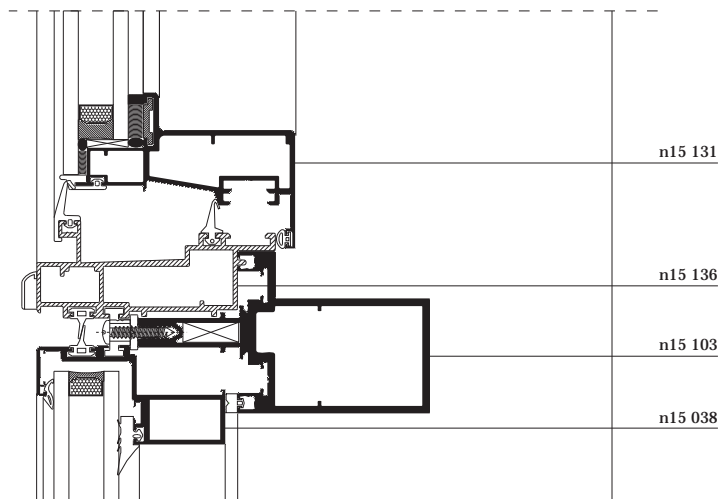


nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

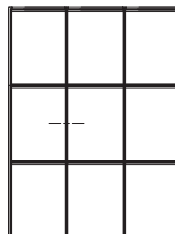
vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.



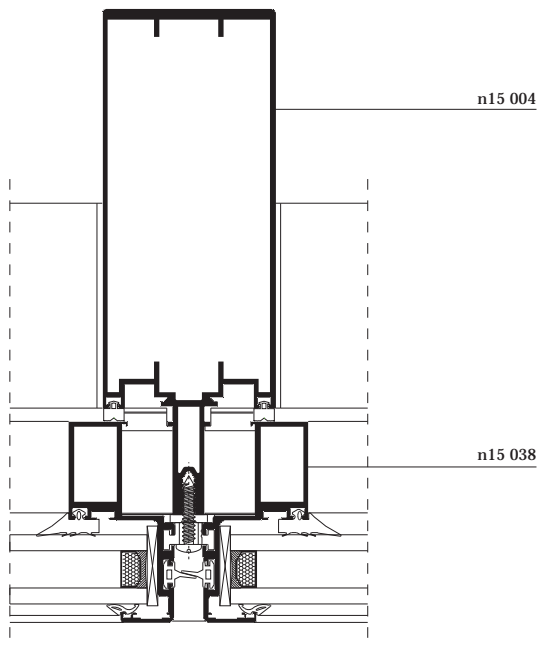
CORTE



vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.



CORTE

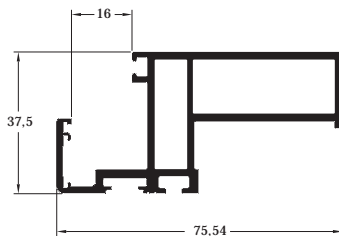


# n15 000







sistema de fachadas  
fachada VEP

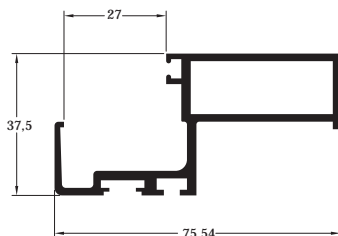












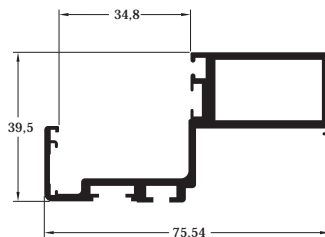
n15 132

Vedante vidro cunha interior EPDM			
	 → 2 ← Ved. 0066	 → 3 ← Ved. 0023	 → 5 ← Ved. 0024
sem vedante (aplicação de silicone)	14	13	11
Vedante vidro exterior EPDM	 → 3-5 ← Ved. 0185	5 - 11	8 - 10
	 → 5-7 ← Ved. 0203	7 - 9	6 - 8
	 → 7-9 ← Ved. 0204	5 - 7	4 - 6









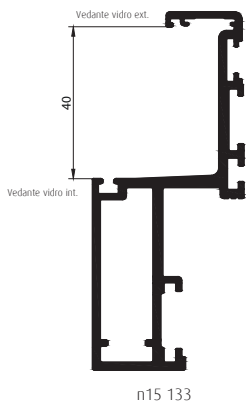
n15 033














Vedante vidro cunha interior EPDM			
	 → 2 ← Ved. 0066	 → 3 ← Ved. 0023	 → 5 ← Ved. 0024
sem vedante (aplicação de silicone)	25	24	22
Vedante vidro exterior EPDM	 → 3.5 ← Ved. 0185	20 - 22	19 - 21
	 → 5.7 ← Ved. 0203	18 - 20	17 - 19
	 → 7.9 ← Ved. 0204	16 - 18	15 - 17



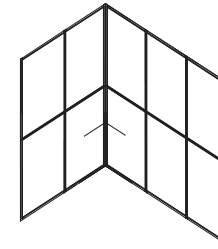
n15 038

Vedante vidro cunha interior EPDM			
	 → 2 ← Ved. 0066	 → 3 ← Ved. 0023	 → 5 ← Ved. 0024
sem vedante (aplicação de silicone)	32	31	29
Vedante vidro exterior EPDM	 → 3,5 ← Ved. 0185	27 - 29	26 - 28
	 → 5,7 ← Ved. 0203	25 - 27	24 - 26
	 → 7,9 ← Ved. 0204	23 - 25	22 - 24

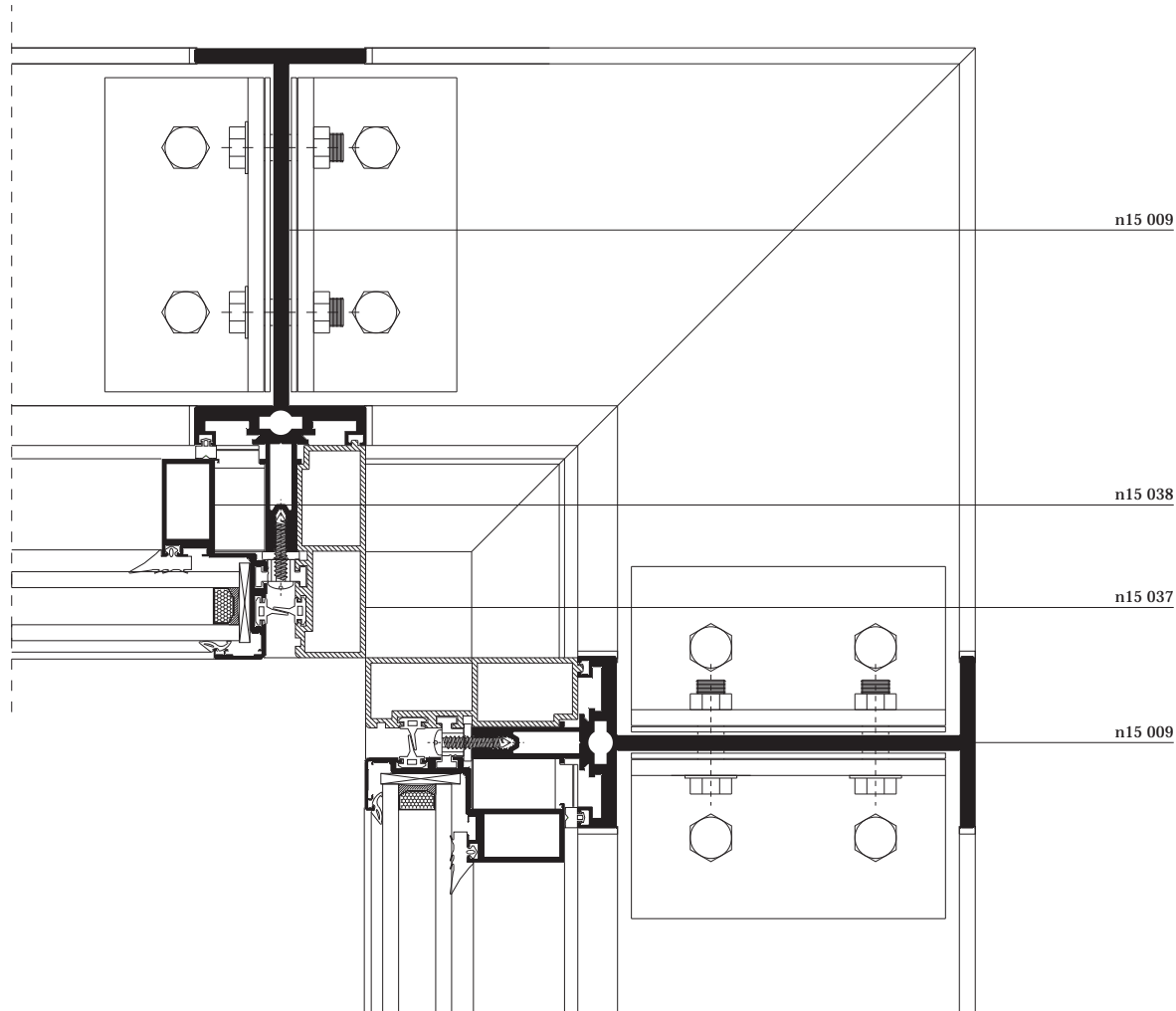


Caixa de vidro	Vedante vidro	
	Exterior	Interior
27 - 28	 Ved. 204 7 a 8 mm	 Ved. 024 5 mm
29 - 30	 Ved. 203 5 A 6 mm	 Ved. 024 5 m
31 - 32	 Ved. 185 3 a 4mm	 Ved. 024 5 mm
33	 Ved. 185 3 a 4mm	 Ved. 023 3 m
34	 Ved. 185 3 a 4mm	 Ved. 066 2 mm
35	Sem Vedante	 Ved. 024 5 mm
36 - 37	Sem Vedante	 Ved. 023 3 mm
38	Sem Vedante	 Ved. 066 2 mm

vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.

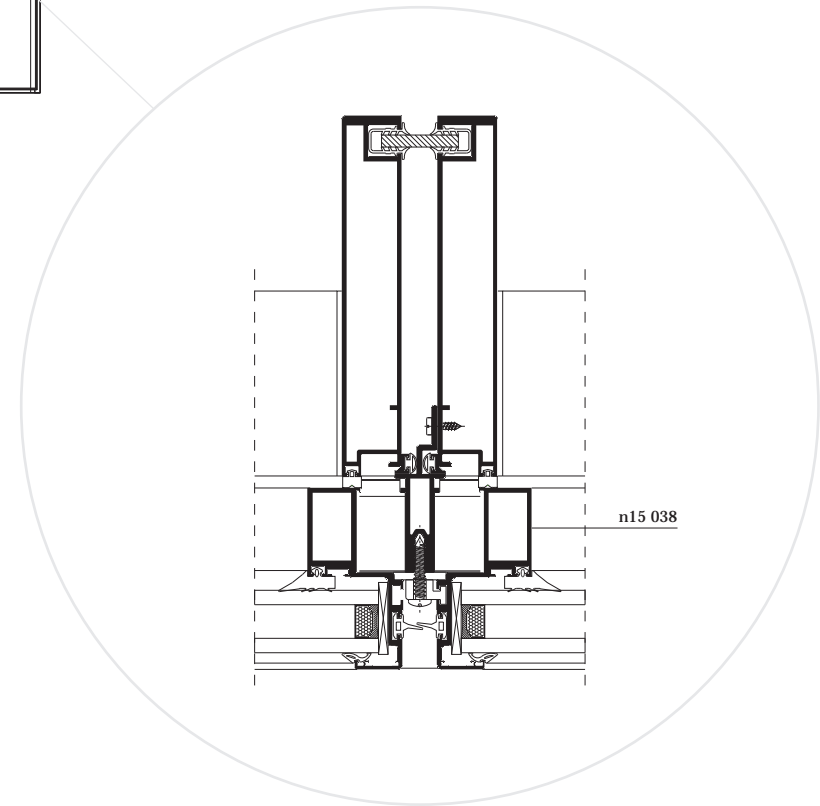
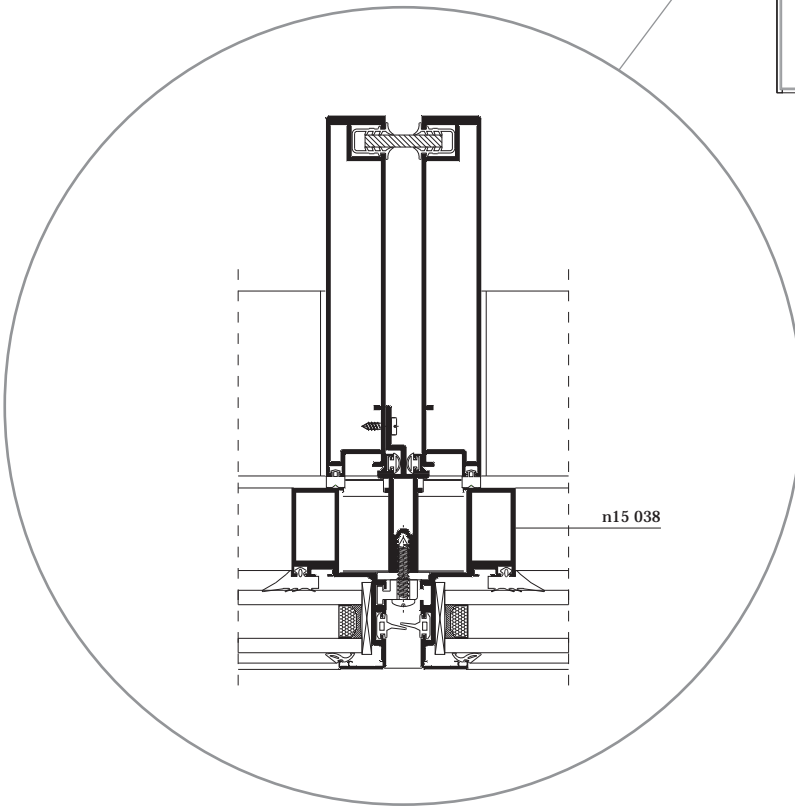
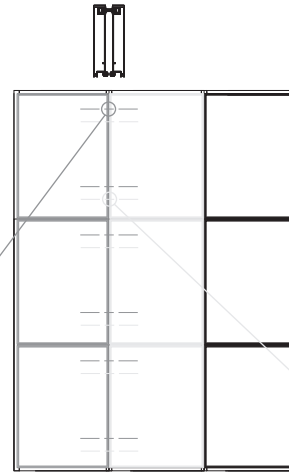


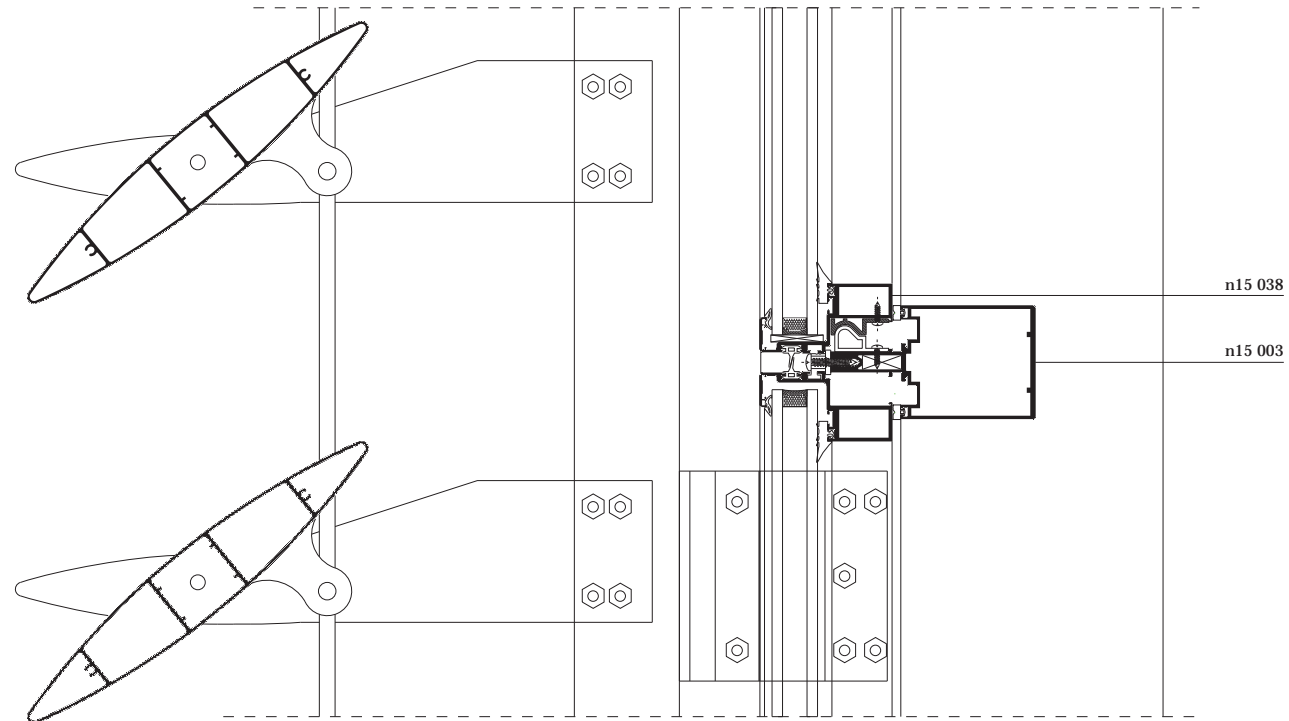
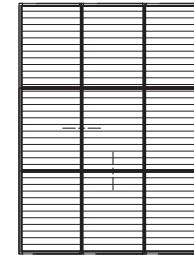
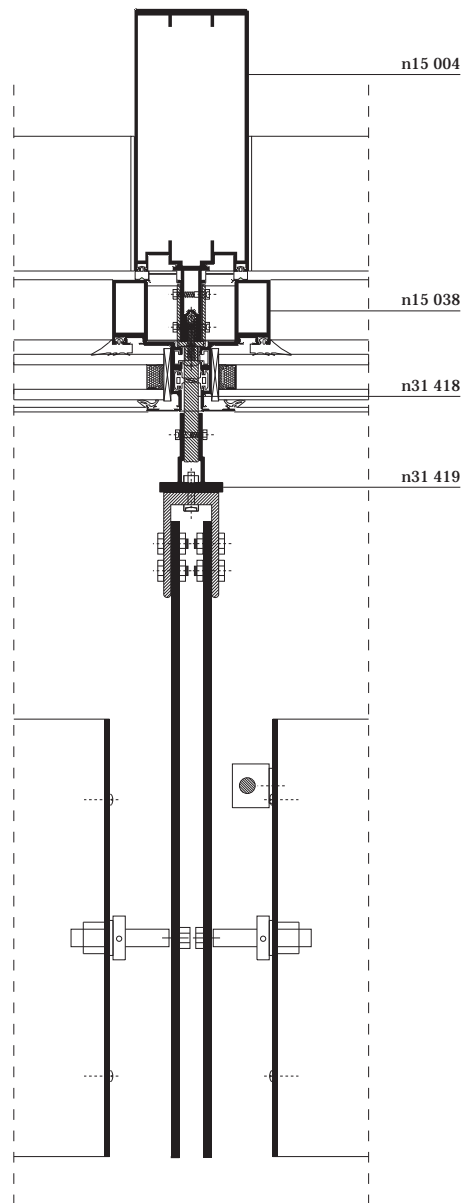
CORTE  
▲



nota:  
desenhos a título  
indicativo.

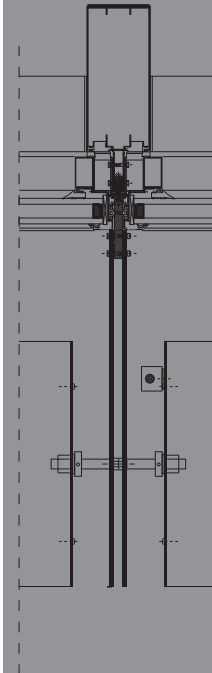
vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.





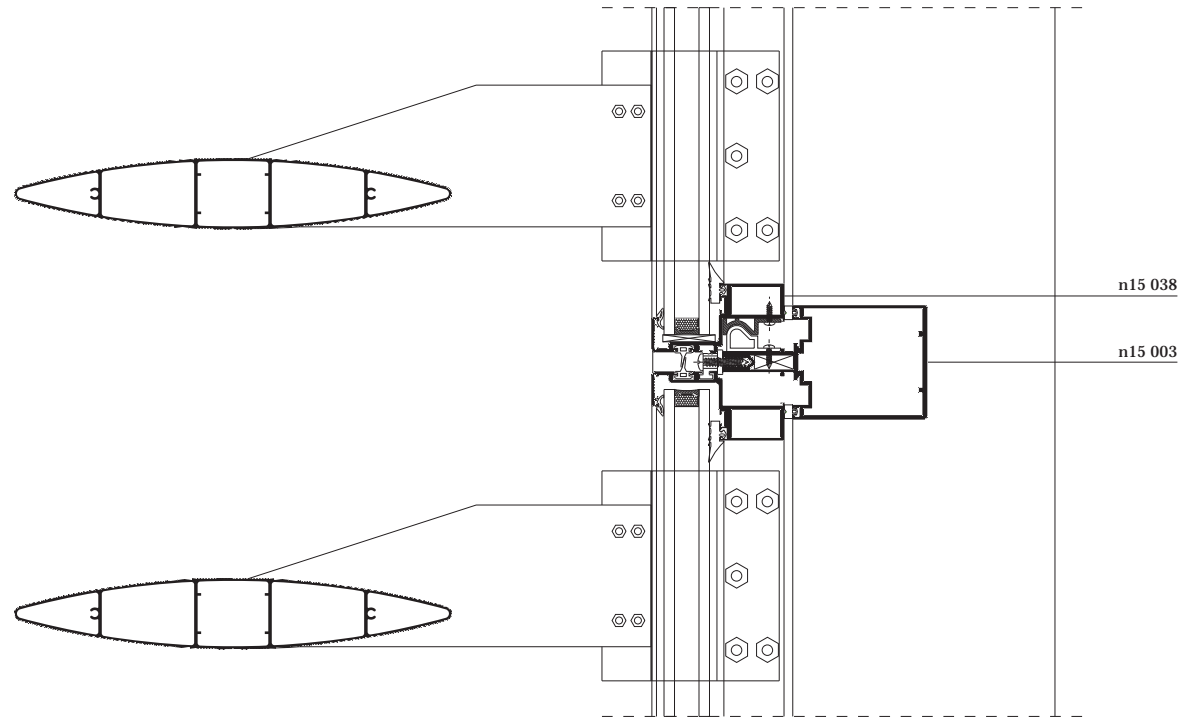
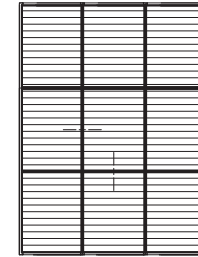
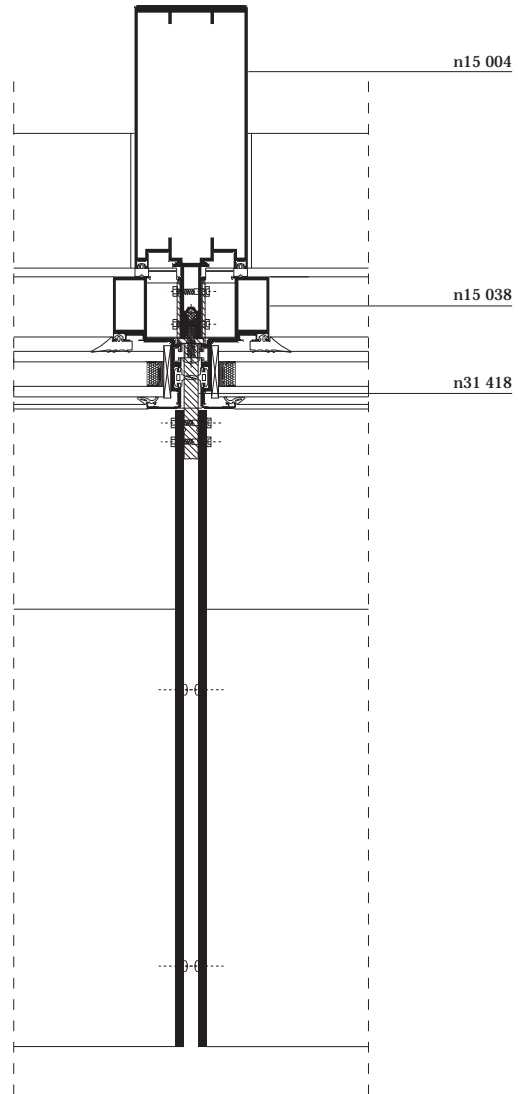
vedantes:  
 Consultar pág. 3.1.33 a  
 3.1.38.

opção:  
 sem calha e apoio.



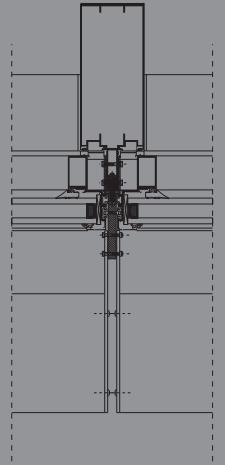
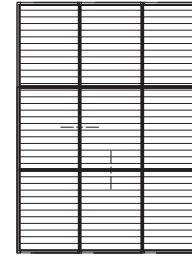
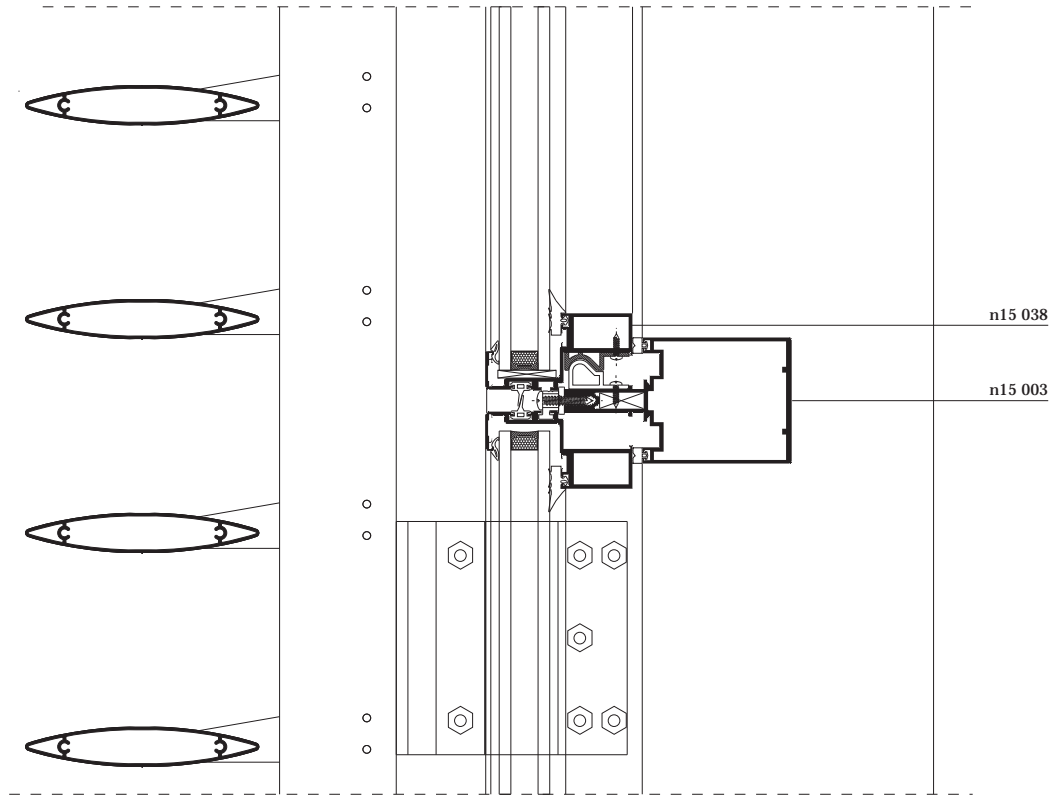
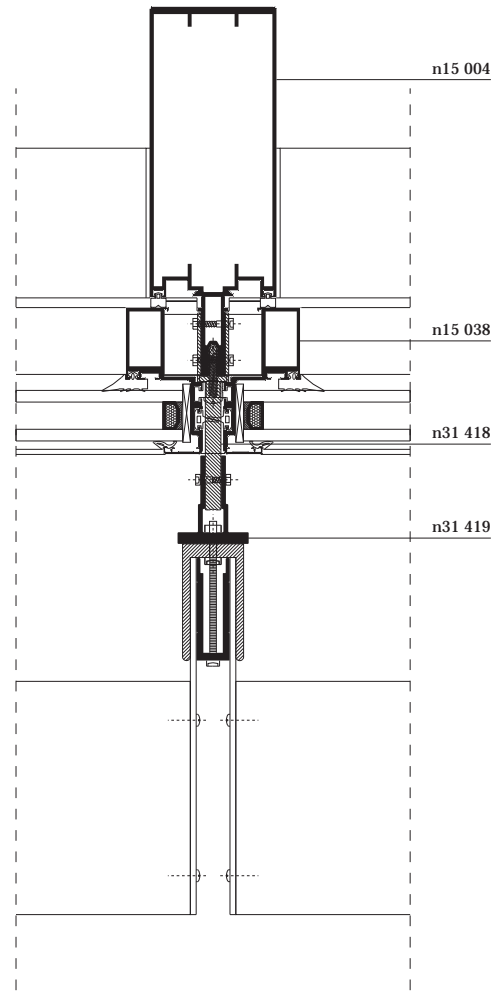


vedantes:  
Consultar pág. 3.1.33 a  
3.1.38.



vedantes:  
 Consultar pág. 3.1.33 a  
 3.1.38.

opção:  
 sem calha e apoio.



esta página foi intencionalmente deixada em branco

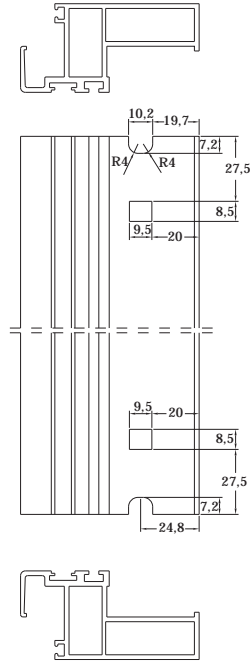
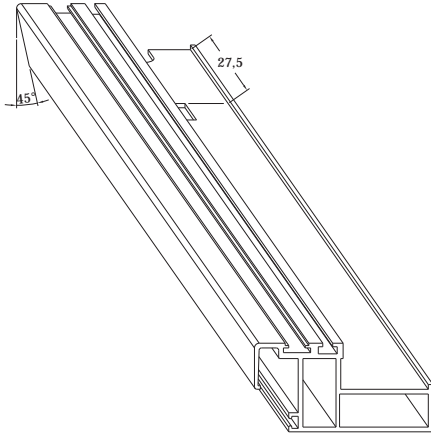
### 3. fachada VEP

#### 3.2 fabricação e montagem

**n15 000**  
sistema de fachadas  
fachada VEP

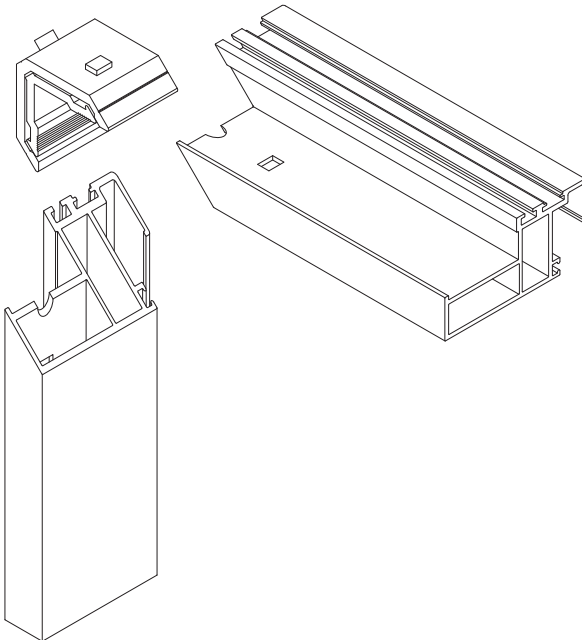
n15 000



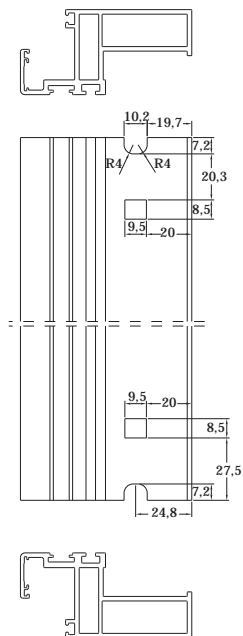
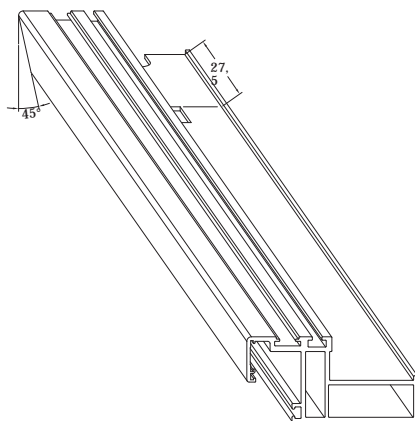


[A]  
furação de perfis móveis  
para aplicação de  
esquadro.  
nota:  
furação efectuada com o  
cunho Cun. 0018.

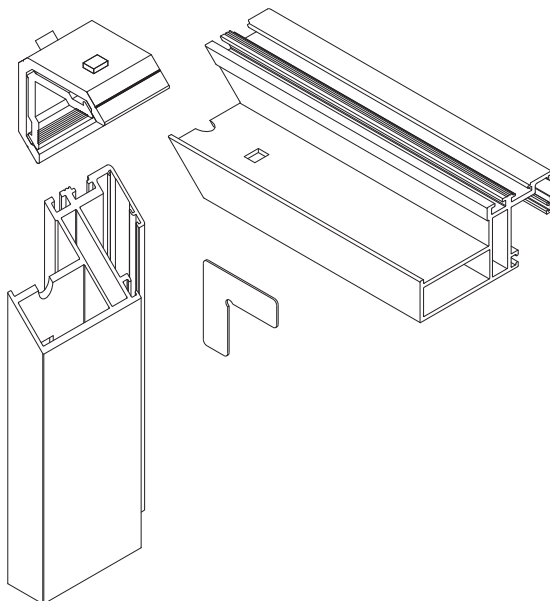
[A]

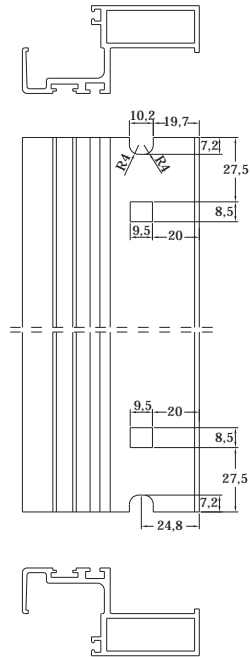
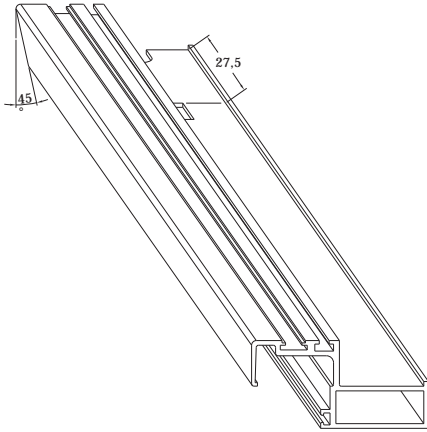


[A]  
furação de perfis móveis  
para aplicação de  
esquadro. (n15 132)  
nota:  
furação efectuada com o  
cunho Cun. 0018.

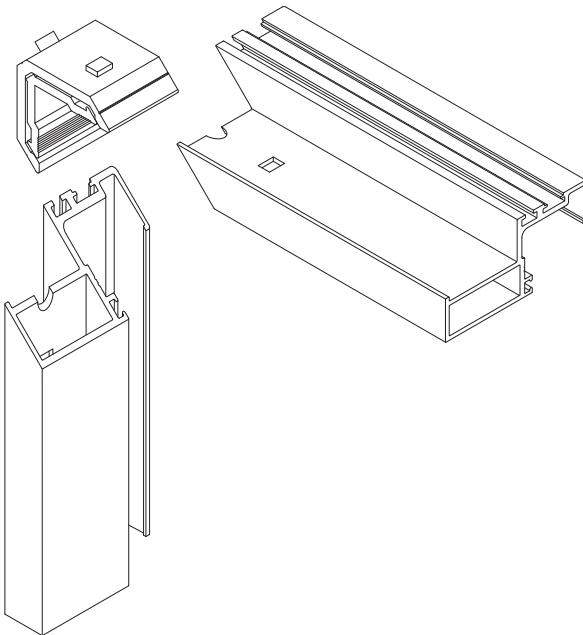


[A]





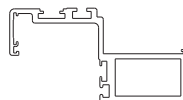
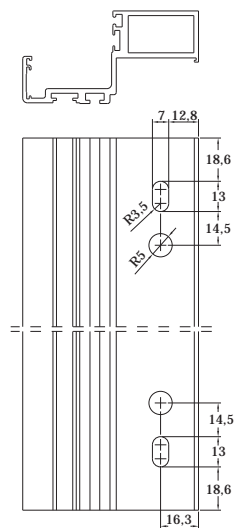
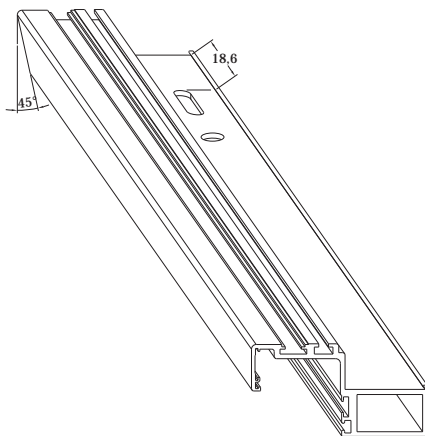
[A]



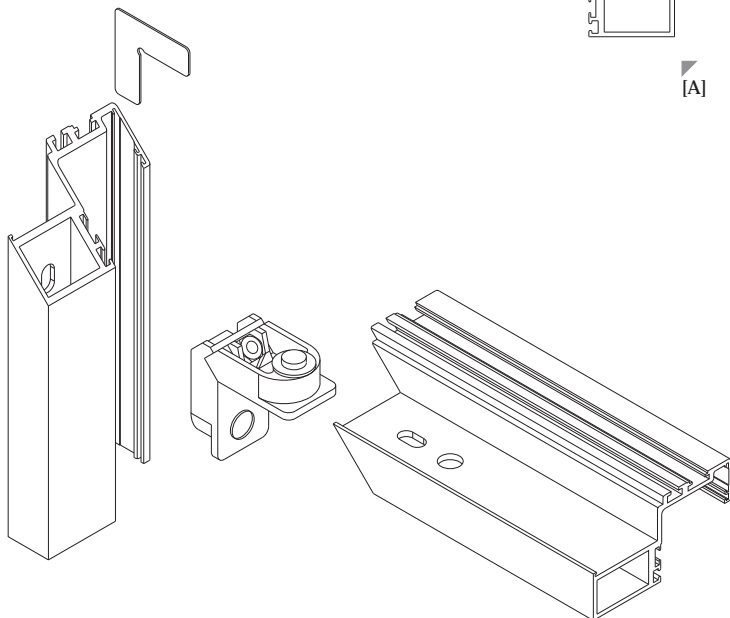
[A]  
furação de perfis móveis  
para aplicação de  
esquadro. (n15 033)  
nota:  
furação efectuada com o  
cunho Cun. 0018.

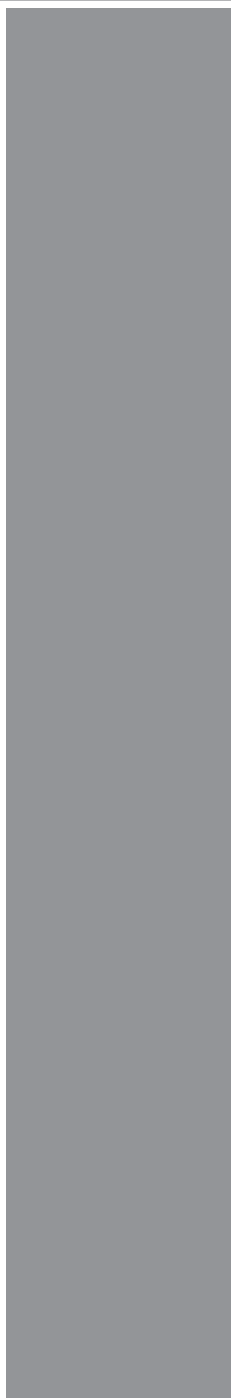


[A]  
furação de perfis móveis  
para aplicação de  
esquadro. (n15 038)  
nota:  
furação efectuada com o  
cunho Cun. 0018.



[A]





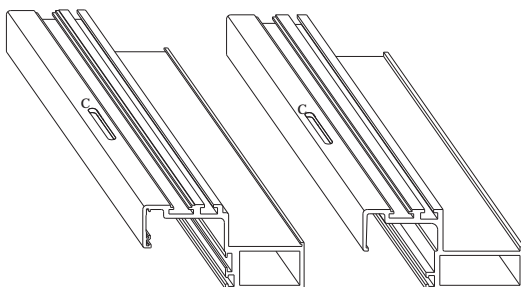


# n15 000

sistema de fachadas  
fachada VEP

fresagens

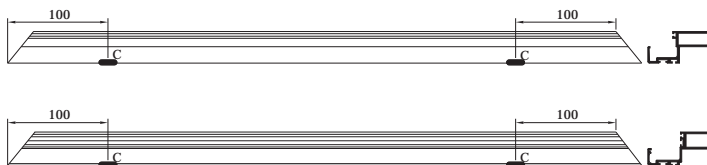
[A]  
rasgos de drenagem.  
nota:  
furação efectuada com o  
cunho Cun. 0018.

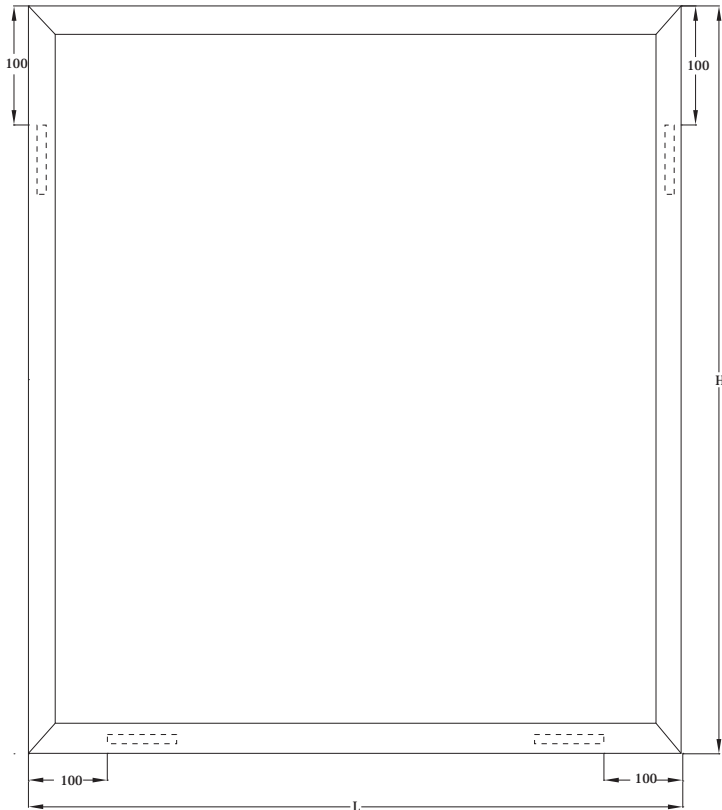


n15 038

n15 033

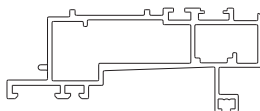
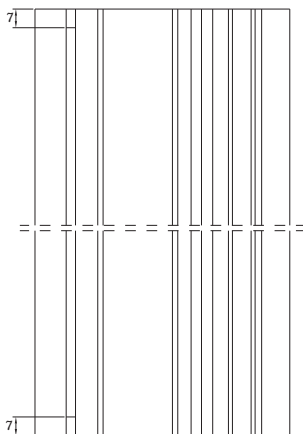
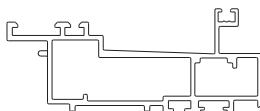
[A]



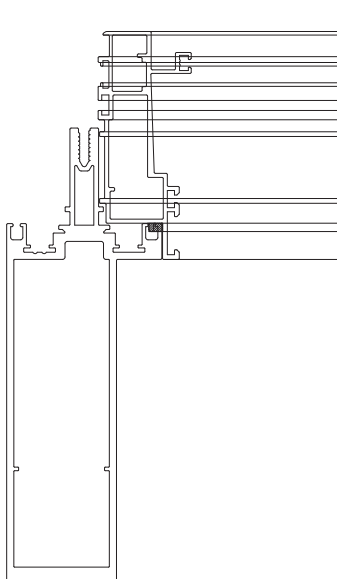


[A]  
fresagem no perfil  
n15 136 para encaixar no  
montante.

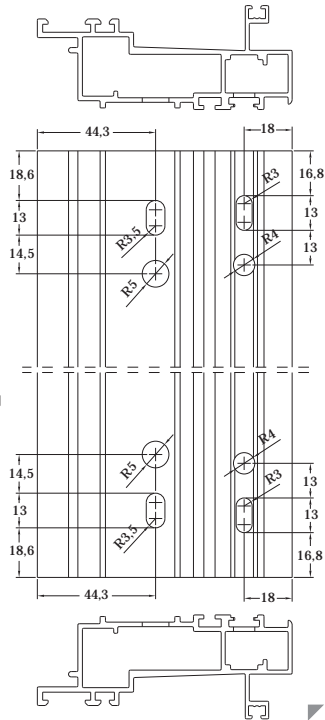
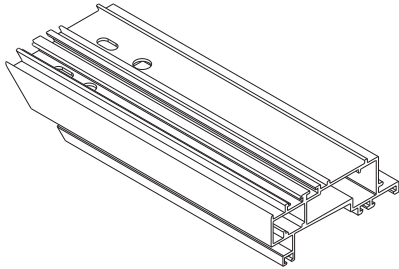
nota:  
operação efectuada com  
o cunho Cun. 0048.



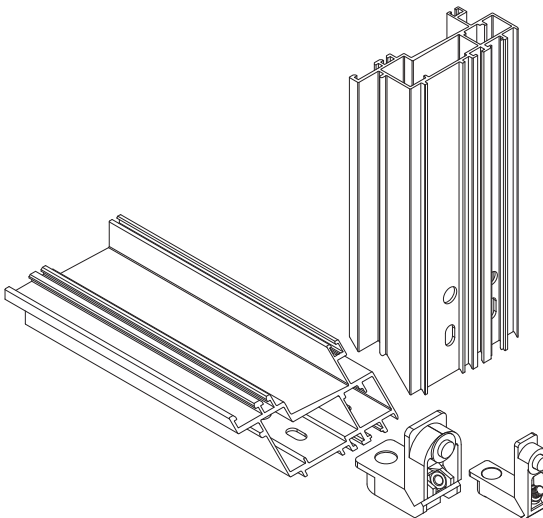
[A]



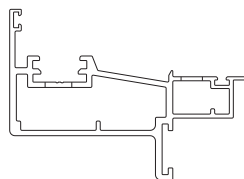
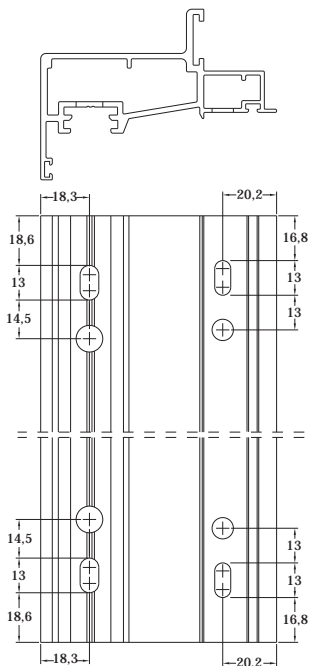
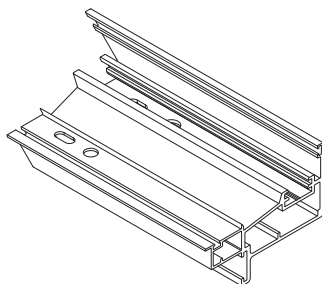
[A]  
furação de perfis móveis  
para aplicação de  
esquadro. (n15 136)  
nota:  
furação efectuada com o  
cunho Cun. 0048.



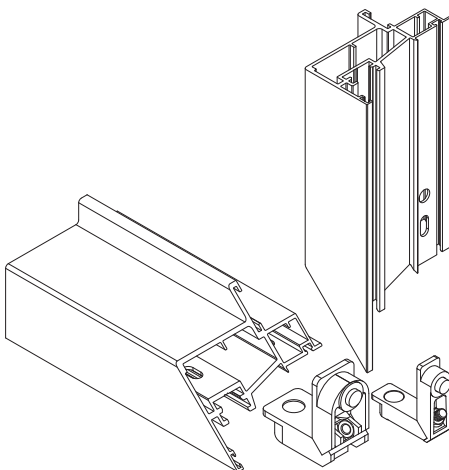
[A]



[A]  
furação de perfis móveis  
para aplicação de  
esquadro. (n15 131)  
nota:  
furação efectuada com o  
cunho Cun. 0048.

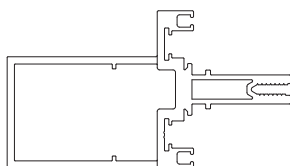
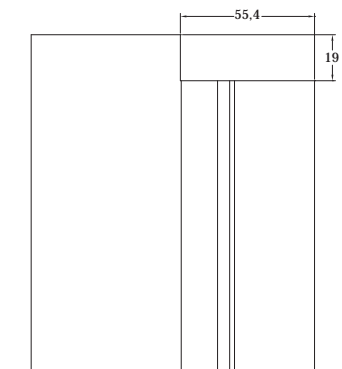


[A]

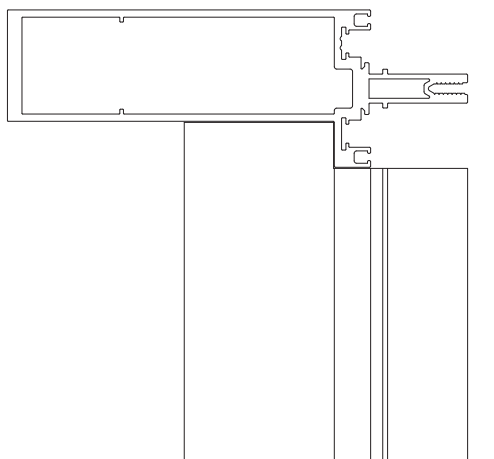




[A]  
malhete travessas.



[A]

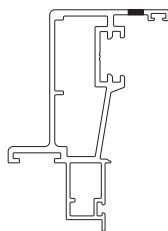
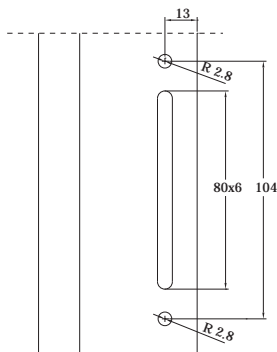


[A]

[A]  
furação para aplicação de  
cremone.

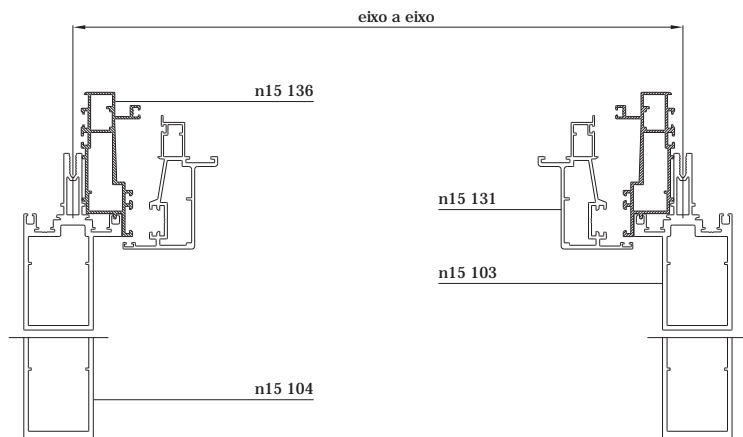
[B]  
medida de corte do aro  
da folha.

nota:  
largura e/ou altura da  
folha tem de ser igual  
ou maior que 800mm.



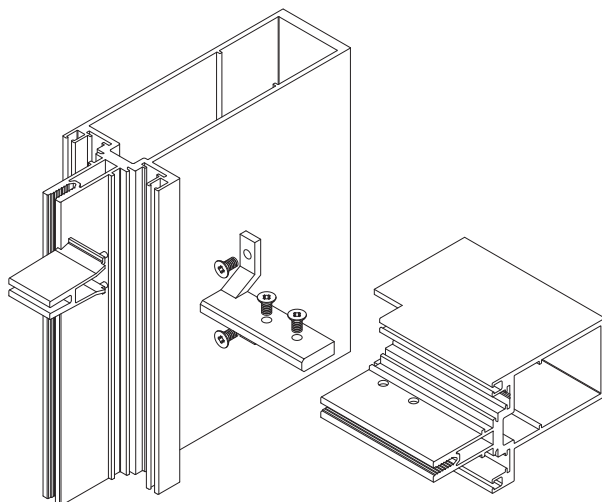
[A]

largura	altura
n15 038 = eixo a eixo - 11mm	n15 038 = eixo a eixo - 11mm
n15 131 = eixo a eixo - 66mm	n15 131 = eixo a eixo - 66mm

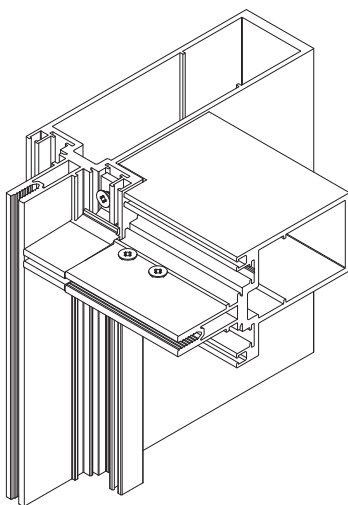


[B]

[A]  
ligação de montante com  
travessa.

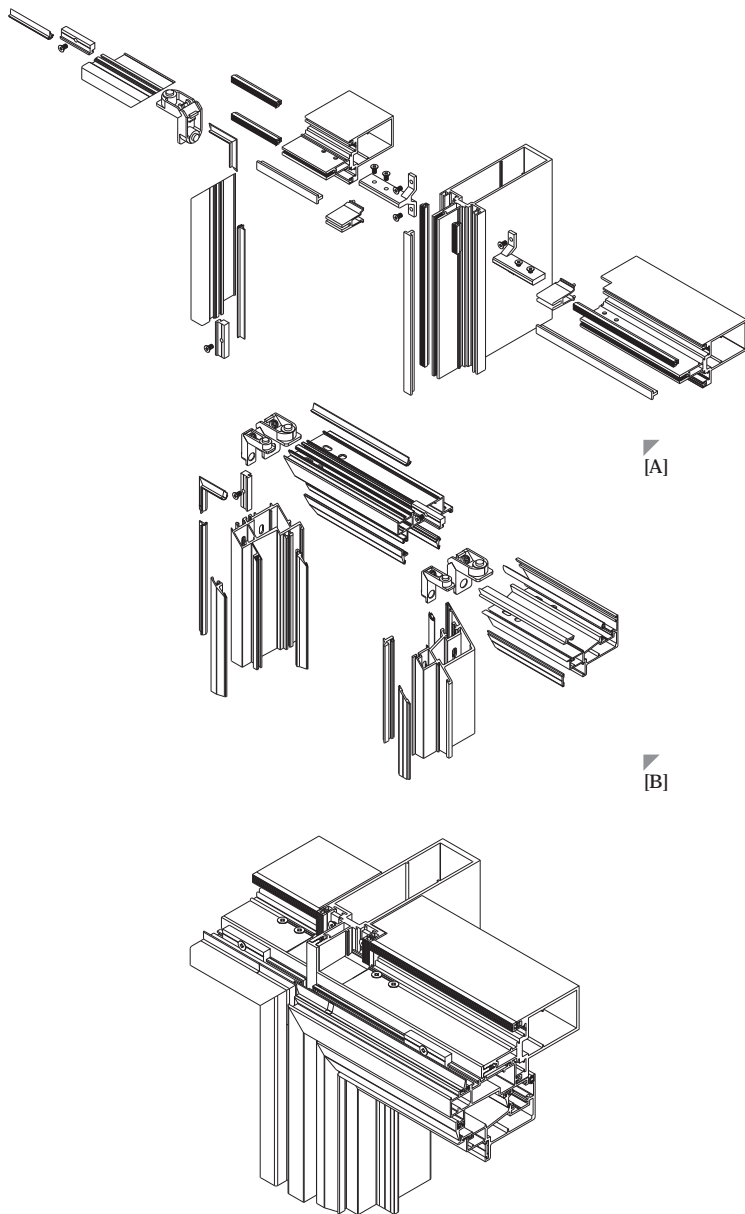


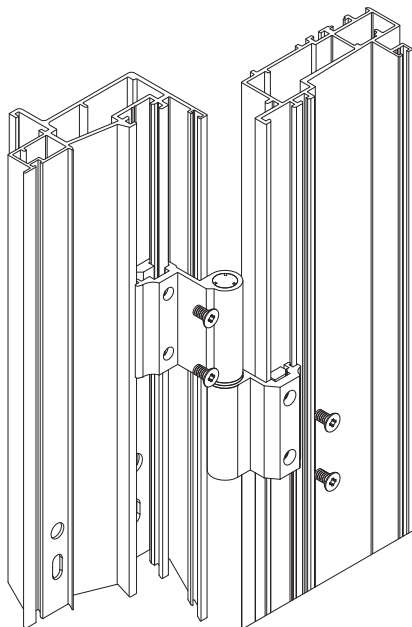
▲  
[A]



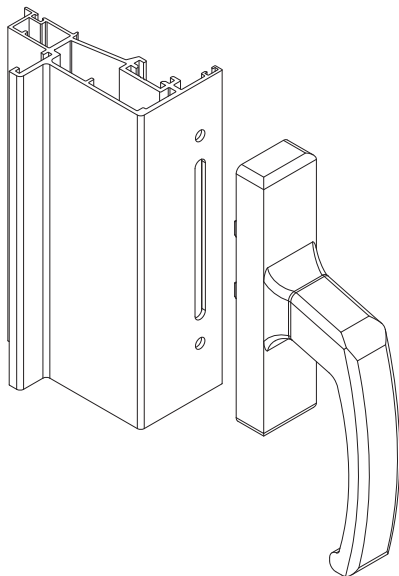
[A]  
quadro.

[B]  
folha.





[A]

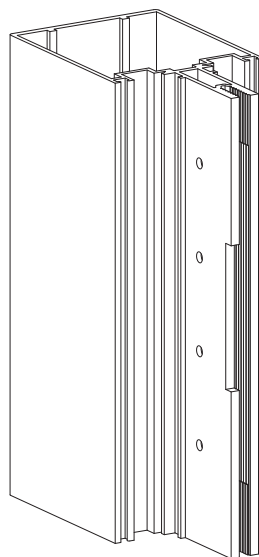
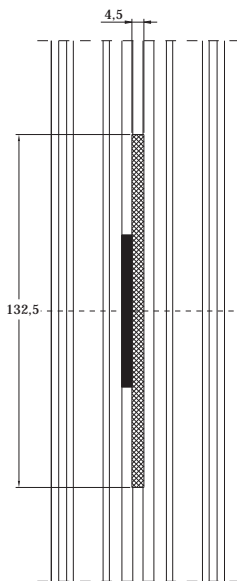
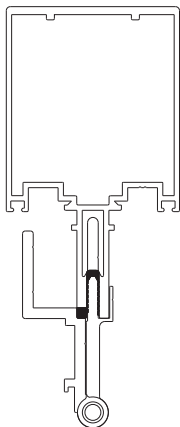


[B]

[A]  
aplicação de dobradiça.

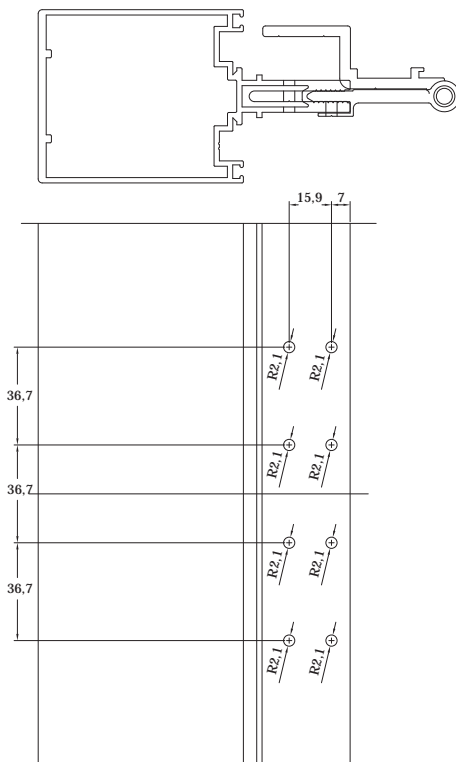
[B]  
aplicação de cremone.

[A]  
fresagem do montante  
para fixação da  
dobradiça.



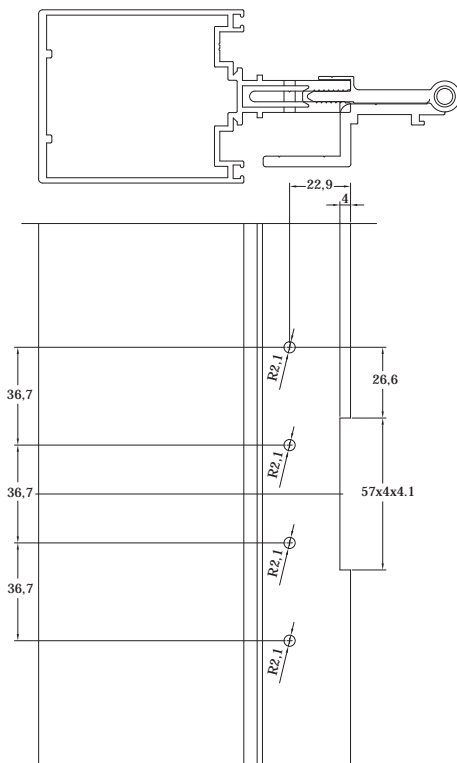
[A]

[A]  
fresagem do montante  
para fixação da  
dobradiça.



[A]

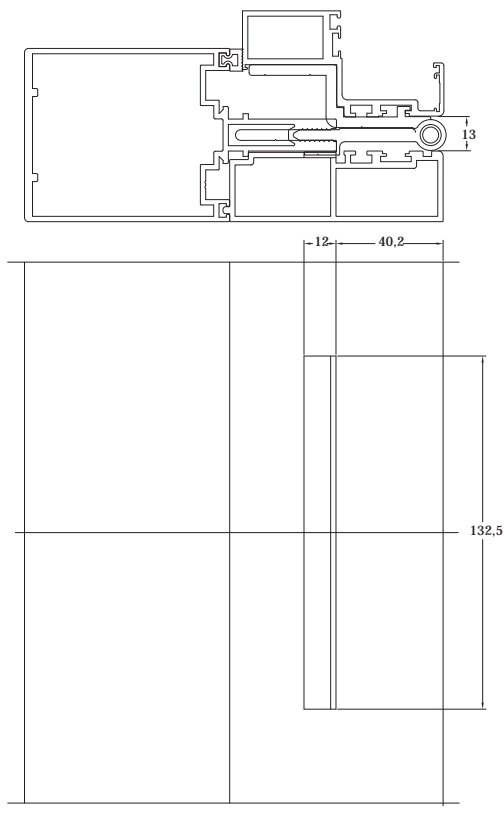
[A]  
fresagem do montante  
para fixação da  
dobradiça.



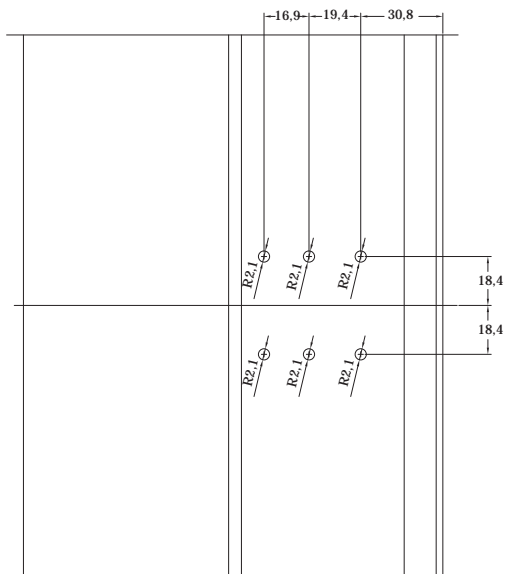
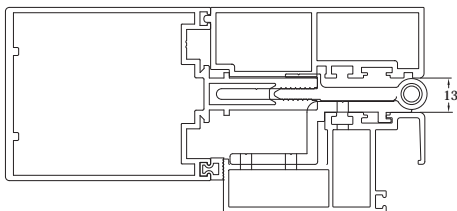
[A]



[A]  
fresagem do perfil de  
remate para fixação da  
dobradiça.

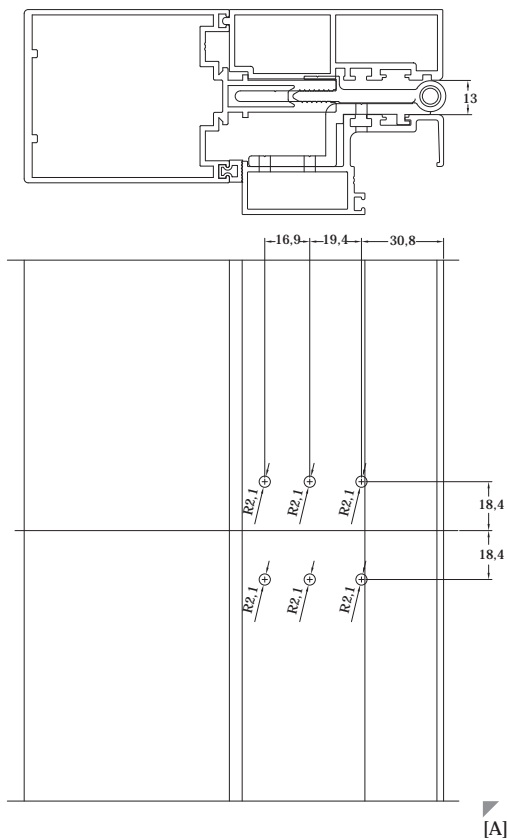


[A]  
fresagem do perfil móvel  
para fixação da  
dobradiça.

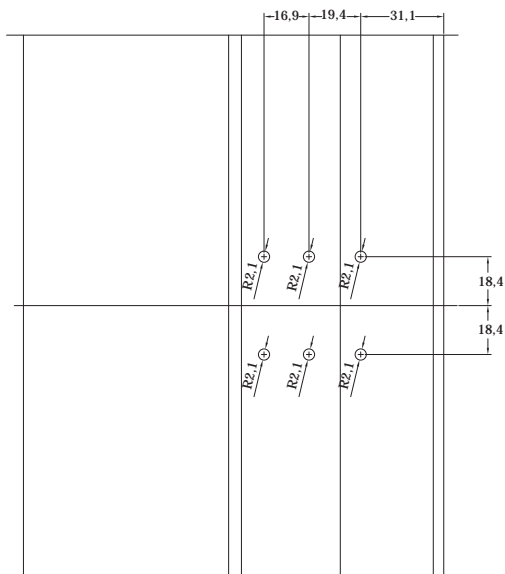
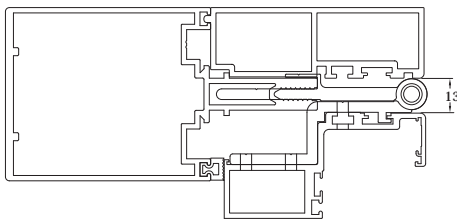


[A]

[A]  
fresagem do perfil móvel  
n15 033 para fixação da  
dobradiça.

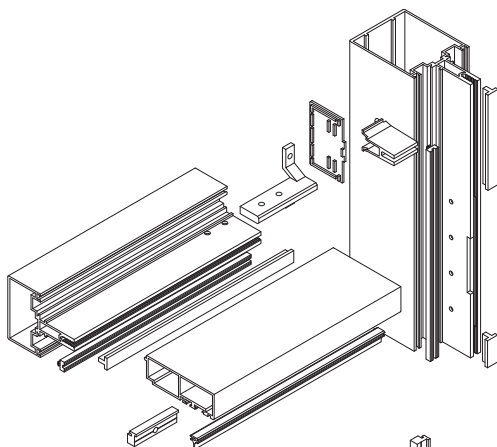


[A]  
fresagem do perfil móvel  
n15 033 para fixação da  
dobradiça.

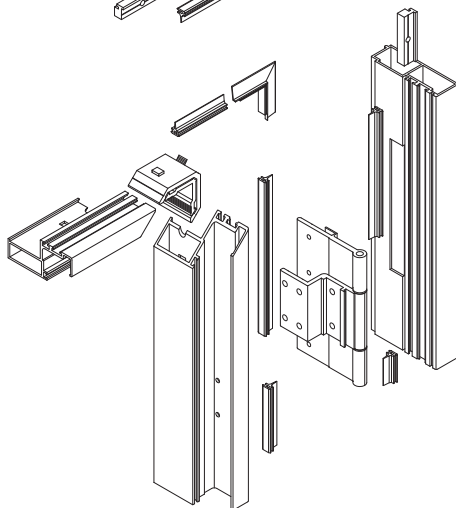


[A]

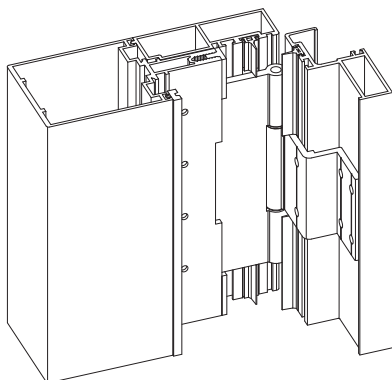
[A]  
aplicação das dobradiças.



▾  
[A]

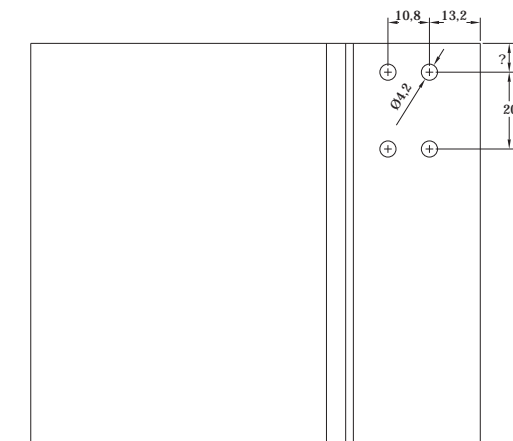
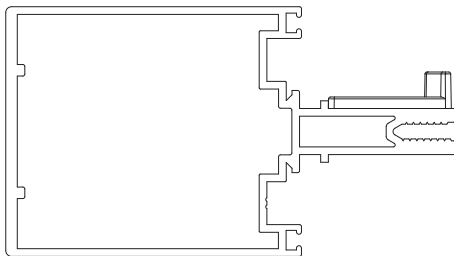


▾  
[A]

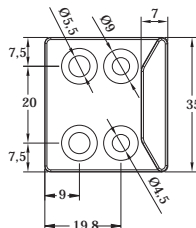


▾  
[A]

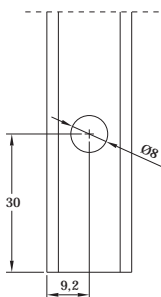
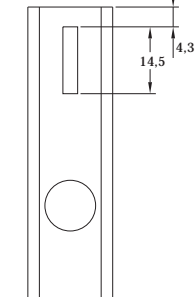
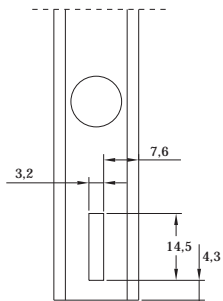
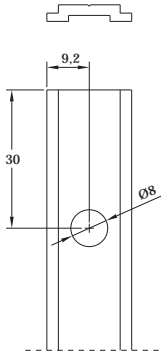
[A]  
fresagens dos montantes  
para fixação do fecho  
suplementar.



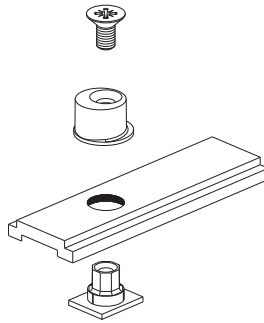
[A]



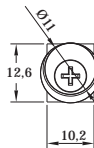
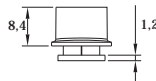
[A]



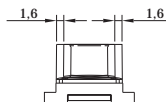
[A]



[B]



[C]



[D]

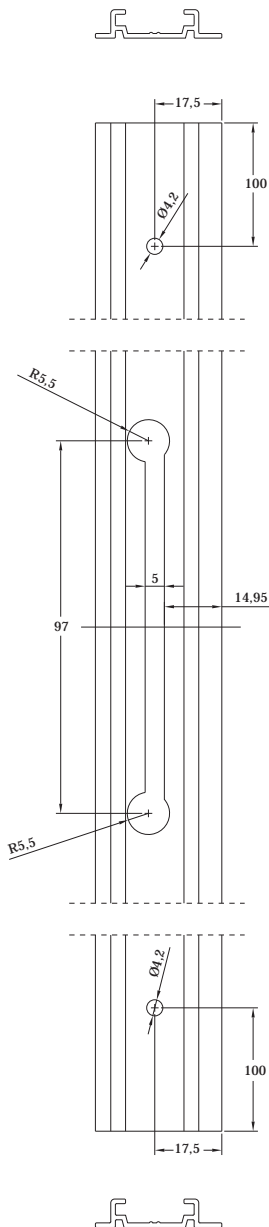
[A] fresagem da vareta para fixação do ponto de fecho suplementar.

[B] maquinação da vareta para o ponto de fecho.

[C] medidas do kit para cremone VEP.

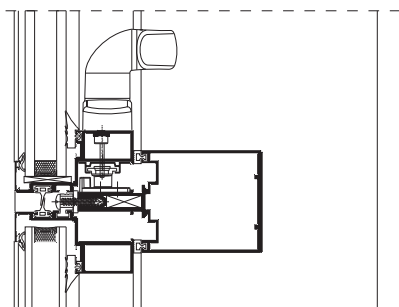
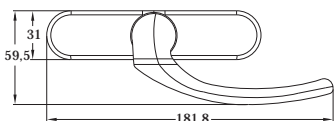
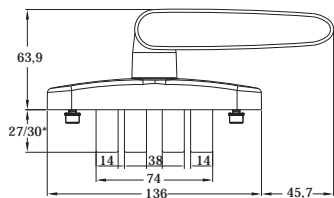
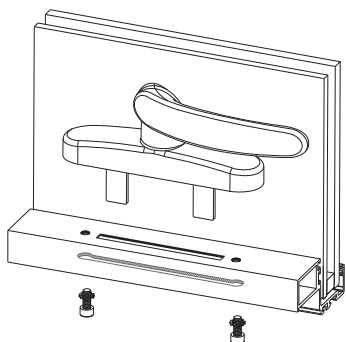
[D] regulação do ponto de fecho.

[A]  
fresagem do perfil  
n15 051.

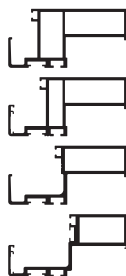
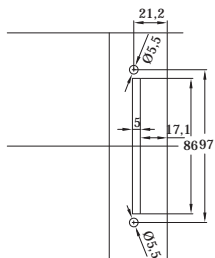


[A]

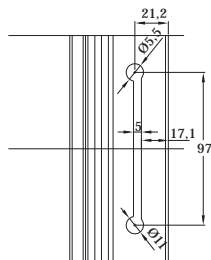
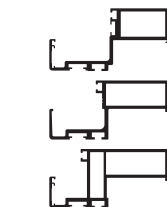




[A]



[B]



[B]

[A]  
aplicação do cremone na  
fachada.

[B]  
fresagem do aro móvel  
para aplicação do  
cremone.

\*nota:  
patilhas do cremone com  
medida de 30 mm nos  
perfis n15 038.

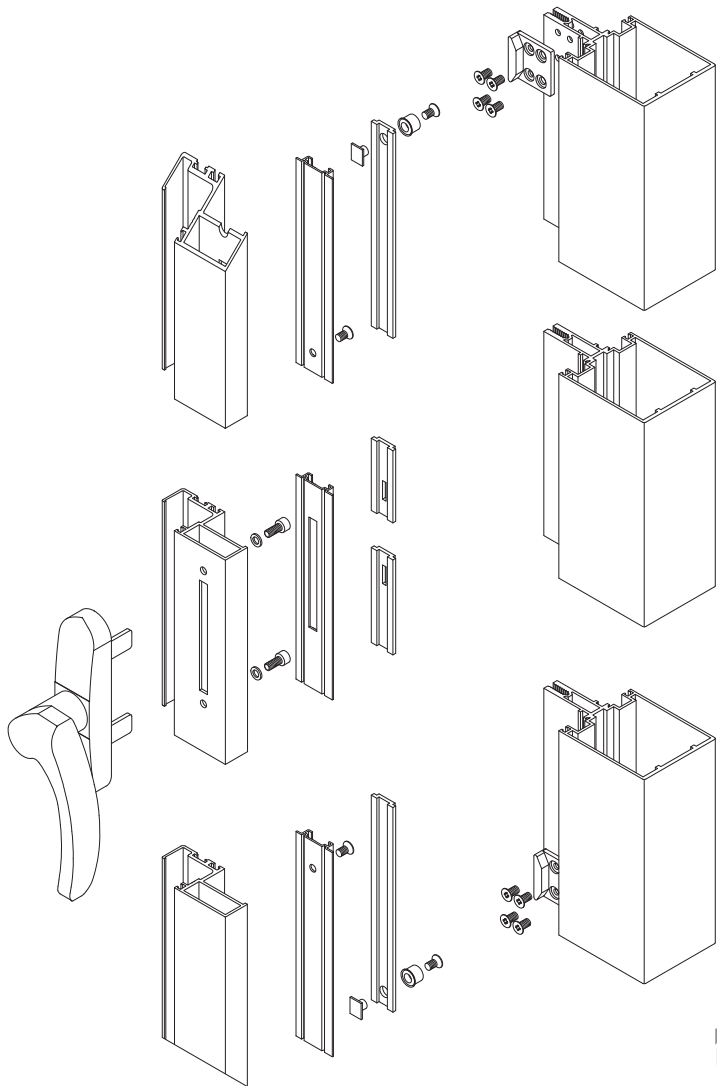
patilhas do cremone com  
medida de 27 mm nos  
perfis n15 132 e n15  
033.

# n15 000

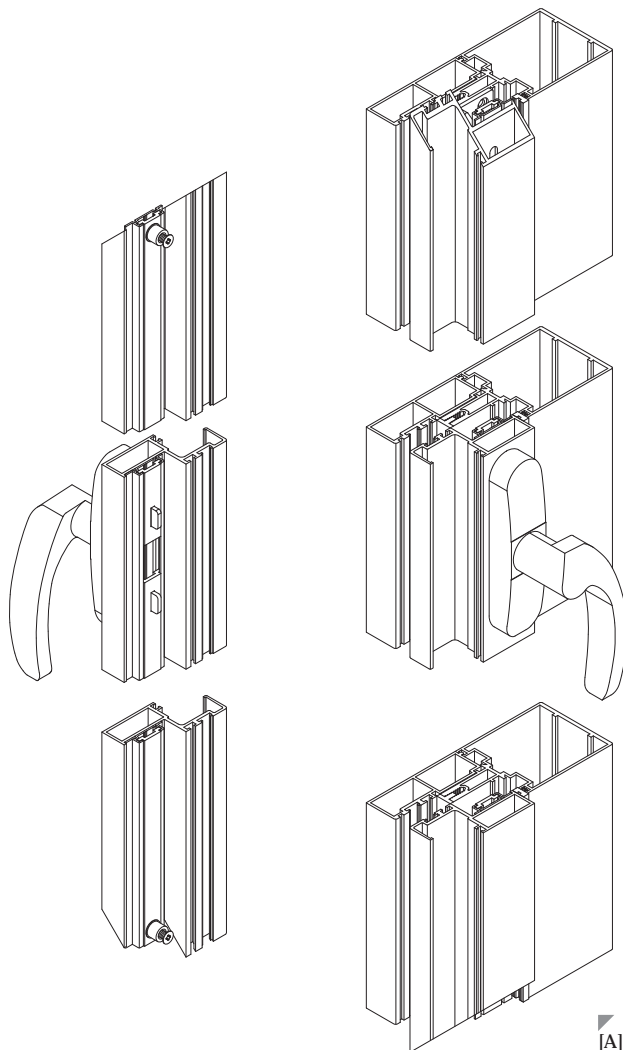
sistema de fachadas  
fachada VEP

esquema de montagem

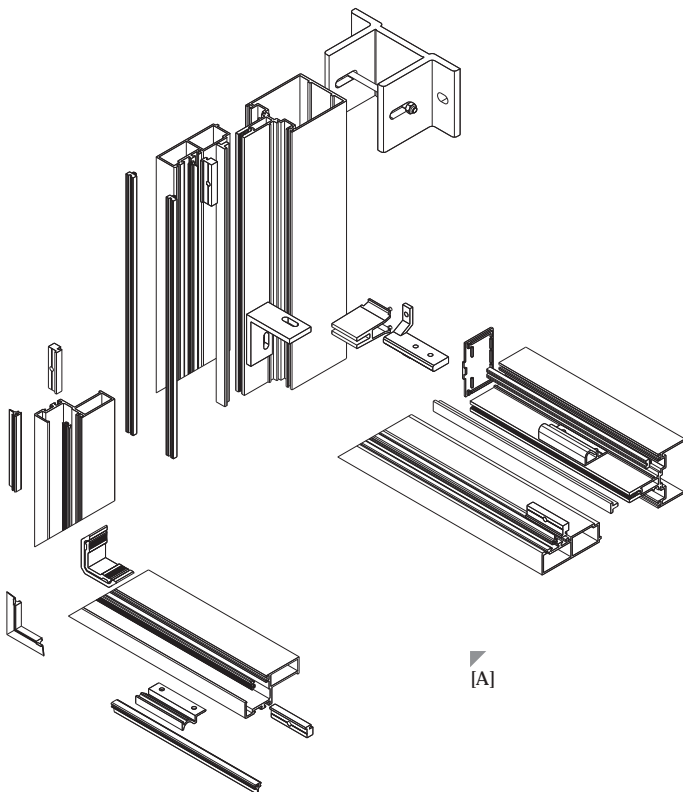
[A]  
montagem de cremone  
VEP.



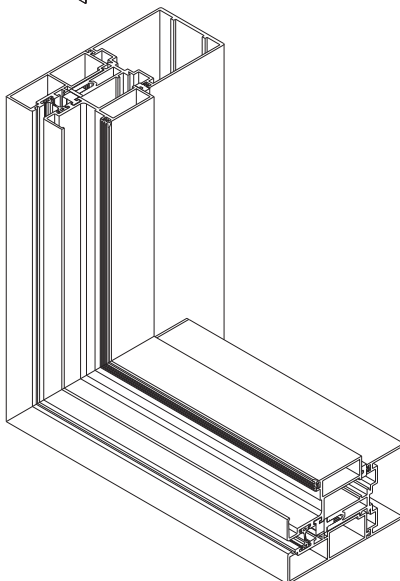
[A]  
montagem de cremone  
VEP.



[A]  
exemplo de montagem  
de fachada VEP.



[A]



[A]  
Div. 0065

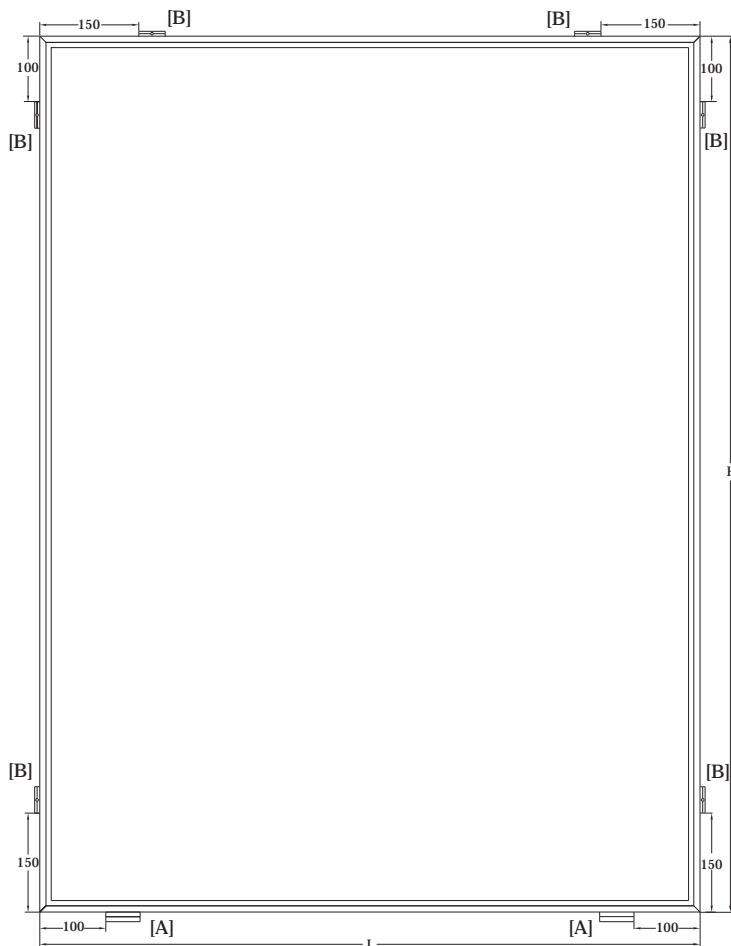


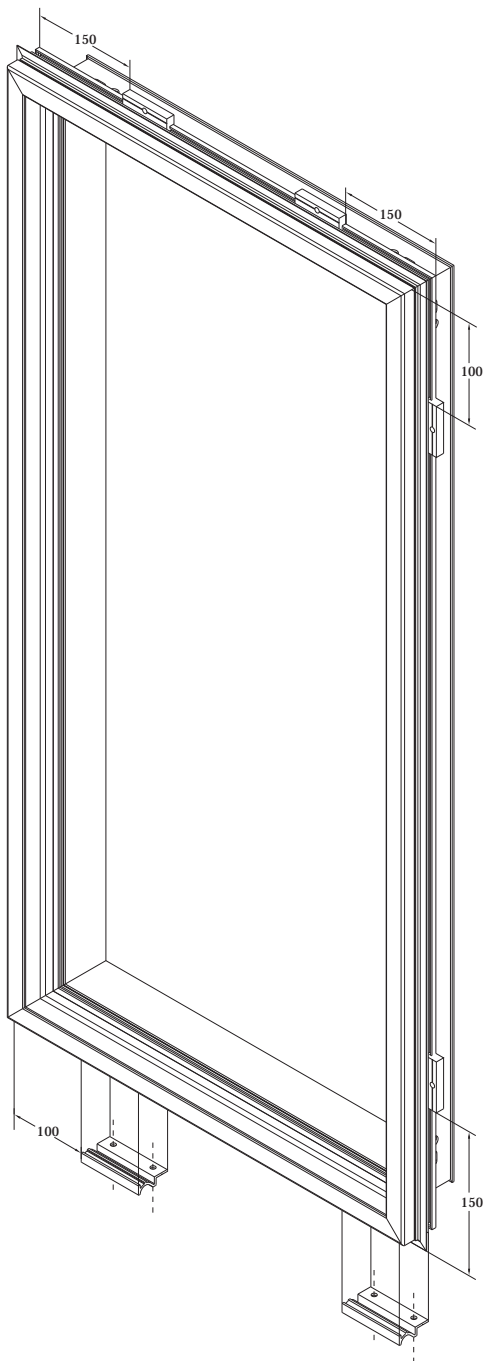
número mínimo de peças  
= 2 unidades.  
salvaguardar distância  
máxima aconselhada  
entre peças  $\leq 1000\text{mm}$ .

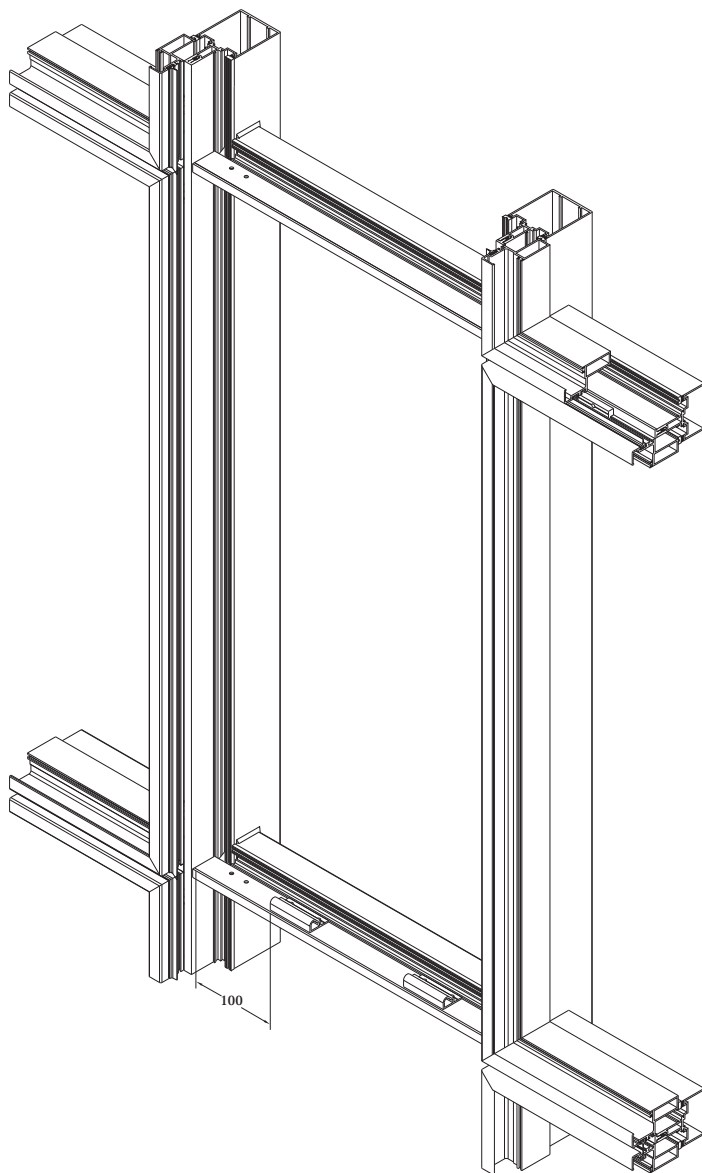
[B]  
Esq. 0002 ou  
Esq. 0071



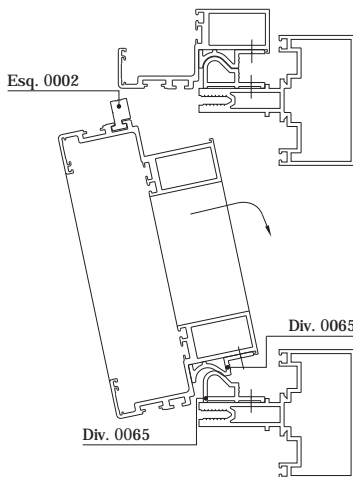
número mínimo de peças  
= 2 unidades.  
salvaguardar distância  
máxima aconselhada  
entre peças  $< 600\text{mm}$ .







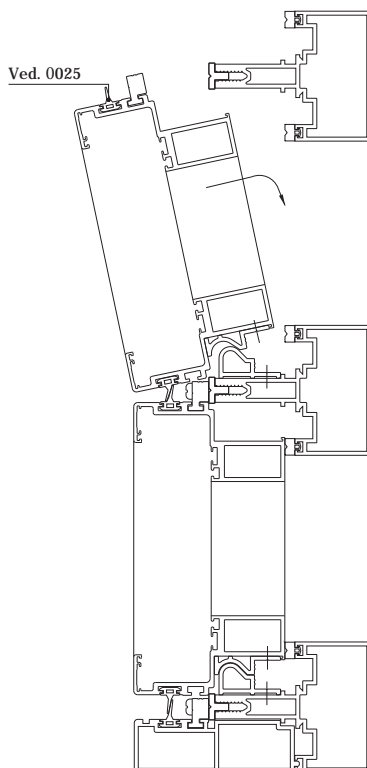
nota:  
o desconto de 11,5 mm  
aplica-se horizontal e  
vertical aos quadros de  
fachada VEP e VEC.



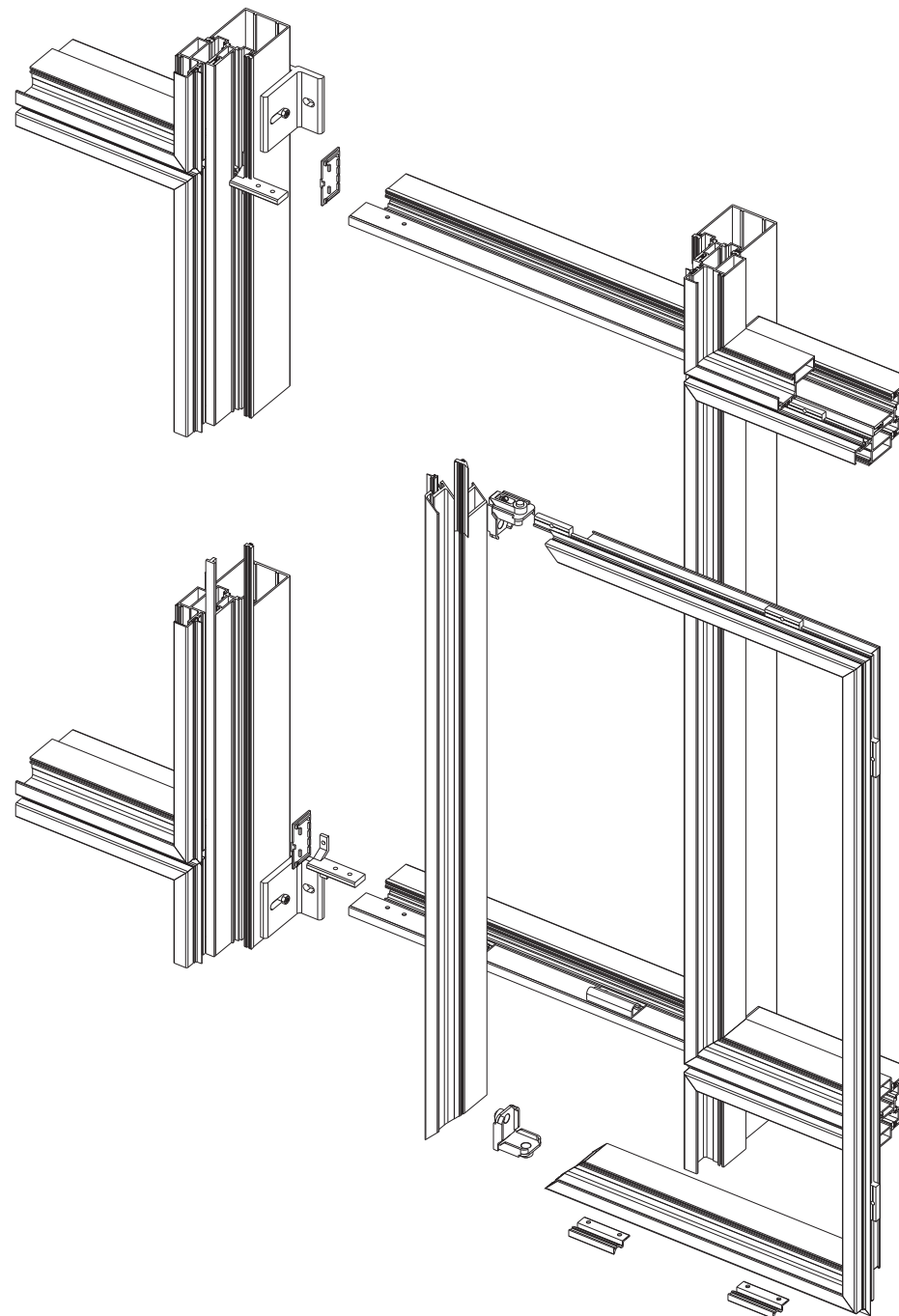
aplicação:

Esq. 0002: verticais e horizontal superior

Div. 0065: horizontal inferior







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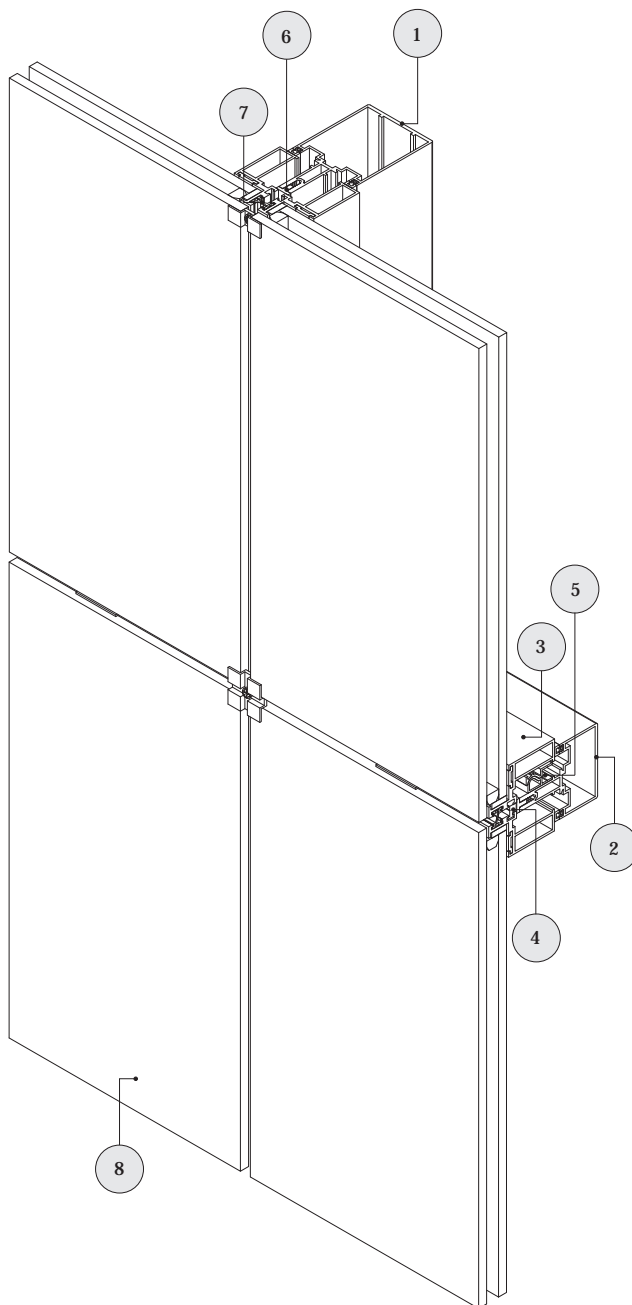
## 4. fachada VEC

### 4.1 cortes e pormenores de montagem

**n15 000**  
sistema de fachadas  
fachada VEC

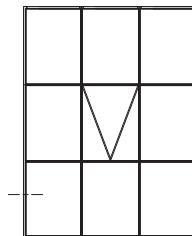
n15 000



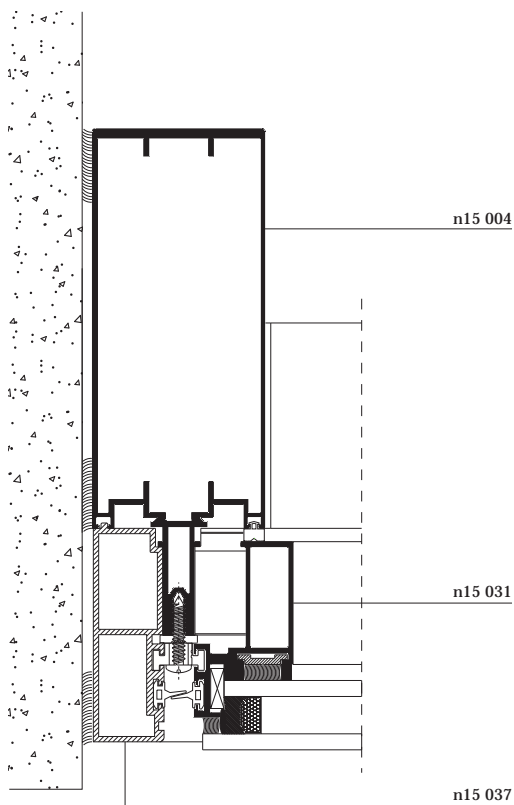


1. perfil de montante.
2. perfil de travessa.
3. perfil de vidro colado.
4. fixador de quadro.
5. apoio de quadro.
6. calço de eixo.
7. vedante quadro.
8. vidro.

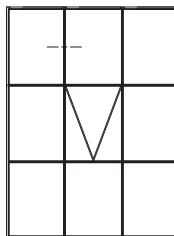
nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.



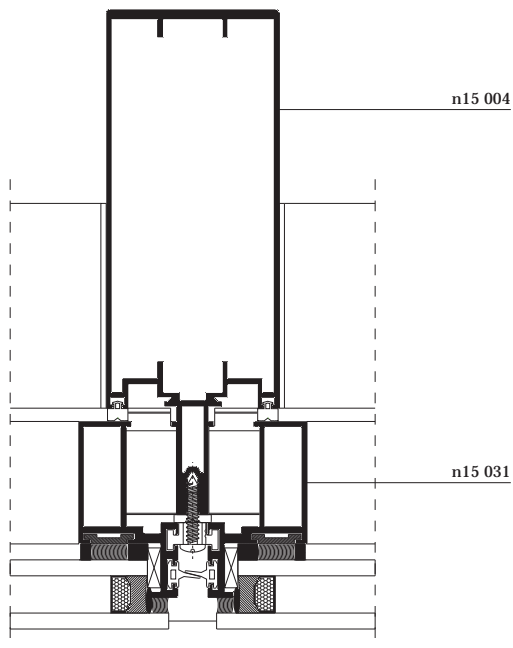
CORTE



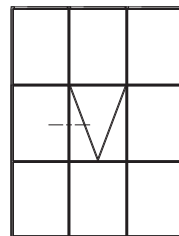
nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.



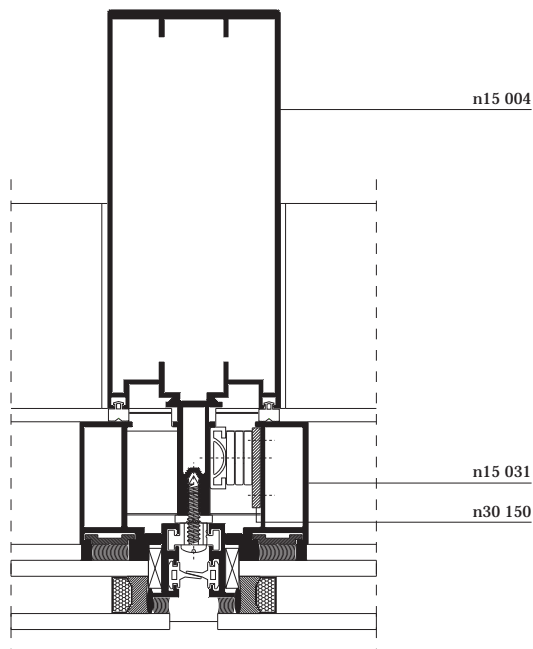
CORTE



nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

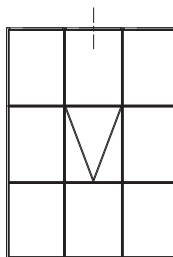


CORTE

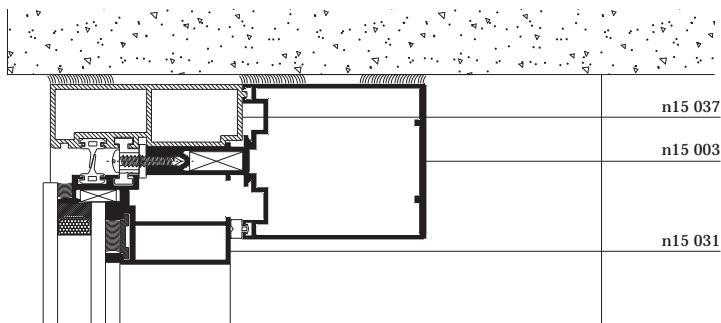




nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.



CORTE

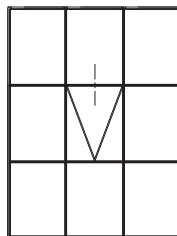


n15 037

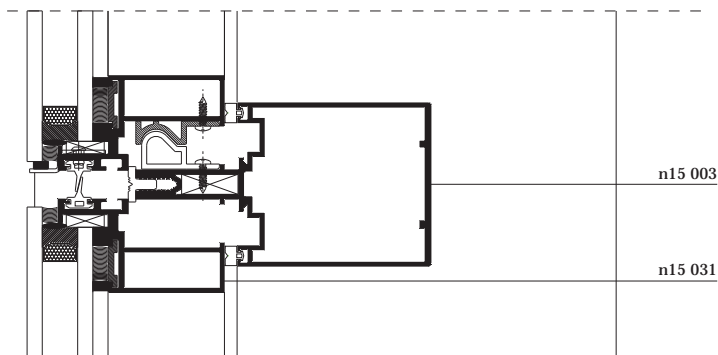
n15 003

n15 031

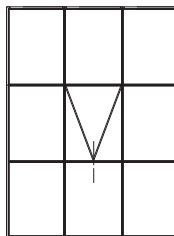
nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.



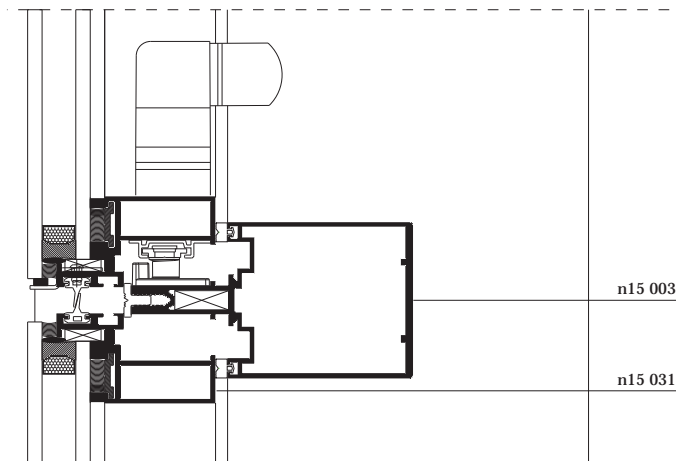
CORTE



nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.



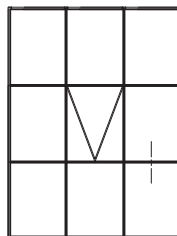
CORTE



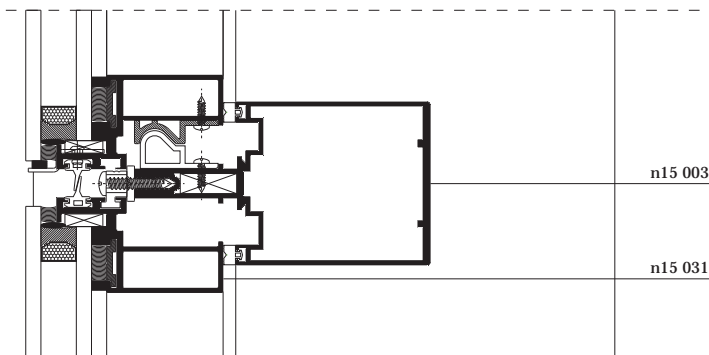
n15 003

n15 031

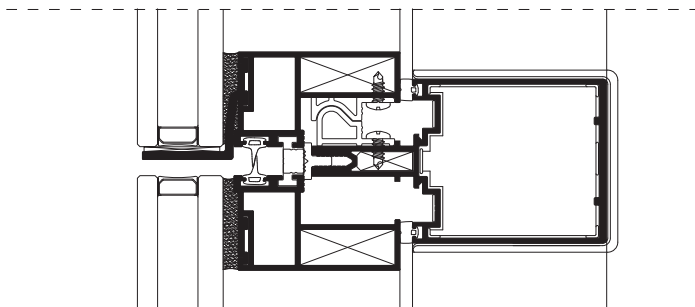
nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.



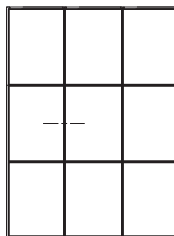
CORTE



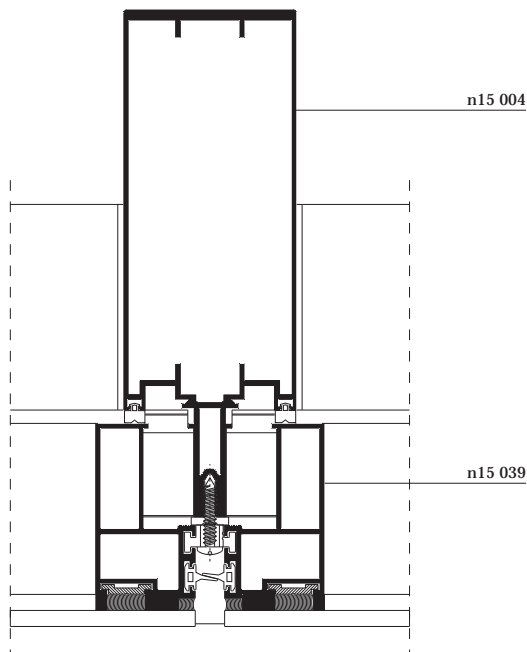
ALTERNATIVA



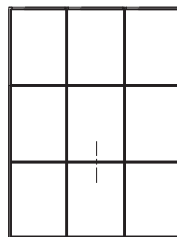
nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.



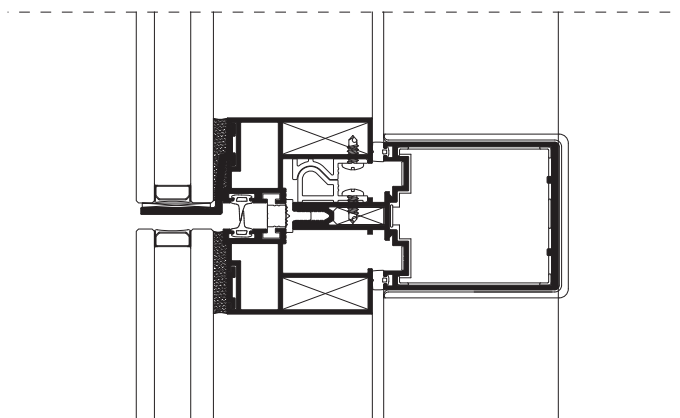
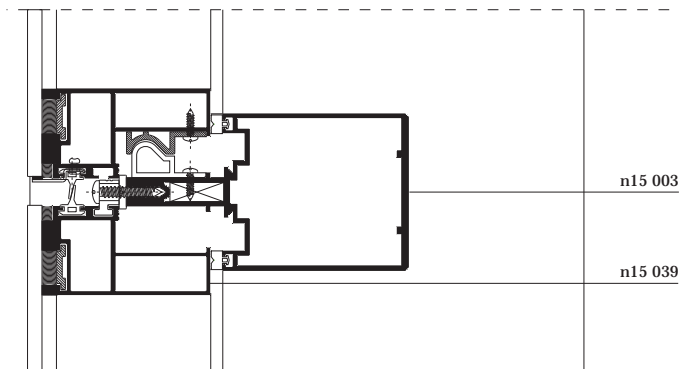
CORTE



nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.



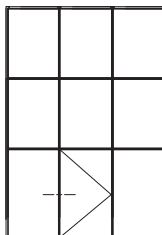
CORTE



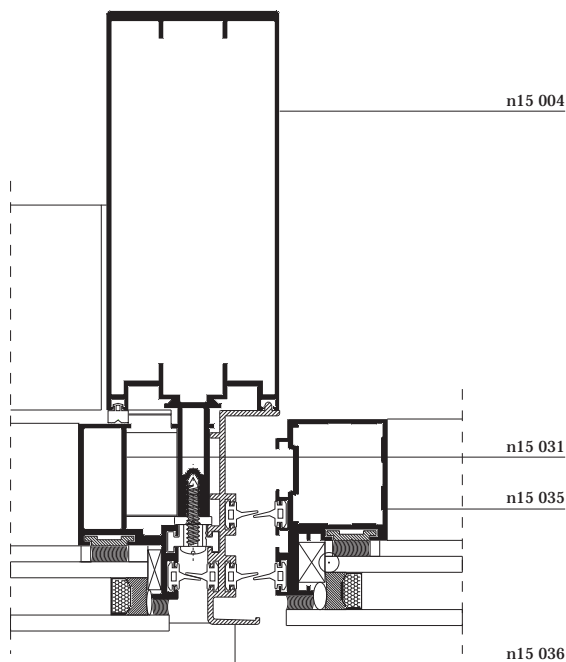
(opção para vidro duplo com N15 150)

nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

nota:  
atenção na aplicação de  
acessórios em portas  
com vidro.

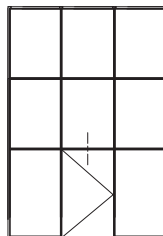


CORTE

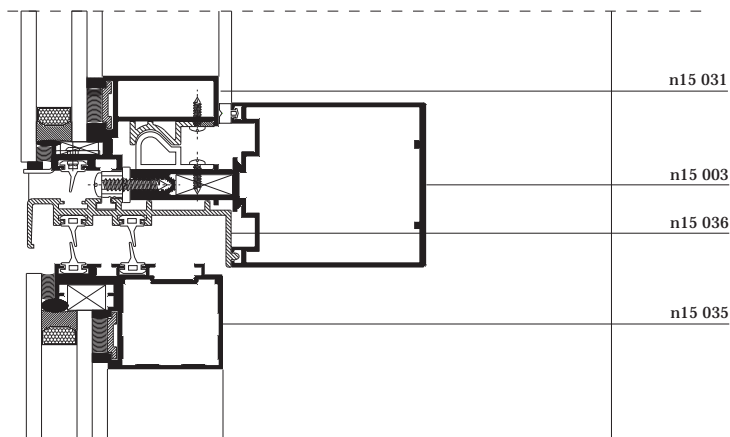


nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

nota:  
atenção na aplicação de  
acessórios em portas  
com vidro.



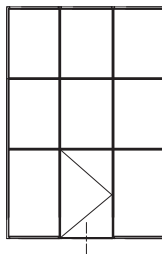
CORTE



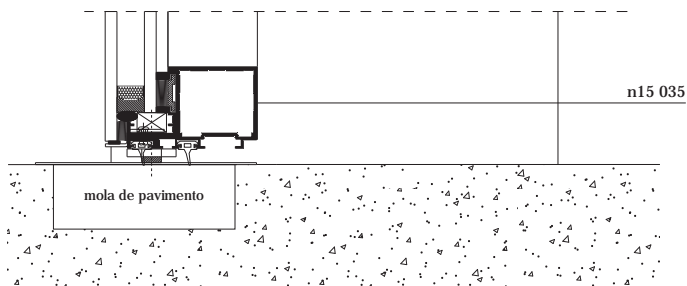


nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

nota:  
atenção na aplicação de  
acessórios em portas  
com vidro.

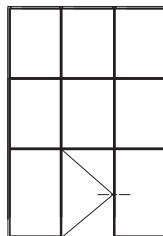


CORTE

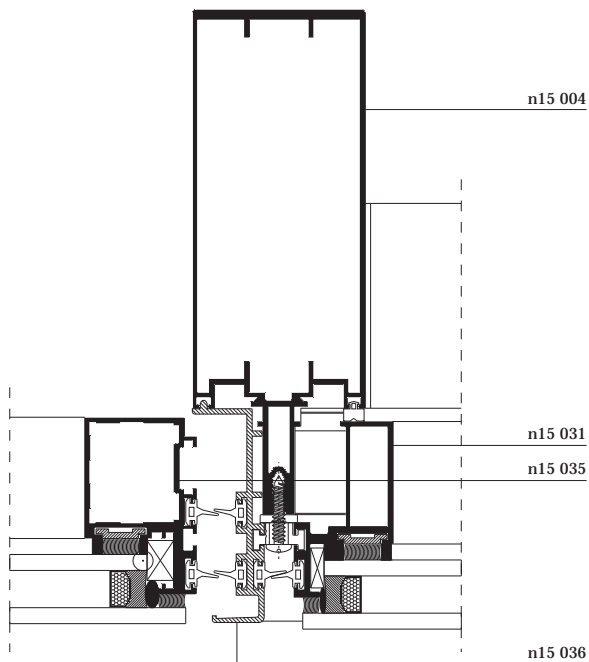


nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

nota:  
atenção na aplicação de  
acessórios em portas  
com vidro.

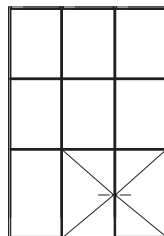


CORTE

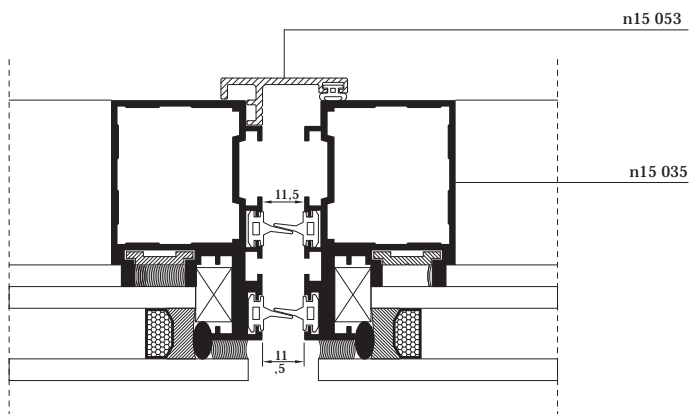


nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

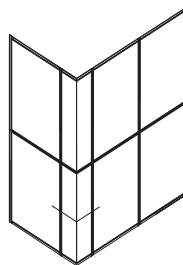
nota:  
atenção na aplicação de  
acessórios em portas  
com vidro.



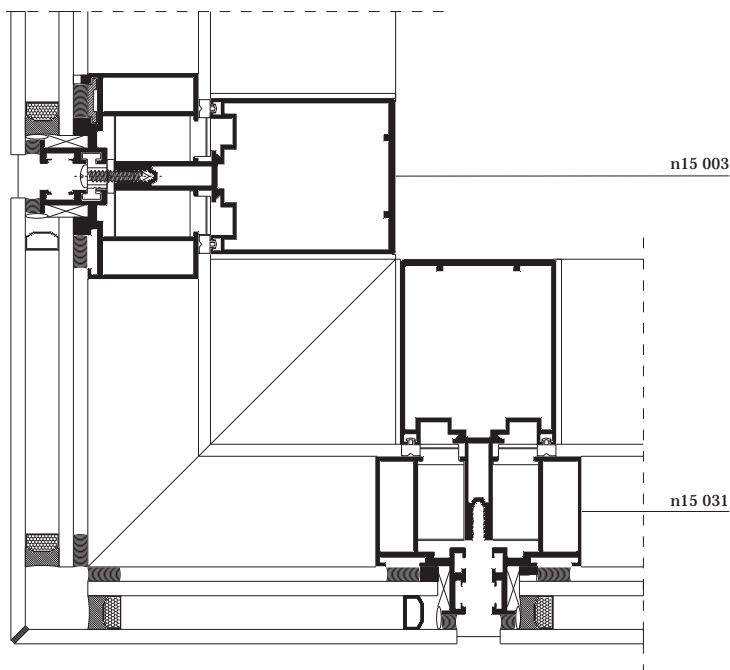
CORTE

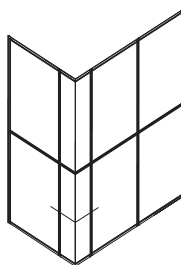


nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

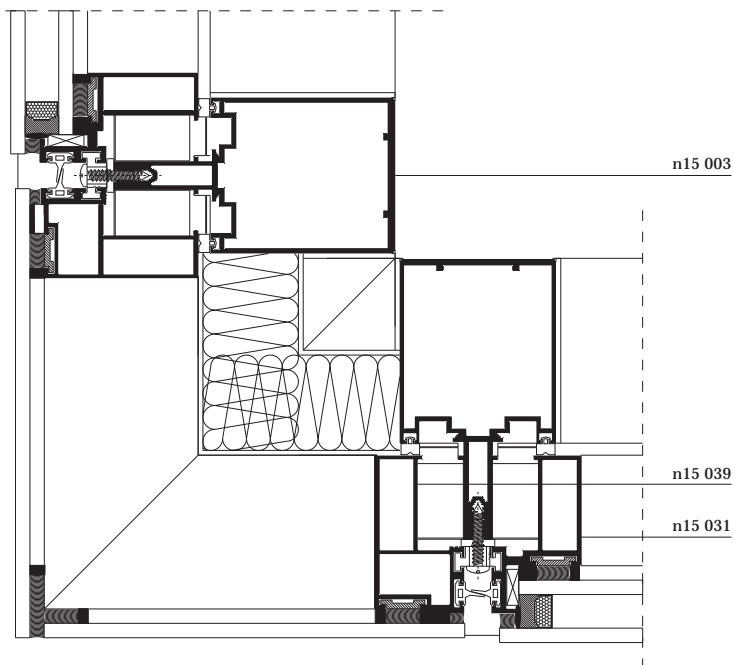


CORTE

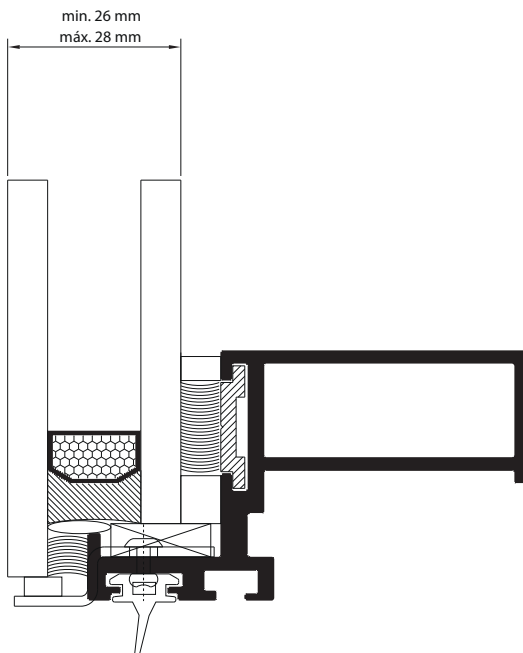




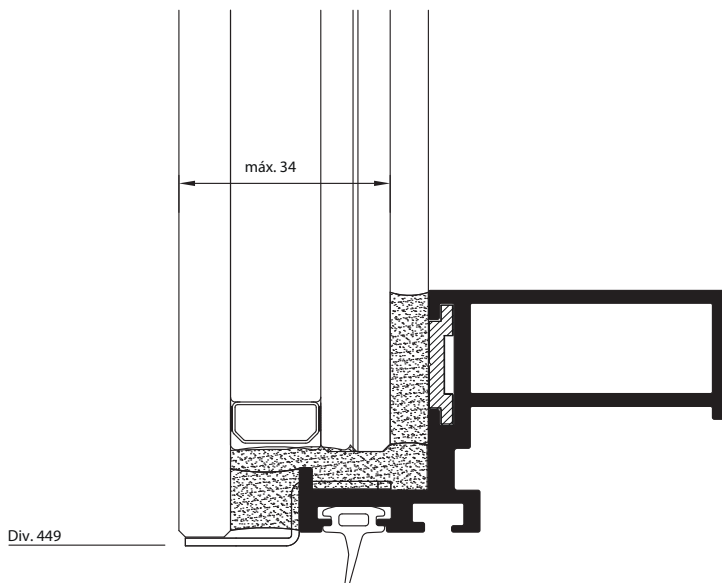
CORTE



nota:  
furação aplicável com o  
cunho Cun. 0072.

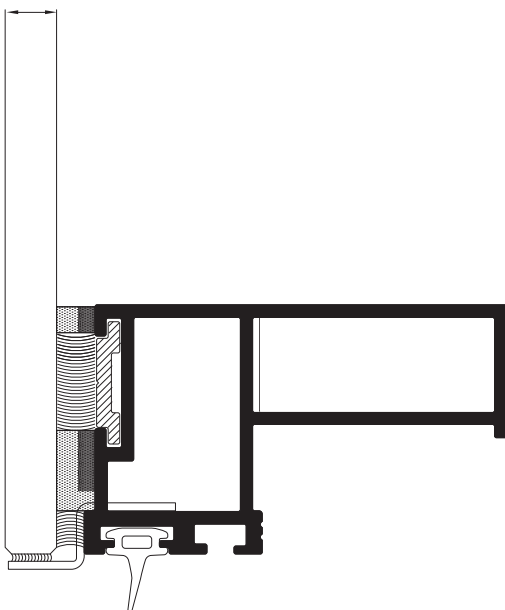


(cunhagem para aplicação da peça de apoio Div. 0308)



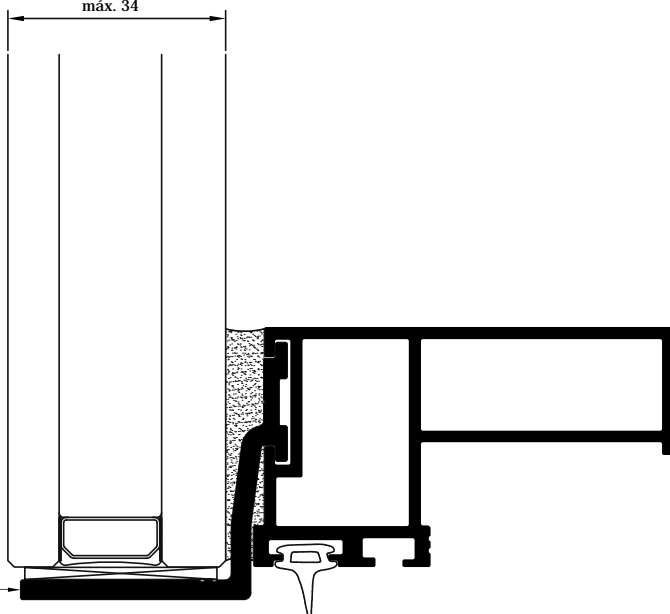
Div. 449

min. 6 mm  
máx. 8 mm



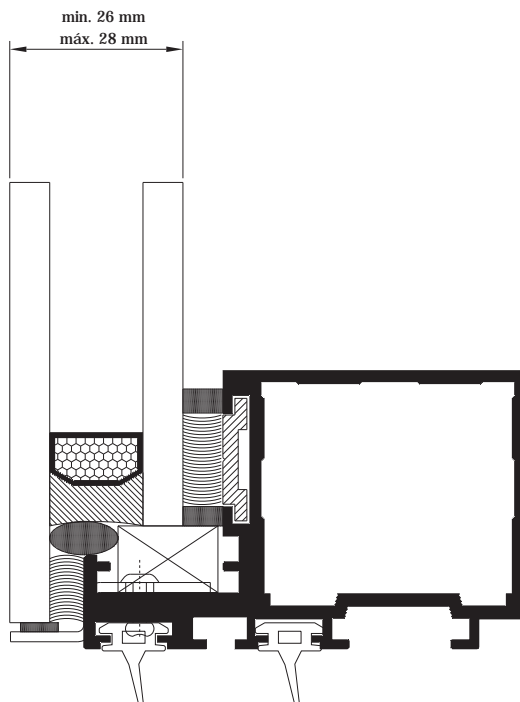
(fresagem para aplicação da peça de apoio Div. 0308)

máx. 34



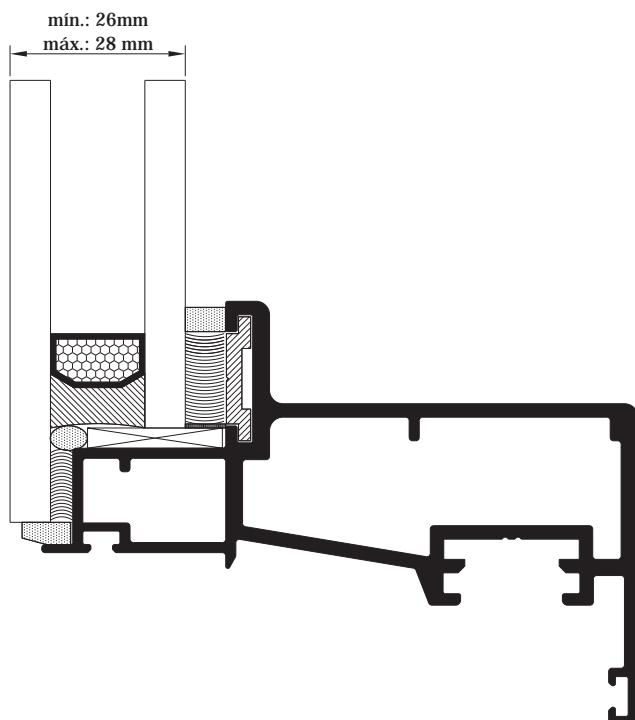
n15 150

nota:  
furação aplicável com o  
cunho Cun. 0072.



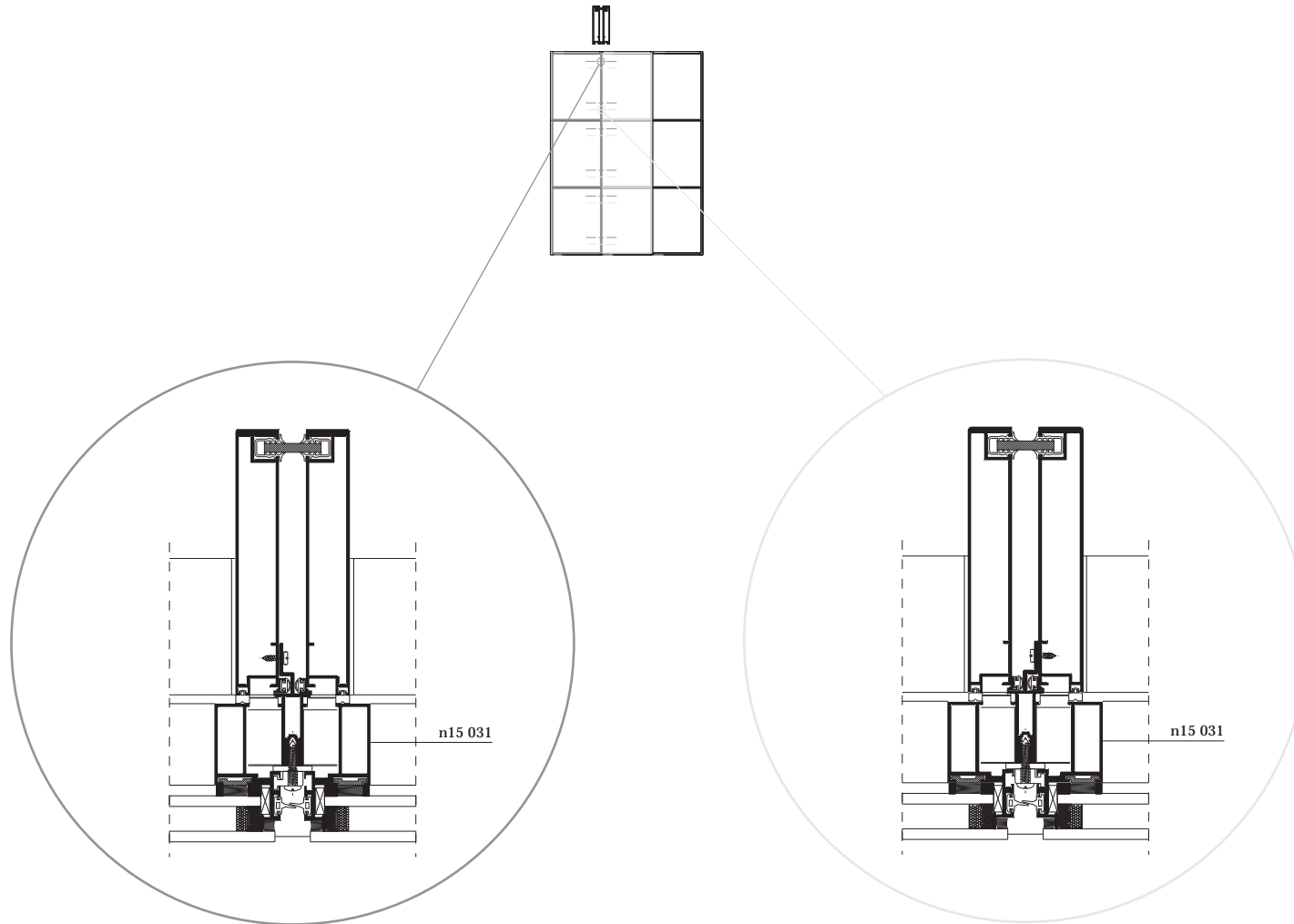
(cunhagem para aplicação da peça de apoio Div. 0308)





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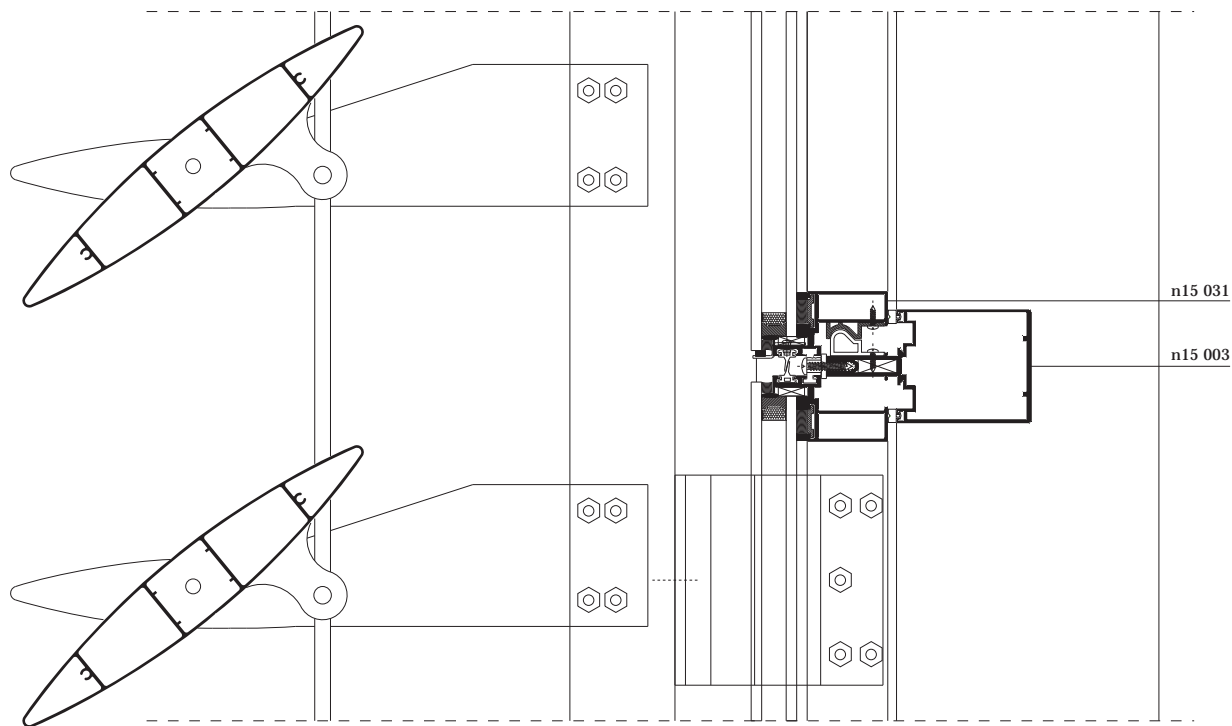
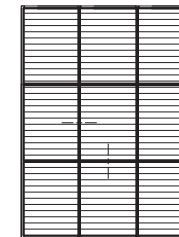
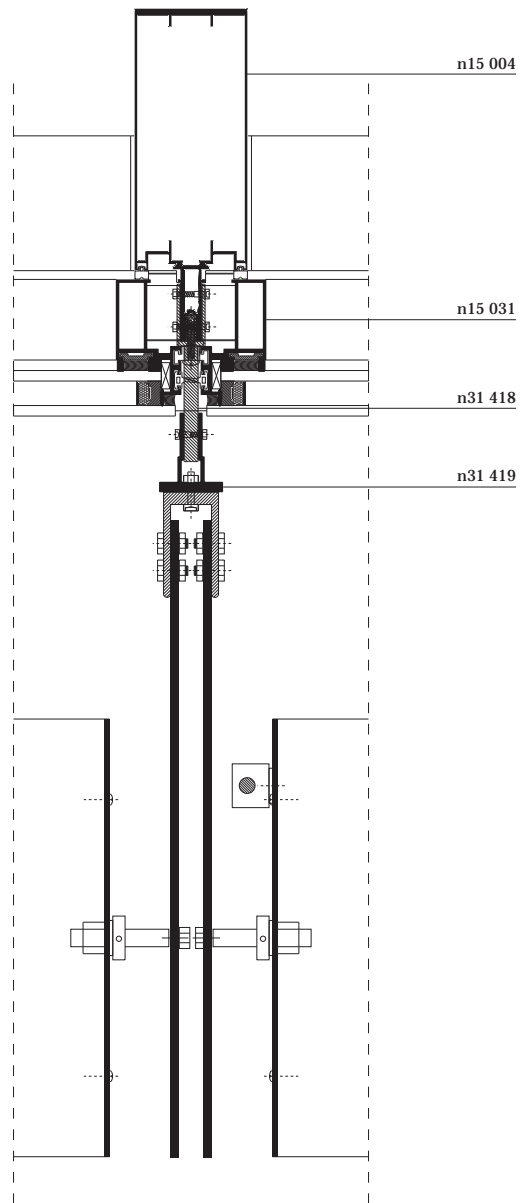
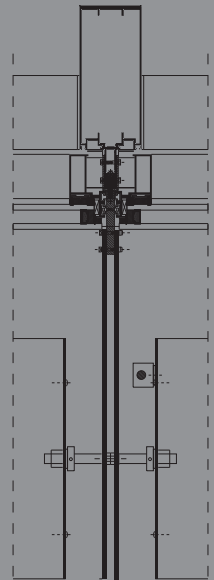
nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.



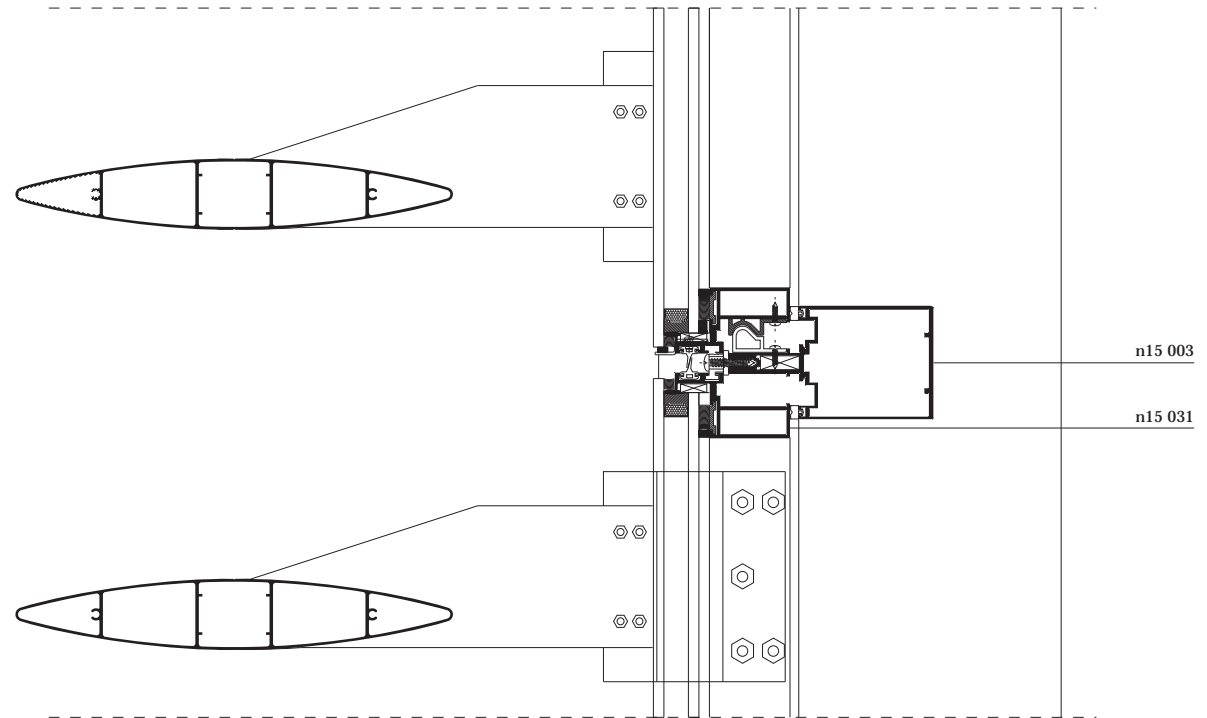
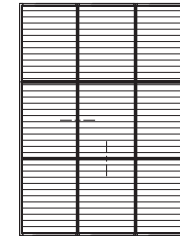
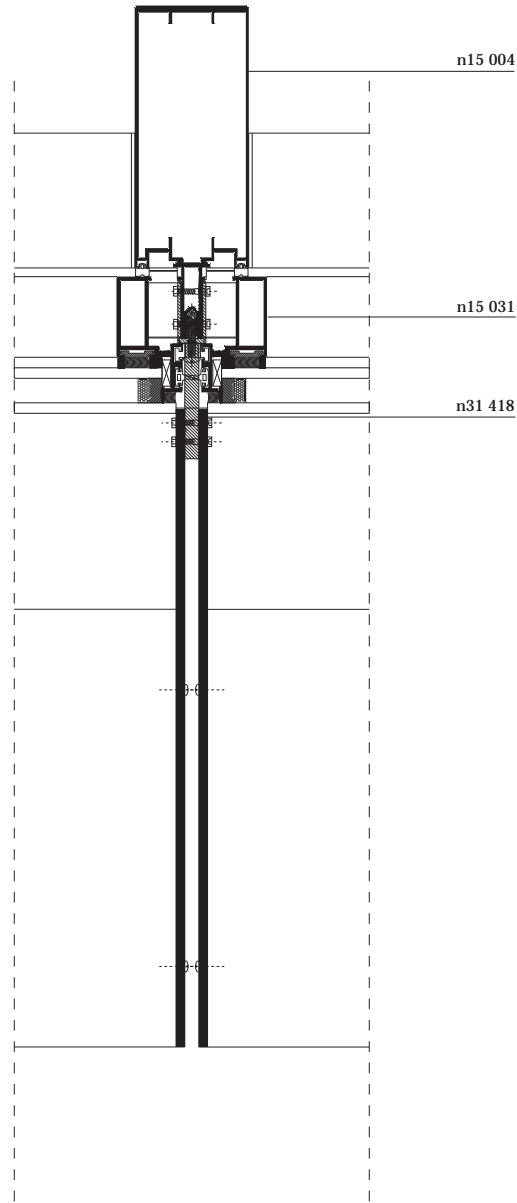
desenhos a título indicativo

nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

opção:  
sem calha e apoio.

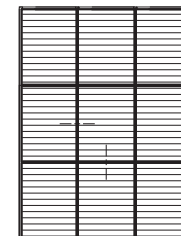
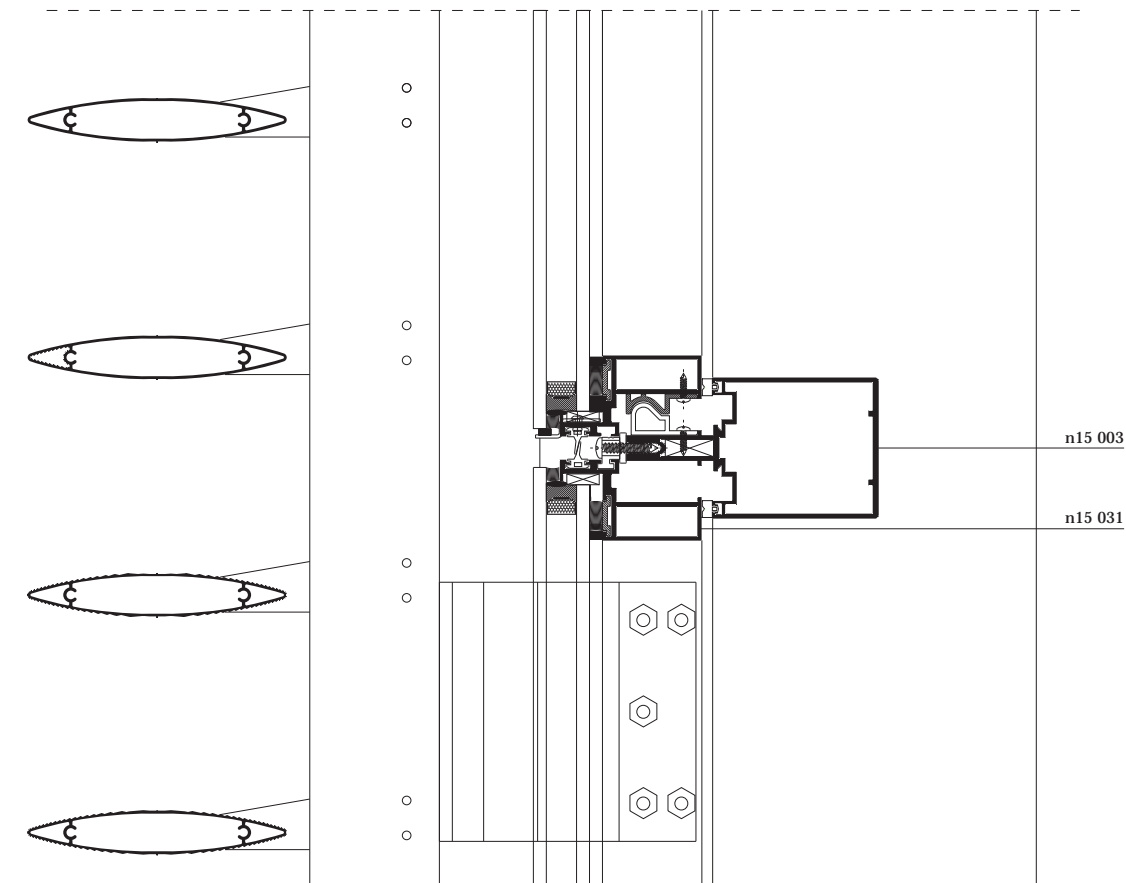
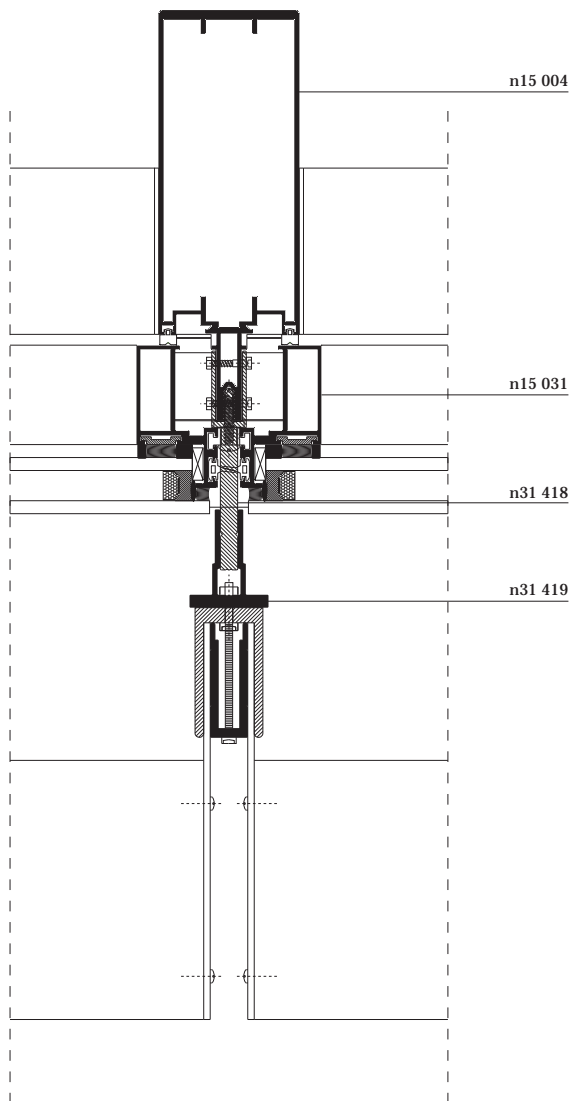
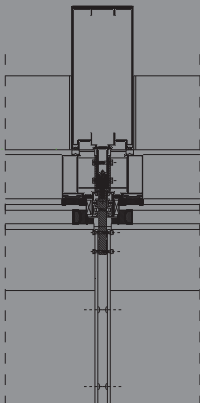


nota:  
 esquemas de colagem do  
 vidro são dados a título  
 indicativo.



nota:  
esquemas de colagem do  
vidro são dados a título  
indicativo.

opção:  
sem calha e apoio.



## 4. fachada VEC

### 4.2 fabricação e montagem

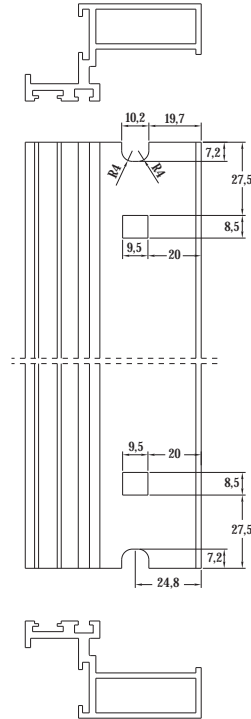
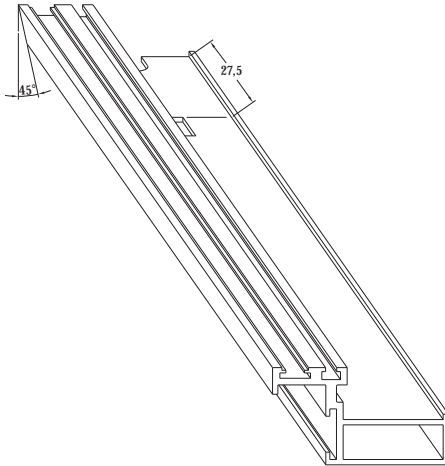
**n15 000**  
sistema de fachadas  
fachada VEC

n15 000

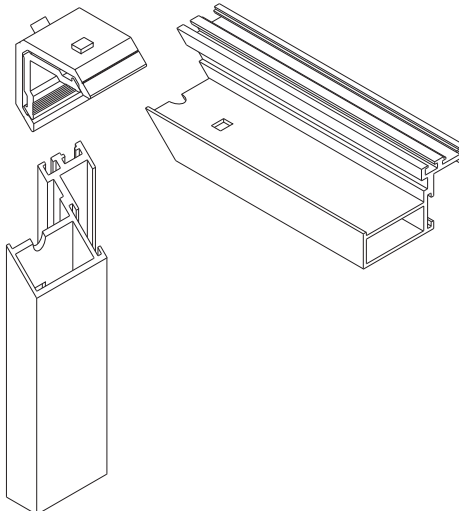




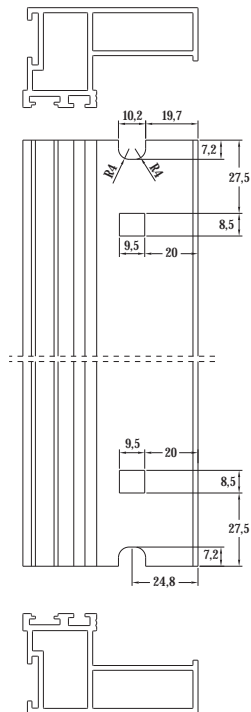
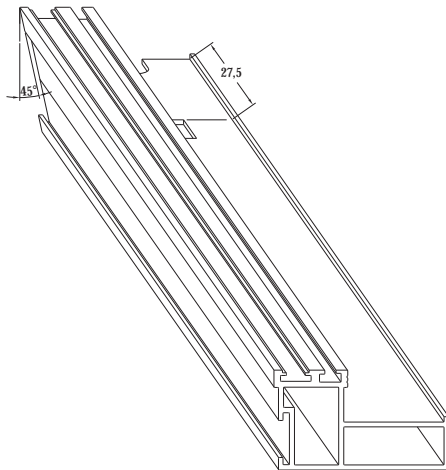
[A]  
furação de perfis móveis  
para aplicação de  
esquadros.  
nota:  
furação efectuada com o  
cunho Cun. 0018.



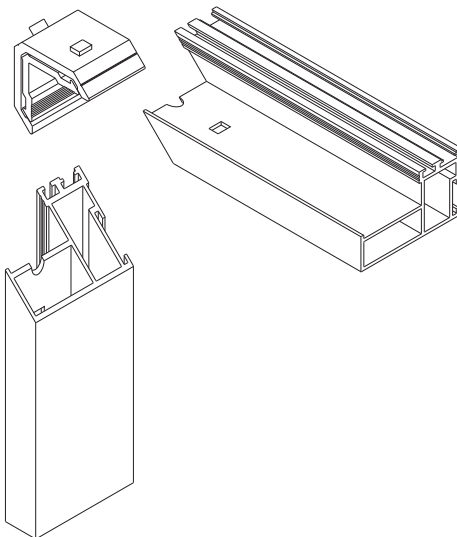
[A]



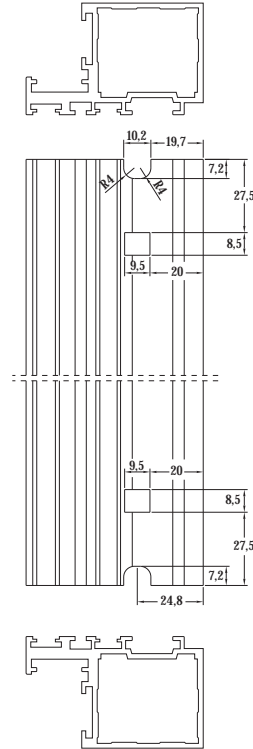
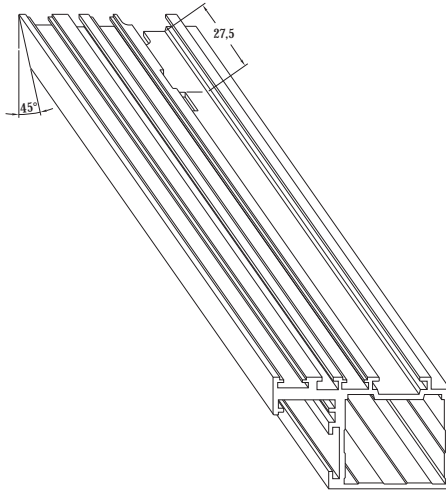
[A]  
furação de perfis móveis  
para aplicação de  
esquadros.  
nota:  
furação efectuada com o  
cunho Cun. 0018.



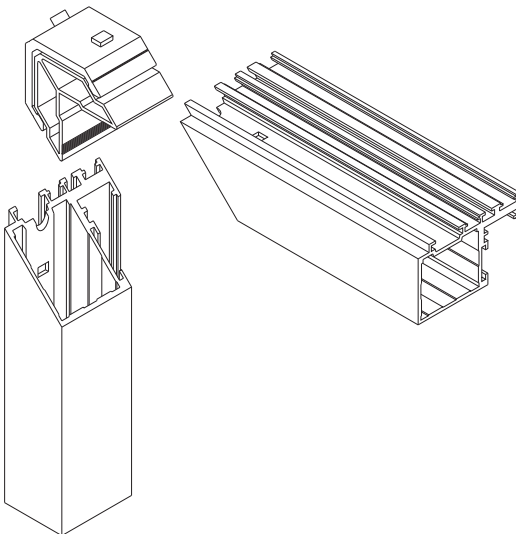
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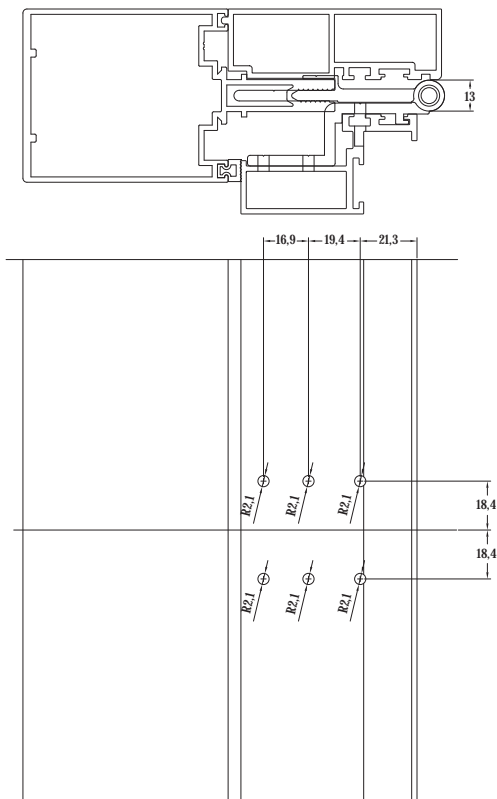
[A]  
furação de perfis móveis  
para aplicação de  
esquadros.  
nota:  
furação efectuada com o  
cunho Cun. 0018.



[A]

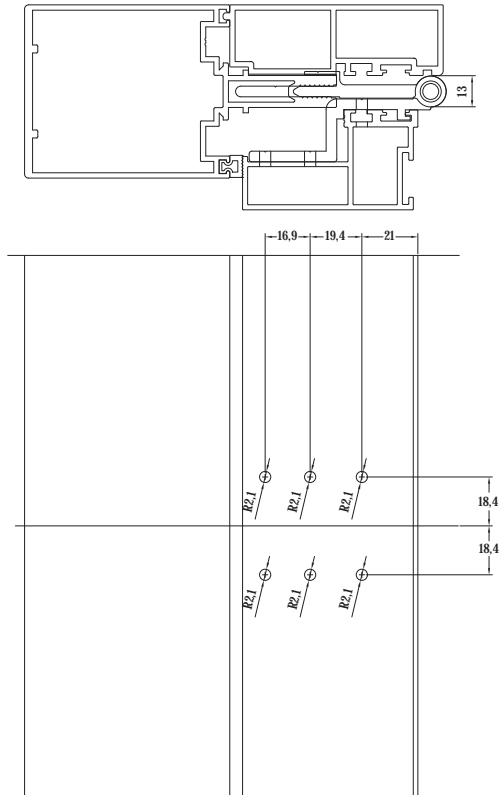


[A]  
fresagem do perfil móvel  
n15 031 para fixação da  
dobradiça.



[A]

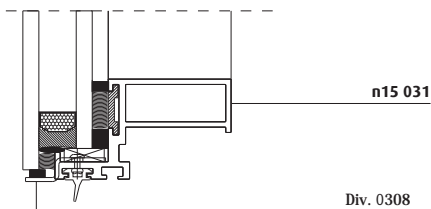
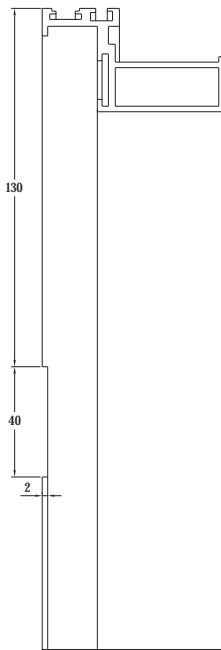
[A]  
fresagem do perfil móvel  
n15 039 para fixação da  
dobradiça.



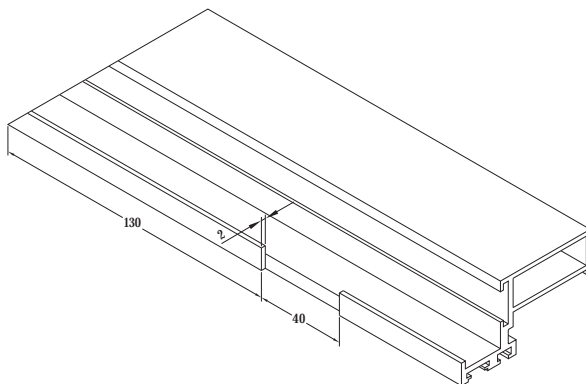
[A]

[A]  
fresagem para aplicação  
da peça de segurança de  
vidro colado.

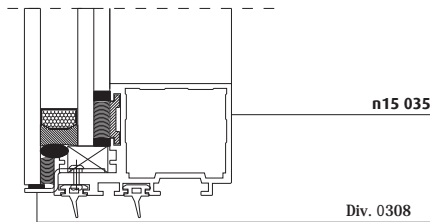
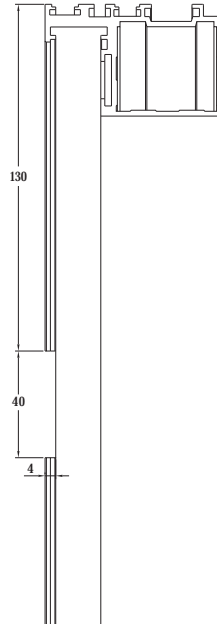
nota:  
cunhagem efectuada com  
o cunho Cun. 0072.



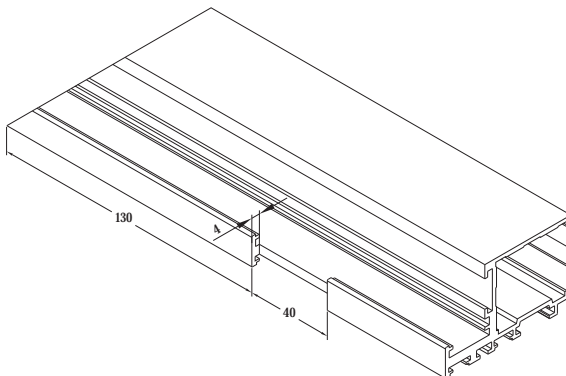
[A]

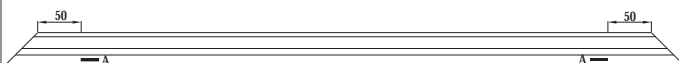
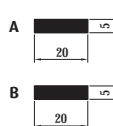
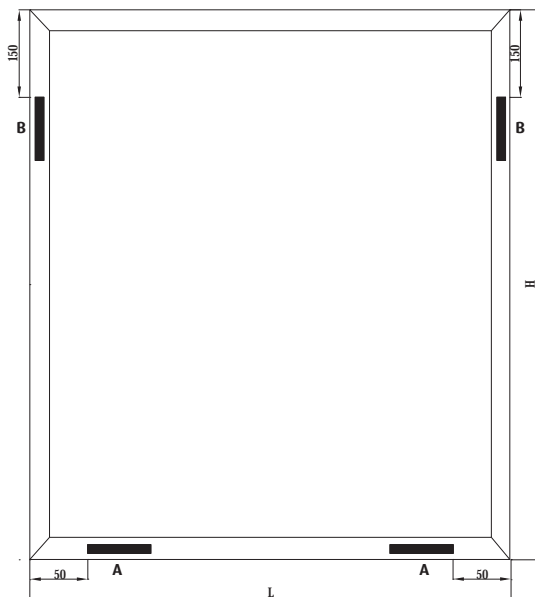


[A]  
fresagem/cunhagem para  
aplicação da peça de  
segurança de vidro colado.

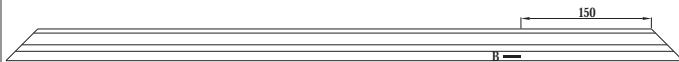


[A]





n15 031



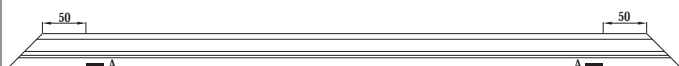
n15 031



n15 035



n15 035



n15 039



(Perfil para vidro simples)



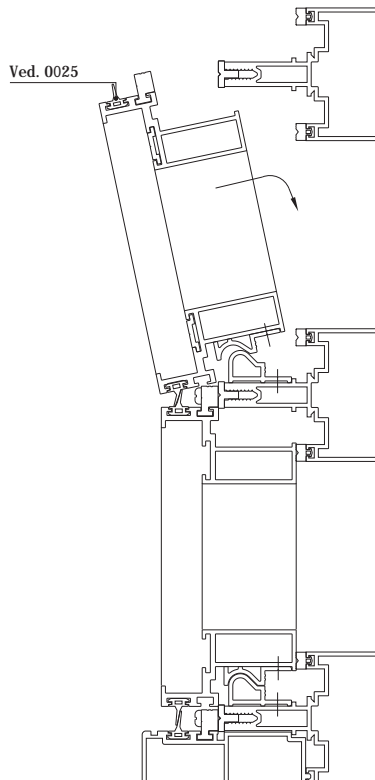
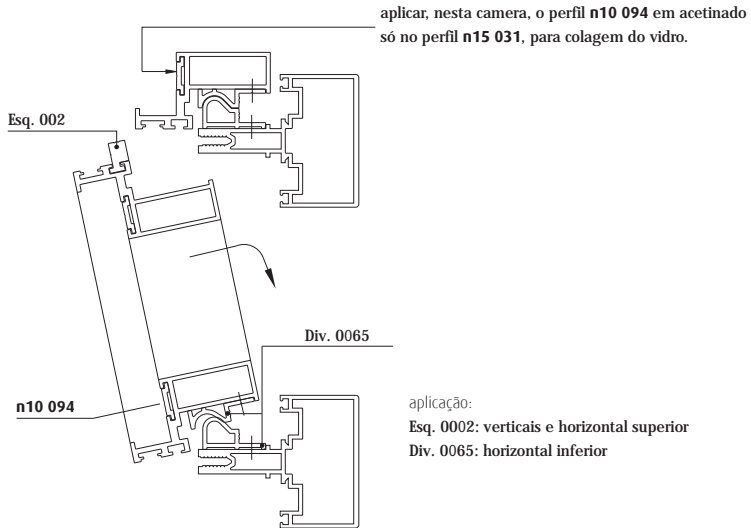
n15 039



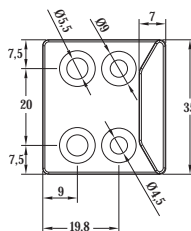
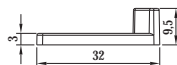
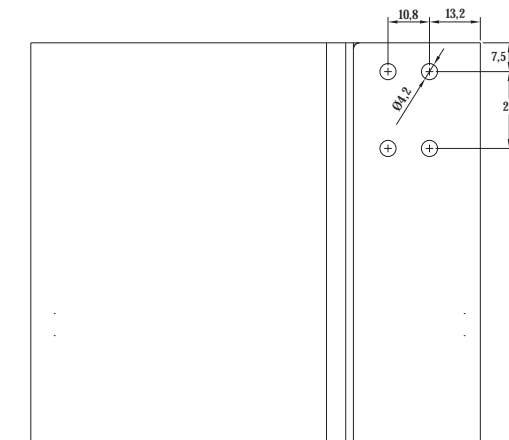
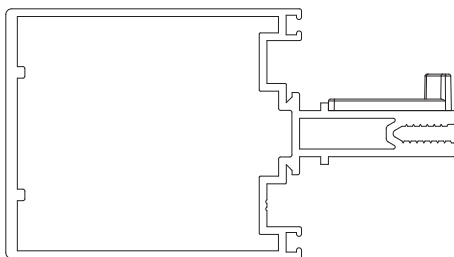
(Perfil para vidro simples)

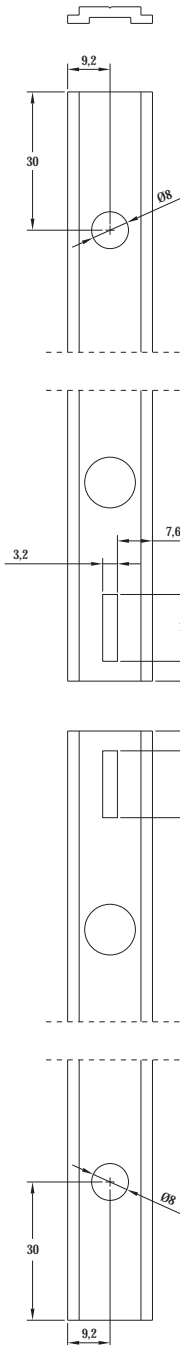


nota:  
consultar página 3.2.33  
para aplicação de  
acessórios Div. 0065 e  
Esq. 0002.

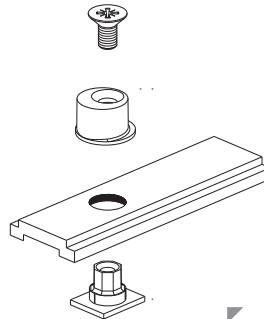


[A]  
fresagens dos montantes  
para fixação do fecho  
suplementar.

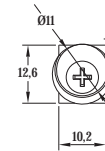
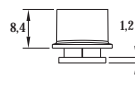




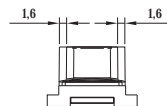
[A]



[B]



[C]



[D]

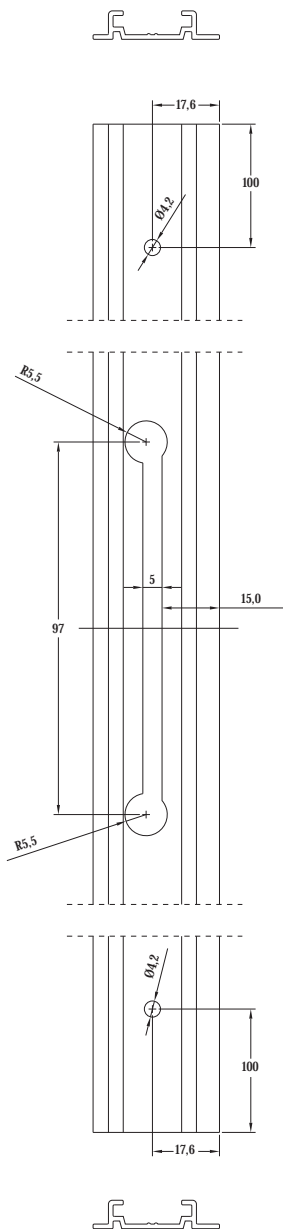
[A] fresagem da vareta para fixação do ponto de fecho suplementar.

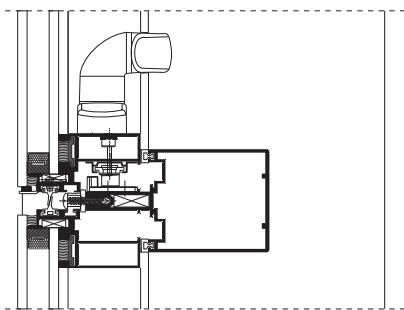
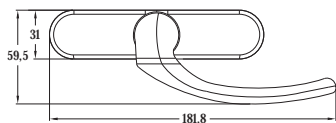
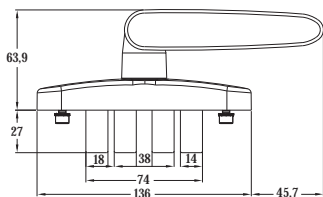
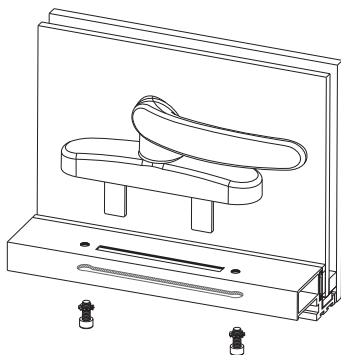
[B] maquinação da vareta para o ponto de fecho.

[C] medidas do kit para cremone VEP.

[D] regulação do ponto de fecho.

[A]  
fresagem do perfil  
n15 051.



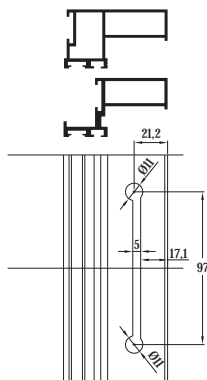


[A]

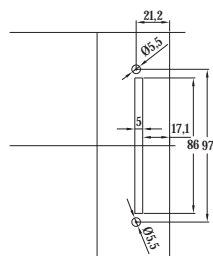
[A]  
aplicação do cremone na  
fachada.

[B]  
fresagem do aro móvel  
para aplicação do  
cremone.

nota:  
patilhas do cremone com  
medida de 27 mm nos  
perfis n15 031 e n15 139.



[B]



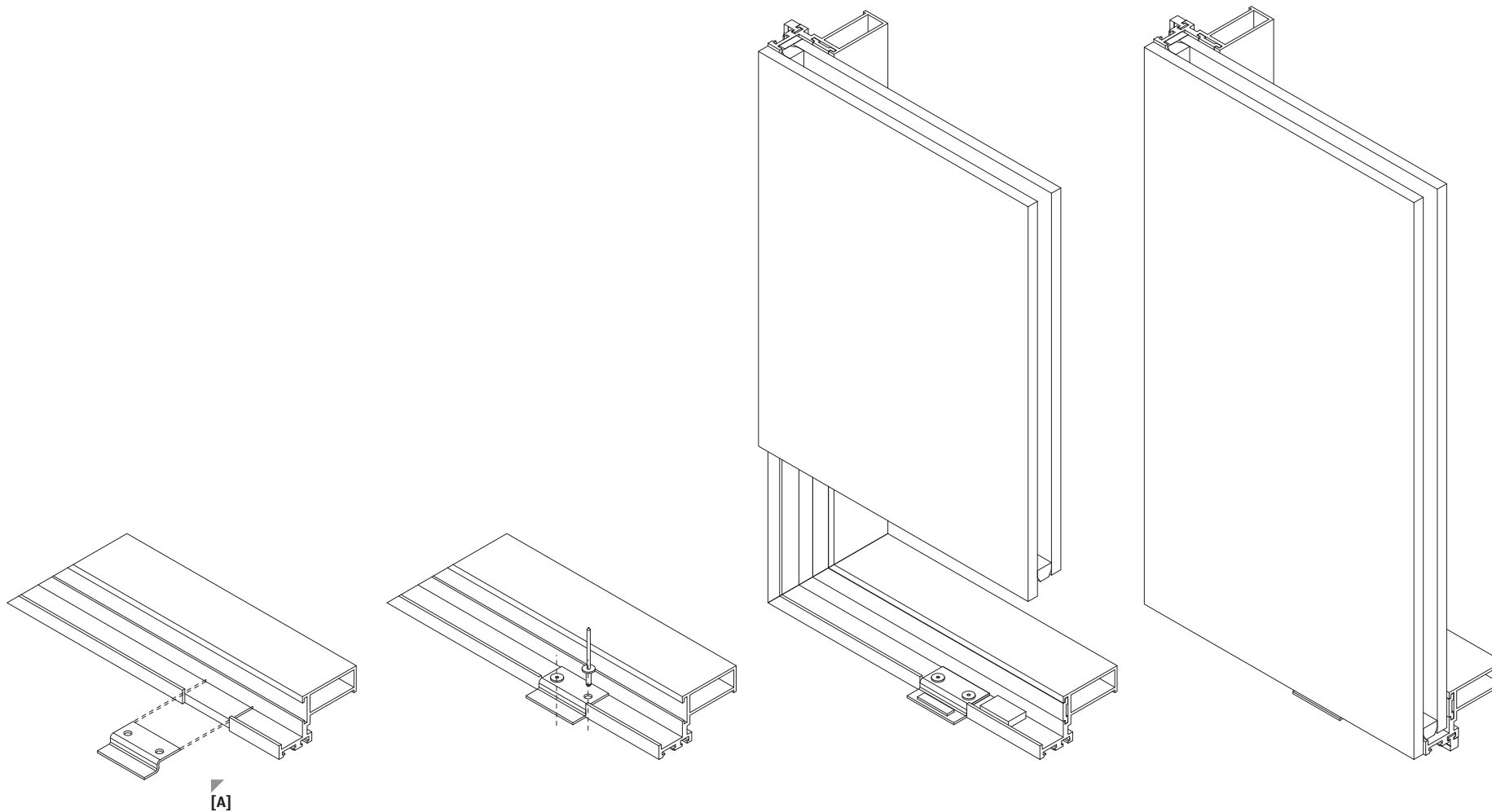
[B]

# n15 000

sistema de fachadas  
fachada VEC

esta página foi intencionalmente deixada em branco

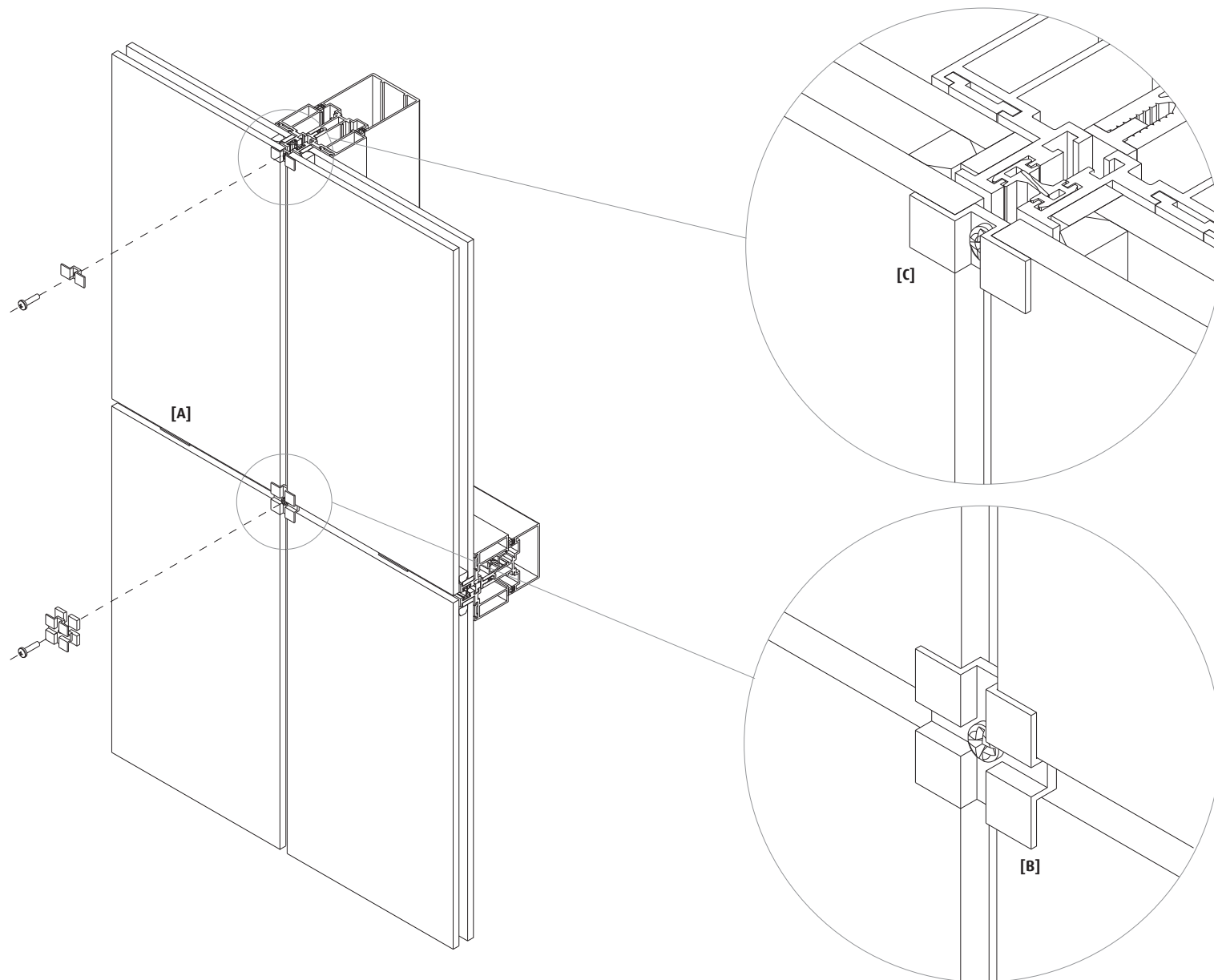
[A]  
cunhagem efetuada com  
o cunho Cun. 0072.



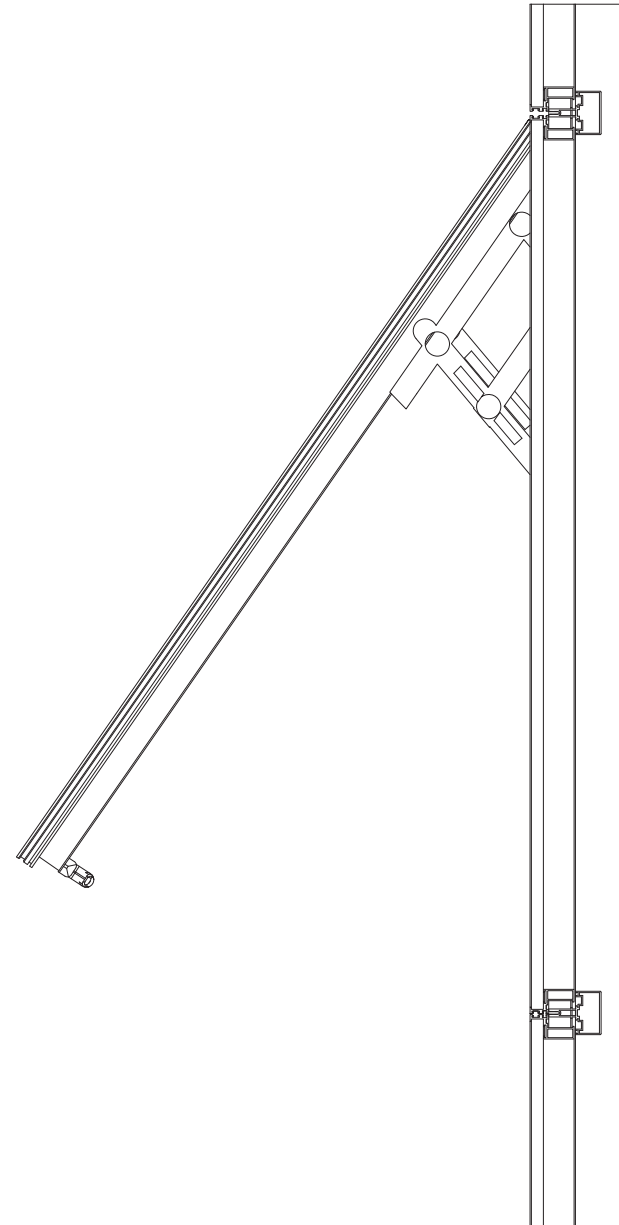
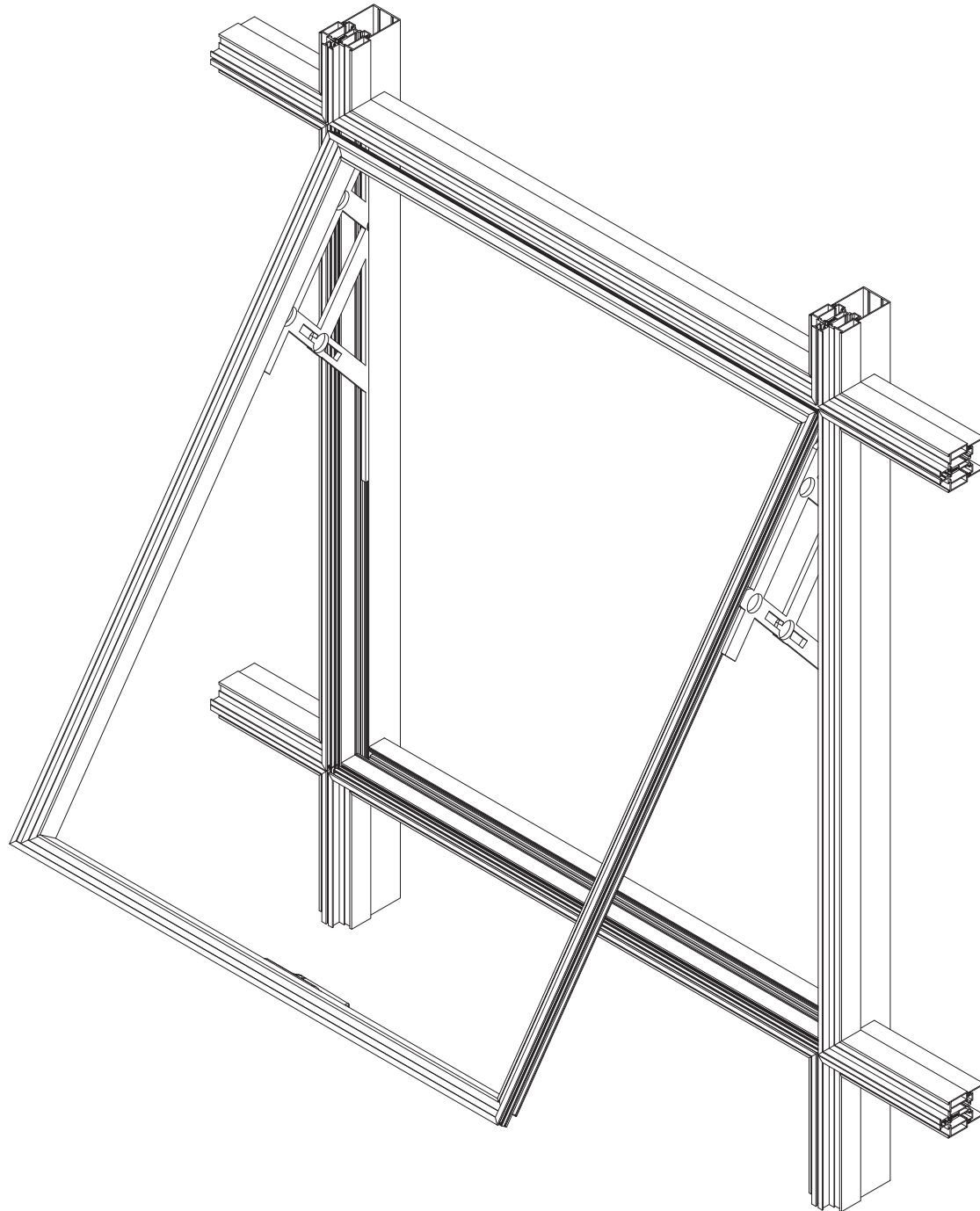
[A] Div. 0308

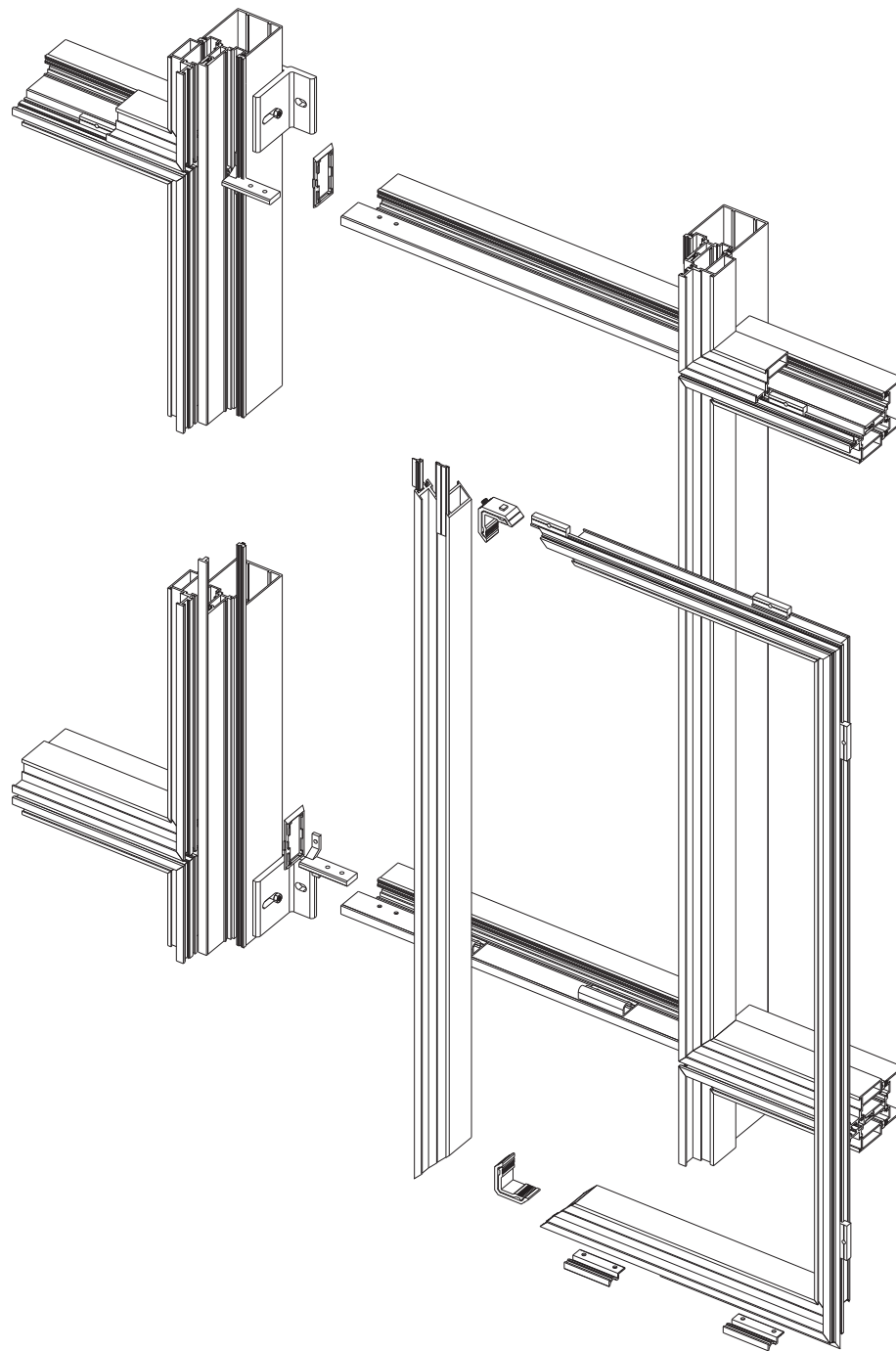
[B] Div. 0309

[C] Div. 0319









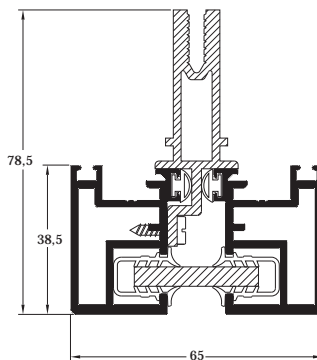
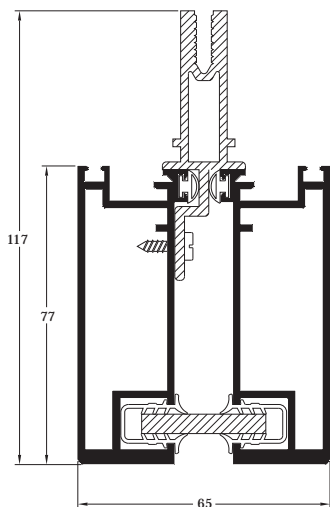
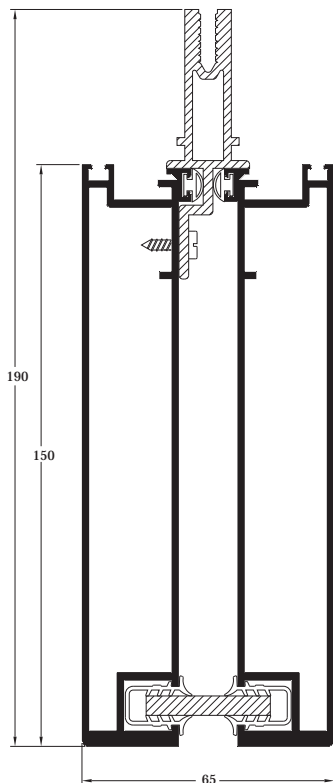
## 5. fachada geral

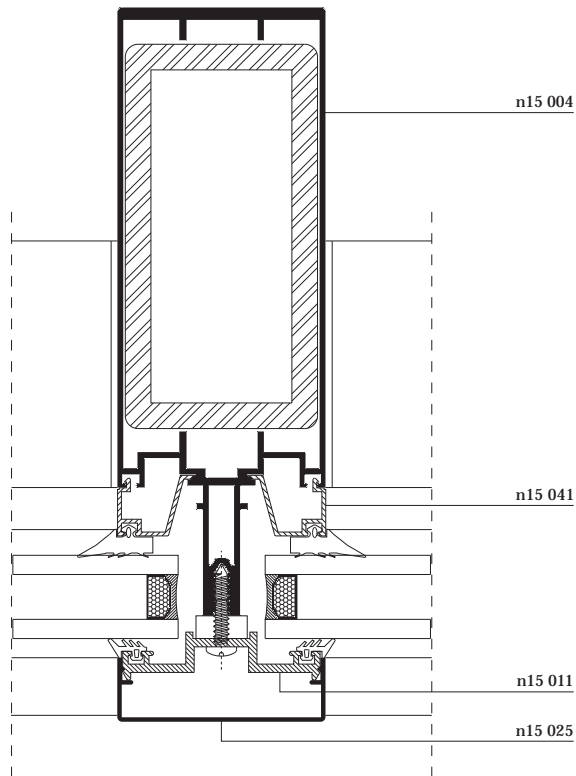
### 5.1 cortes e pormenores de montagem

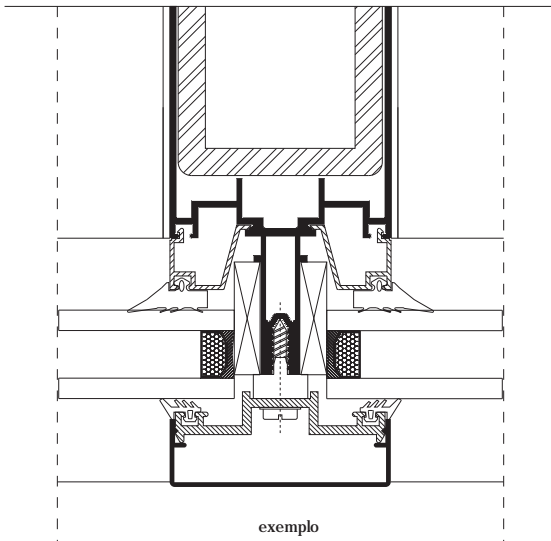
**n15 000**  
sistema de fachadas  
geral




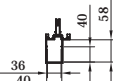
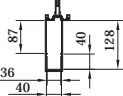
n15 000

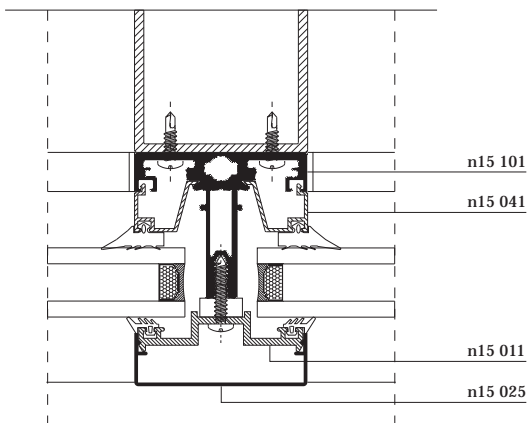




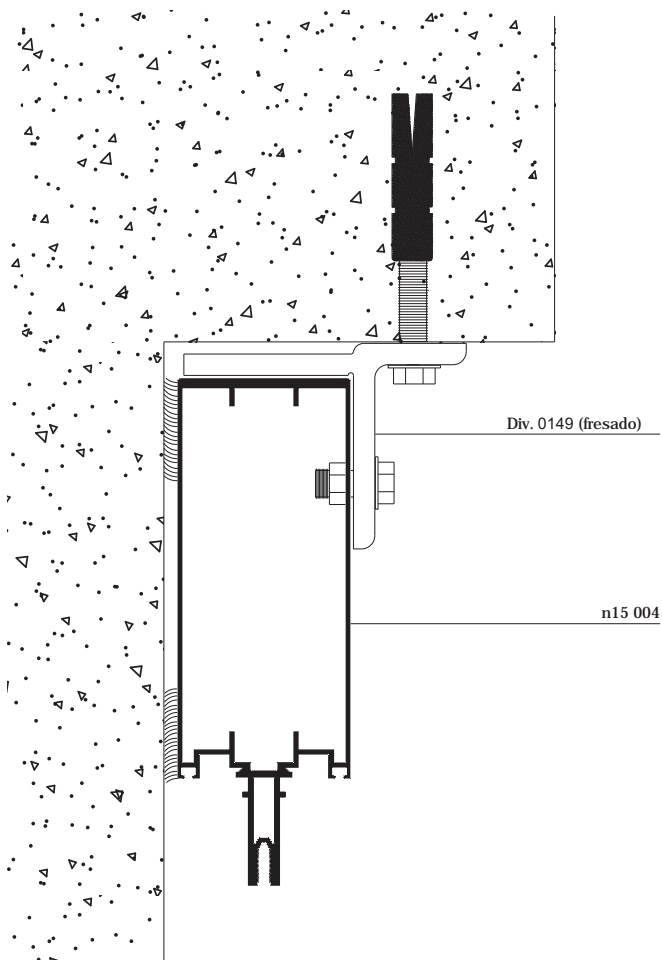


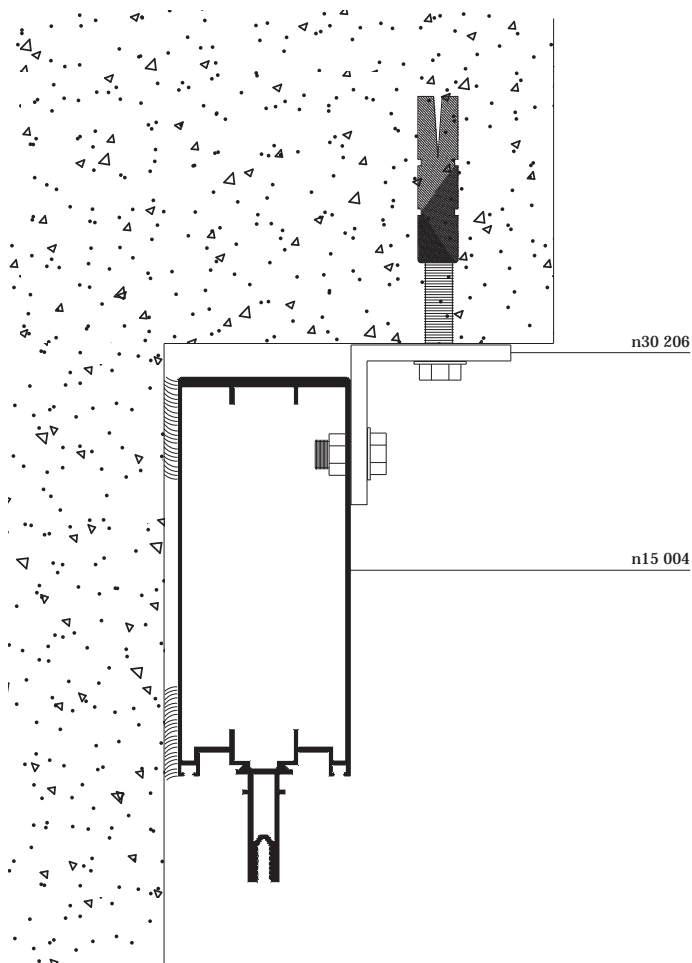


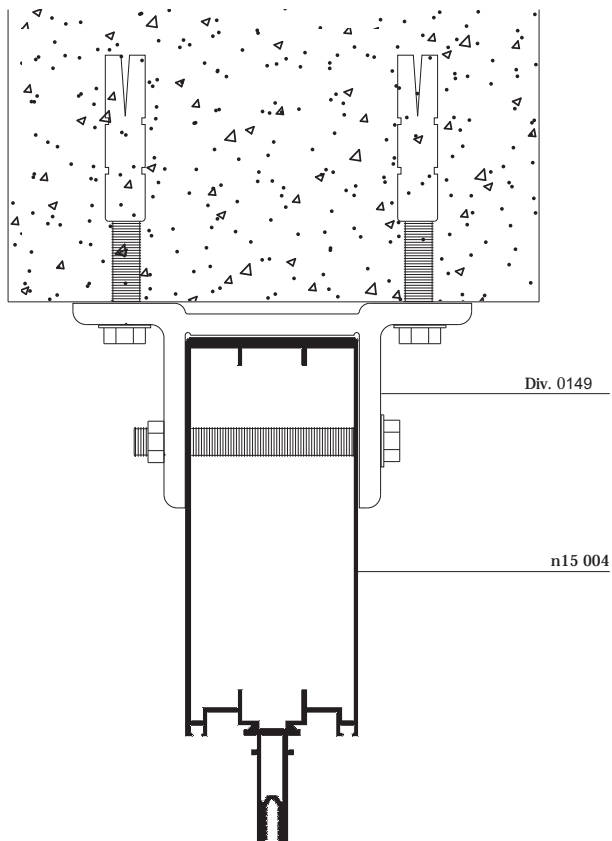
perfis	medidas de caixa interior para aplicação de um reforço (mm)	
n15 002		61 x 25
n15 003		61 x 61
n15 004		61 x 122
n15 103		40 x 40 ou 36 x 58
n15 104		40 x 40 ou 40 x 87 ou 36 x 128

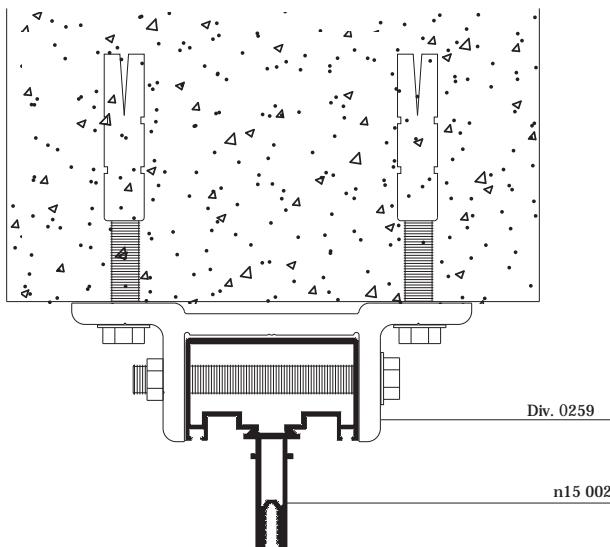


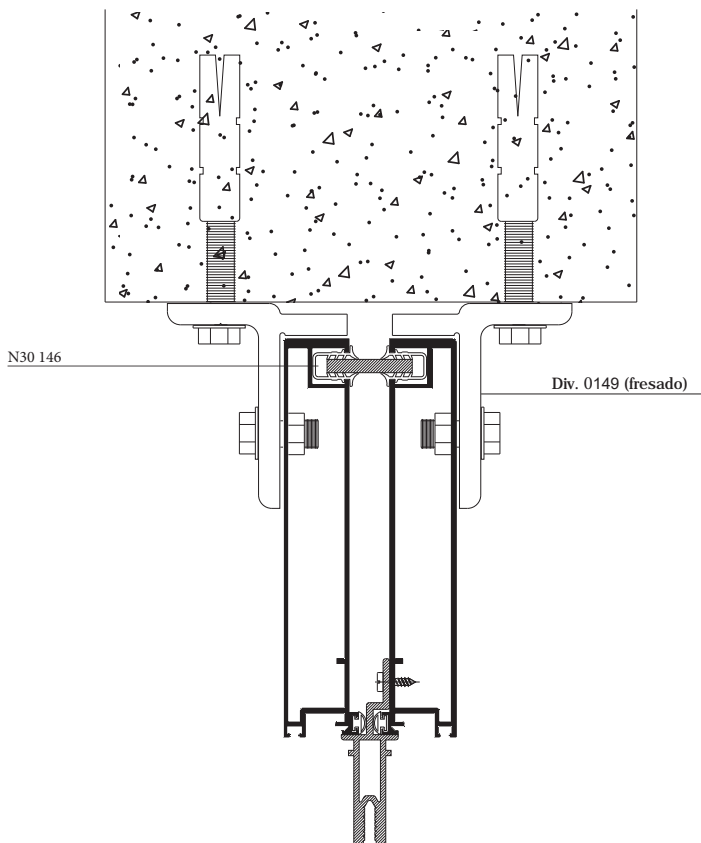


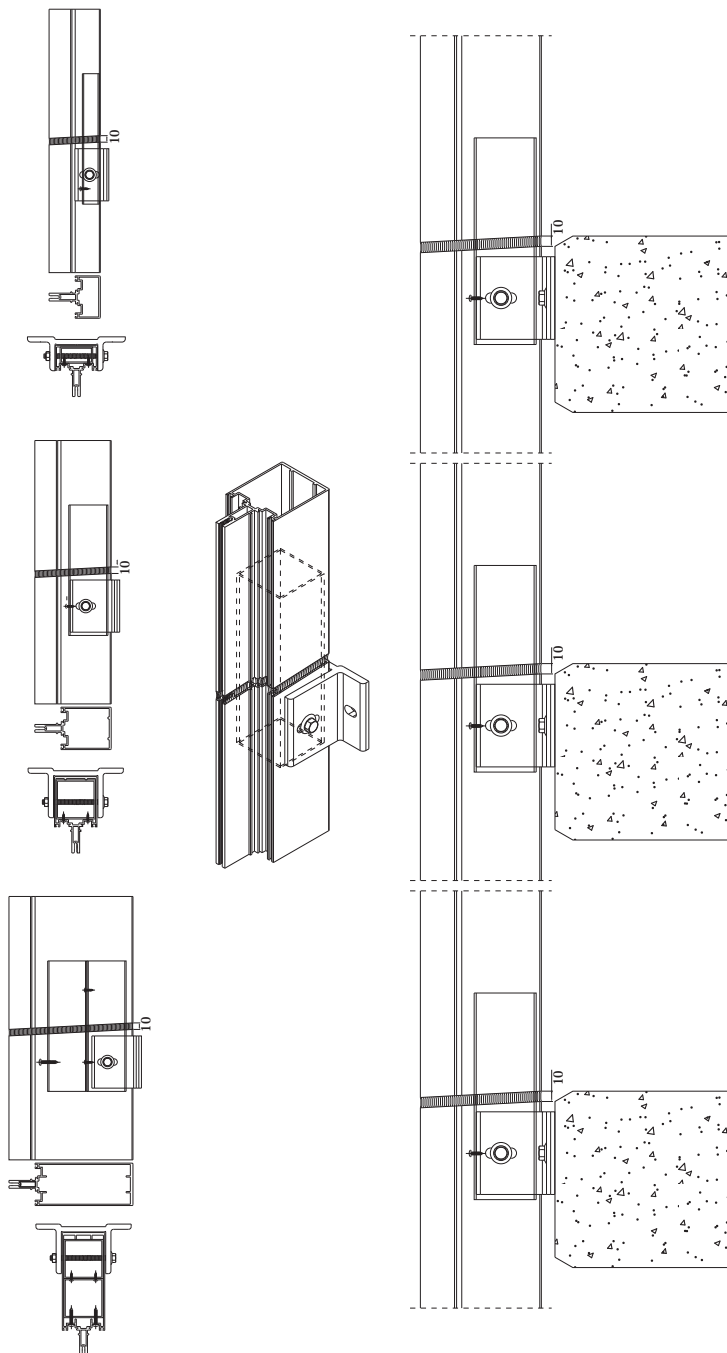


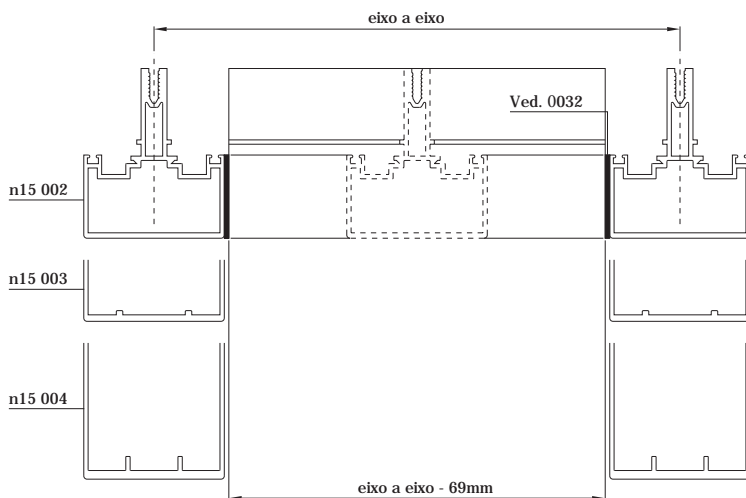


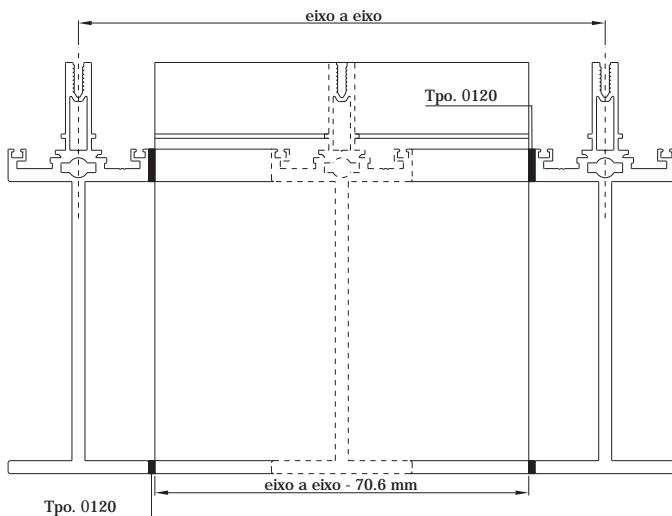




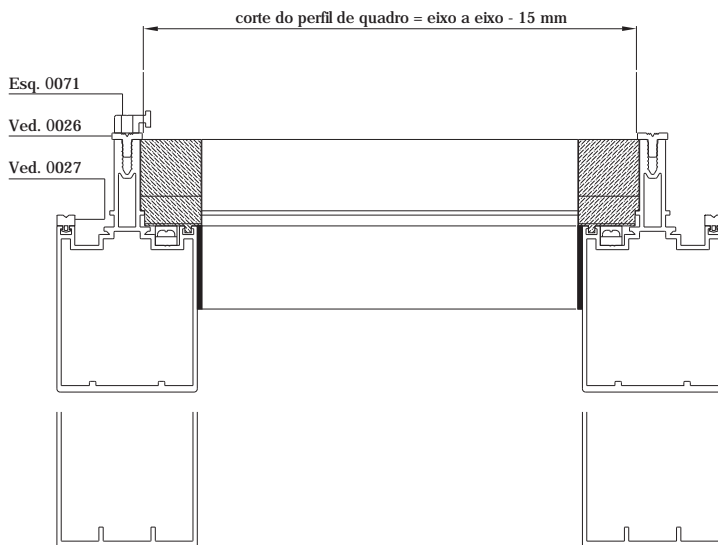
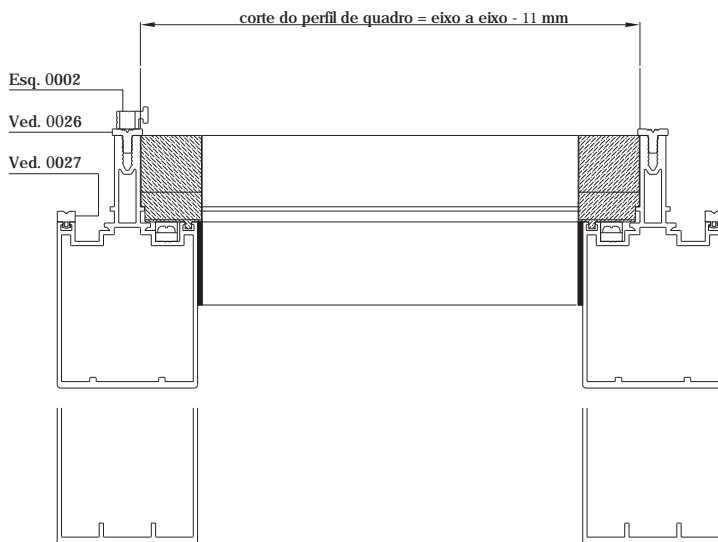












n15 033



n15 038



n15 031



n15 039



Ved. 0026



Ved. 0022



Ved. 0215



Ved. 0195

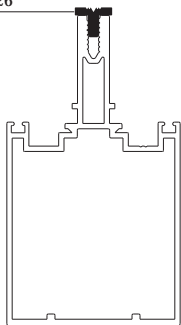


Ved. 0216

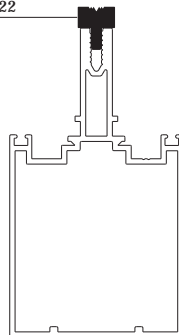


Ved. 0219

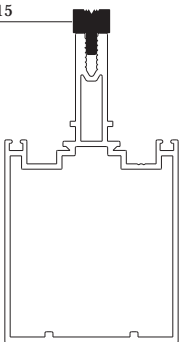
Ved. 0026



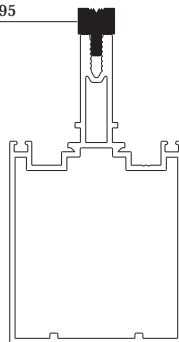
Ved. 0022



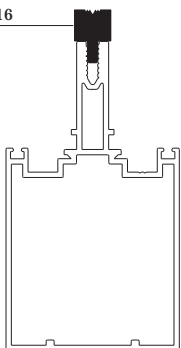
Ved. 0215



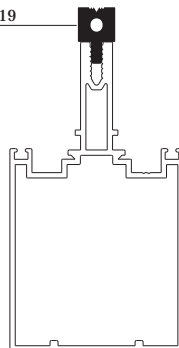
Ved. 0195



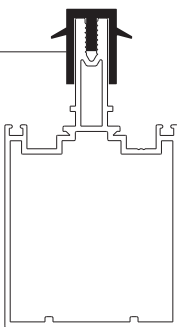
Ved. 0216



Ved. 0219



Ved. 0214

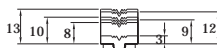
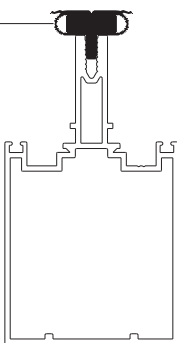


Ved. 0214



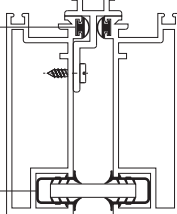
Ved. 0226

Ved. 0226



Ved. 0071

Ved. 0020





Ved. 0026



Ved. 0215



Ved. 0219



Ved. 0027



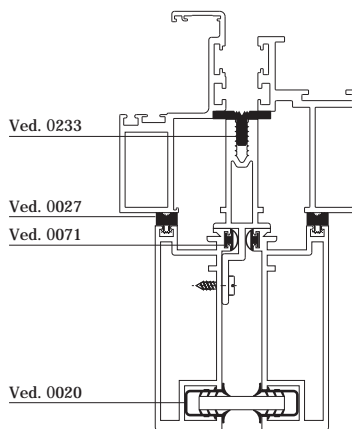
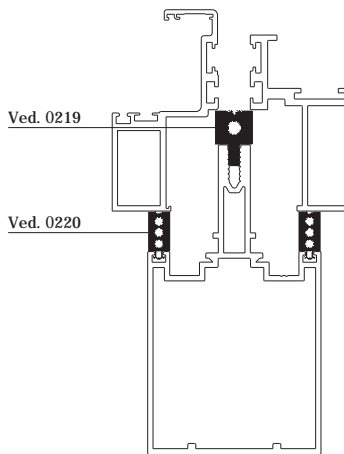
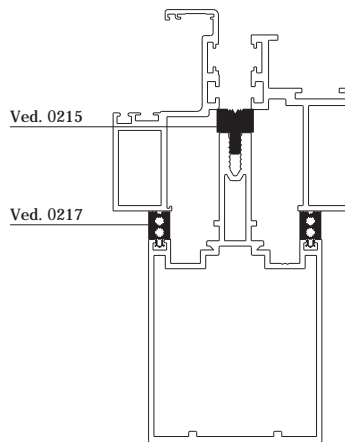
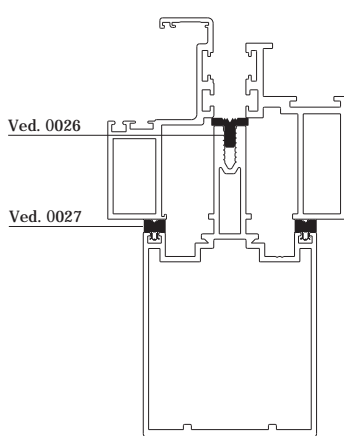
Ved. 0217



Ved. 0220



Ved. 0233



5. fachada geral

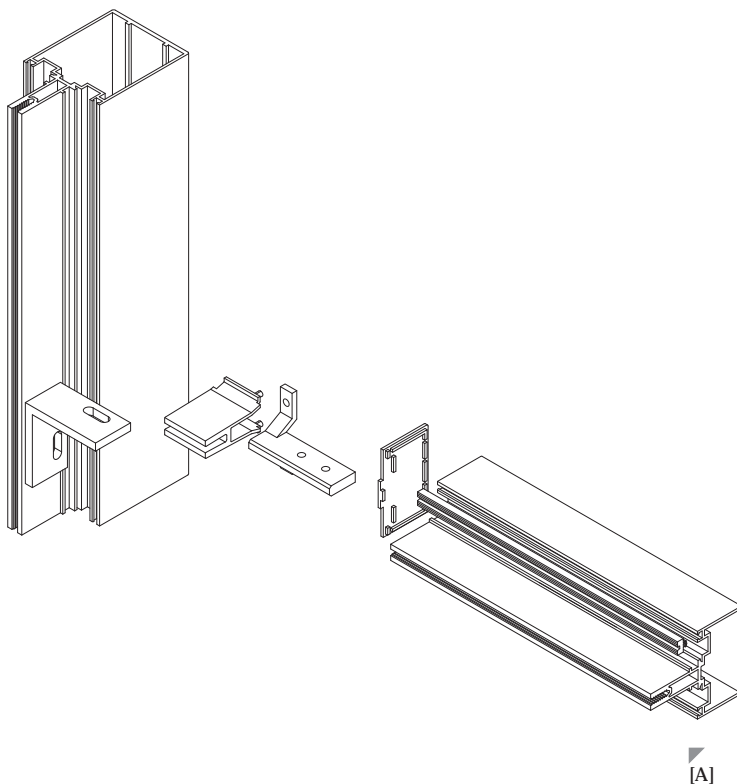
5.2 fabricação e montagem

**n15 000**  
sistema de fachadas  
geral

n15 000

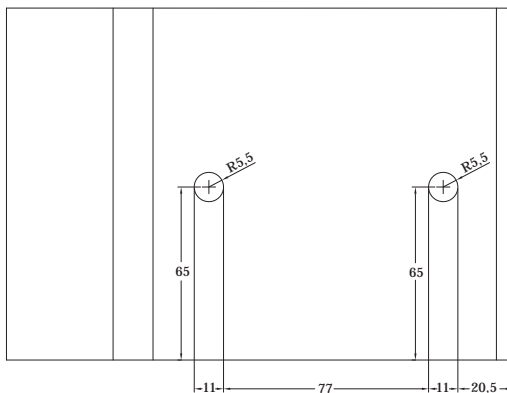
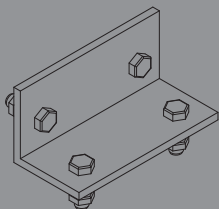


[A]  
montagem de estrutura  
de suporte das fachadas.

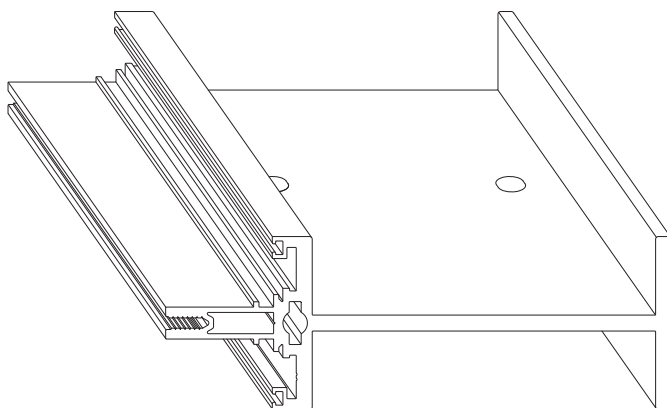


[A]  
rasgos de drenagem no  
montante para fixação  
com travessa.

nota:  
fixação do montante com  
travessa efectuada com  
Div. 0158.



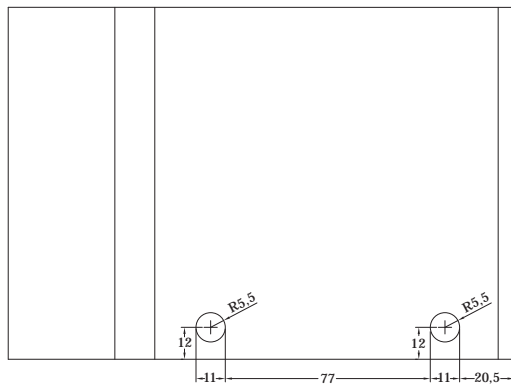
[A]



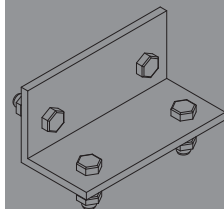
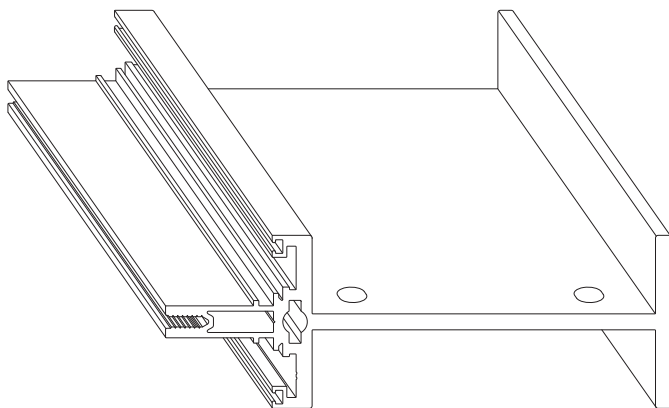


[A]  
rasgos de drenagem na  
travessa para fixação  
com montante.

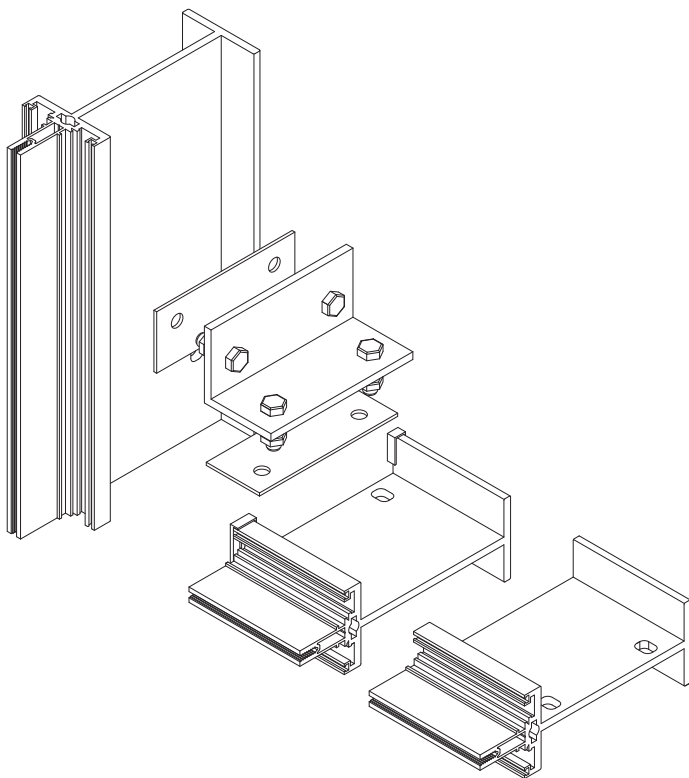
nota:  
fixação do montante com  
travessa efectuada com  
Div. 0158.



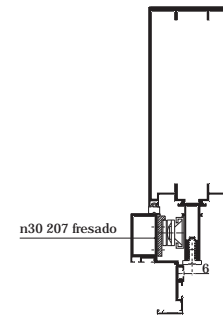
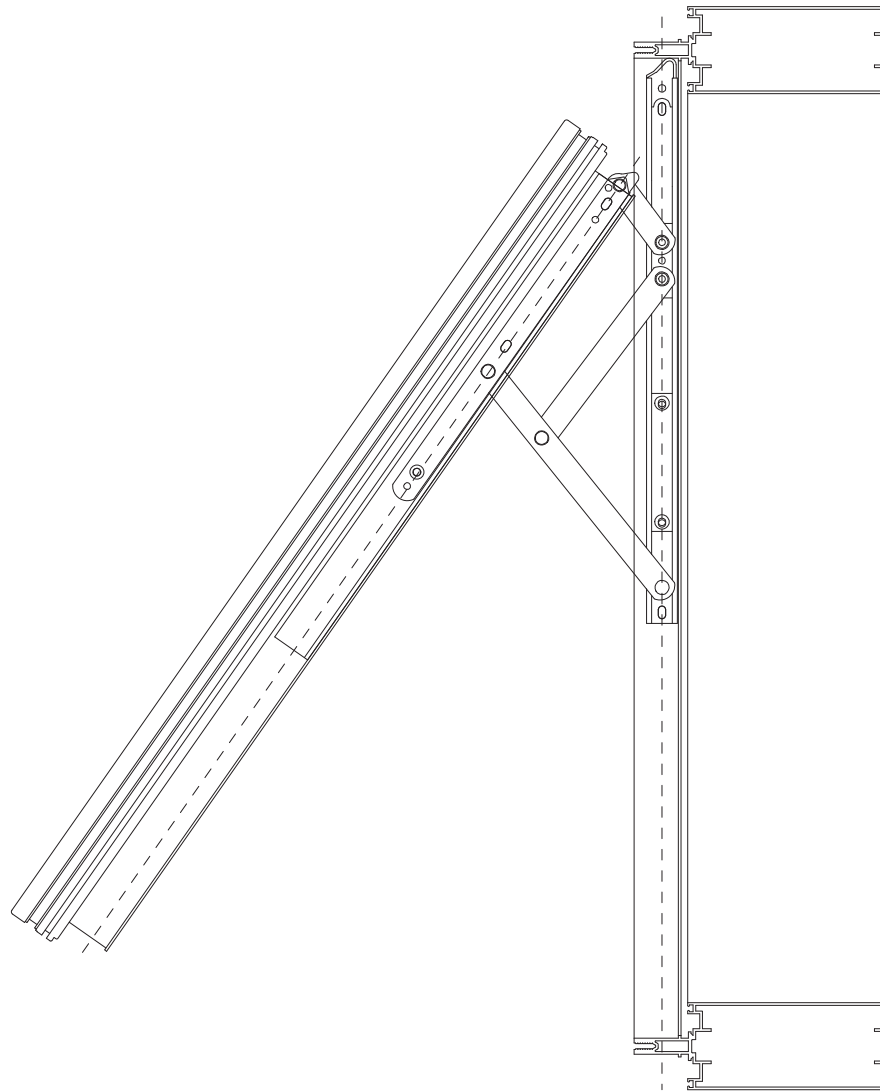
[A]

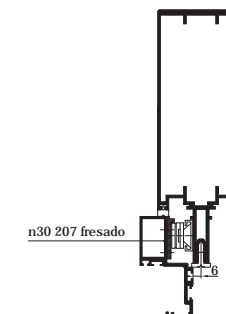
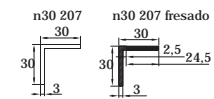
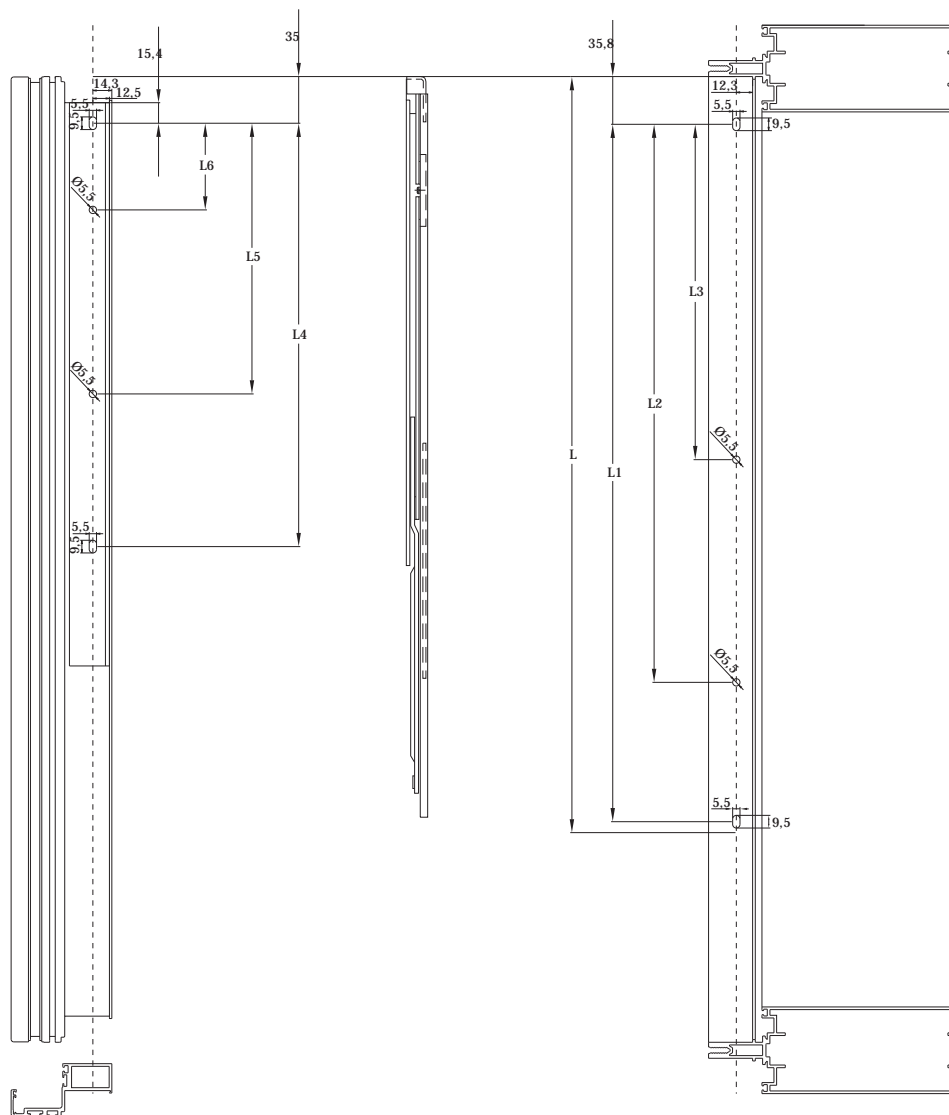


[A]  
fixação do montante com  
travessa.



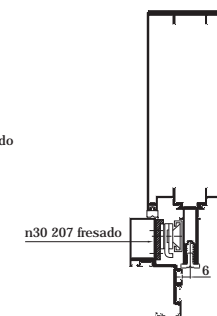
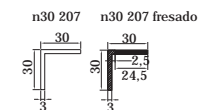
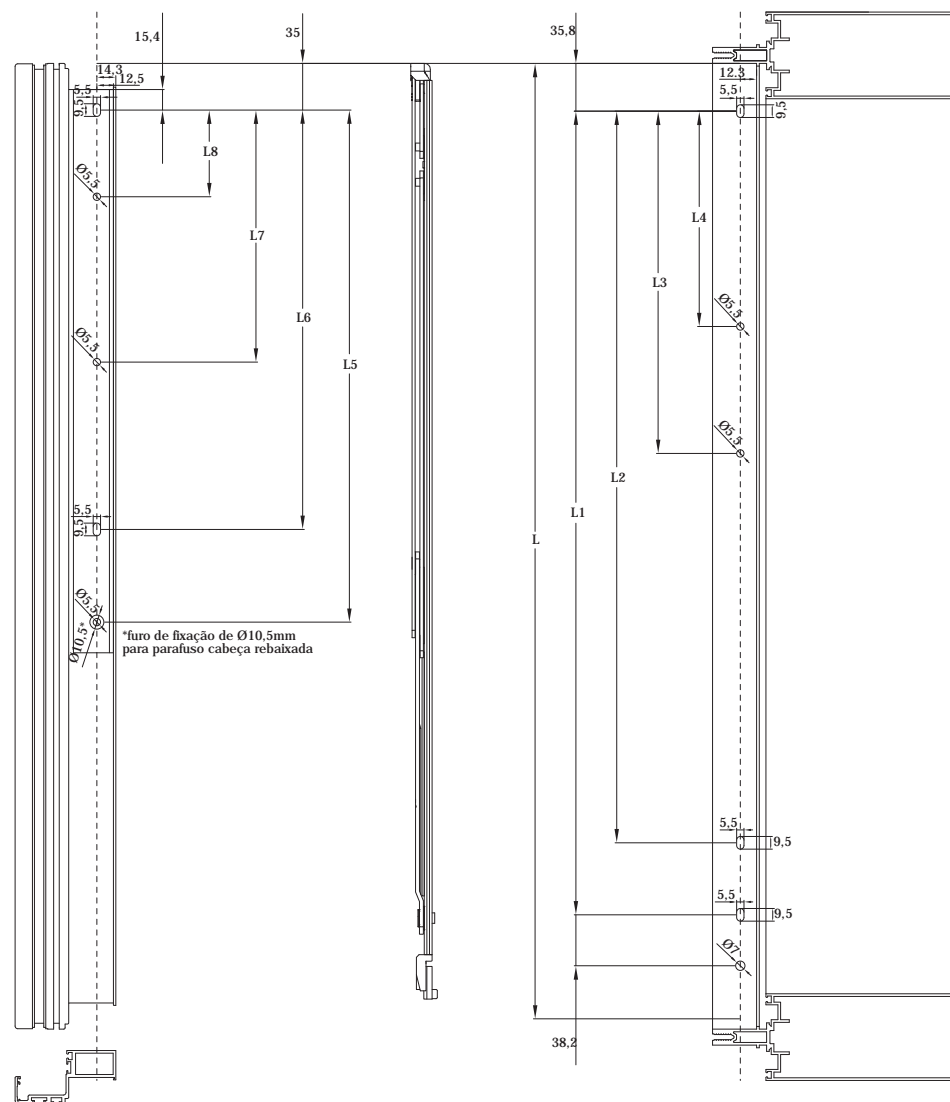
[A]





compassos	L	L1	L2	L3	L4	L5	L6
Com. 0528	262,0	218	178,0	-	165,0	41,0	-
Com. 0529	313,0	269,0	213,0	-	190,0	64,5	-
Com. 0531	567,0	523,0	418,5	251,5	317,5	203,0	65,0





compassos	L	L	L2	L3	L4	L5	L6	L7	L8
Com_0533	682.5	1	584.5	292.5	161.5	419.0	314.5	189.0	65.
Com_0534	716.5	638.5	584.5	292.5	161.5	419.0	314.5	189.0	05.

5. fachada geral

5.3 dimensionamentos e informações gerais

**n15 000**  
sistema de fachadas  
geral

n15 000





## Determinação dos momentos de inércia.

A seguinte informação funciona como guia para determinar, usando pressões de vento e pesos, os perfis de alumínio adequados para colocar numa fachada, devendo ser usado como complemento e não como substituto de regulamentos ou normas nacionais e internacionais. Os valores indicados são para cálculos estruturais preliminares, não substituindo o cálculo, por um técnico qualificado.

Não assumimos nenhuma responsabilidade por cálculos feitos com base nas informações seguintes.

## Zonamento do território português.

zona A - generalidade do território excepto zona B;

zona B - açores e madeira e regiões do continente situadas numa faixa costeira com 5 km de largura ou altitudes superiores a 600 m.

## Rugosidade do terreno.

tipo I – interior zonas urbanas com edifícios de médio ou grande porte;

tipo II – restantes locais, zonas rurais com algum relevo e periferia das zonas urbanas;

tipo III – zonas planas ou na proximidade de extensos planos de água nas zonas rurais.

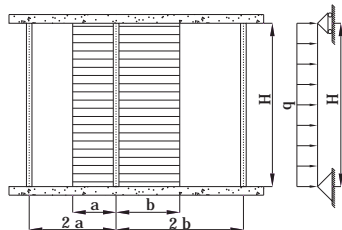
tabela 1 – estado limite de utilização.  
valor de cálculo da pressão do vento actuante em fachadas leves [PA]

cota (desde o solo ate ao centro do vão)	região A			região B		
	I	II	III	I	II	III
<10 m	1000	1310	1850	1210	1580	2240
10 m a 15 m	1000	1450	2000	1210	1760	2420
15 m a 18 m	1070	1520	2080	1290	1840	2510
18 m a 28 m	1240	1720	2270	1500	2080	2750
28 m a 40 m	1410	1900	2440	1710	2300	2960
40 m a 50 m	1530	2020	2560	1860	2440	3100
50 m a 60 m	1640	2130	2660	1990	2580	3220
60 m a 70 m	1740	2230	2750	2110	2690	3320
70 m a 80 m	1840	2310	2830	2220	2800	3420
80 m a 90 m	1920	2400	2900	2330	2900	3500
90 m a 100 m	2000	2470	2960	2420	2990	3580

<sup>1</sup> ITE 51 – Componentes de edifícios. Selecção de caixilharia e seu dimensionamento mecânico, LNEC, Lisboa, 2006.

## Montantes

### 1. Carga distribuída num montante com dois apoios.



### Exemplo de cálculo:

- cota até meio do vão: < 10 m
- região B
- rugosidade tipo II
- pressão de vento: 1580 Pa

· factor de correção:  $\frac{1580 \text{ Pa}}{1000 \text{ Pa}} = 1,58$

· Painel com:

Distância entre montantes,  $2a = 1800 \text{ mm} \rightarrow a = 900 \text{ mm}$

Distância entre montantes,  $2b = 2000 \text{ mm} \rightarrow a = 1000 \text{ mm}$

Altura,  $H = 3000 \text{ mm}$

Momento de inércia ( $I_x$ ), do perfil, necessário de acordo com a tabela 2:

$$I_{x,a} = 169,50 \text{ cm}^4$$

$$I_{x,b} = 188,34 \text{ cm}^4$$

$$I_{x,\text{total}} = 169,50 + 188,34 = 357,84 \text{ cm}^4$$

$$I_{x,\text{necessário}} = 357,84 \times 1,58 = 565,387 \text{ cm}^4$$

Os perfis que podem ser usados são:

n15004 ( $I_x = 574,314 \text{ cm}^4$ )

n15009 ( $I_x = 750,134 \text{ cm}^4$ )

n15104 ( $I_x = 644,001 \text{ cm}^4$ )

# dimensionamentos e informações gerais

## tabela 2

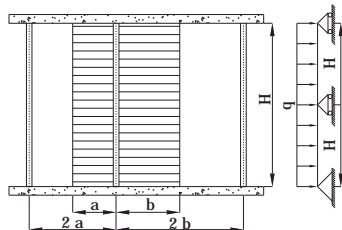
# n15 000

sistema de fachadas  
geral

altura	s e b - metade longa																														
	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000		
333	1000	1.12	1.07	2.23	2.79	3.35	3.91	1.85	2.08	2.32	2.55	2.78	3.01	3.24	3.47	3.71	3.94	4.17	4.40	4.63	4.86	5.10	5.33	5.56	5.79	6.02	6.25	6.49	6.72	6.95	
367	1100	2.23	2.29	3.88	4.72	4.46	5.20	3.47	2.78	3.08	3.39	3.70	4.01	4.32	4.63	4.93	5.24	5.55	5.86	6.17	6.48	6.78	7.09	7.40	7.71	8.02	8.33	8.63	8.94	9.25	
400	1150	2.85	2.93	3.98	4.82	5.79	6.75	3.20	3.00	4.00	5.20	6.40	7.60	8.81	10.01	11.21	12.41	13.61	14.81	16.01	17.21	18.41	19.61	20.81	22.01	23.21	24.41	25.61	26.81	28.01	
433	1300	2.45	3.68	4.90	6.13	7.36	8.58	4.07	4.58	5.09	5.60	6.12	6.62	7.13	7.63	8.14	8.65	9.16	9.67	10.18	10.69	11.20	11.71	12.22	12.72	13.23	13.73	14.24	14.74	15.25	
467	1400	3.06	4.59	6.13	7.66	9.19	10.72	5.09	5.72	6.38	6.99	7.63	8.28	8.90	9.54	10.17	10.81	11.44	12.08	12.71	13.35	13.98	14.62	15.25	15.89	16.53	17.16	17.80	18.43	19.07	
500	1500	3.77	5.05	7.53	9.42	11.30	13.18	14.25	7.04	8.42	8.60	9.38	10.16	11.23	12.31	13.29	14.07	14.88	15.68	16.42	17.20	17.98	18.76	19.55	20.33	21.11	21.89	22.67	23.46		
533	1600	4.37	6.86	9.14	11.43	13.32	15.16	16.54	8.94	9.44	11.39	12.84	14.35	15.18	16.37	17.08	18.08	18.88	19.65	20.42	21.22	22.02	22.77	23.52	24.27	25.02	25.77	26.52	27.27	28.02	
567	1700	5.48	8.22	10.57	13.71	16.45	19.19	21.11	10.24	11.38	12.52	13.66	14.86	16.35	17.07	18.21	19.35	20.49	21.62	22.76	23.90	25.04	26.17	27.32	28.45	29.57	30.67	31.87	33.01	34.14	
600	1800	6.31	9.76	13.02	16.27	19.13	22.78	25.81	14.86	16.21	17.56	18.91	20.27	21.62	22.97	24.32	25.67	27.02	28.37	29.72	31.07	32.43	33.78	35.13	36.48	37.83	39.18	40.53			
633	1900	7.06	11.48	15.31	19.14	22.97	26.79	32.71	14.40	16.00	17.48	19.07	20.66	22.25	23.83	25.42	27.01	28.60	30.19	31.78	33.37	34.96	36.55	38.13	39.72	41.30	42.89	44.48	46.07		
667	2000	8.55	13.59	18.18	22.32	26.79	32.71	42.83	16.68	18.53	20.39	22.24	24.09	25.95	27.80	29.65	31.51	33.37	35.22	37.07	38.92	40.77	42.63	44.48	46.33	48.19	50.04	51.89	53.75	55.60	
700	2100	10.34	15.50	20.67	25.84	31.01	36.18	48.18	19.31	21.45	23.60	25.74	27.89	30.03	32.17	34.32	36.47	38.62	40.77	42.91	45.05	47.20	49.34	51.49	53.64	55.78	57.93	60.07	62.22	64.36	
733	2200	11.88	17.33	22.77	28.71	35.05	41.19	57.17	22.20	24.67	27.13	29.59	32.05	34.51	37.00	39.47	41.93	44.40	46.87	49.34	51.80	54.27	56.73	59.20	61.67	64.13	66.60	69.07	71.54	74.00	
767	2300	13.59	20.37	27.16	33.95	40.74	47.53	62.55	25.57	28.19	31.00	33.82	36.64	39.46	42.28	45.10	47.92	50.73	53.55	56.37	59.19	62.01	64.83	67.65	70.47	73.28	76.10	78.92	81.74	84.56	
800	2400	15.43	23.14	30.86	38.57	46.29	54.00	68.22	28.82	32.28	35.83	39.38	43.03	46.58	50.14	53.69	57.24	60.79	64.34	67.89	71.44	74.99	78.54	82.09	85.64	89.19	92.74	96.29	99.84	103.39	
833	2500	17.47	27.25	36.53	45.41	54.30	63.28	79.16	33.93	37.71	41.58	45.45	49.32	53.19	57.06	60.93	64.80	68.67	72.54	76.41	80.28	84.15	88.02	91.89	95.76	99.63	103.50	107.37	111.24	115.12	
867	2600	21.21	31.07	40.93	51.73	63.75	74.38	92.59	39.70	44.11	48.52	52.93	57.34	61.75	66.16	70.58	74.99	79.40	83.81	88.22	92.64	97.05	101.46	105.86	110.27	114.69	119.10	123.51	127.92	132.33	
900	2700	24.58	42.88	57.78	72.63	85.65	100.04	124.48	43.40	46.17	51.04	55.91	60.78	65.65	70.52	75.39	80.26	85.13	90.00	94.87	99.74	104.61	109.48	114.35	119.22	124.09	128.96	133.83	138.70	143.57	
933	2800	28.89	49.34	65.78	81.23	86.77	115.12	146.82	48.81	68.27	75.10	81.92	88.75	95.58	102.40	109.23	116.06	122.89	129.71	136.54	143.37	150.20	157.03	163.86	170.69	177.52	184.35	191.18	198.01	204.84	
967	2900	32.89	56.32	74.32	91.37	113.80	131.84	162.55	70.37	78.19	86.06	93.92	101.84	109.80	117.82	125.84	133.85	141.87	149.89	157.91	165.93	173.95	181.97	189.99	197.99	205.99	213.99	221.99	229.99	237.99	
1000	3000	42.65	76.35	102.77	132.80	164.31	196.33	231.35	82.63	89.14	96.90	104.66	112.42	120.18	127.94	135.70	143.46	151.22	158.98	166.74	174.50	182.26	190.02	197.78	205.54	213.30	221.06	228.82	236.58	244.34	
1033	3100	47.74	83.14	97.52	121.90	146.29	170.67	207.07	91.09	101.21	111.41	121.61	131.81	142.01	152.21	162.41	172.61	182.81	193.01	203.21	213.41	223.61	233.81	244.01	254.21	264.41	274.61	284.81	295.01	305.21	
1067	3200	48.76	73.14	97.52	121.90	146.29	170.67	207.07	91.09	101.21	111.41	121.61	131.81	142.01	152.21	162.41	172.61	182.81	193.01	203.21	213.41	223.61	233.81	244.01	254.21	264.41	274.61	284.81	295.01	305.21	315.41
1100	3300	55.15	82.72	110.30	137.87	165.45	193.02	231.60	91.58	103.02	114.47	125.92	137.37	148.81	160.26	171.71	183.15	194.60	206.05	217.50	228.95	240.40	251.84	263.29	274.74	286.19	297.64	309.09	320.54	332.00	
1133	3400	62.74	93.22	124.29	155.36	186.43	217.50	265.19	110.09	128.99	141.89	154.79	167.69	180.59	193.48	206.38	219.28	232.18	245.08	257.98	270.88	283.78	296.68	309.58	322.48	335.37	348.27	361.17	374.07	386.97	
1167	3500	68.18	104.88	139.27	174.40	208.53	242.24	315.88	120.36	144.85	159.33	173.82	188.30	202.79	217.27	231.76	246.24	260.73	275.21	289.70	304.19	318.68	333.17	347.66	362.15	376.64	391.13	405.62	420.11	434.54	
1200	3600	78.11	117.16	154.21	193.27	234.32	273.38	349.10	145.91	162.15	178.54	194.55	205.76	220.98	236.19	251.41	266.62	281.83	297.04	312.25	327.46	342.67	357.88	373.09	388.30	403.51	418.72	433.93	449.14	464.35	
1233	3700	87.15	130.75	173.31	216.86	261.46	305.04	381.46	161.01	181.14	201.27	221.39	241.52	261.65	281.78	301.91	322.04	342.17	362.30	382.43	402.56	422.69	442.82	462.95	483.08	503.21	523.34	543.47	563.60	583.73	
1267	3800	96.17	145.83	193.83	242.41	290.80	339.28	416.01	171.01	191.14	211.27	231.39	251.52	271.65	291.78	311.91	332.04	352.17	372.30	392.43	412.56	432.69	452.82	472.95	493.08	513.21	533.34	553.47	573.60	593.73	
1300	3900	107.58	161.37	215.16	269.55	323.73	378.61	456.01	181.01	201.14	221.27	241.39	261.52	281.65	301.78	321.91	342.04	362.17	382.30	402.43	422.56	442.69	462.82	482.95	503.08	523.21	543.34	563.47	583.60	603.73	
1333	4000	119.05	178.29	238.10	292.57	347.14	401.67	479.67	191.01	211.14	231.27	251.39	271.52	291.65	311.78	331.91	352.04	372.17	392.30	412.43	432.56	452.69	472.82	492.95	513.08	533.21	553.34	573.47	593.60	613.73	
1367	4100	134.11	197.11	262.81	326.84	391.24	455.28	534.48	201.01	221.14	241.27	261.39	281.52	301.65	321.78	341.91	362.04	382.17	402.30	422.43	442.56	462.69	482.82	502.95	523.08	543.21	563.34	583.47	603.60	623.73	
1400	4200	144.70	208.41	281.74	346.14	410.96	475.26	564.26	210.01	230.14	250.27	270.39	290.52	310.65	330.78	350.91	371.04	391.17	411.30	431.43	451.56	471.69	491.82	511.95	532.08	552.21	572.34	592.47	612.60	632.73	
1433	4300	158.98	228.48	317.97	393.46	478.95	558.45	648.00	220.01	240.14	260.27	280.39	300.52	320.65	340.78	360.91	381.04	401.17	421.30	441.43	461.56	481.69	501.82	521.95	542.08	562.21	582.34	602.47	622.60	642.73	
1467	4400	174.90	248.48	348.90	428.89	514.88	600.87	690.96	230.01	250.14	270.27	290.39	310.52	330.65	350.78	370.91	391.04	411.17	431.30	451.43	471.56	491.69	511.82	531.95	552.08	572.21	592.34	612.47	632.60	652.73	
1500	4500	200.62	286.04	381.38	472.97	564.56	656.15	751.74	240.01	260.14	280.27	300.39	320.52	340.65	360.78	380.91	401.04	421.17	441.30	461.43	481.56	501.69	521.82	541.95	562.08	582.21	602.34	622.47	642.60	662.73	
1533	4600	222.92	312.34	416.33	524.65	628.45	732.25	836.05	250.01	270.14	290.27	310.39	330.52	350.65	370.78	390.91	411.04	431.17	451.30	471.43	491.56	511.69	531.82	551.95	572.08	592.21	612.34	632.47			

## Montantes

### 2. Carga distribuída num montante com três apoios.



### Exemplo de cálculo:

- cota até meio do vão: < 10 m
- região B
- rugosidade tipo II
- pressão de vento: 1900 Pa

- factor de correção:  $\frac{1580 \text{ Pa}}{1000 \text{ Pa}} = 1,58$

- Painel com:

Distância entre montantes,  $2a = 1800 \text{ mm} \rightarrow a = 900 \text{ mm}$

Distância entre montantes,  $2b = 2000 \text{ mm} \rightarrow a = 1000 \text{ mm}$

Altura,  $H = 3000 \text{ mm}$

Momento de inércia ( $I_x$ ), do perfil, necessário de acordo com a tabela 3:

$$I_{x,a} = 70,37 \text{ cm}^4$$

$$I_{x,b} = 78,19 \text{ cm}^4$$

$$I_{x,\text{total}} = 70,37 + 78,19 = 148,56 \text{ cm}^4$$

$$I_{x,\text{necessário}} \cdot 1,58 = 234,725 \text{ cm}^4$$

Os perfis que podem ser usados são:

n15004 ( $I_x = 574,314 \text{ cm}^4$ )

n15009 ( $I_x = 750,134 \text{ cm}^4$ )

n15104 ( $I_x = 644,001 \text{ cm}^4$ )

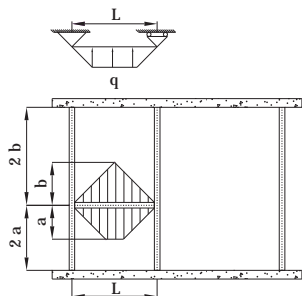
dimensionamentos e informações gerais  
tabela 3

n15 000  
sistema de fachadas  
geral

L/300 ou 80mm	a cada 1 metro largura																													
	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	3000			
3.33	1000	046	069	093	116	139	162	185	208	232	255	278	301	324	347	371	394	417	440	463	486	510	533	556	579	602	625	649	672	695
3.67	1100	062	085	123	154	185	216	247	278	308	339	370	401	432	463	494	525	556	617	647	678	709	740	771	802	833	863	894	925	
4.00	1200	080	120	160	240	280	320	360	400	440	480	520	560	600	640	680	720	760	800	840	880	920	960	1000	1040	1080	1120	1160	1200	
4.33	1300	102	153	204	305	345	407	458	509	560	611	662	713	764	815	866	917	968	1019	1070	1121	1172	1223	1274	1325	1376	1427	1478	1529	
4.67	1400	127	191	254	318	381	445	509	572	636	699	763	826	890	954	1017	1081	1144	1207	1270	1333	1396	1459	1522	1585	1648	1711	1774	1837	
5.00	1500	156	235	313	391	469	547	625	704	782	860	938	1016	1095	1173	1251	1329	1407	1486	1564	1642	1720	1798	1876	1955	2033	2111	2189	2267	2346
5.33	1600	190	285	380	474	569	664	759	854	949	1044	1139	1234	1329	1423	1518	1613	1708	1803	1898	1993	2088	2183	2277	2372	2467	2562	2657	2752	2847
5.67	1700	228	341	455	569	683	797	911	1024	1138	1252	1366	1480	1594	1707	1821	1935	2049	2162	2276	2390	2504	2618	2732	2845	2959	3073	3187	3301	3414
6.00	1800	270	405	540	675	810	945	1080	1215	1350	1485	1620	1755	1890	2025	2160	2295	2430	2565	2700	2835	2970	3105	3240	3375	3510	3645	3780	3915	4050
6.33	1900	318	477	636	794	953	1112	1271	1430	1589	1748	1907	2066	2225	2383	2542	2701	2860	3019	3178	3337	3496	3655	3813	3972	4131	4290	4449	4608	4767
6.67	2000	371	556	741	927	1112	1297	1483	1668	1853	2039	2224	2409	2595	2780	2965	3151	3336	3521	3707	3892	4077	4263	4448	4633	4819	5004	5189	5374	5560
7.00	2100	429	644	858	1073	1287	1502	1717	1931	2145	2359	2574	2789	3004	3218	3433	3647	3862	4076	4290	4505	4720	4934	5149	5364	5578	5793	6007	6222	6436
7.33	2200	493	740	987	1233	1480	1727	1973	2220	2467	2713	2960	3207	3454	3701	3948	4195	4442	4689	4937	5184	5431	5678	5925	6172	6419	6666	6913	7160	7407
7.67	2300	564	846	1127	1409	1691	1973	2255	2537	2819	3101	3382	3664	3946	4228	4510	4792	5073	5355	5637	5919	6201	6483	6765	7047	7328	7610	7892	8174	8456
8.00	2400	640	961	1281	1601	1921	2242	2562	2882	3202	3523	3843	4163	4483	4804	5124	5444	5764	6084	6405	6725	7045	7365	7685	8005	8325	8645	8965	9285	9605
8.00	2500	724	1131	1540	1949	2358	2767	3176	3585	3994	4403	4812	5221	5630	6039	6448	6857	7266	7675	8084	8493	8902	9311	9720	10129	10538	10947	11356	11765	12174
8.00	2600	826	1323	1732	2141	2550	2959	3368	3777	4186	4595	5004	5413	5822	6231	6640	7049	7458	7867	8276	8685	9094	9503	9912	10321	10730	11139	11548	11957	12366
8.00	2700	946	1539	2036	2533	3030	3527	3936	4345	4754	5163	5572	5981	6390	6799	7208	7617	8026	8435	8844	9253	9662	10071	10480	10889	11298	11707	12116	12525	12934
8.00	2800	1187	1780	2373	2966	3559	4152	4745	5338	5931	6524	7117	7710	8303	8896	9489	10082	10675	11268	11861	12454	13047	13640	14233	14826	15419	16012	16605	17198	17791
8.00	2900	1365	2048	2731	3414	4097	4780	5463	6146	6829	7512	8195	8878	9561	10244	10927	11610	12293	12976	13659	14342	15025	15708	16391	17074	17757	18440	19123	19806	20489
8.00	3000	1583	2346	3109	3872	4635	5398	6161	6924	7687	8450	9213	9976	10739	11502	12265	13028	13791	14554	15317	16080	16843	17606	18369	19132	19895	20658	21421	22184	22947
8.00	3100	1763	2674	3585	4496	5407	6318	7229	8140	9051	9962	10873	11784	12695	13606	14517	15428	16339	17250	18161	19072	19983	20894	21805	22716	23627	24538	25449	26360	27271
8.00	3200	2024	3035	4046	5057	6068	7079	8090	9101	10112	11123	12134	13145	14156	15167	16178	17189	18200	19211	20222	21233	22244	23255	24266	25277	26288	27299	28310	29321	30332
8.00	3300	2289	3434	4579	5724	6869	8014	9159	10304	11449	12594	13739	14884	16029	17174	18319	19464	20609	21754	22899	24044	25189	26334	27479	28624	29769	30914	32059	33204	34349
8.00	3400	2580	3870	5160	6450	7740	9030	10320	11610	12900	14190	15480	16770	18060	19350	20640	21930	23220	24510	25800	27090	28380	29670	30960	32250	33540	34830	36120	37410	38700
8.00	3500	2937	4345	5744	7142	8541	9940	11339	12738	14137	15536	16935	18334	19733	21132	22531	23930	25329	26728	28127	29526	30925	32324	33723	35122	36521	37920	39319	40718	42117
8.00	3600	3243	4864	6485	8106	9727	11348	12969	14590	16211	17832	19453	21074	22695	24316	25937	27558	29179	30800	32421	34042	35663	37284	38905	40526	42147	43768	45389	47010	48631
8.00	3700	3618	5427	7236	9045	10854	12663	14472	16281	18090	19899	21708	23517	25326	27135	28944	30753	32562	34371	36180	37989	39798	41607	43416	45225	47034	48843	50652	52461	54270
8.00	3800	4025	6038	8051	10063	12076	14089	16101	18114	20127	22139	24152	26165	28178	30191	32204	34217	36230	38243	40256	42269	44282	46295	48308	50321	52334	54347	56360	58373	60386
8.00	3900	4460	6639	8828	11016	13204	15392	17580	19768	21956	24144	26332	28520	30708	32896	35084	37272	39460	41648	43836	46024	48212	50400	52588	54776	56964	59152	61340	63528	65716
8.00	4000	4927	7313	9698	12083	14468	16853	19238	21623	24008	26393	28778	31163	33548	35933	38318	40703	43088	45473	47858	50243	52628	55013	57398	59783	62168	64553	66938	69323	71708
8.00	4100	5435	8113	10910	13698	16485	19273	22060	24848	27636	30424	33212	36000	38788	41576	44364	47152	49940	52728	55516	58304	61092	63880	66668	69456	72244	75032	77820	80608	83396
8.00	4200	6007	9001	12014	15027	18040	21053	24066	27079	30092	33105	36118	39131	42144	45157	48170	51183	54196	57209	60222	63235	66248	69261	72274	75287	78300	81313	84326	87339	90352
8.00	4300	6736	10054	13372	16690	20008	23326	26644	29962	33280	36598	39916	43234	46552	49870	53188	56506	59824	63142	66460	69778	73096	76414	79732	83050	86368	89686	93004	96322	99640
8.00	4400	7619	11474	14889	18304	21719	25134	28549	31964	35379	38794	42209	45624	49039	52454	55869	59284	62699	66114	69529	72944	76359	79774	83189	86604	90019	93434	96849	100264	103679
8.00	4500	8614	12866	16709	20552	24395	28238	32081	35924	39767	43610	47453	51296	55139	58982	62825	66668	70511	74354	78197	82040	85883	89726	93569	97412	101255	105098	108941	112784	116627
8.00	4600	9742	14572	20096	25620	31144	36668	42192	47716	53240	58764	64288	69812	75336	80860	86384	91908	97432	102956	108480	113904	119328	124752	130176	135600	141024	146448	151872	157296	162720
8.00	4700	11029	16572	22116	27660	33204	38748	44292	49836	55380	60924	66468	72012	77556	83100	88644	94188	99732	105276	110820	116364	121908	127452	132996	138540	144084	149628	155172	160716	166260
8.00	4800	12296	18096	23896	30696	37496	44296	51096	57896	64696	71496	78296	85096	91896	98696	105496	112296	119096	125896	132696	139496	146296	153096	159896	166696	173496	180296	187096	193896	200696
8.00	4900	13849	20049	26249	32449	38649	44849	51049	57249	63449	69649	75849	82049	88249	94449	100649	106849	113049	119249	125449	131649	137849	144049	150249	156449	162649	168849	175049	181249	187449
8.00	5000	15696	22296	28896	35496	42096	48696	55296	61896	68496	75096	81696	88296	94896	101496	108096	1146													

## Travessas

### 1. Carga trapezoidal numa travessa.



### Exemplo de cálculo:

- cota até meio do vão: < 10 m
- região B
- rugosidade tipo II
- pressão de vento: 1900 Pa
- factor de correção:  $\frac{1580 \text{ Pa}}{1000 \text{ Pa}} = 1,58$
- Painel com:  
Distância entre montantes,  $L = 3000 \text{ mm}$   
Altura,  $2a = 4000 \text{ mm} \rightarrow a = 2000 \text{ mm}$   
Altura,  $2b = 3000 \text{ mm} \rightarrow b = 1500 \text{ mm}$

Momento de inércia ( $I_x$ ), do perfil, necessário de acordo com a tabela 4:

$$I_{x,a} = 180,80 \text{ cm}^4$$

$$I_{x,b} = 180,80 \text{ cm}^4$$

$$I_{x,\text{total}} = 180,80 + 180,80 = 361,60 \text{ cm}^4$$

$$I_{x,\text{necessário}} = 361,60 \times 1,58 = 571,328 \text{ cm}^4$$

Os perfis que podem ser usados são:

n15004 ( $I_x = 574,314 \text{ cm}^4$ )

n15009 ( $I_x = 750,134 \text{ cm}^4$ )

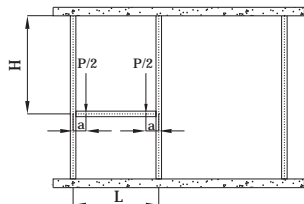
dimensionamentos e informações gerais  
tabela 4

n15 000  
sistema de fachadas  
geral

a on b, metade altura	L300 cm 8 mm															
	1,33	2,00	2,67	3,33	4,00	4,67	5,33	6,00	6,67	7,33	8,00	8,67	9,33	10,00	10,67	11,33
400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000	3200	3400	3600
0,05	0,20	0,52	1,05	1,84	2,86	4,14	5,69	7,38	8,79	11,73	15,96	21,05	28,35	37,50	48,46	61,18
250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250
0,22	0,61	1,26	2,25	3,64	5,49	7,89	10,83	14,55	18,85	26,17	35,27	45,56	60,36	77,01	96,88	120,37
300	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200	4500	4800	5100
0,23	0,68	1,44	2,61	4,26	6,48	9,33	12,92	17,12	22,67	31,20	42,69	55,60	72,12	92,96	118,56	144,00
350	700	1,05	1,50	2,00	2,50	3,00	3,50	4,00	4,50	5,00	5,50	6,00	6,50	7,00	7,50	8,00
0,72	1,59	2,93	4,84	7,40	10,71	14,87	19,86	26,09	36,12	48,78	64,49	83,71	108,92	134,63	167,39	202,40
400	800	1,20	1,80	2,40	3,00	3,60	4,20	4,80	5,40	6,00	6,60	7,20	7,80	8,40	9,00	9,60
1,76	3,42	5,85	8,25	12,01	16,73	22,53	29,50	38,12	48,78	61,88	81,73	108,27	135,93	171,38	213,20	262,40
450	900	1,35	2,02	2,70	3,37	4,04	4,71	5,38	6,05	6,72	7,39	8,06	8,73	9,40	10,07	10,74
1,79	3,58	6,17	9,71	14,33	20,15	27,31	35,84	45,73	56,97	69,57	83,60	99,08	115,93	134,16	153,76	174,72
500	1,00	1,50	2,00	2,50	3,00	3,50	4,00	4,50	5,00	5,50	6,00	6,50	7,00	7,50	8,00	8,50
3,67	6,17	10,31	15,33	21,07	28,49	37,84	49,13	62,36	77,54	94,67	113,76	134,89	158,06	183,27	210,54	239,86
600	1,20	1,80	2,40	3,00	3,60	4,20	4,80	5,40	6,00	6,60	7,20	7,80	8,40	9,00	9,60	10,20
3,70	6,82	11,97	18,21	25,07	33,54	43,72	55,64	69,31	84,75	102,06	121,26	142,35	165,34	190,23	217,01	245,69
650	1,35	2,02	2,70	3,37	4,04	4,71	5,38	6,05	6,72	7,39	8,06	8,73	9,40	10,07	10,74	11,41
6,86	11,18	19,67	29,42	35,42	44,43	55,46	68,60	83,84	101,19	120,68	142,21	165,83	191,54	219,35	249,26	281,28
700	1,40	2,10	2,80	3,50	4,20	4,90	5,60	6,30	7,00	7,70	8,40	9,10	9,80	10,50	11,20	11,90
11,65	18,10	26,57	36,66	44,43	53,45	63,69	75,19	87,94	101,94	117,18	133,66	151,39	170,37	190,60	212,08	234,81
750	1,45	2,17	2,90	3,63	4,36	5,09	5,82	6,55	7,28	8,01	8,74	9,47	10,20	10,93	11,66	12,39
11,70	18,46	27,16	36,12	44,33	52,81	62,45	73,24	85,28	98,57	113,11	128,90	145,94	164,24	183,79	204,59	226,64
800	1,50	2,22	2,95	3,68	4,41	5,14	5,87	6,60	7,33	8,06	8,79	9,52	10,25	10,98	11,71	12,44
11,87	17,77	27,06	36,01	43,22	51,03	59,45	69,58	81,42	94,97	109,24	124,24	140,06	156,70	174,16	192,34	211,24
850	1,55	2,27	3,00	3,73	4,46	5,19	5,92	6,65	7,38	8,11	8,84	9,57	10,30	11,03	11,76	12,49
11,95	17,95	27,44	36,39	43,60	51,41	59,83	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
900	1,60	2,32	3,05	3,78	4,51	5,24	5,97	6,70	7,43	8,16	8,89	9,62	10,35	11,08	11,81	12,54
12,05	18,05	27,54	36,49	43,70	51,51	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
950	1,65	2,37	3,10	3,83	4,56	5,29	6,02	6,75	7,48	8,21	8,94	9,67	10,40	11,13	11,86	12,59
12,15	18,15	27,64	36,59	43,80	51,61	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1000	1,70	2,42	3,15	3,88	4,61	5,34	6,07	6,80	7,53	8,26	8,99	9,72	10,45	11,18	11,91	12,64
12,25	18,25	27,74	36,69	43,90	51,71	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1050	1,75	2,47	3,20	3,93	4,66	5,39	6,12	6,85	7,58	8,31	9,04	9,77	10,50	11,23	11,96	12,69
12,35	18,35	27,84	36,79	44,00	51,81	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1100	1,80	2,52	3,25	3,98	4,71	5,44	6,17	6,90	7,63	8,36	9,09	9,82	10,55	11,28	12,01	12,74
12,45	18,45	27,94	36,89	44,10	51,91	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1150	1,85	2,57	3,30	4,03	4,76	5,49	6,22	6,95	7,68	8,41	9,14	9,87	10,60	11,33	12,06	12,79
12,55	18,55	28,04	36,99	44,20	52,01	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1200	1,90	2,62	3,35	4,08	4,81	5,54	6,27	7,00	7,73	8,46	9,19	9,92	10,65	11,38	12,11	12,84
12,65	18,65	28,14	37,09	44,30	52,11	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1250	1,95	2,67	3,40	4,13	4,86	5,59	6,32	7,05	7,78	8,51	9,24	9,97	10,70	11,43	12,16	12,89
12,75	18,75	28,24	37,19	44,40	52,21	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1300	2,00	2,72	3,45	4,18	4,91	5,64	6,37	7,10	7,83	8,56	9,29	10,02	10,75	11,48	12,21	12,94
12,85	18,85	28,34	37,29	44,50	52,31	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1350	2,05	2,77	3,50	4,23	4,96	5,69	6,42	7,15	7,88	8,61	9,34	10,07	10,80	11,53	12,26	12,99
12,95	18,95	28,44	37,39	44,60	52,41	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1400	2,10	2,82	3,55	4,28	5,01	5,74	6,47	7,20	7,93	8,66	9,39	10,12	10,85	11,58	12,31	13,04
13,05	19,05	28,54	37,49	44,70	52,51	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1450	2,15	2,87	3,60	4,33	5,06	5,79	6,52	7,25	7,98	8,71	9,44	10,17	10,90	11,63	12,36	13,09
13,15	19,15	28,64	37,59	44,80	52,61	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1500	2,20	2,92	3,65	4,38	5,11	5,84	6,57	7,30	8,03	8,76	9,49	10,22	10,95	11,68	12,41	13,14
13,25	19,25	28,74	37,69	44,90	52,71	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1550	2,25	2,97	3,70	4,43	5,16	5,89	6,62	7,35	8,08	8,81	9,54	10,27	11,00	11,73	12,46	13,19
13,35	19,35	28,84	37,79	45,00	52,81	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1600	2,30	3,02	3,75	4,48	5,21	5,94	6,67	7,40	8,13	8,86	9,59	10,32	11,05	11,78	12,51	13,24
13,45	19,45	28,94	37,89	45,10	52,91	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1650	2,35	3,07	3,80	4,53	5,26	5,99	6,72	7,45	8,18	8,91	9,64	10,37	11,10	11,83	12,56	13,29
13,55	19,55	29,04	37,99	45,20	53,01	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1700	2,40	3,12	3,85	4,58	5,31	6,04	6,77	7,50	8,23	8,96	9,69	10,42	11,15	11,88	12,61	13,34
13,65	19,65	29,14	38,09	45,30	53,11	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1750	2,45	3,17	3,90	4,63	5,36	6,09	6,82	7,55	8,28	9,01	9,74	10,47	11,20	11,93	12,66	13,39
13,75	19,75	29,24	38,19	45,40	53,21	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1800	2,50	3,22	3,95	4,68	5,41	6,14	6,87	7,60	8,33	9,06	9,79	10,52	11,25	11,98	12,71	13,44
13,85	19,85	29,34	38,29	45,50	53,31	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1850	2,55	3,27	4,00	4,73	5,46	6,19	6,92	7,65	8,38	9,11	9,84	10,57	11,30	12,03	12,76	13,49
13,95	19,95	29,44	38,39	45,60	53,41	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1900	2,60	3,32	4,05	4,78	5,51	6,24	6,97	7,70	8,43	9,16	9,89	10,62	11,35	12,08	12,81	13,54
14,05	20,05	29,54	38,49	45,70	53,51	59,93	69,96	81,80	95,35	109,62	124,62	140,44	157,08	174,54	192,82	211,92
1950	2,65	3,37	4,10	4,83	5,56	6,29	7,02	7,75	8,48	9,21	9,94	10,67	11,40	12,13	12,86	13,59
14,15	20,15	29,64	38,59	45,80	53,61	59,93	69,96	8								

## Travessas

### 2. Travessa sujeita ao peso de vidro.



### Exemplo de cálculo:

· vidro

Largura,  $L = 1500$  mm

Altura,  $H = 2000$

Vidro - 6/12/2 → 6+6 = 12 mm de espessura de vidro

· factor de correção:  $\frac{12 \text{ mm}}{8 \text{ mm}} = 1,50$

Momento de inércia ( $I_x$ ), do perfil, necessário de acordo com a tabela 5:

$$I_y = 5,95 \text{ cm}^4$$

$$I_{y,\text{total}} = 5,95 \text{ cm}^4$$

$$I_{x,\text{necessário}} \cdot 5,95 \times 1,58 = 8,3925 \text{ cm}^4$$

Os perfis que podem ser usados são:

n15101 ( $I_y = 17,891 \text{ cm}^4$ )

n15002 ( $I_y = 26,870 \text{ cm}^4$ )

n15003 ( $I_y = 43,407 \text{ cm}^4$ )

n15004 ( $I_y = 74,735 \text{ cm}^4$ )

n15009 ( $I_y = 35,943 \text{ cm}^4$ )

n15103 ( $I_y = 41,158 \text{ cm}^4$ )

n15104 ( $I_y = 64,238 \text{ cm}^4$ )



altura	L/500 ou 3 mm															
	0,5	1	1,5	2	2,5	3	3	3	3	3	3	3	3	3	3	3
	largura (mm)															
	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500	3750	4000
400	0,02	0,12	0,29	0,52	0,82	1,19	1,90	2,84	4,04	5,55	7,40	9,61	12,23	15,28	18,79	22,81
500	0,02	0,15	0,36	0,65	1,03	1,49	2,37	3,54	5,05	6,94	9,25	12,01	15,28	19,09	23,49	28,52
600	0,03	0,18	0,43	0,78	1,23	1,78	2,84	4,25	6,07	8,33	11,10	14,42	18,34	22,91	28,19	34,22
700	0,03	0,21	0,50	0,91	1,44	2,08	3,32	4,96	7,08	9,72	12,95	16,82	21,39	26,73	32,89	39,93
800	0,03	0,24	0,57	1,04	1,64	2,38	3,79	5,67	8,09	11,11	14,80	19,22	24,45	30,55	37,59	45,63
900	0,04	0,27	0,64	1,17	1,85	2,68	4,26	6,38	9,10	12,50	16,65	21,62	27,51	34,37	42,29	51,33
1000	0,04	0,29	0,71	1,30	2,05	2,97	4,74	7,09	10,11	13,88	18,49	24,03	30,56	38,19	46,98	57,04
1100	0,05	0,32	0,78	1,43	2,26	3,27	5,21	7,80	11,12	15,27	20,34	26,43	33,62	42,01	51,68	62,74
1200	0,05	0,35	0,86	1,56	2,46	3,57	5,69	8,51	12,13	16,66	22,19	28,83	36,68	45,83	56,58	68,44
1300	0,06	0,38	0,93	1,69	2,67	3,87	6,16	9,22	13,14	18,05	24,04	31,23	39,73	49,64	61,08	74,15
1400	0,06	0,41	1,00	1,82	2,87	4,16	6,63	9,93	14,15	19,44	25,89	33,64	42,79	53,46	65,78	79,85
1500	0,07	0,44	1,07	1,95	3,08	4,46	7,11	10,63	15,16	20,83	27,74	36,04	45,84	57,28	70,48	85,55
1600	0,07	0,47	1,14	2,08	3,28	4,76	7,58	11,34	16,18	22,21	29,59	38,44	48,90	61,10	75,17	91,26
1700	0,07	0,50	1,21	2,21	3,49	5,05	8,06	12,05	17,19	23,60	31,44	40,85	51,96	64,92	79,87	96,96
1800	0,08	0,53	1,28	2,34	3,69	5,35	8,53	12,76	18,20	24,99	33,29	43,25	55,01	68,74	84,57	102,66
1900	0,08	0,56	1,36	2,47	3,90	5,65	9,00	13,47	19,21	26,38	35,14	45,65	58,07	72,56	89,27	108,37
2000	0,09	0,59	1,43	2,60	4,10	5,95	9,48	14,18	20,22	27,77	36,99	48,05	61,13	76,38	93,97	114,07
2100	0,09	0,62	1,50	2,73	4,31	6,24	9,95	14,89	21,23	29,16	38,84	50,46	64,18	80,19	98,67	119,78
2200	0,10	0,65	1,57	2,86	4,52	6,54	10,42	15,60	22,24	30,54	40,69	52,86	67,24	84,01	103,36	125,48
2300	0,10	0,68	1,64	2,99	4,72	6,84	10,90	16,31	23,25	31,93	42,54	55,26	70,30	87,83	108,06	131,18
2400	0,10	0,71	1,71	3,12	4,93	7,14	11,37	17,01	24,26	33,32	44,39	57,66	73,35	91,65	112,76	136,89
2500	0,11	0,74	1,78	3,25	5,13	7,43	11,85	17,72	25,27	34,71	46,24	60,07	76,41	95,47	117,46	142,59
2600	0,11	0,77	1,85	3,38	5,34	7,73	12,32	18,43	26,29	36,10	48,09	62,47	79,46	99,29	122,16	148,29
2700	0,12	0,80	1,93	3,51	5,54	8,03	12,79	19,14	27,30	37,49	49,94	64,87	82,52	103,11	126,86	154,00
2800	0,12	0,83	2,00	3,64	5,75	8,33	13,27	19,85	28,31	38,88	51,79	67,28	85,58	106,93	131,55	159,70
2900	0,13	0,85	2,07	3,77	5,95	8,62	13,74	20,56	29,32	40,26	53,64	69,68	88,63	110,74	136,25	165,40
3000	0,13	0,88	2,14	3,90	6,16	8,92	14,21	21,27	30,33	41,65	55,48	72,08	91,69	114,56	140,95	171,11
3100	0,13	0,91	2,21	4,03	6,36	9,22	14,69	21,98	31,34	43,04	57,33	74,48	94,75	118,38	145,65	176,81
3200	0,14	0,94	2,28	4,16	6,57	9,51	15,16	22,69	32,35	44,43	59,18	76,89	97,80	122,20	150,35	182,51
3300	0,14	0,97	2,35	4,29	6,77	9,81	15,64	23,39	33,36	45,82	61,03	79,29	100,86	126,02	155,05	188,22
3400	0,15	1,00	2,42	4,42	6,98	10,11	16,11	24,10	34,37	47,21	62,88	81,69	103,91	129,84	159,74	193,92
3500	0,15	1,03	2,50	4,55	7,18	10,41	16,58	24,81	35,38	48,59	64,73	84,09	106,97	133,66	164,44	199,63
3600	0,16	1,06	2,57	4,68	7,39	10,70	17,06	25,52	36,40	49,98	66,58	86,50	110,03	137,48	169,14	205,33
3700	0,16	1,09	2,64	4,81	7,59	11,00	17,53	26,23	37,41	51,37	68,43	88,90	113,08	141,29	173,84	211,03
3800	0,17	1,12	2,71	4,94	7,80	11,30	18,01	26,94	38,42	52,76	70,28	91,30	116,14	145,11	178,54	216,74
3900	0,17	1,15	2,78	5,07	8,00	11,60	18,48	27,65	39,43	54,15	72,13	93,70	119,20	148,93	183,24	222,44
4000	0,17	1,18	2,85	5,20	8,21	11,89	18,95	28,36	40,44	55,54	73,98	96,11	122,25	152,75	187,94	228,14
4100	0,18	1,21	2,92	5,33	8,42	12,19	19,43	29,07	41,45	56,92	75,83	98,51	125,31	156,57	192,63	233,85
4200	0,18	1,24	3,00	5,46	8,62	12,49	19,90	29,78	42,46	58,31	77,68	100,91	128,36	160,39	197,33	239,55
4300	0,19	1,27	3,07	5,59	8,83	12,78	20,37	30,48	43,47	59,70	79,53	103,32	131,42	164,21	202,03	245,25
4400	0,19	1,30	3,14	5,72	9,03	13,08	20,85	31,19	44,48	61,09	81,38	105,72	134,48	168,03	206,73	250,96
4500	0,20	1,33	3,21	5,85	9,24	13,38	21,32	31,90	45,49	62,48	83,23	108,12	137,53	171,84	211,43	256,66
4600	0,20	1,36	3,28	5,98	9,44	13,68	21,80	32,61	46,51	63,87	85,08	110,52	140,59	175,66	216,13	262,36
4700	0,20	1,38	3,35	6,11	9,65	13,97	22,27	33,32	47,52	65,25	86,93	112,93	143,65	179,48	220,82	268,07
4800	0,21	1,41	3,42	6,24	9,85	14,27	22,74	34,03	48,53	66,64	88,78	115,33	146,70	183,30	225,52	273,77
4900	0,21	1,44	3,49	6,37	10,06	14,57	23,22	34,74	49,54	68,03	90,63	117,73	149,76	187,12	230,22	279,48
5000	0,22	1,47	3,57	6,50	10,26	14,87	23,69	35,45	50,55	69,42	92,47	120,13	152,82	190,94	234,92	285,18
5100	0,22	1,50	3,64	6,63	10,47	15,16	24,17	36,16	51,56	70,81	94,32	122,54	155,87	194,76	239,62	290,88
5200	0,23	1,53	3,71	6,76	10,67	15,46	24,64	36,86	52,57	72,20	96,17	124,94	158,93	198,58	244,32	296,59
5300	0,23	1,56	3,78	6,89	10,88	15,76	25,11	37,57	53,58	73,58	98,02	127,34	161,98	202,39	249,01	302,29
5400	0,24	1,59	3,85	7,02	11,08	16,06	25,59	38,28	54,59	74,97	99,87	129,74	165,04	206,21	253,71	307,99
5500	0,24	1,62	3,92	7,15	11,29	16,35	26,06	38,99	55,60	76,36	101,72	132,15	168,10	210,03	258,41	313,70
5600	0,24	1,65	3,99	7,28	11,49	16,65	26,53	39,70	56,62	77,75	103,57	134,55	171,15	213,85	263,11	319,40
5700	0,25	1,68	4,07	7,40	11,70	16,95	27,01	40,41	57,63	79,14	105,42	136,95	174,21	217,67	267,81	325,10
5800	0,25	1,71	4,14	7,53	11,90	17,24	27,48	41,12	58,64	80,53	107,27	139,36	177,27	221,49	272,50	330,81
5900	0,26	1,74	4,21	7,66	12,11	17,54	27,96	41,83	59,65	81,92	109,12	141,76	180,32	225,31	277,20	336,51
6000	0,26	1,77	4,28	7,79	12,31	17,84	28,43	42,54	60,66	83,30	110,97	144,16	183,38	229,13	281,90	342,21

Tabela obtida para uma pressão de 1000Pa e flecha máxima de L/500 ou 3 mm.  
Módulo de elasticidade (E) = 70000 N/mm<sup>2</sup>. a = 150 mm  
O cálculo estático deve ser validado por um técnico qualificado.

Dilatação térmica =  $\alpha \cdot \Delta t \cdot c$

Coefficiente dilatação do alumínio -  $\alpha = 0,0000232 / ^\circ\text{C}$

Varição de temperatura -  $\Delta t = |t_1 - t_0|$

Comprimento do perfil -  $c = (\text{mm})$

### Exemplo:

Temperatura mínima =  $20 ^\circ\text{C}$

Temperatura máxima =  $85 ^\circ\text{C}$

Varição temperatura -  $\Delta t = 85 - 20 = 65$
















Comprimento do perfil -  $c = 2500 \text{ mm}$

Dilatação térmica =  $\alpha \cdot \Delta t \cdot c = 23,2 \times 10^{-6} \times 65 \times 2500 = 3,77 \text{ mm}$

Dilatação térmica  $= \frac{3,77 \text{ mm}}{2,50 \text{ m}} = 1,508 \text{ mm/m}$

Logo, deve usar-se junta de dilatação.

A partir de 1,5 mm/m deve usar-se junta de dilatação!

			
	altura (mín./máx.)	peso máximo (kg)	comprimento do compasso (mm)
compasso projectante Com. 0528 	267/640	40	262
compasso projectante Com. 0529 	641/800	50	313
compasso projectante Com. 0530 	801/1000	65	415
compasso projectante Com. 0531 	1001/1500	100	567
compasso projectante Com. 0532 	1501/2000	100	570,5
compasso projectante Com. 0533 	2001/2500	100	682,5
compasso projectante Com. 0534 	2001/2500	180	716,5
<b>largura</b>	L=1000mm		L=1000mm
cremone de desvio Fch. 0636 (esq.) / 0637 (dir.)  opção 1	1		
kit para cremone Fch. 0413  opção 1	2	2	
varela n10 094  opção 1	conforme dimensões		
fecho semi-automático Fch. 0228  opção 3	1	2	
ponto de fecho Fch. 0228 Div. 0262  opção 3	1	2	
motor eléctrico Div. 0066  opção 4	1		
limitador de abertura Com. 0062  opção A	2		

Recomenda-se o uso de um limitador de abertura Com. 0062 para projectantes com peso igual ou superior a 100kg.

Com. 0062



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














5. fachada geral

5.4 acessórios gerais























**n15 000**  
sistema de fachadas  
geral

n15 000















acessórios fachada n15 000			
referência	aplicação	referência	aplicação
 Esq. 0001	ligação travessa/montante	 Div. 0065	apoio quadro VBC/VEP
 Esq. 0002	fixador quadro folga 11mm	 Div. 0149	fixação montante à lage parafuso inox M10
 Esq. 0037		 Div. 0117	fixador inox revestimentos diversos
 Esq. 0039	n15 031 n15 033	 Div. 0172	fixador apoio de vidro
 Esq. 0040	n15 035	 Div. 0158	n15 009 cantoneira fixação montante/travessa
 Esq. 0068	n15 038	 Div. 0189	apoio travessa
 Esq. 0071	fixador quadro folga 13mm para utilizar com acessório Dob. 0112	 Div. 0198	tela autocolante
 Div. 0308	apoio de vidro	 Div. 0259	n15 102 fixação montante à lage parafuso inox M10
 Div. 0449	apoio de vidro de 29 a 34 mm	 Div. 0268	canto vulcanizado Ved. 0025 - 11mm
 Div. 0309	cruzeta para prisão de vidro	 Div. 0277	canto vulcanizado Ved. 0025 - 14mm
 Div. 0319	fixador vidro	 Div. 0262	ponto fecho Fch. 0228
 Div. 0197	calço vidro		

## acessórios fachada n15 000

referência	aplicação		referência	aplicação
 Ved. 0020	vedante para perfis de dilatação		 Ved. 0214	calço montante com aba
 Ved. 0022	calço eixo 8mm		 Ved. 0215	calço eixo 9,2mm
 Ved. 0023	vedante vidro 3mm		 Ved. 0216	calço eixo 12mm
 Ved. 0024	vedante vidro 5mm		 Ved. 0217	calço apoio quadro 10,7mm
 Ved. 0025	vedante quadro 9mm		 Ved. 0219	calço eixo 13mm
 Ved. 0026	calço eixo 3mm		 Ved. 0220	calço apoio quadro 15,2mm
 Ved. 0027	calço apoio quadro 5mm		 Ved. 0223	vedante quadro 14mm
 Ved. 0032	n15 002 junta de vedação		 Ved. 0226	calço montante
 Ved. 0066	vedante vidro 2mm		 Ved. 0233	calço eixo 3mm
 Ved. 0134	vedante vidro		 Ved. 0239	n15 004 junta de vedação
 Ved. 0195	calço eixo 10mm			
 Ved. 0211	n15 003 junta de vedação			



**acessórios fachada n15 000**

referência	aplicação		referência	aplicação
 Tpo. 0120	n15 009 junta vedação/dilatação		 Fch. 0228	fecho semi-automático
 Tpo. 0121	n15 009 junta vedação/dilatação		 Fch. 0411	cremone
 Tpo. 0169	montante/travessa		 Fch. 0413	kit para Fch. 0411
 Ved. 0071	perfis dilatação		 Com. 0528	compasso projectante 262
 Ved. 0196	geral		 Com. 0529	compasso projectante 313
 Cun. 0018	geral		 Com. 0530	compasso projectante 415
 Cun. 0048	abertura interior		 Com. 0531	compasso projectante 567
 Cun. 0056	n15 031		 Com. 0532	compasso projectante 570,5
 Cun. 0023	Div. 0308 peça de apoio		 Com. 0533	compasso projectante 682,5
 Com. 0062	limitador de abertura		 Com. 0534	compasso projectante 716,5

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