

Ventilirana fasada

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OPĆE ODREDBE

PRITISAK VJETRA U OVISNOSTI O VISINI OBJEKTA

Uloga potkonstrukcije je da nosi vanjsku fasadnu oblogu i prenosi opterećenje nastalo vjetrom na nosivu konstrukciju objekta.

Pritisak uslijed djelovanja vjetra

h [m]	v [m/s]	q		v_p	v_s		v_s
		kg/m^2	kN/m^2	$c_p = 0,8$	$c_p = 0,5$ $h/b \geq 0,5$	$c_p = 0,7$ $h/b \geq 0,5$	$c_p = 2$ $b/8 \leq 2$
				$v_p = 1,25 \cdot 0,8 \cdot q$	$v_s = 0,5 \cdot q$	$v_p = 0,7 \cdot q$	$v_p = 2 \cdot q$
0-8	28,3	50	0,5	0,5	0,25	0,35	1,0
8-20	35,8	80	0,8	0,8	0,40	0,56	1,6
20-100	42,0	110	1,1	1,1	0,55	0,77	2,2
≥ 100	45,6	130	1,3	1,3	0,65	0,91	2,6

h visina objekta [m]

v brzina vjetra [m/s]

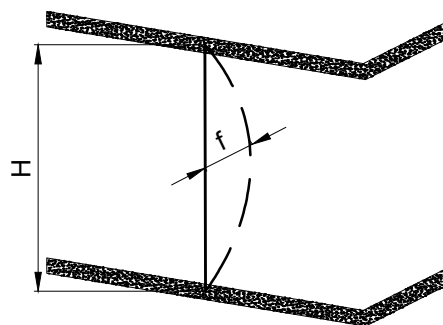
$v_{p/s}$ pritisak vjetrom pozitivan/negativan [kN/m^2]

b širina objekta [m]

q opterećenje vjetrom [kN/m^2]

c_p korektivni faktor

DOZVOLJENI UGIB VERTIKALNOG NOSAČA



H [mm]	Dozvoljeni ugib [mm]
$H \leq 3000$	$f \leq H/200$
$3000 < H \leq 7500$	$f \leq 5 + H/300$
$H > 7500$	$f \leq H/250$

DOZVOLJENI UGIBI U OVISNOSTI OD VRSTE MATERIJALA VENTILIRAJUĆE OBLOGE

- Za krhke materijale (paneli na bazi gipsa - gipsani paneli):
1/360 opsega panela ili 10 mm ako je ugib manji
- Za panele od prirodnog kamena:
1/360 opsega panela ili 3 mm ako je ugib manji (ovisno o dimenzijama panela i načinu kačenja)
- Ostale ventilirajuće obloge:
1/90 od raspona između točki kačenja za aluminij, staklo i čelik
1/360 od raspona između točki kačenja, odnosno 3mm za prirodni kamen i krhke materijale

Napomena: Poštovati preporuke proizvođača ventilirajućih obloga!

- U slučaju horizontalnih nosača, dozvoljeni ugibi su:
 $d \leq L / 200$ ako je $L \leq 3000 \text{ mm}$ $L[\text{mm}]$ - dužina nosača između točki oslonaca
 $d \leq 5 \text{ mm} + L / 300$ ako je $L > 3000 \text{ mm}$

KOTVE ZA FIKSIRANJE

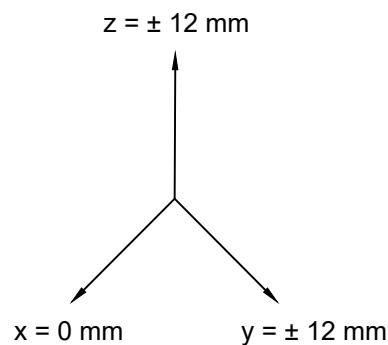
Kotve za fiksiranje moraju zadovoljavati sljedeće kriterije:

- sigurno prenijeti sva opterećenja sa fasade koja nastaju uslijed pritiska vjetra, težine potkonstrukcije i težine panela
- omogućiti pomjeranje nosača uzrokovano termičkim širenjem

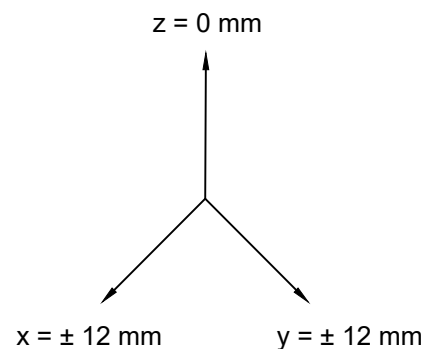
Fiksni oslonac se dimenzionira na osnovu opterećenja uslijed vlastite težine elemenata konstrukcije i pritiska vjetra.

Pokretni oslonac se dimenzionira na osnovu opterećenja uslijed pritiska vjetra.

FIKSNI OSLONAC



POKRETNI OSLONAC



Vlastita težina: $v = g \cdot h \cdot b$

Pozitivan pritisak vjetra: $v_p = f_1 \cdot q \cdot c_p \cdot \frac{h}{2} \cdot b$

Negativan pritisak vjetra: $v_s = q \cdot c_p \cdot \frac{h}{2} \cdot b$

OPĆE ODREDBE

v	vlastita težina [N]	q	dinamičko opterećenje [kN/m ²]
g	težina elemenata konstrukcije [kN/m ²] (nosači i panel)	c_p	korektivni faktor (Tabela 1?)
v_p	pozitivan pritisak vjetra [kN]	h	raspon oslonaca [m]
v_s	negativan pritisak vjetra [kN]	b	rastojanje između nosača [m]
f_1	korekcijski faktor		

Vrijednost osnovne brzine vjetra $v_{b,0}$ definirana je u *EN 1991-1-4:2005+A1:2010 Section 4*. Faktori smjera i sezone općenito su $c_{dir} = 1,0$ i $c_{sezona} = 1,0$.

OSTALO

Ventilirajuće fasadne obloge sa aluminijskom potkonstrukcijom sastoje se od: aluminijskih nosača, okomitih i vodoravnih nosivih aluminijskih profila i držača fasadnih obloga. Držači fasadnih obloga mogu biti vidljivi ili skriveni.

Aluminijski ekstrudirani profili su rađeni od legure EN-AW 6060, a aluminijski nosači od legure EN-AW 6063. Fasadne obloge mogu biti:

- Fasadne obloge od aluminijskih kompozitnih panela
- HPL obloge (Trespa, Fundermax i sl.)
- Keramičke fasadne obloge (Laminam, Kerlit i sl.)
- Kamene fasadne obloge
- Fasadne obloge od aluminijskih profila

Težina panela za ventilirajuće fasade

Vrsta obloge	Težina [kg/m ²]
HPL-Fundermax	1,35
HPL-Trespa	1,40
Aluminijski kompozitni panel 3mm	5,90
Aluminijski kompozitni panel 4mm	7,60
Laminam 3+	8,20
Laminam 5	14,00
Laminam 5+	14,90
Swisspearl Fibercement paneli 8 mm	15,10
Swisspearl Fibercement paneli 10 mm	18,90
Granit 30mm	87,00

Vijci koji se koriste za vezu elemenata potkonstrukcije imaju po jednu elastičnu i jednu ravnu podlošku, a kvalitete su inoks A2.

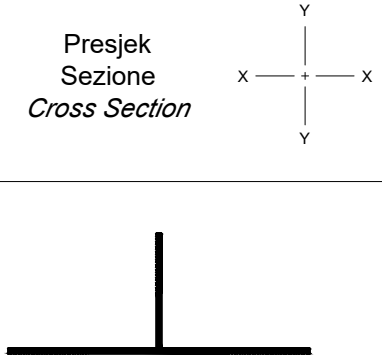
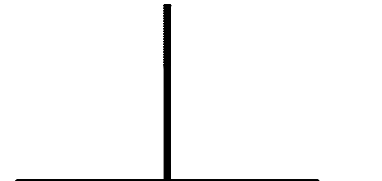
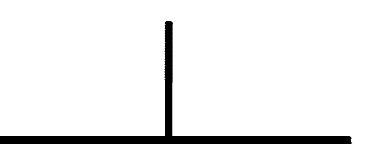
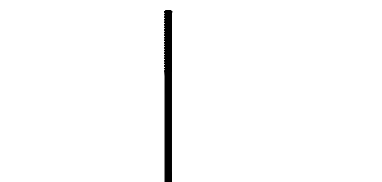

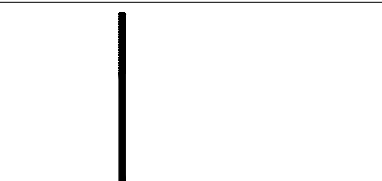
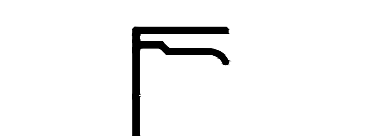
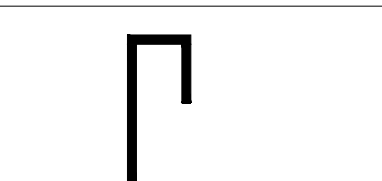
Pop nitne i samourezujući vijci kao vezni dio se ne preporučuju za elemente trajno stabilne konstrukcije.

Minimalna širina ventiliranog sloja mora biti bar 2 cm, bez prekida. Ventilirani sloj je horizontalni razmak od obloge ili profila do sloja termoizolacije. Potrebno je omogućiti ulaz zraka sa donje strane fasade i izlaz na vrhu fasade. Ulaz mora biti veći od 50 cm² na dužini metar fasade. Sa druge strane, izlaz na vrhu fasade mora biti od 50 cm² na dužini metar fasade. Ventilirane fasade nisu vodonepropusne, pa se vodonepropusnost rješava detaljima koji su vezani za fasadne otvore.

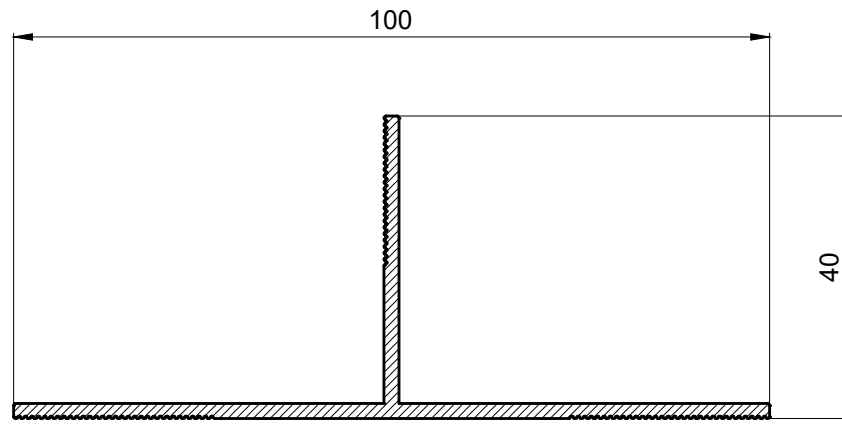
Kod fasada sa vanjskom oblogom sa otvorenim spojevima, preporučuje se uporaba specijalne paropropusne-vodonepropusne folije sa UV zaštitom.

Za ventilirajuće fasade sa zatvorenim spojevima preporučuje se korištenje folije koja se sastoji iz dva sloja presovane polipropilenske tkanine i mikroporoznim slojem između tkanina što je čini paropropusnom vodonepropusnom folijom.

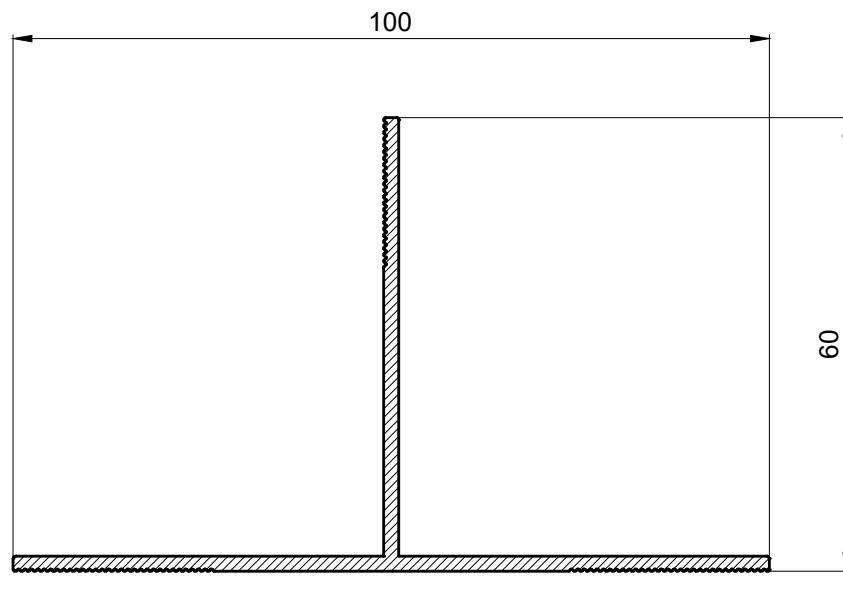
PROFILI

Kod Codice Code	Presjek Sezione Cross Section	Težina Peso Weight Kg/m	Perimetar Perimetro Perimeter mm	Vidljiva površina Sup. in Vista Exposed surface mm	Jx cm ⁴	Wx cm ³	Jy cm ⁴	Wy cm ³
PS16300		0.718	298.25	100.00				
PS16301		0.826	338.25	100.00				
PS16302		0.826	338.25	120.00				
PS16303		0.934	378.25	120.00				
PS16304		0.515	209.77	100.00				
PS16305		0.622	249.77	120.00				
PS16111		0.337	158.55	25.00	-	-	-	-
PS16309								

PROFILI

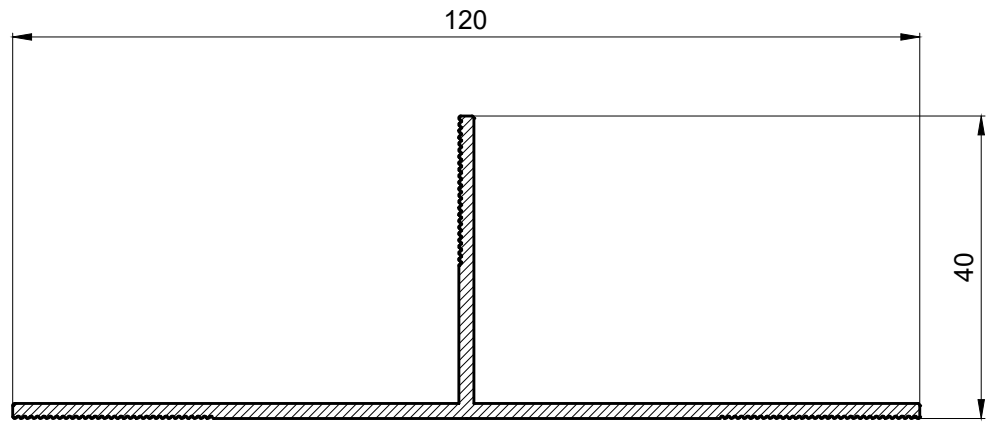


PS16300 0.718 Kg/m

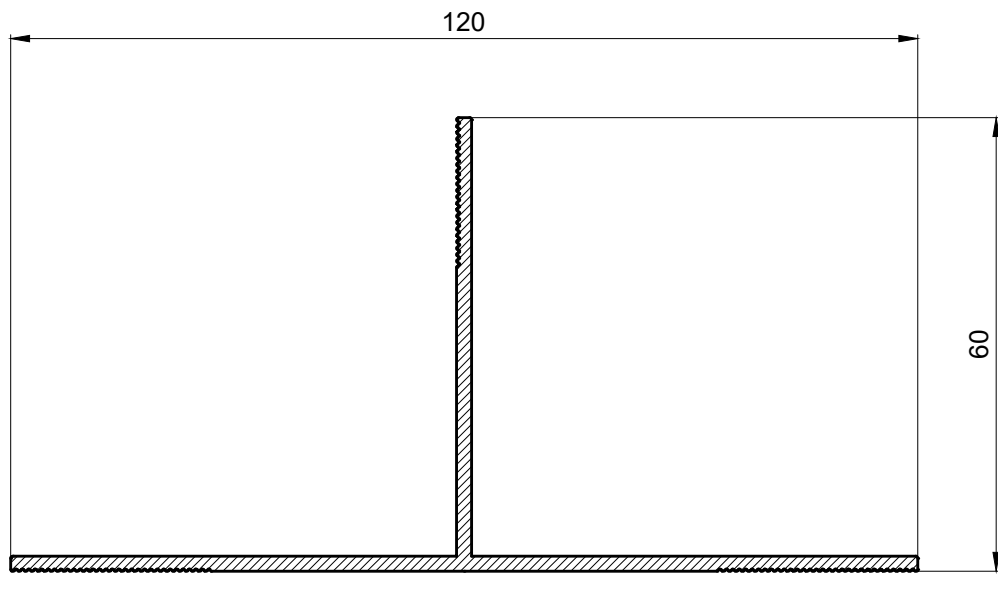


PS16301 0.826 Kg/m

PROFILI

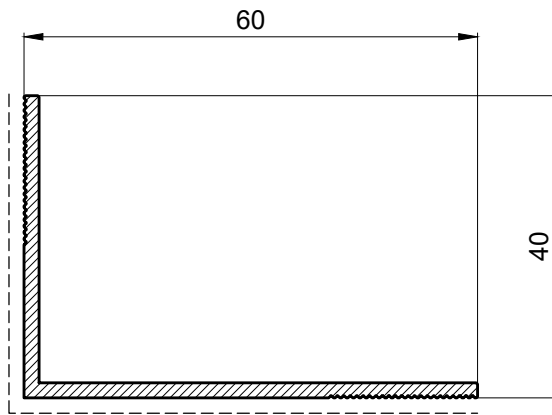


PS16302 0.826 Kg/m

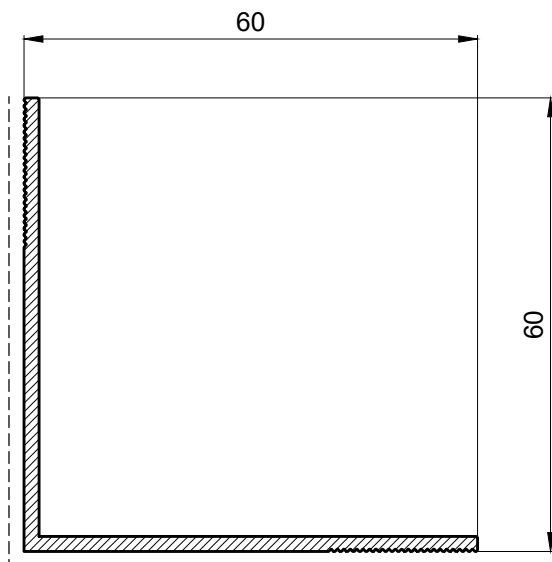


PS16303 0.934 Kg/m

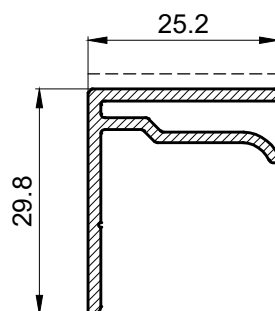
PROFILI



PS16304 0.515 Kg/m

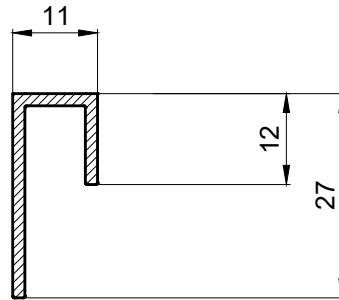


PS16305 0.622 Kg/m



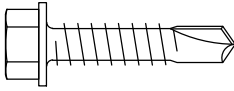
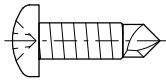
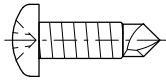
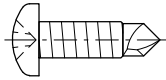



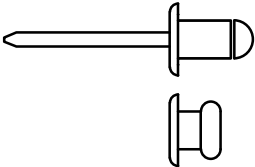
PS16111 0.337 Kg/m

PROFILI



PS16309 0.xxx Kg/m

VEZNI ELEMENTI

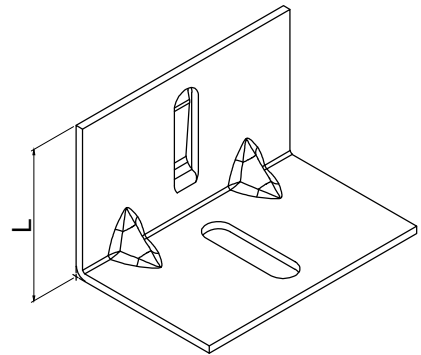
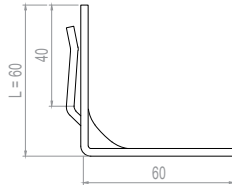
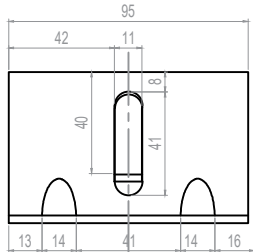
KOD	IZGLED-PRESJEK	OPIS	MATERIJAL
DIN 7504 K		Vijak za lim sa šesterokutnom (ključ) glavom, samobušeci M5,5 x 25	Nehrđajući čelik A2
DIN 7504 N		Vijak za lim, sa cilindričnom glavom, križni prihvati, samobušeci M3,9 x 9,5	Nehrđajući čelik A2
DIN 7504 N		Vijak za lim, sa cilindričnom glavom, križni prihvati, samobušeci M4,8 x 13	Nehrđajući čelik A2
DIN 7504 N		Vijak za lim, sa cilindričnom glavom, križni prihvati, samobušeci M4,8 x 16	Nehrđajući čelik A2
DIN 7981 C		Vijak za lim, sa cilindričnom glavom, križni prihvati, samourezujući M4,2 x 13	Nehrđajući čelik A2
		Turbo vijak 4,8x79	
EJOT BA-E Plus		Sidreni vijak M12x110 / npr. Fischer ... /	Nehrđajući čelik A4
ISO 15983		Slijepa zakovica zaobljene glave 5x10mm	Aluminij + pocinčani čelik

NOSAČI

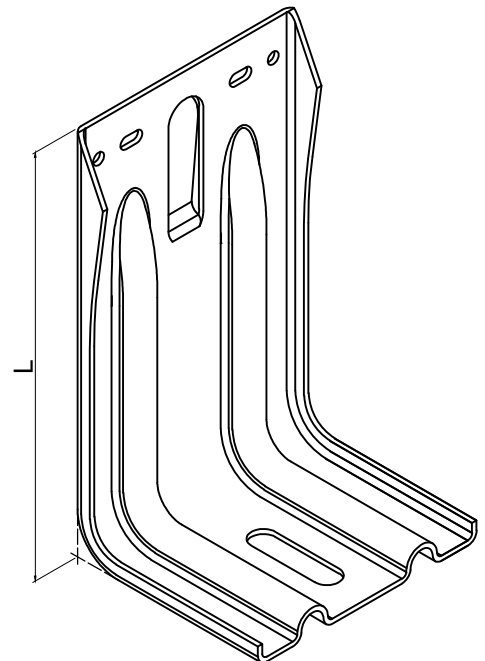
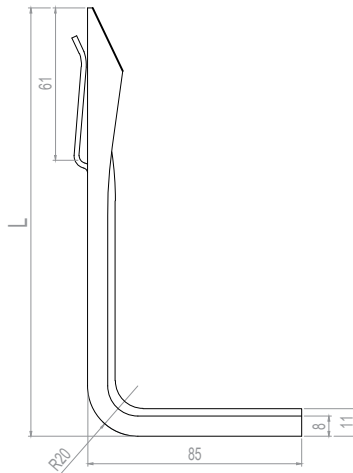
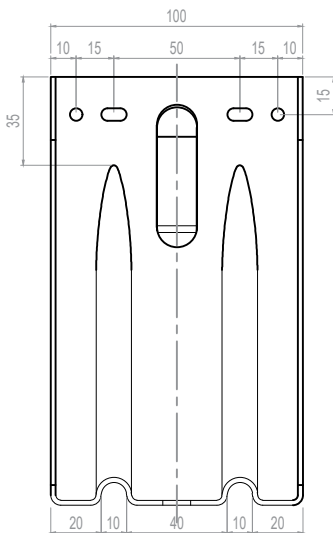
Nosači ventilirane fasade izrađuju se od aluminijskog lima debljine 2mm, duljina L [mm]:

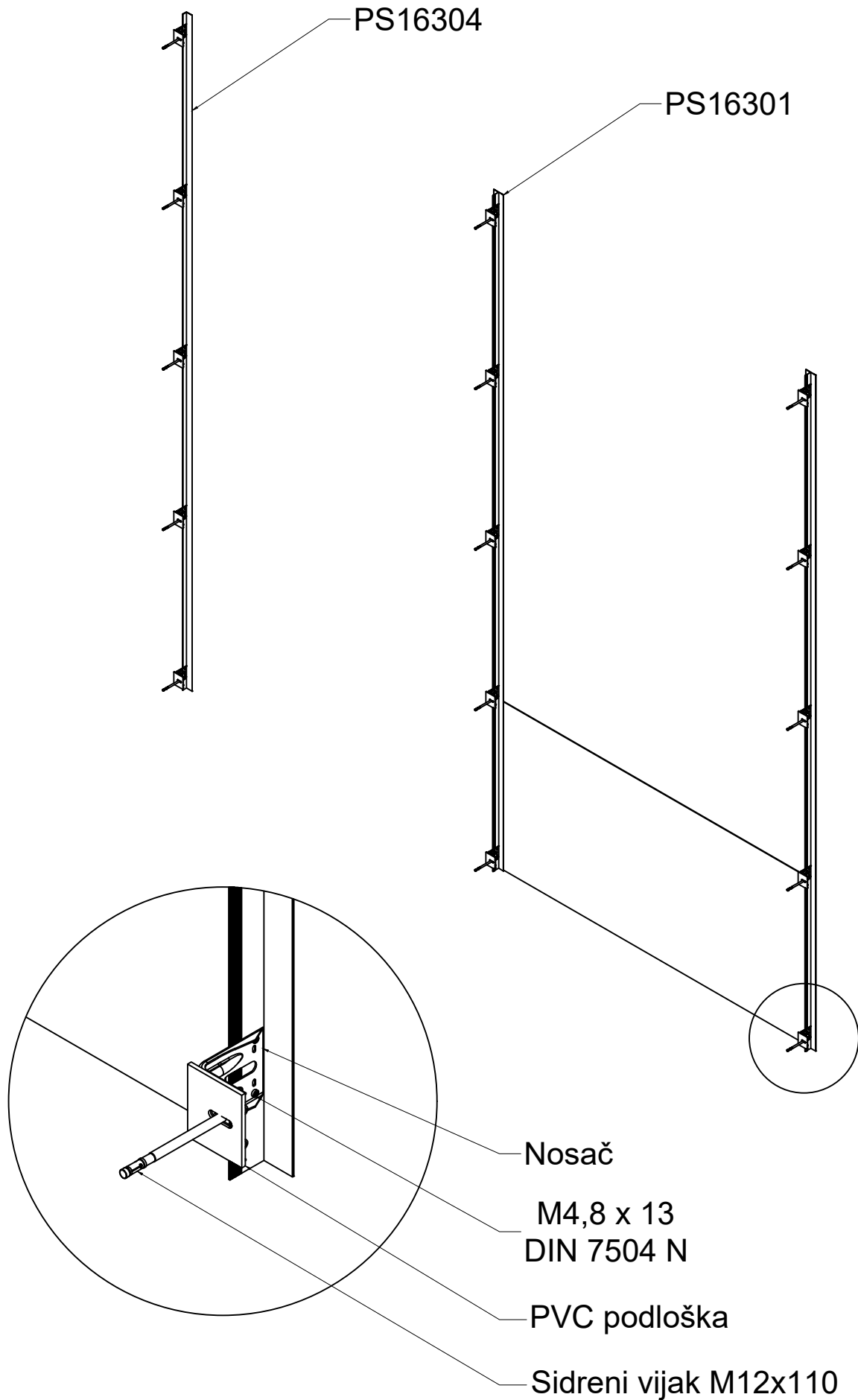
60, 90, 100, 110, 120, 130, 140, 150, 160, 170, 180, 190, 200, 210, 220, 230, 240, 250, 260, 270, 280, 290, 300, 310, 320, 330, 340, 350, 400.

L = 60 mm

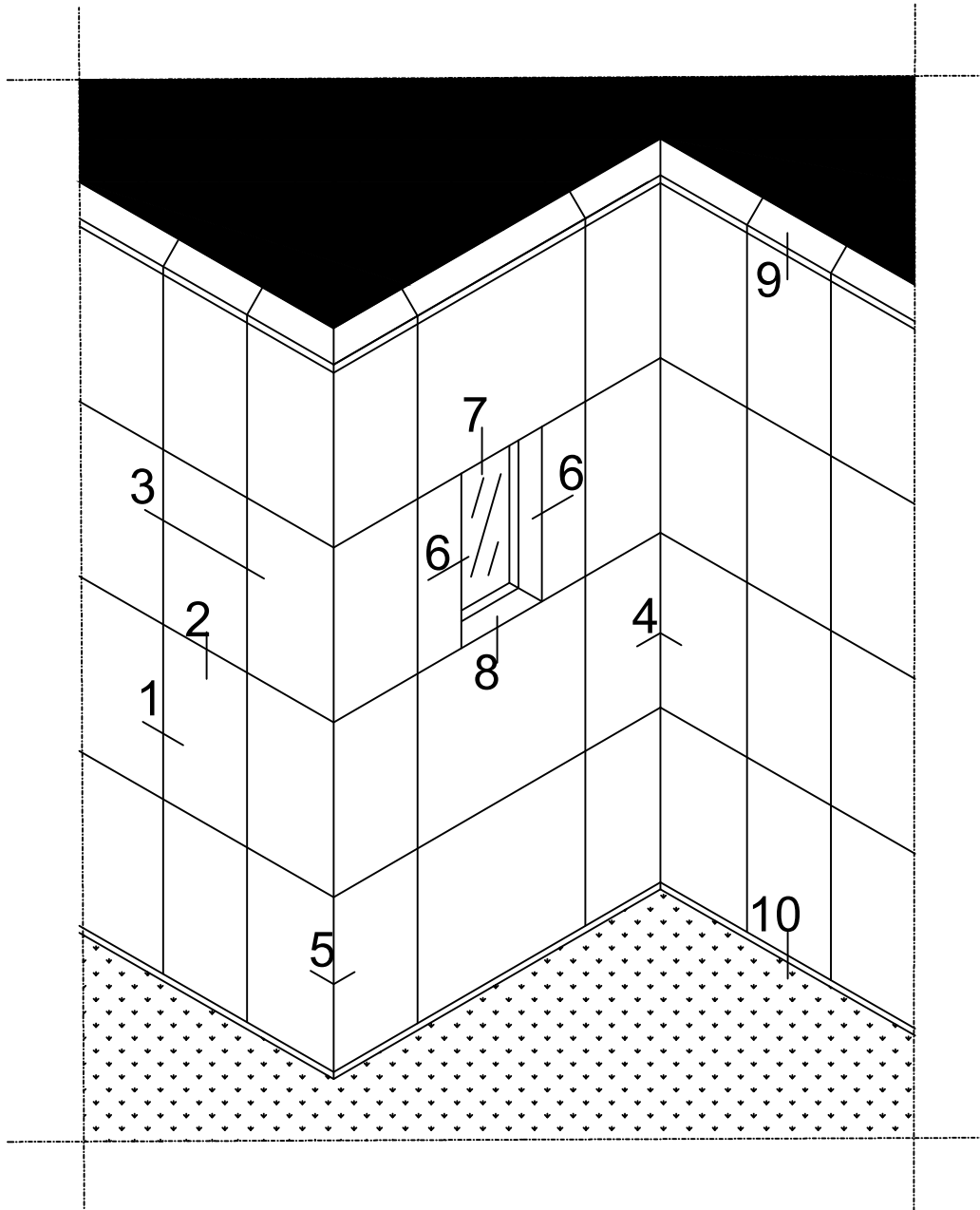


L = 90 - 400 mm





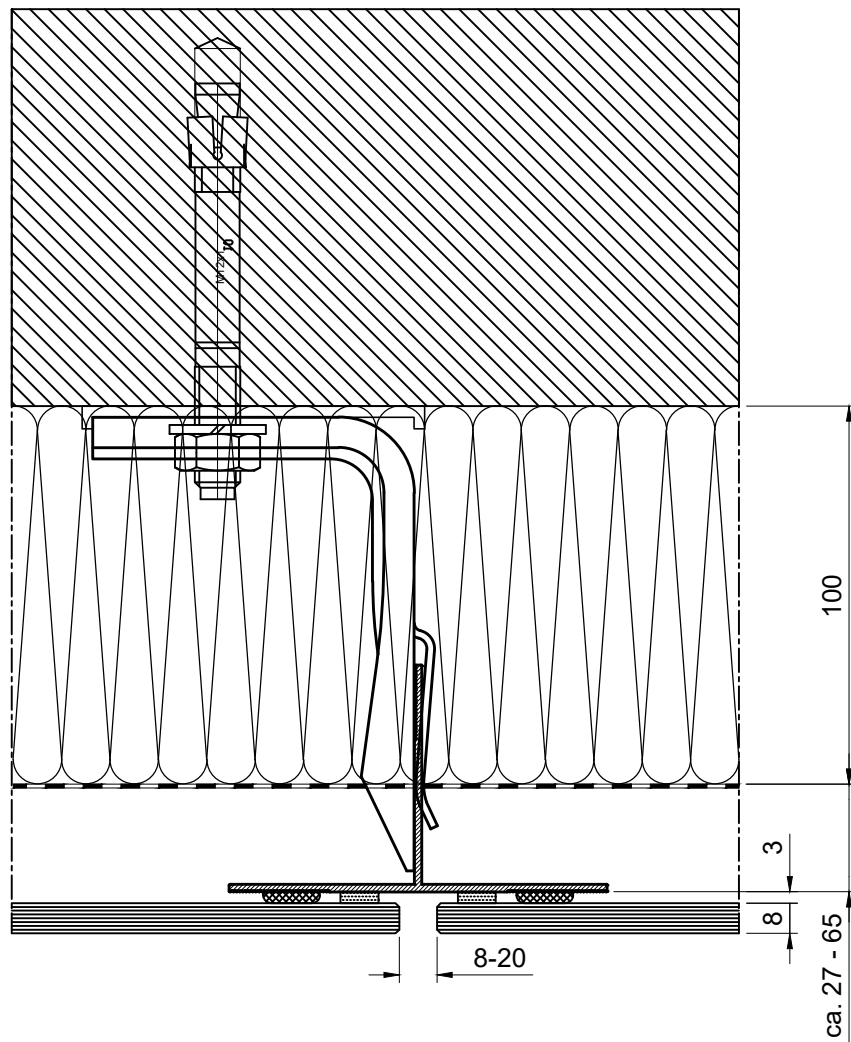
Keramika, Fibercement paneli, HPL/ Ceramic, fibreC,HPL



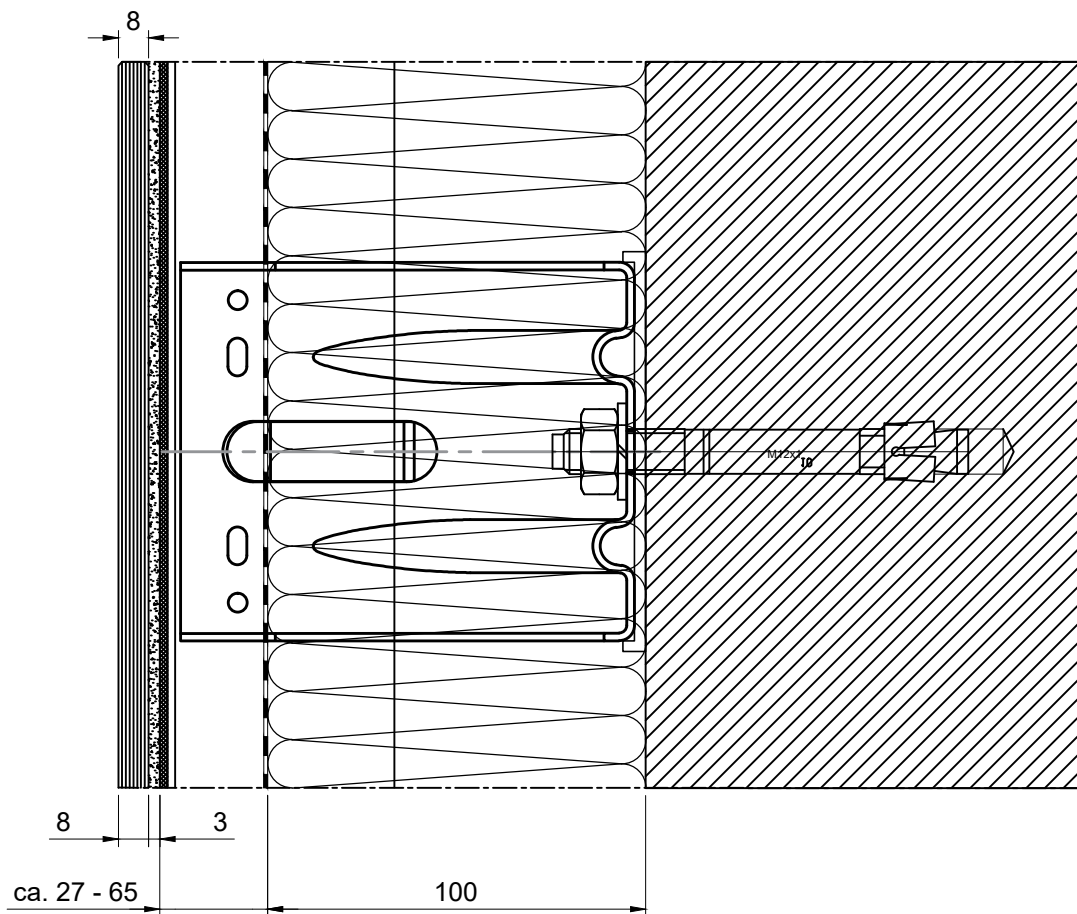
pogled na fasadu / view of cladding

Za montažu panela i razmake pričvršćenja mjerodavne su preporuke proizvođača panela!

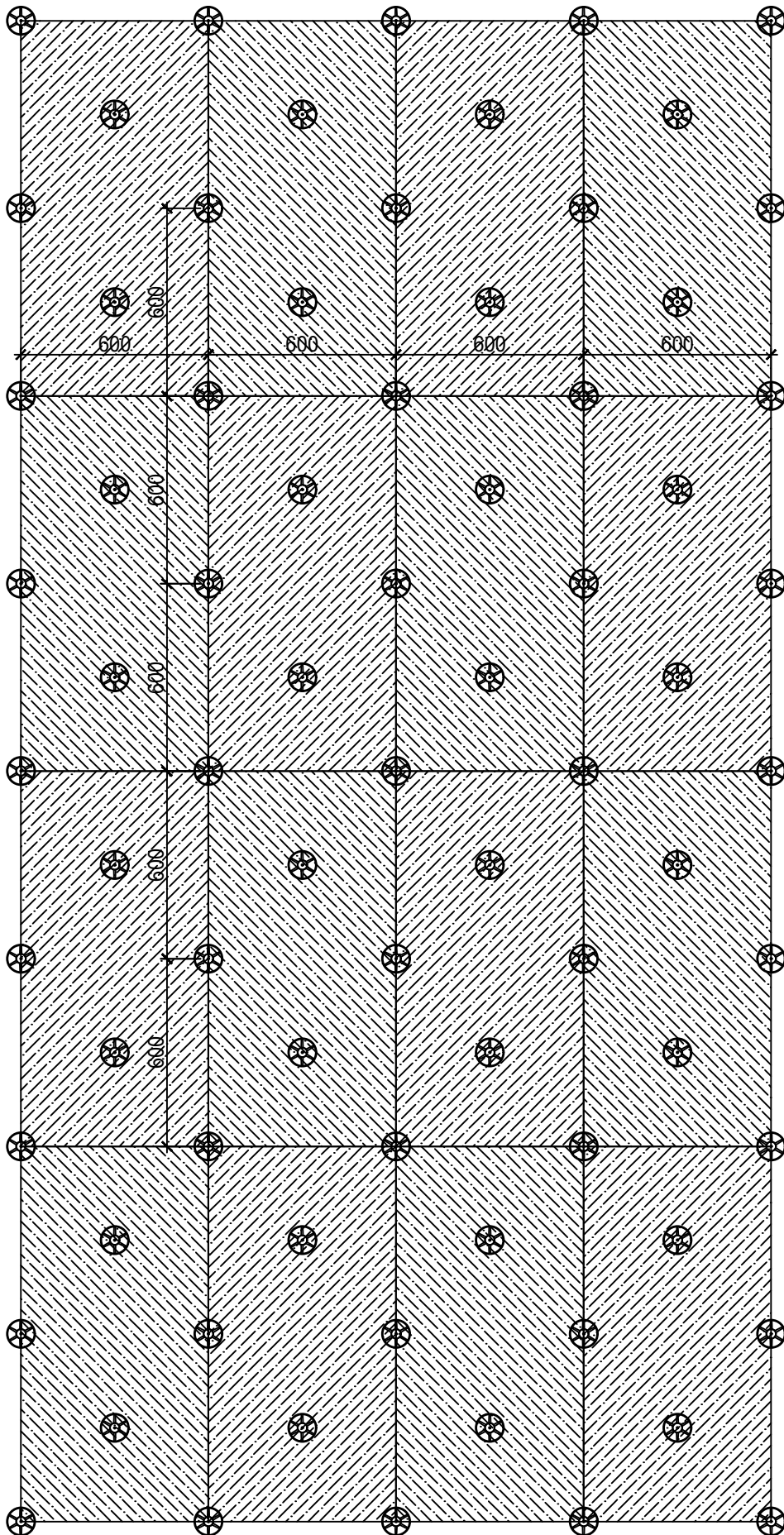
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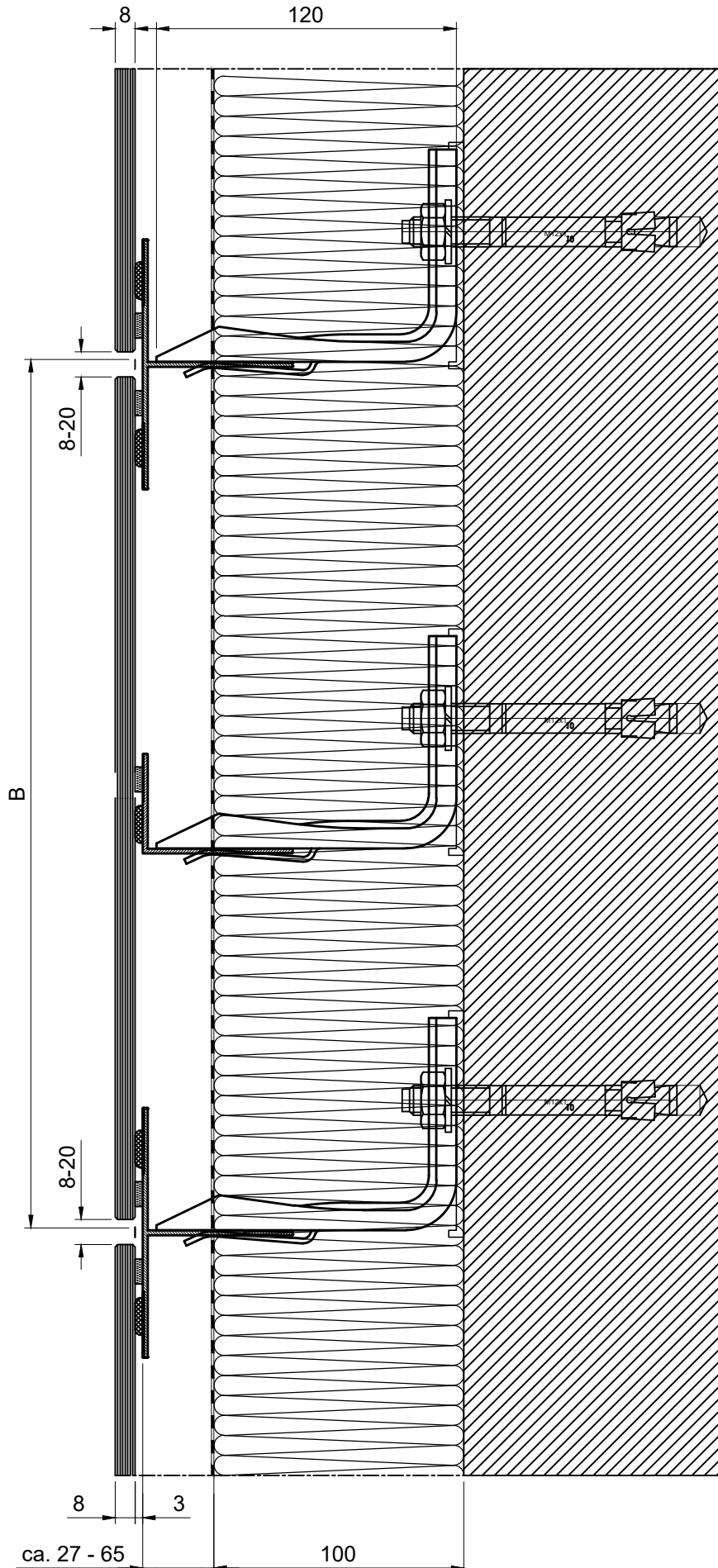
2



POSTAVLJANJE IZOLACIJE

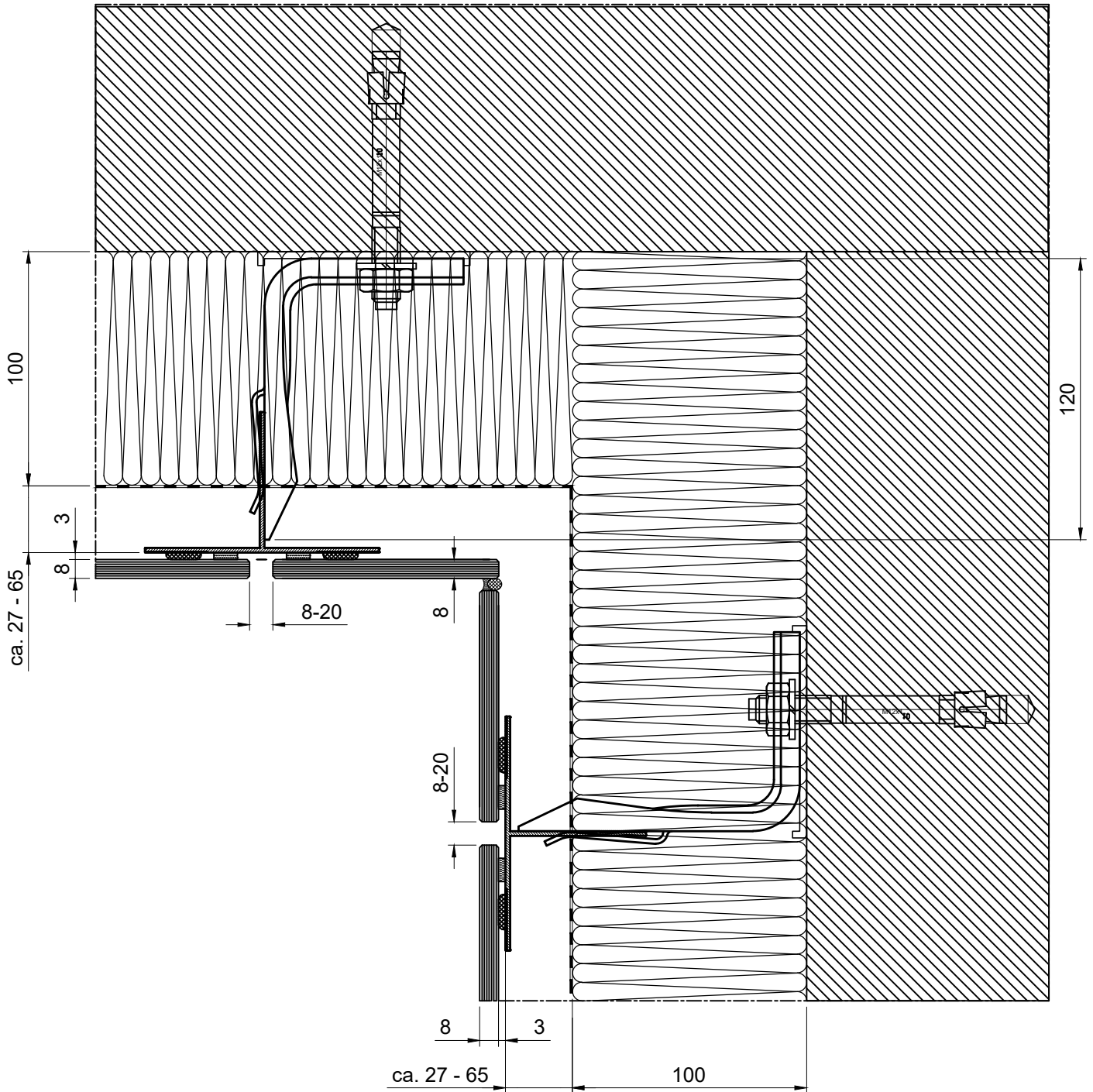


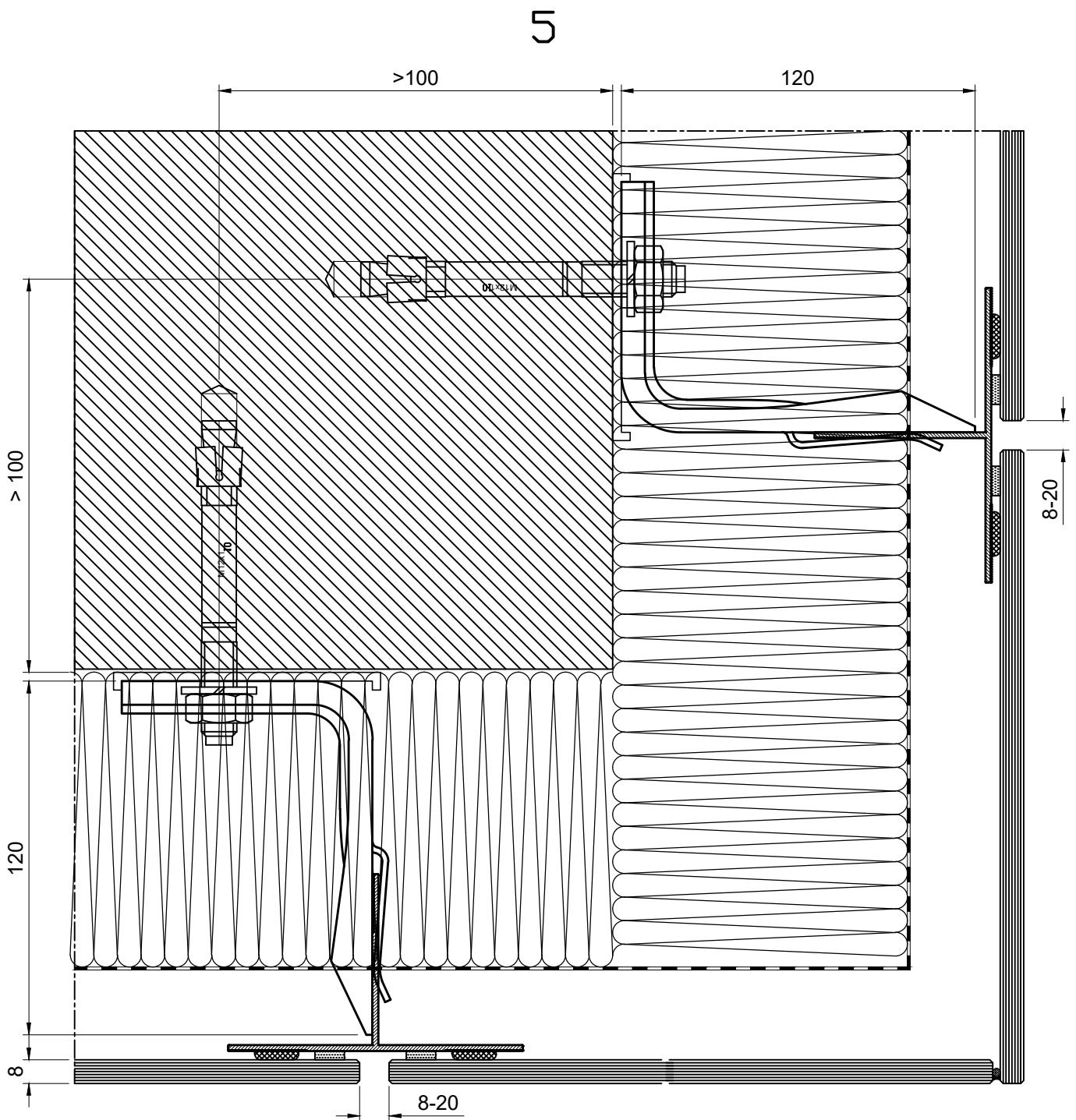
B - prema statičkom proračunu, ali ne više od 1200mm/B - according to structural analysis, but no more than 1200mm



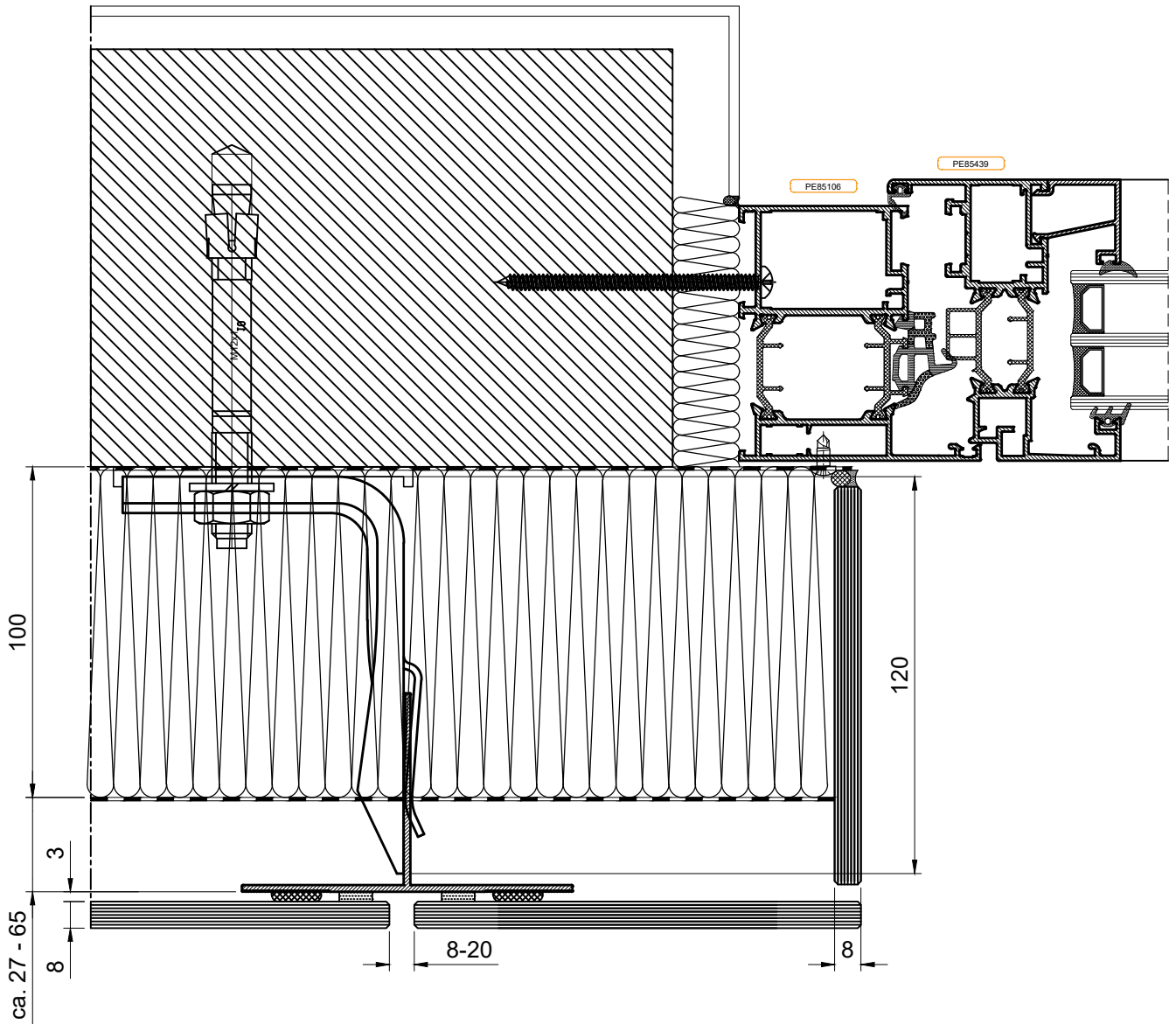
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4

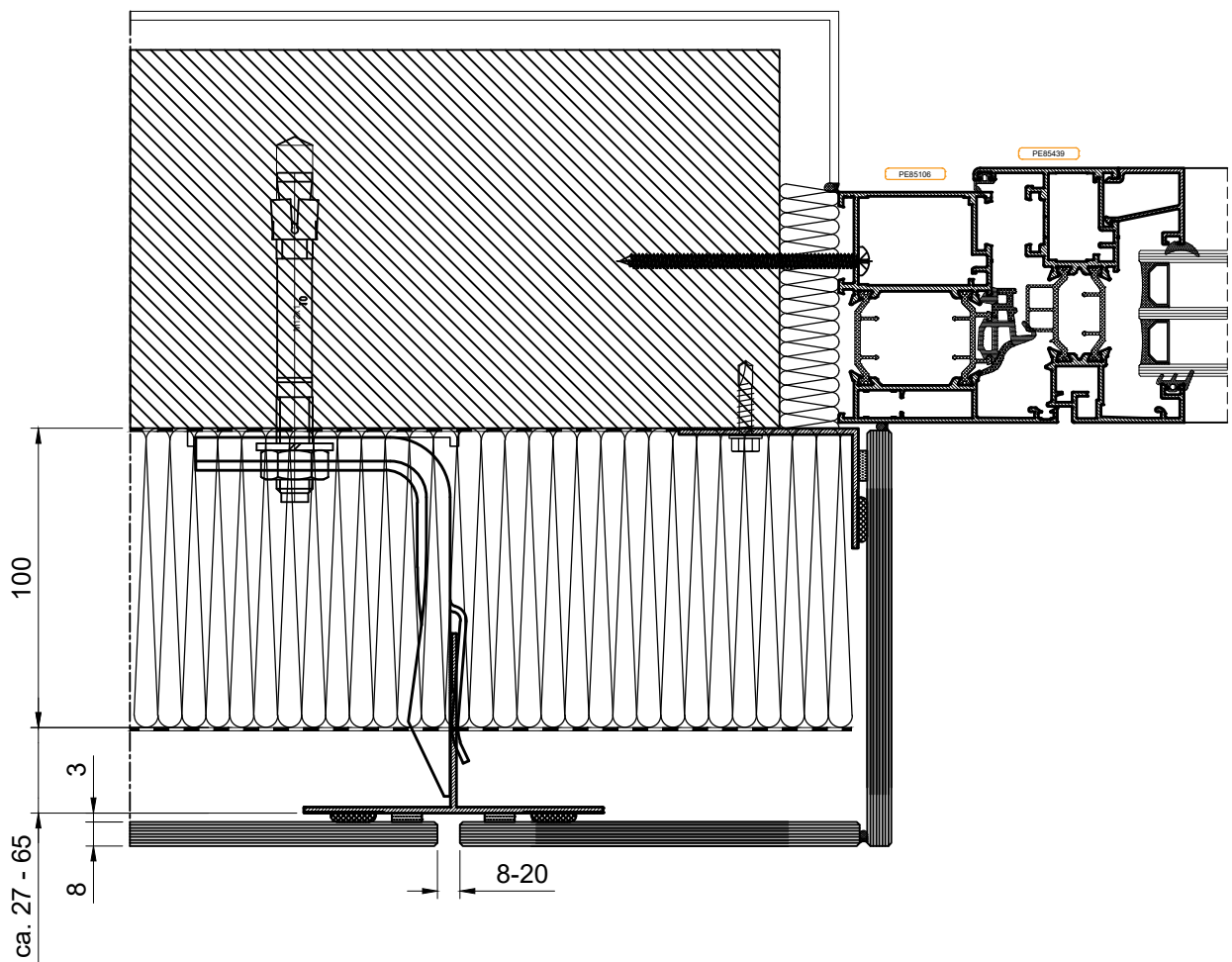




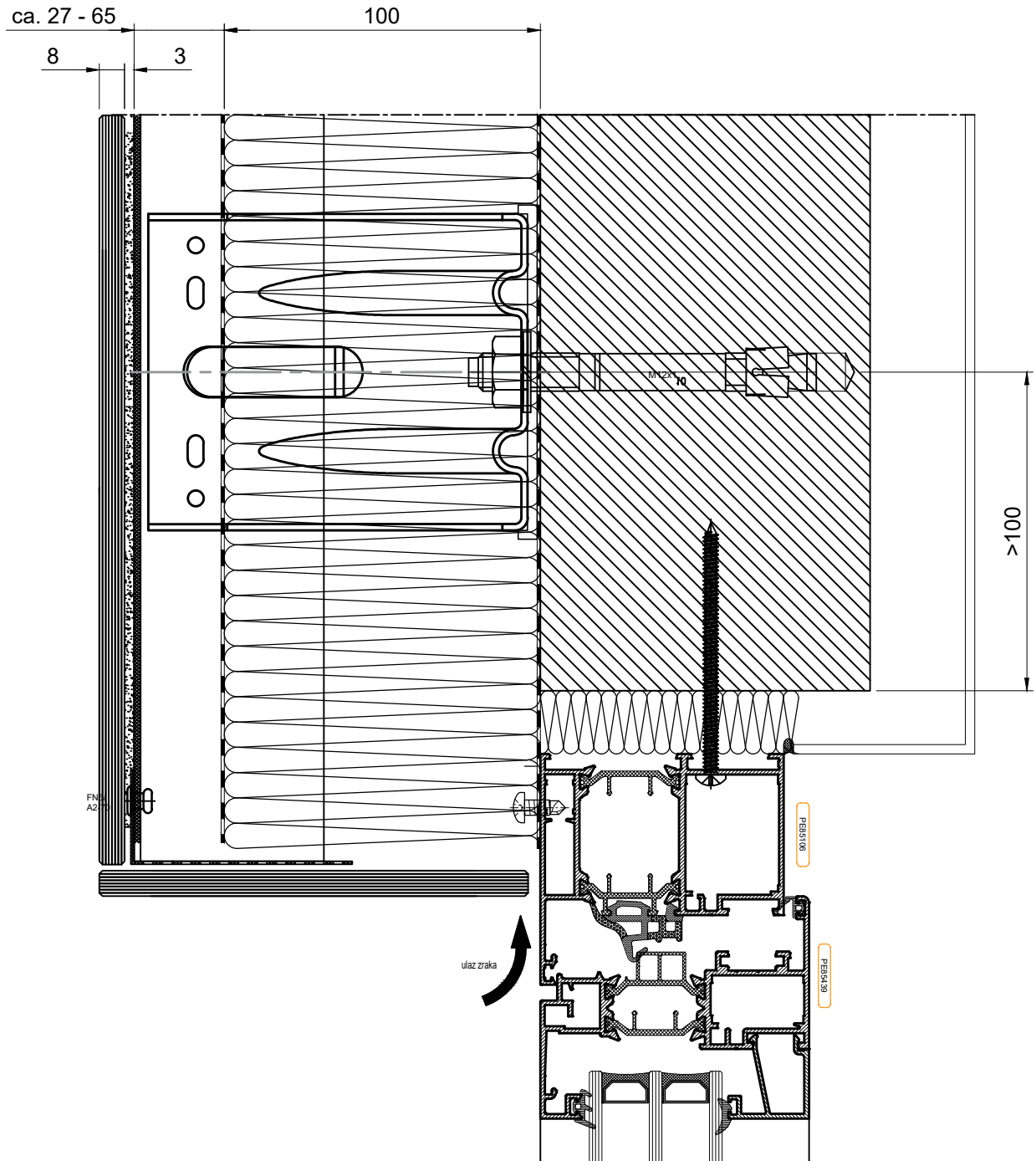
6.1



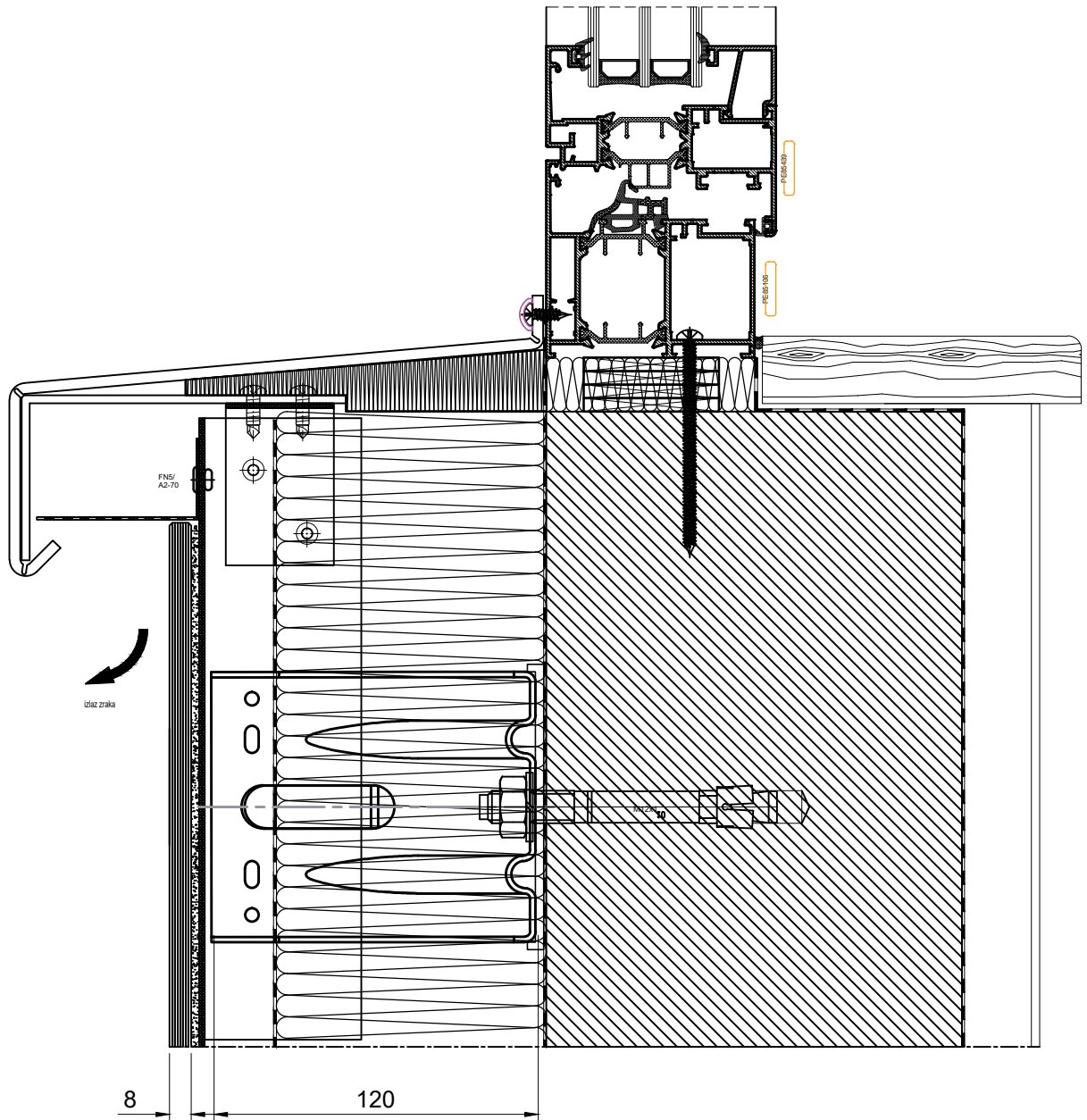
6.2



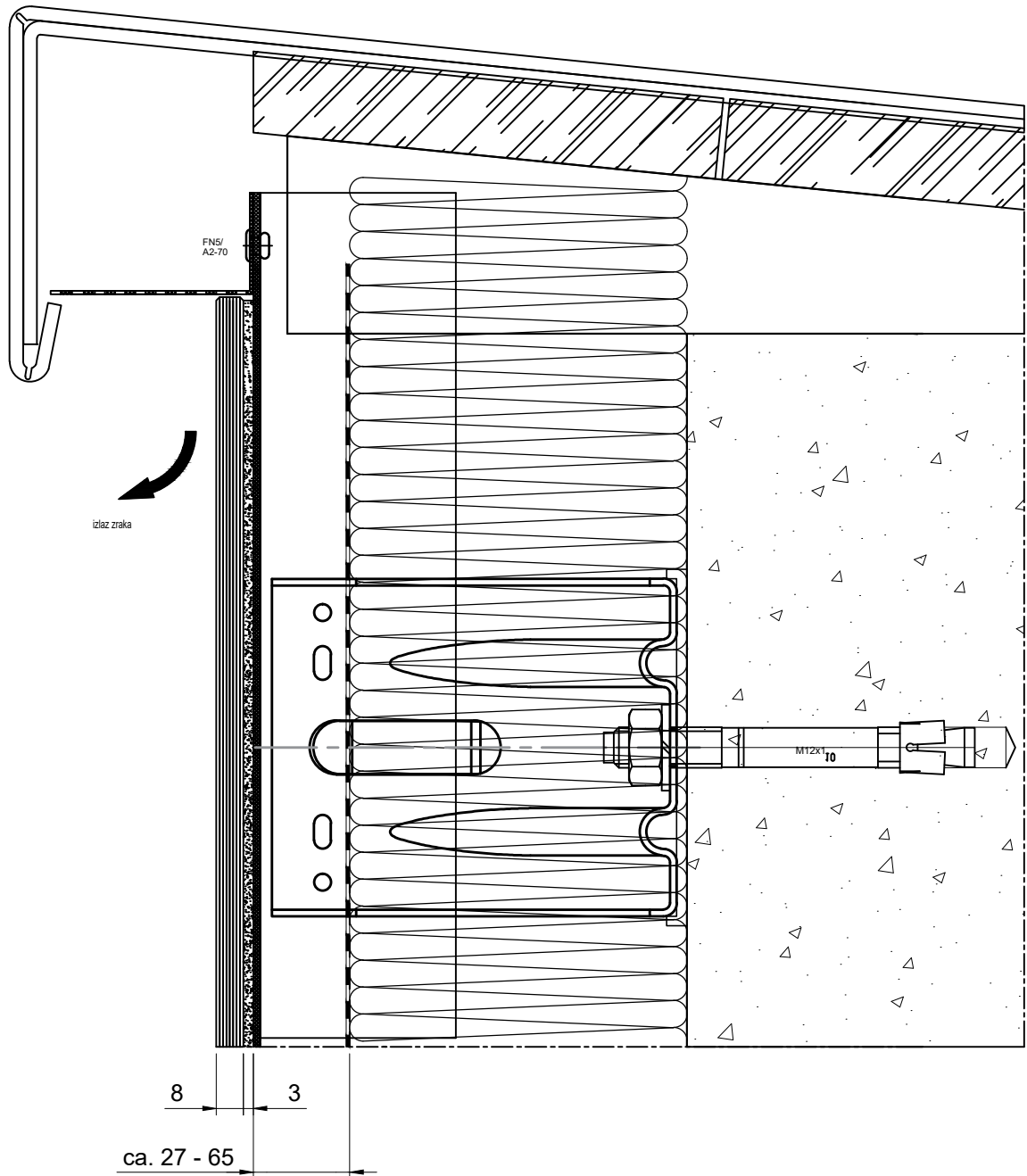
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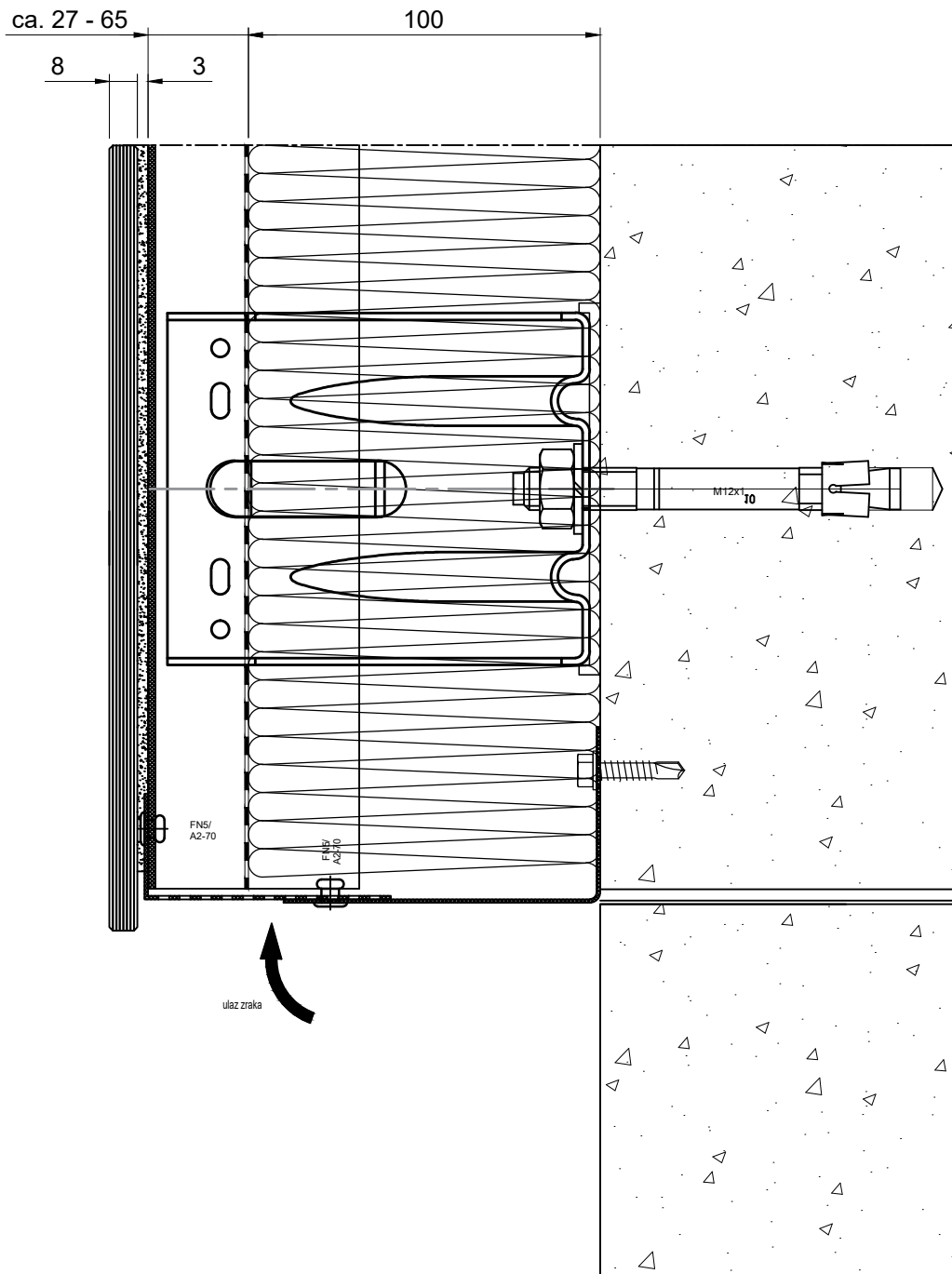
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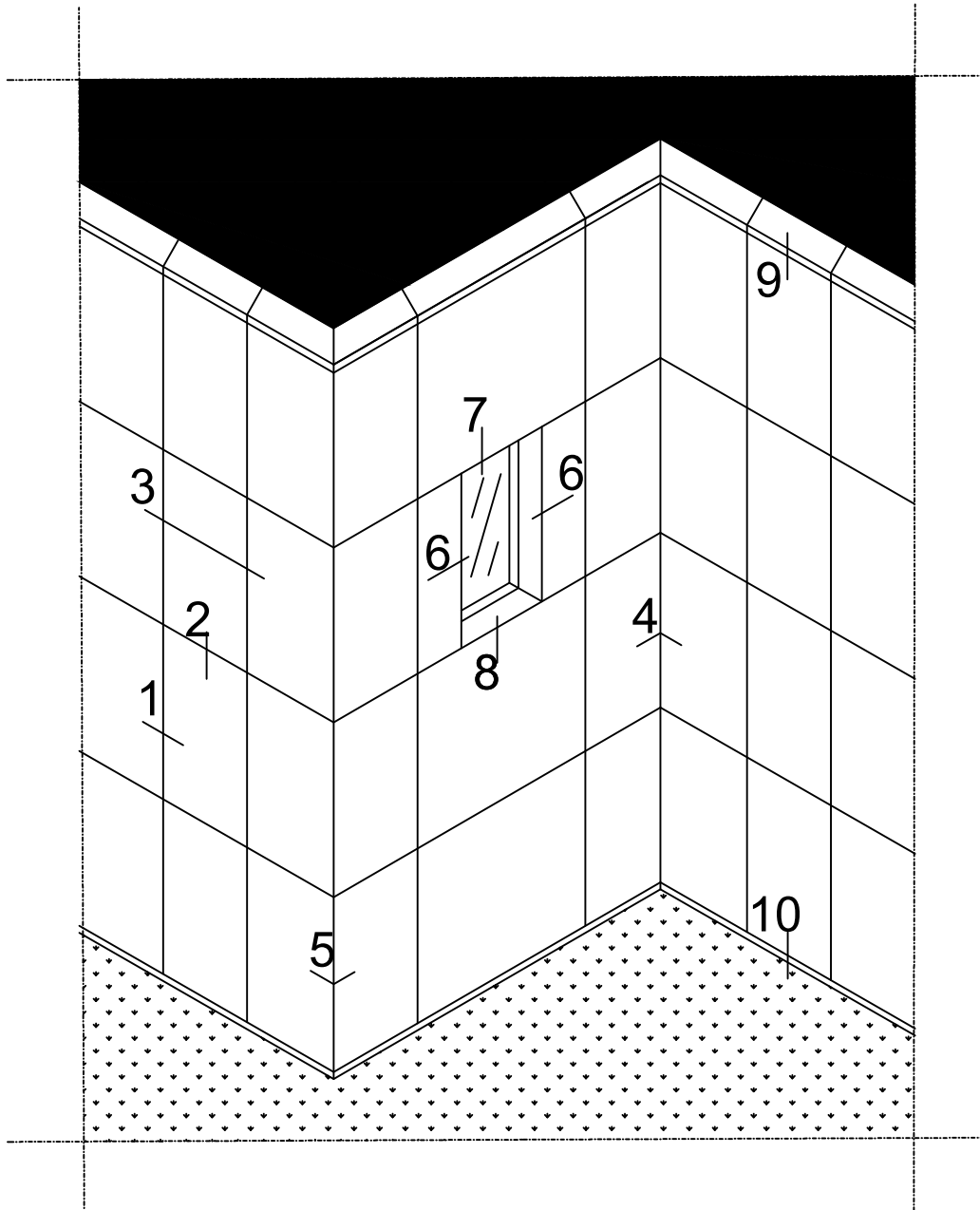
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10



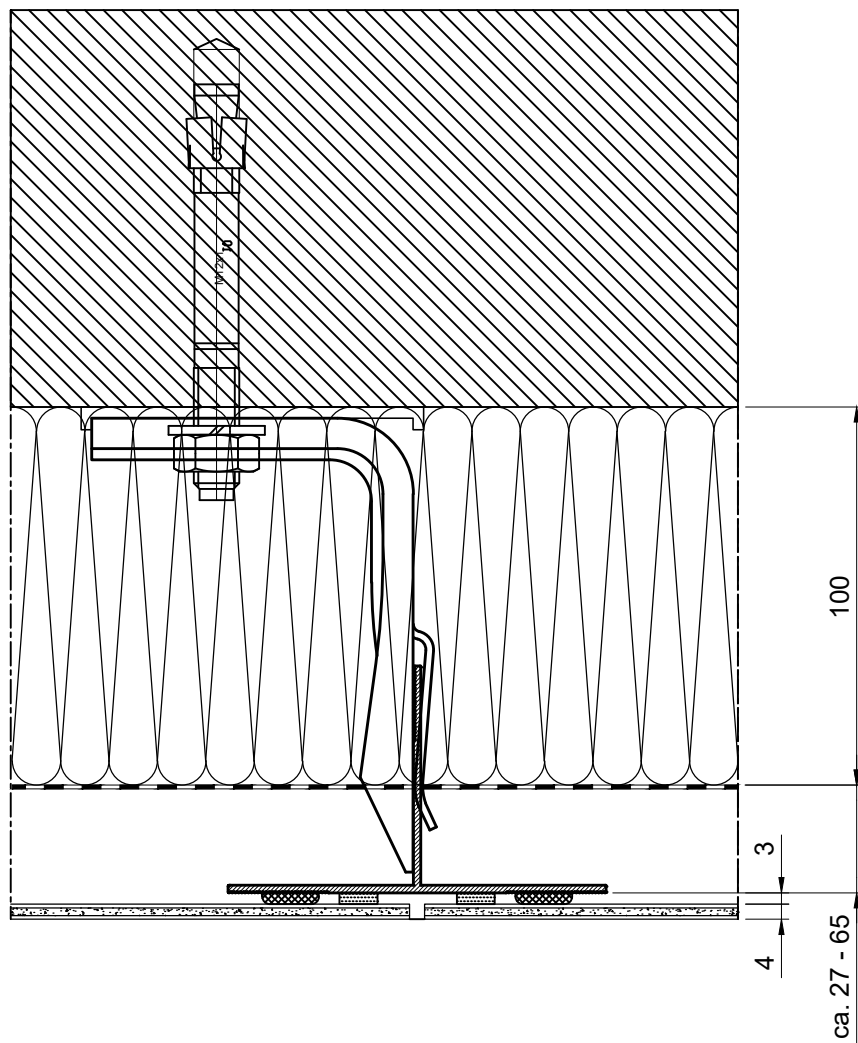
Aluminijumski kompozitni panel/ Aluminium composite panel



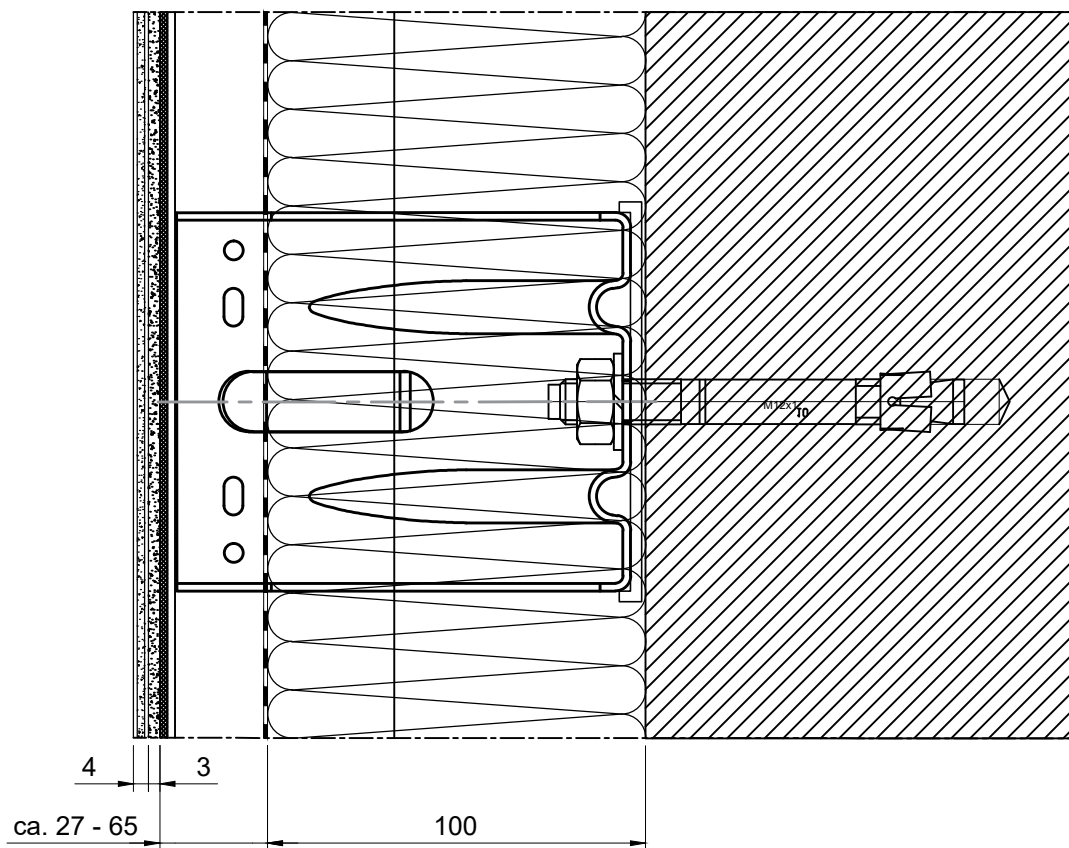
pogled na fasadu / view of cladding

Za montažu panela i razmake pričvršćenja mjerodavne su preporuke proizvođača panela!

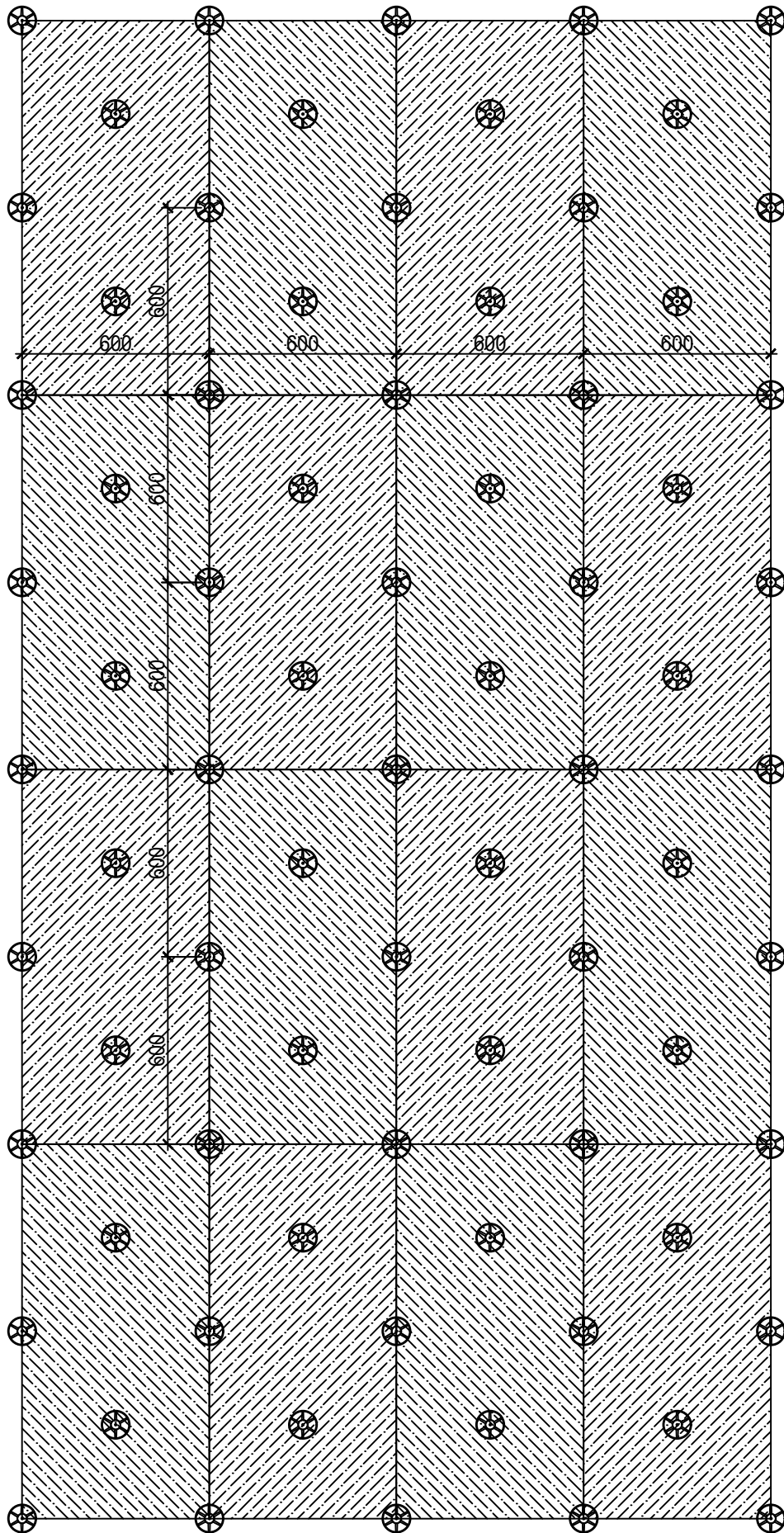
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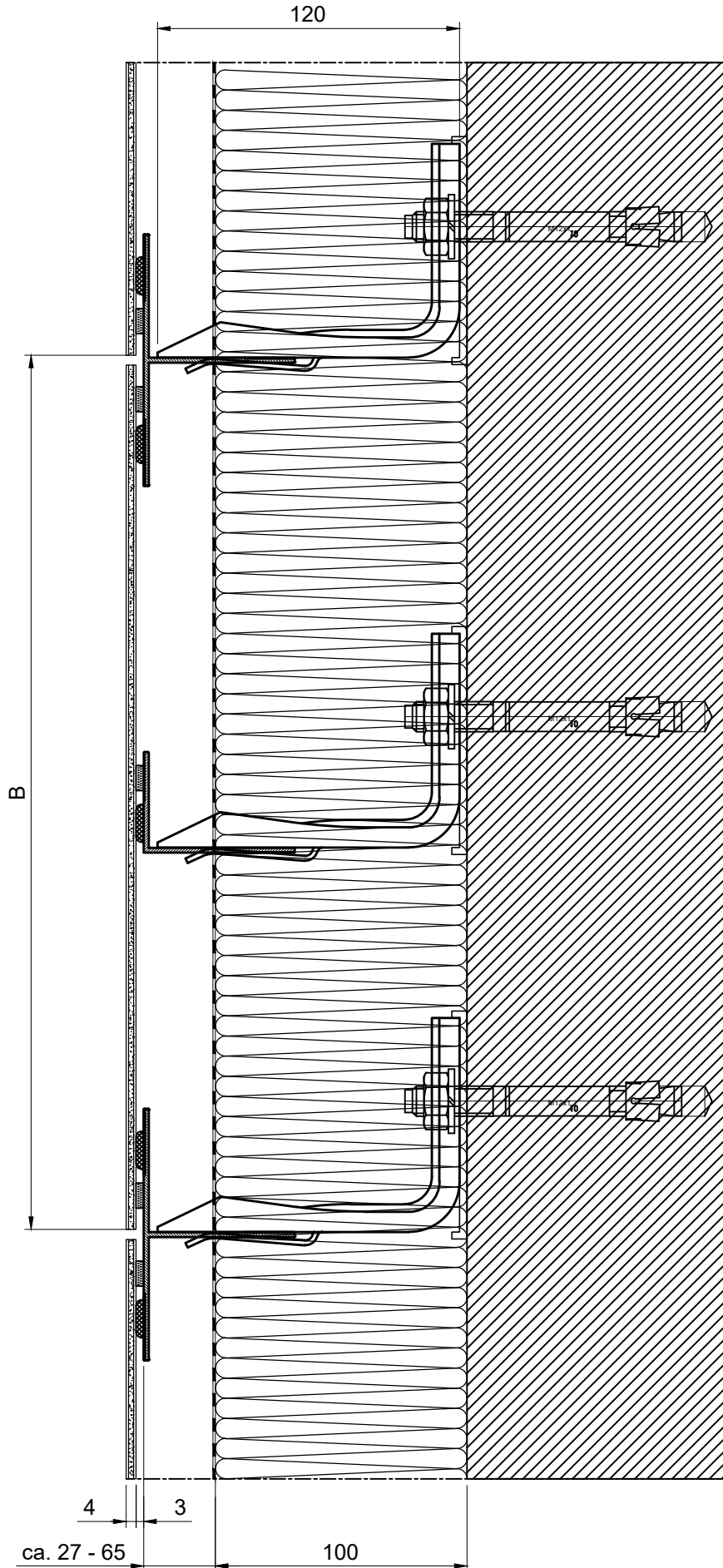
2



POSTAVLJANJE IZOLACIJE

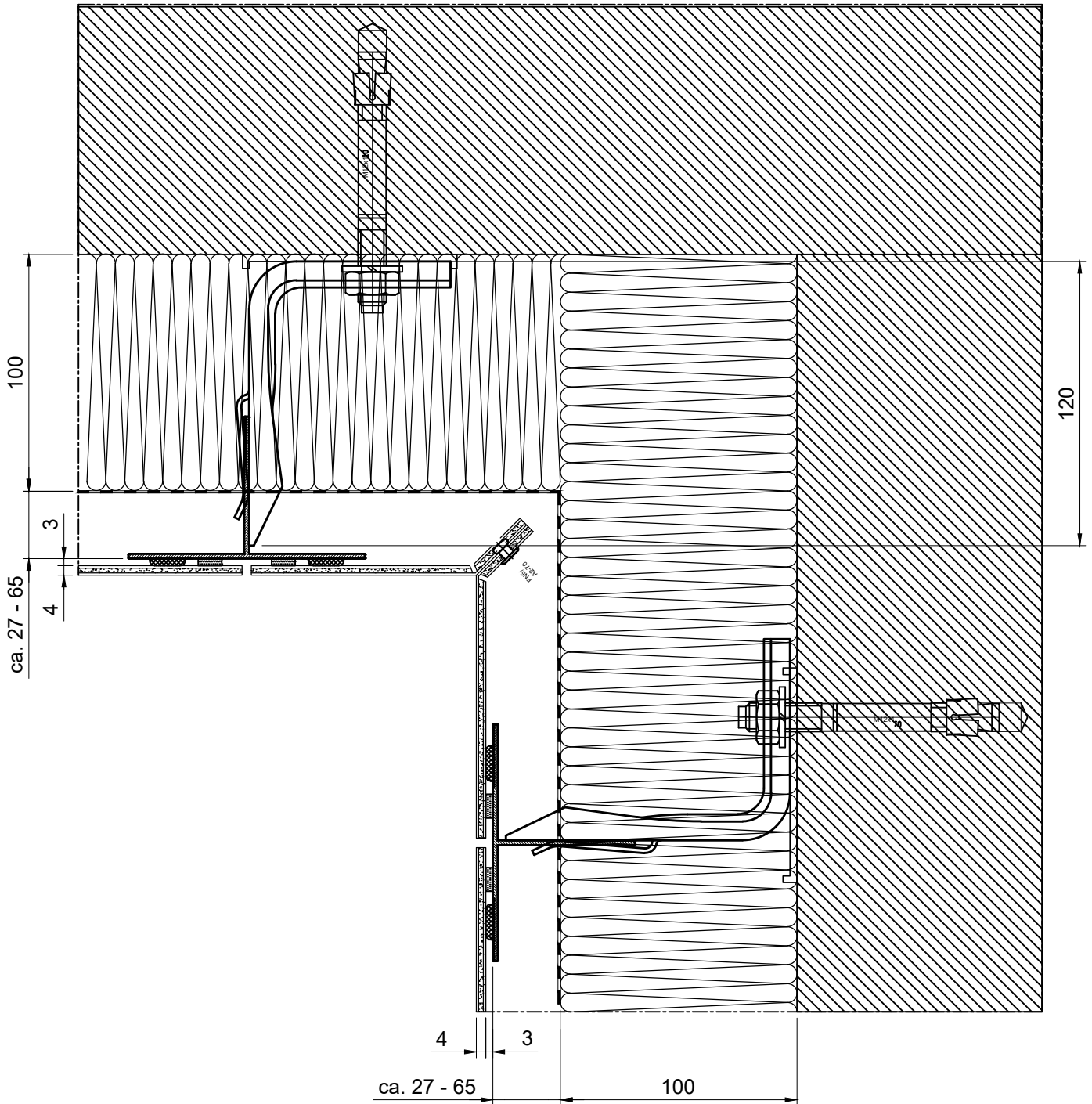


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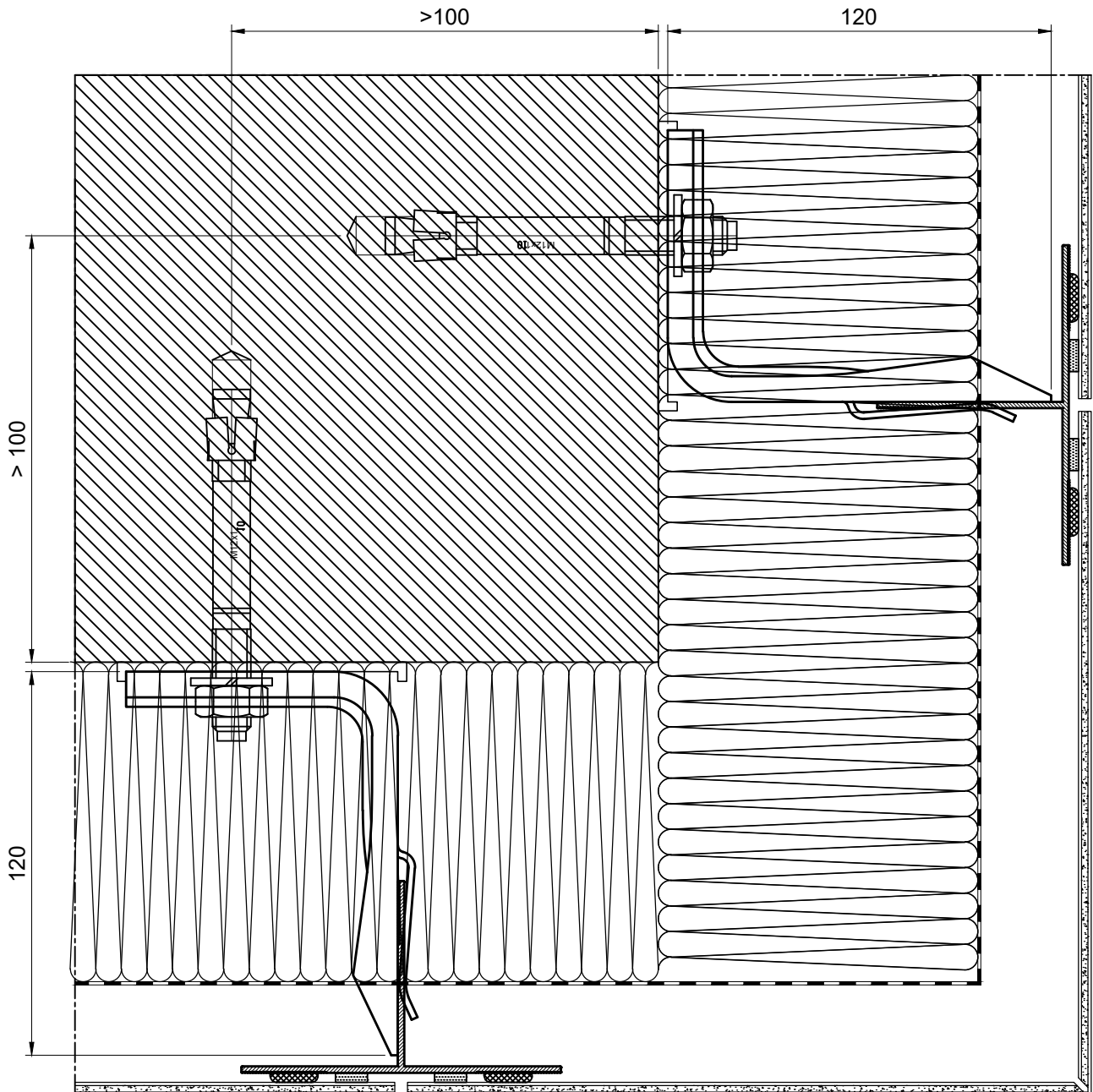


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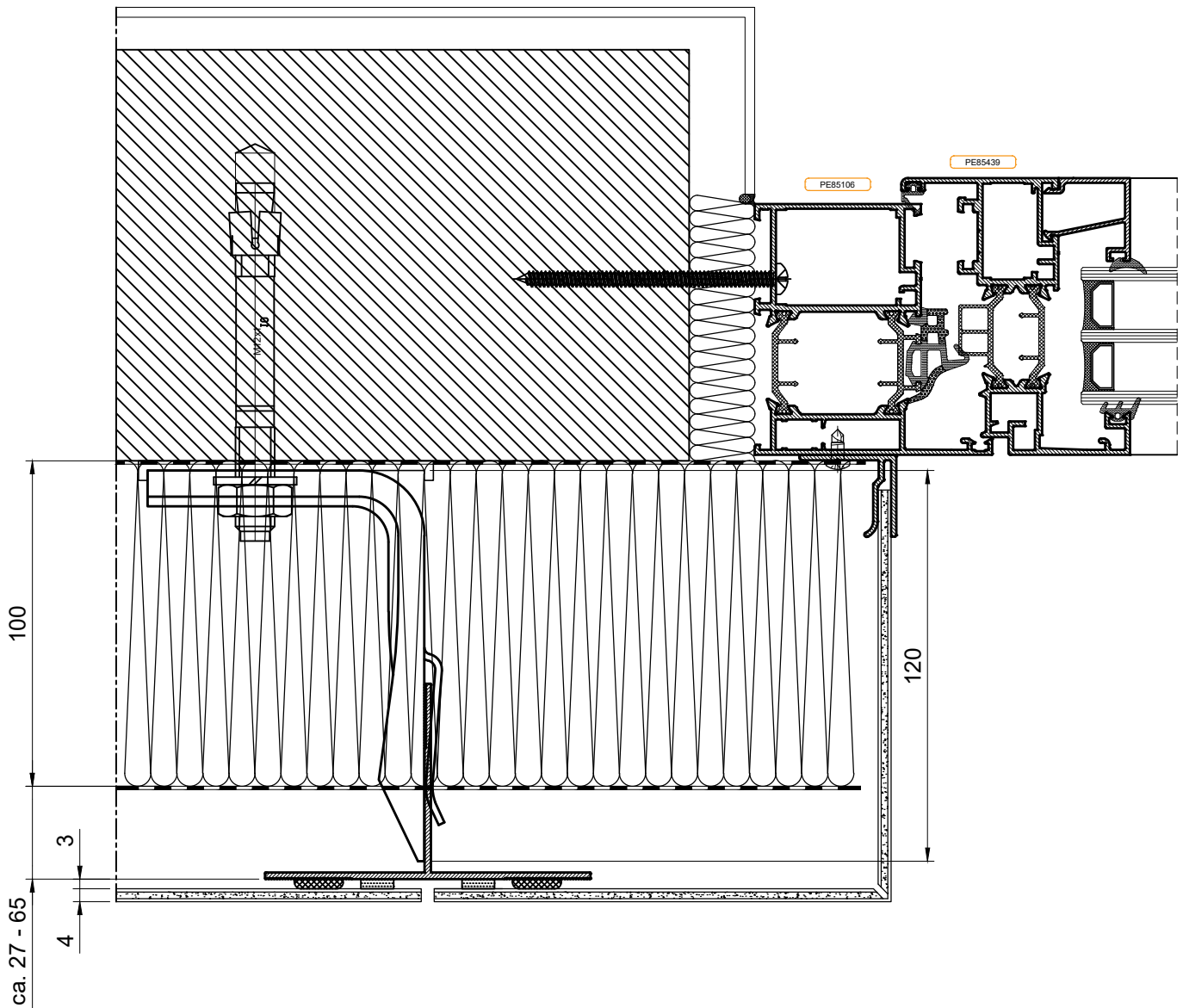
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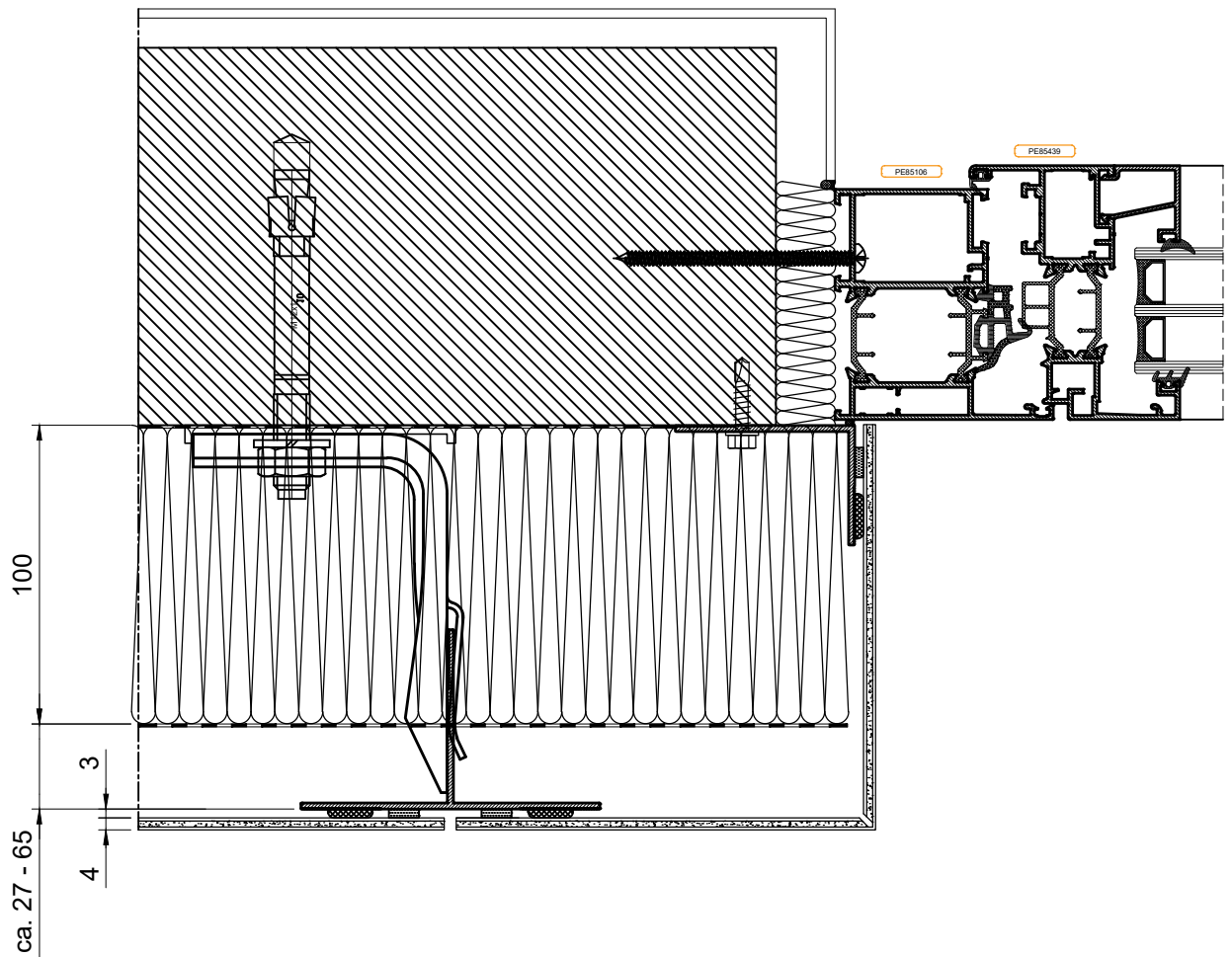
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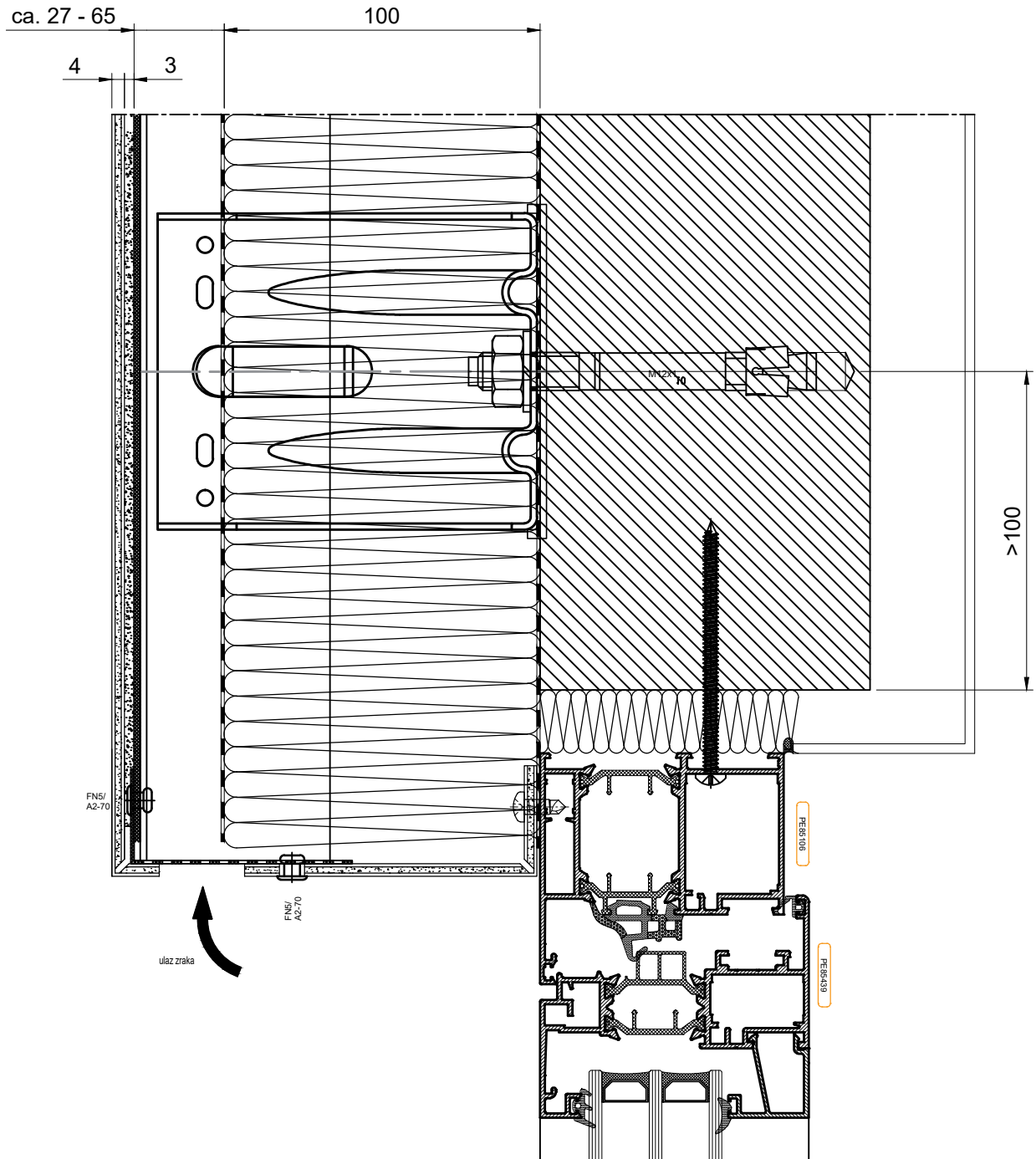
6.1



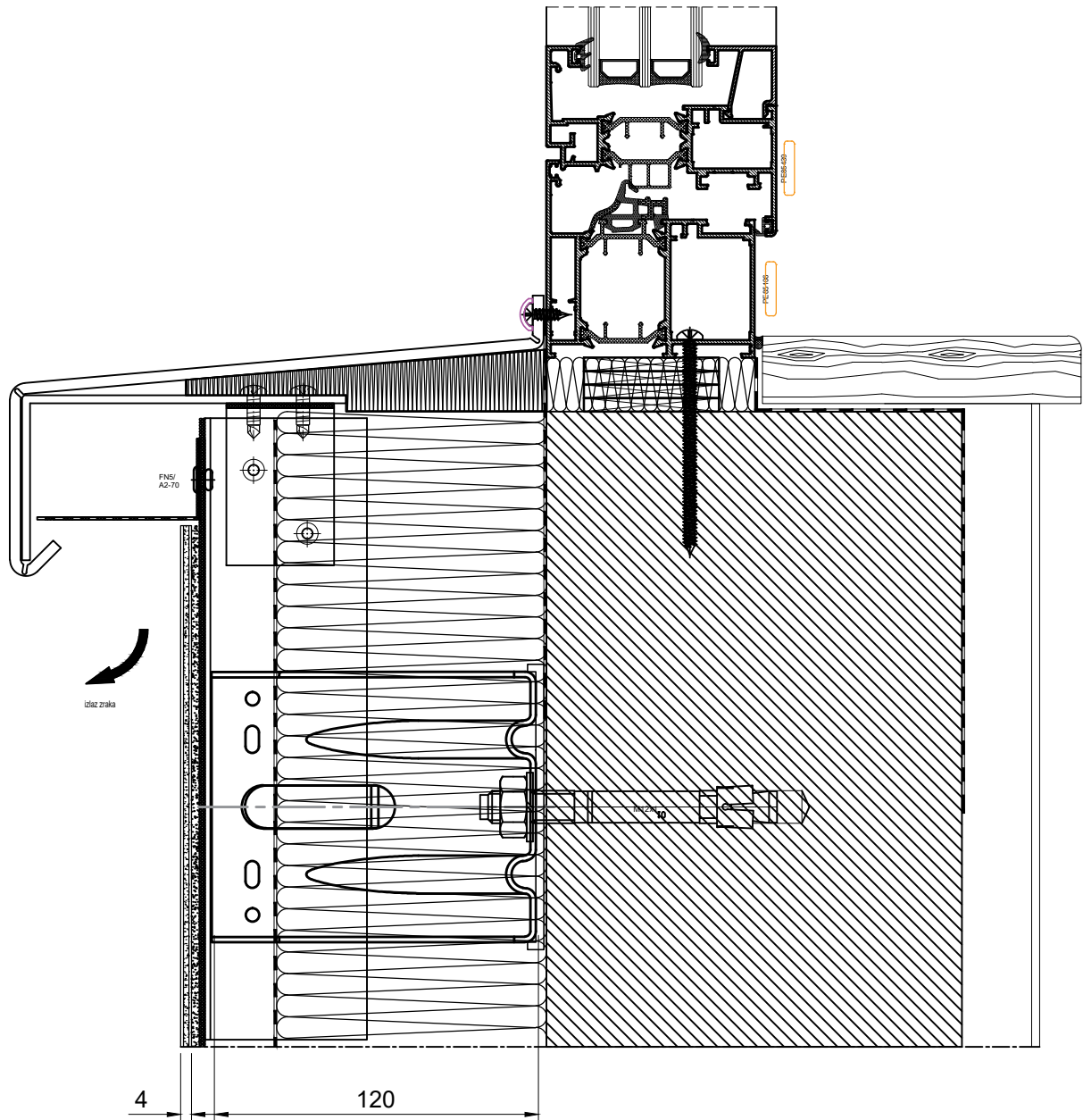
6.2



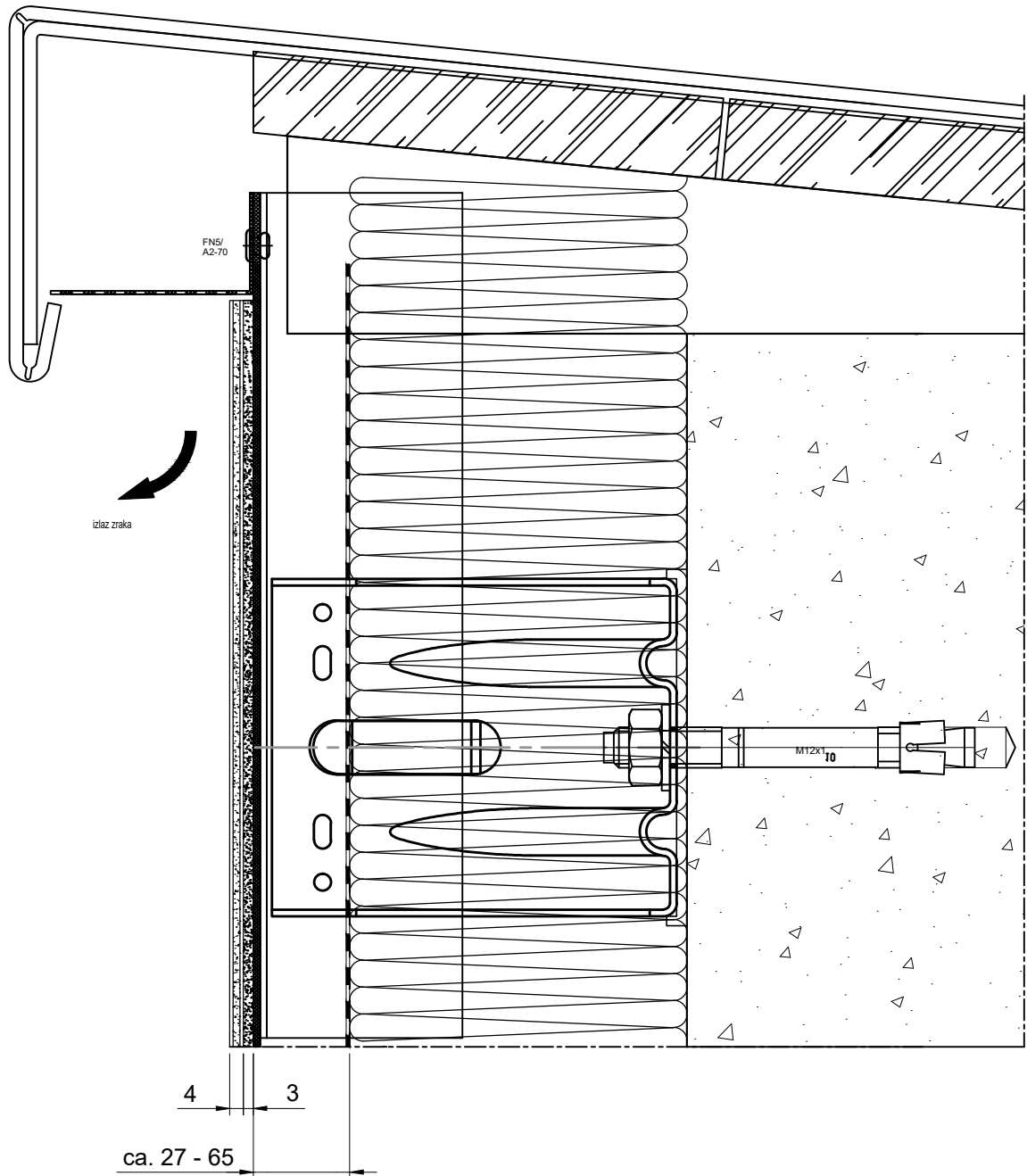
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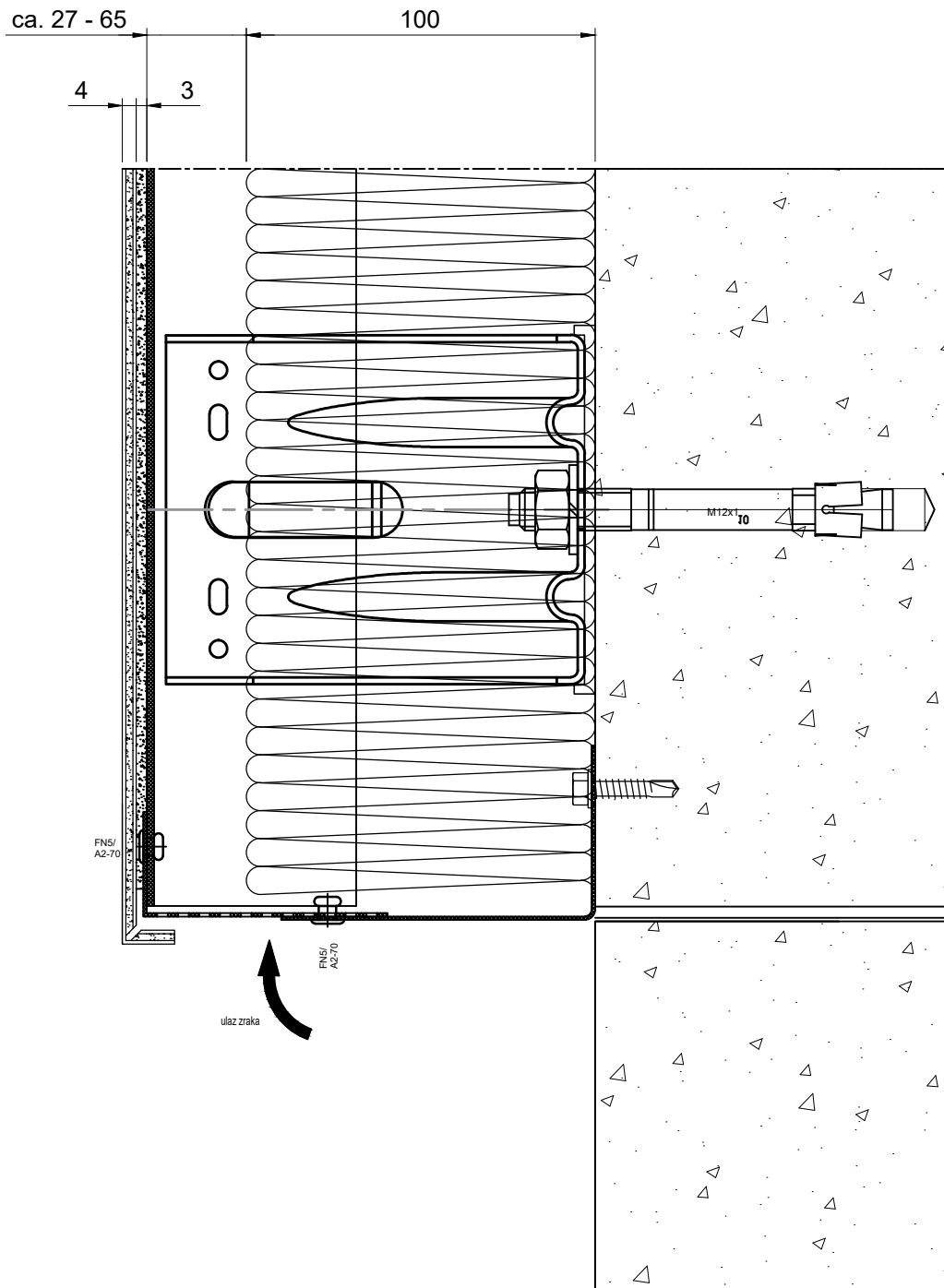
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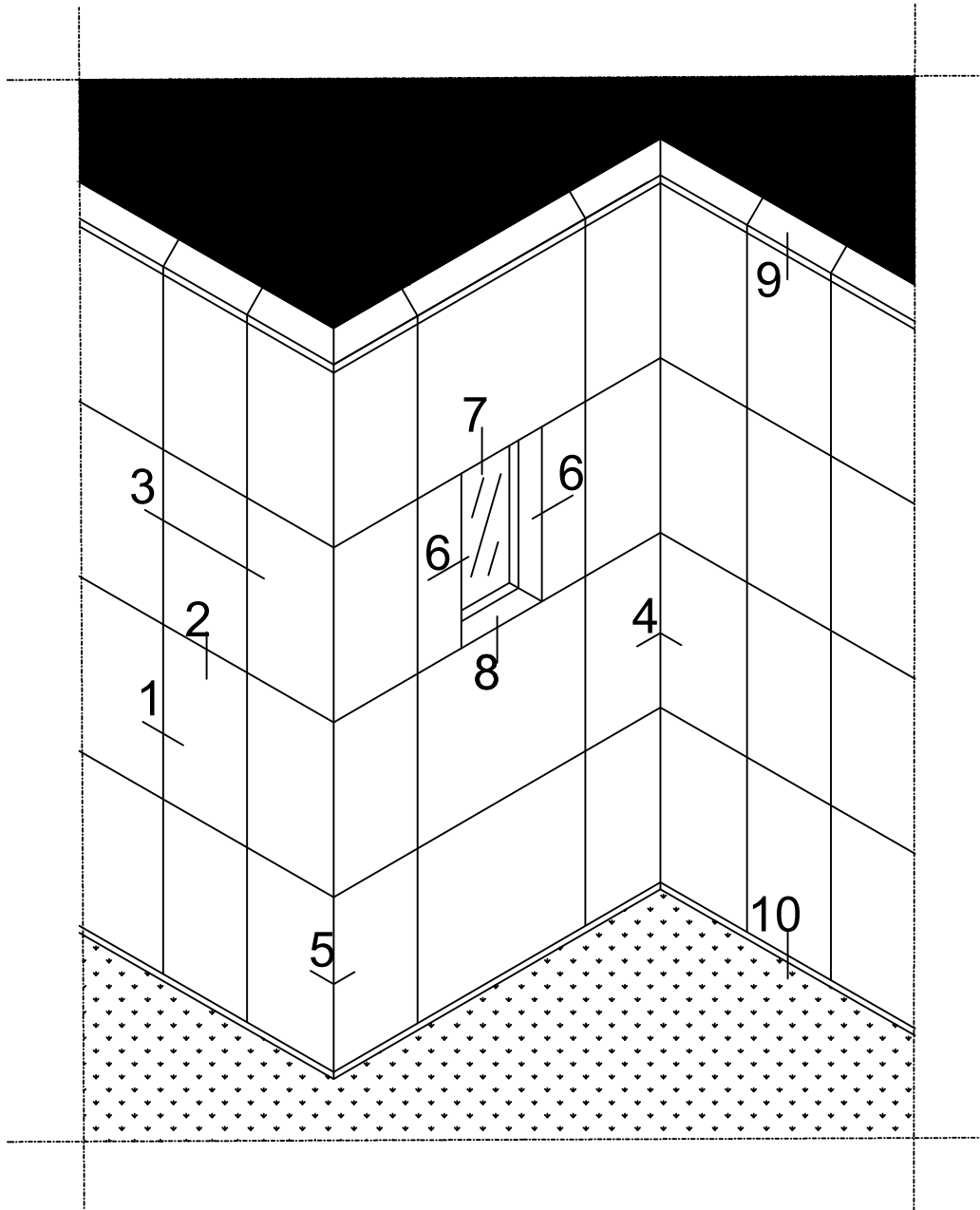
9



10



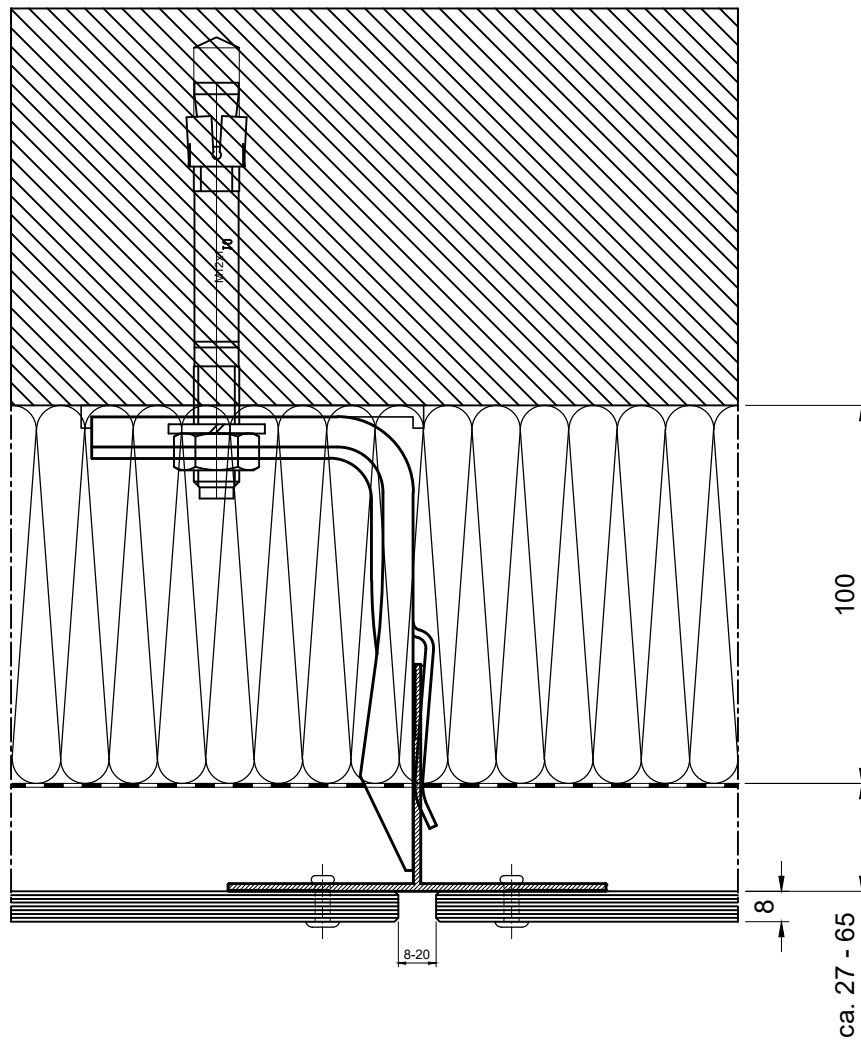
Keramika, Fibercement paneli, HPL/ Ceramic, fibreC,HPL



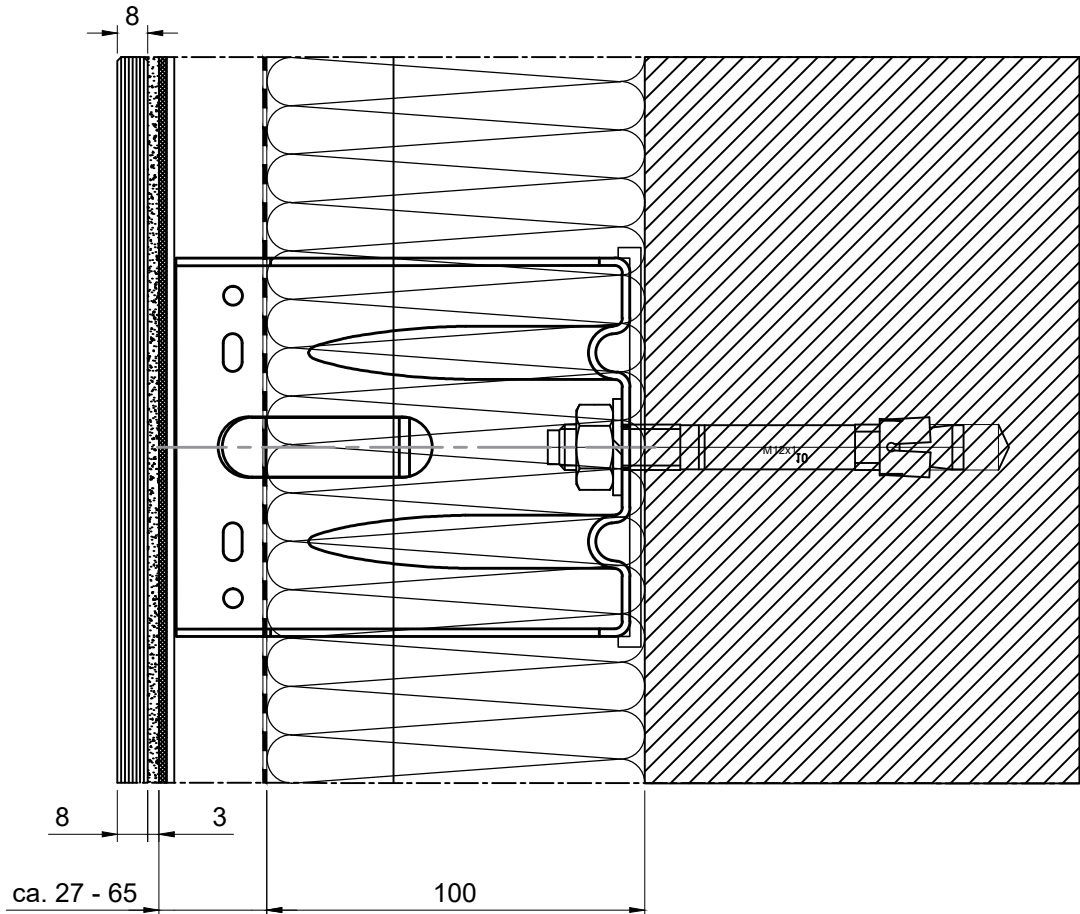
pogled na fasadu / view of cladding

Za montažu panela i razmake pričvršćenja mjerodavne su preporuke proizvođača panela!

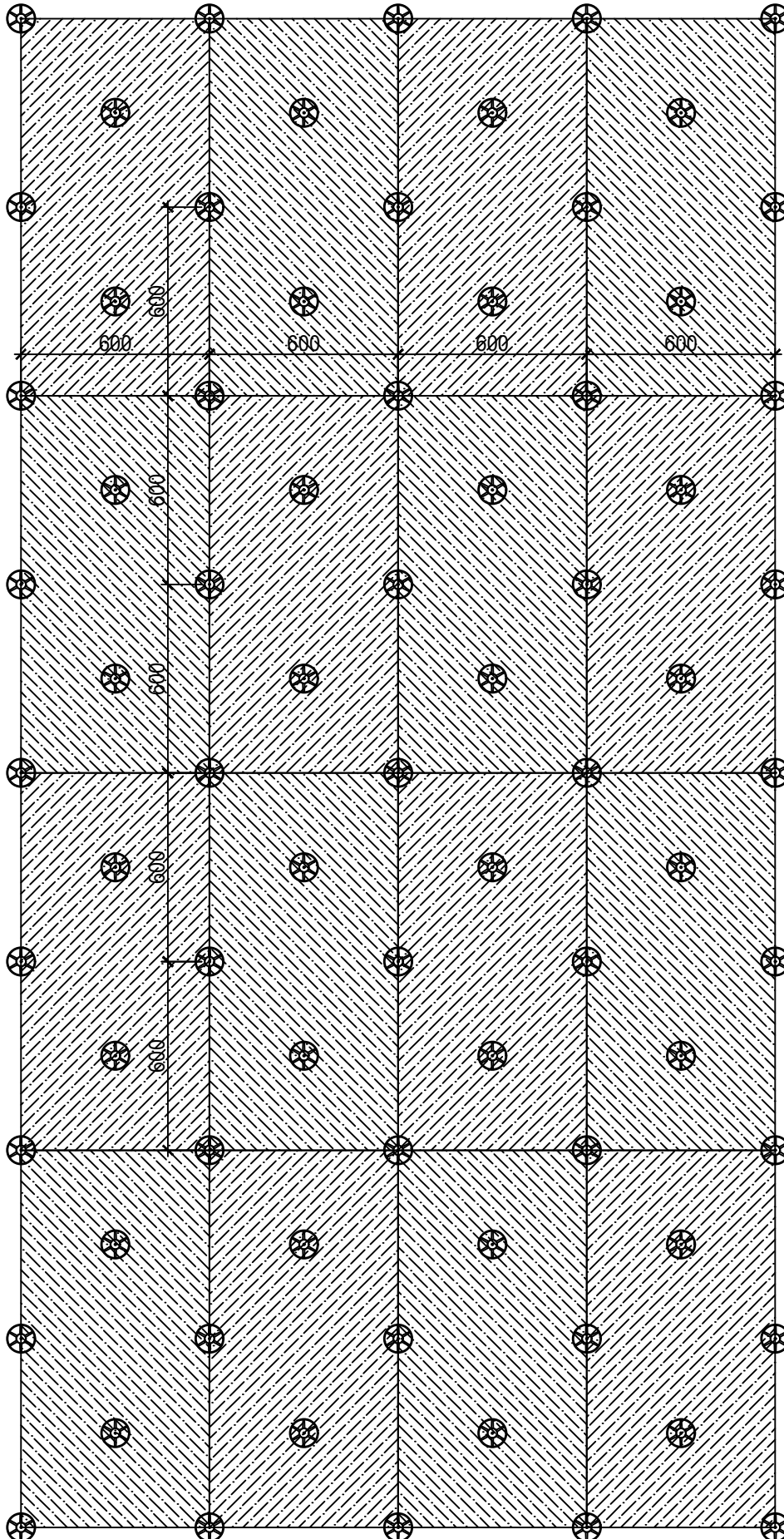
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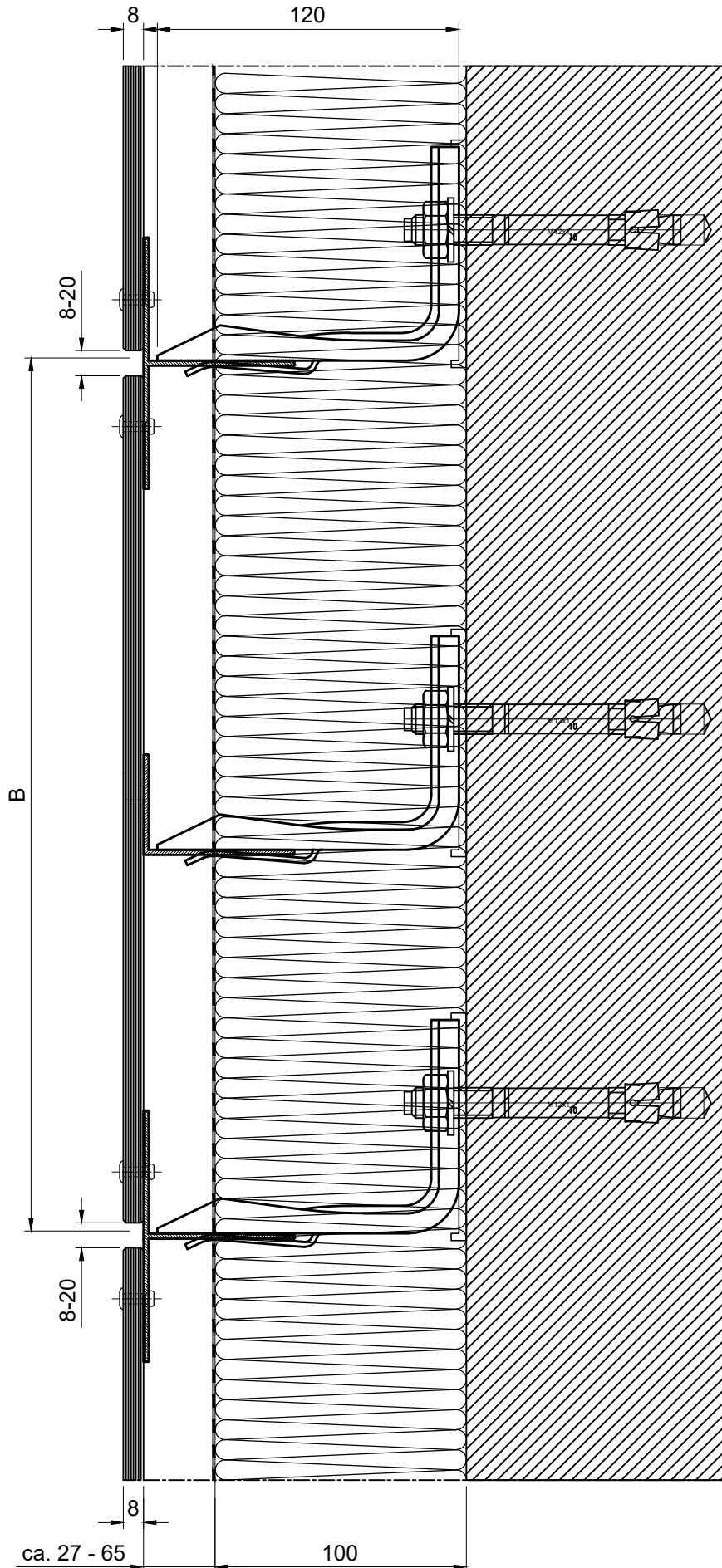
2



POSTAVLJANJE IZOLACIJE

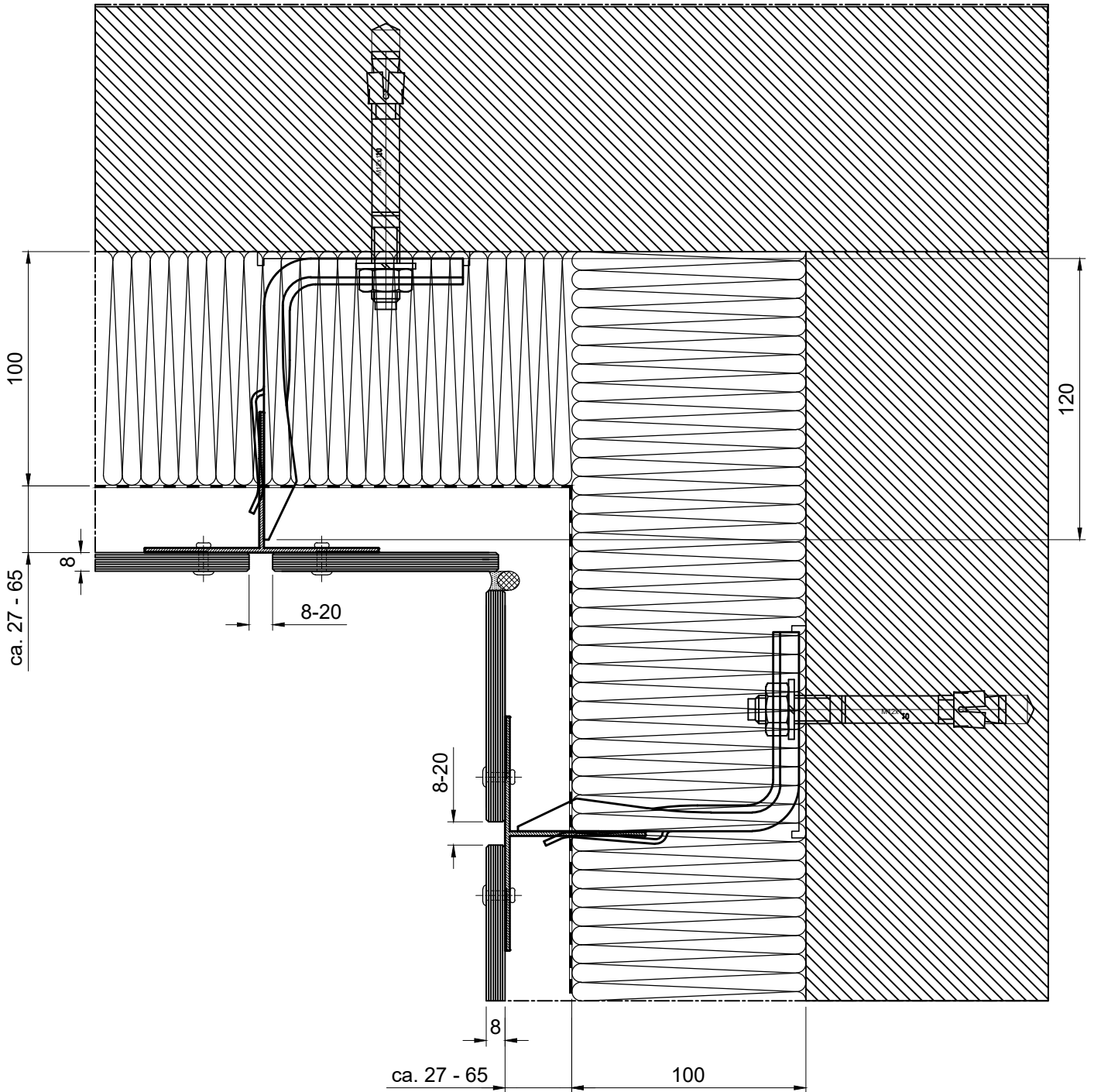


B - prema statičkom proračunu, ali ne više od 1200mm/B - according to structural analysis, but no more than 1200mm

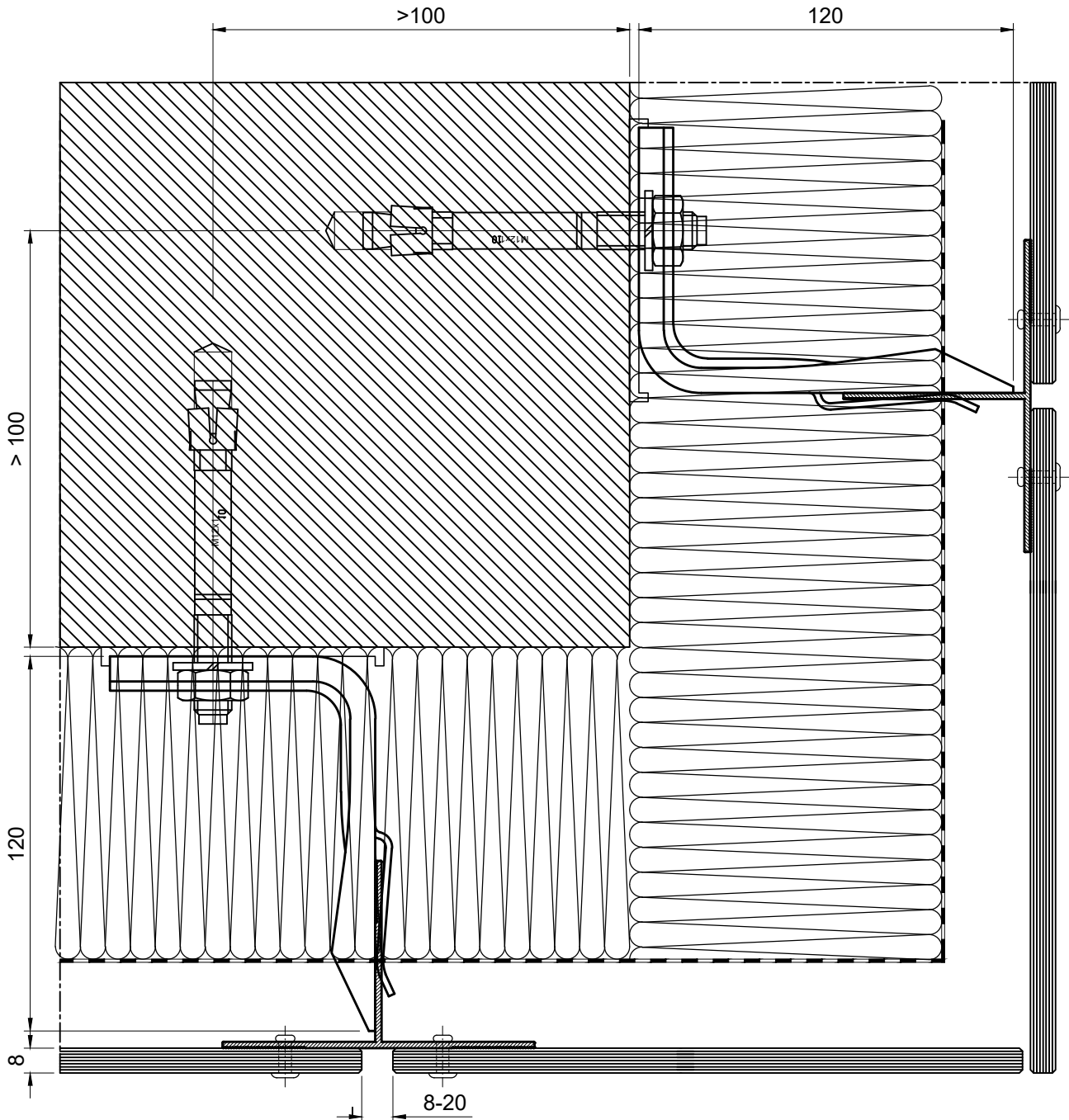


3

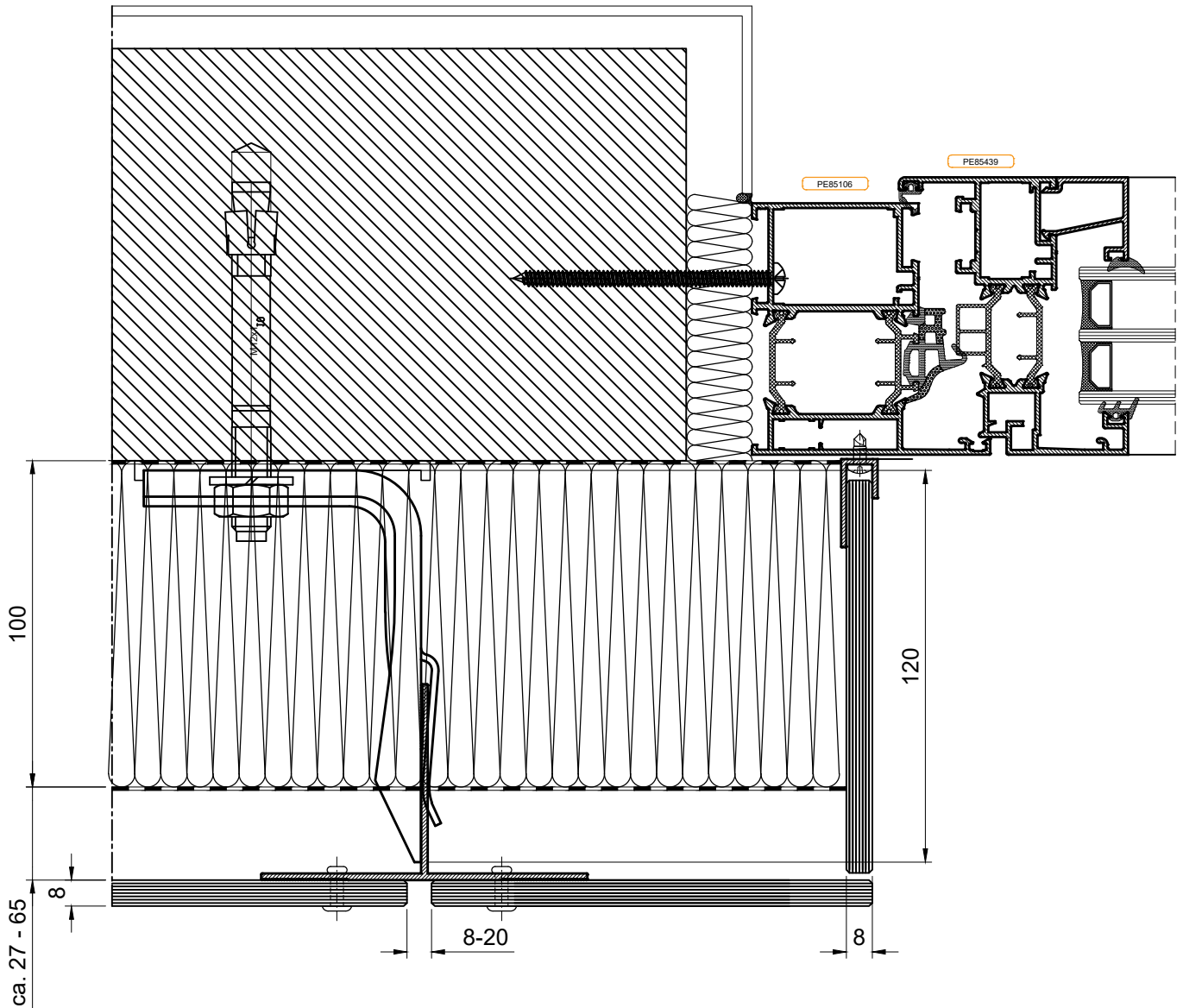
4



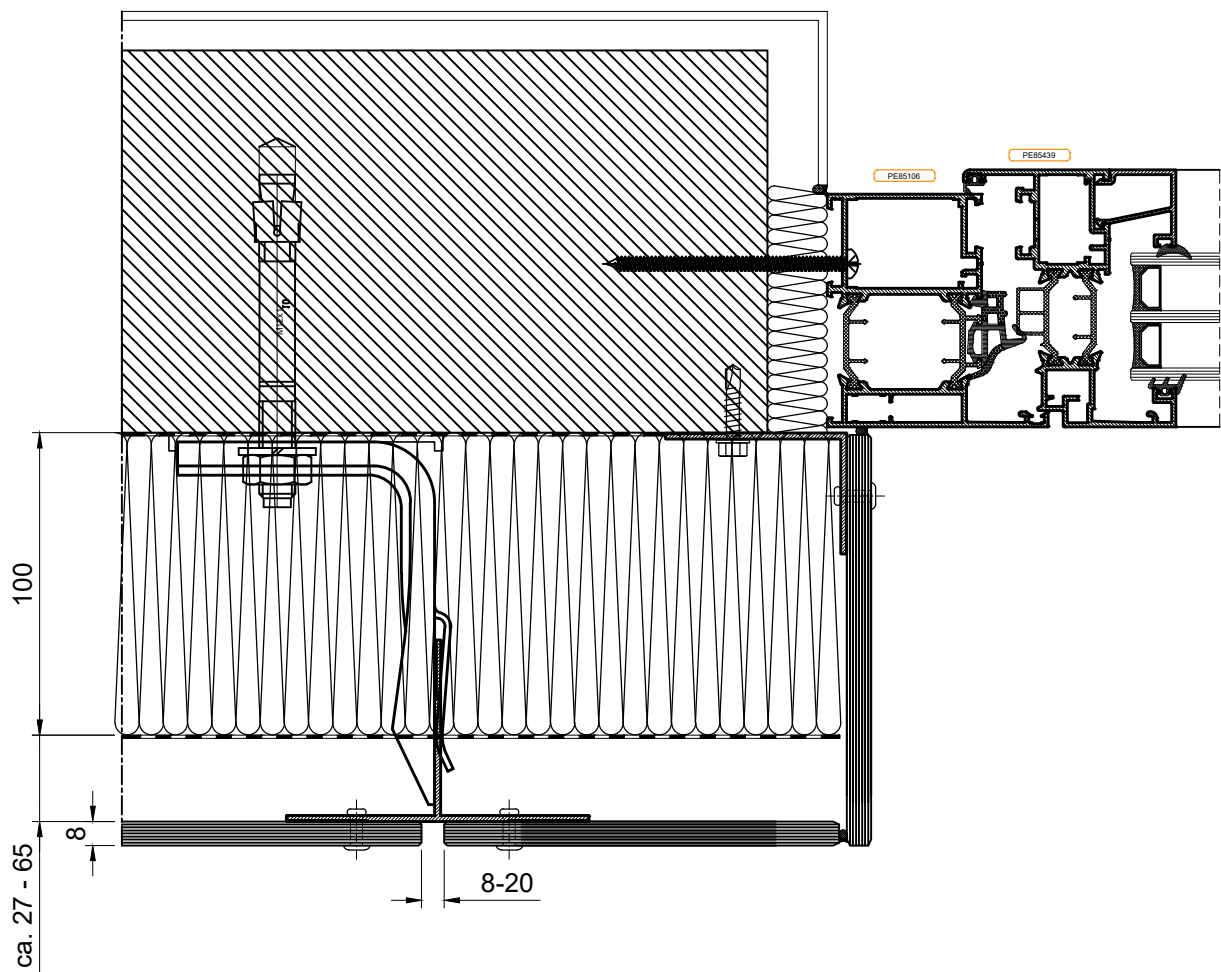
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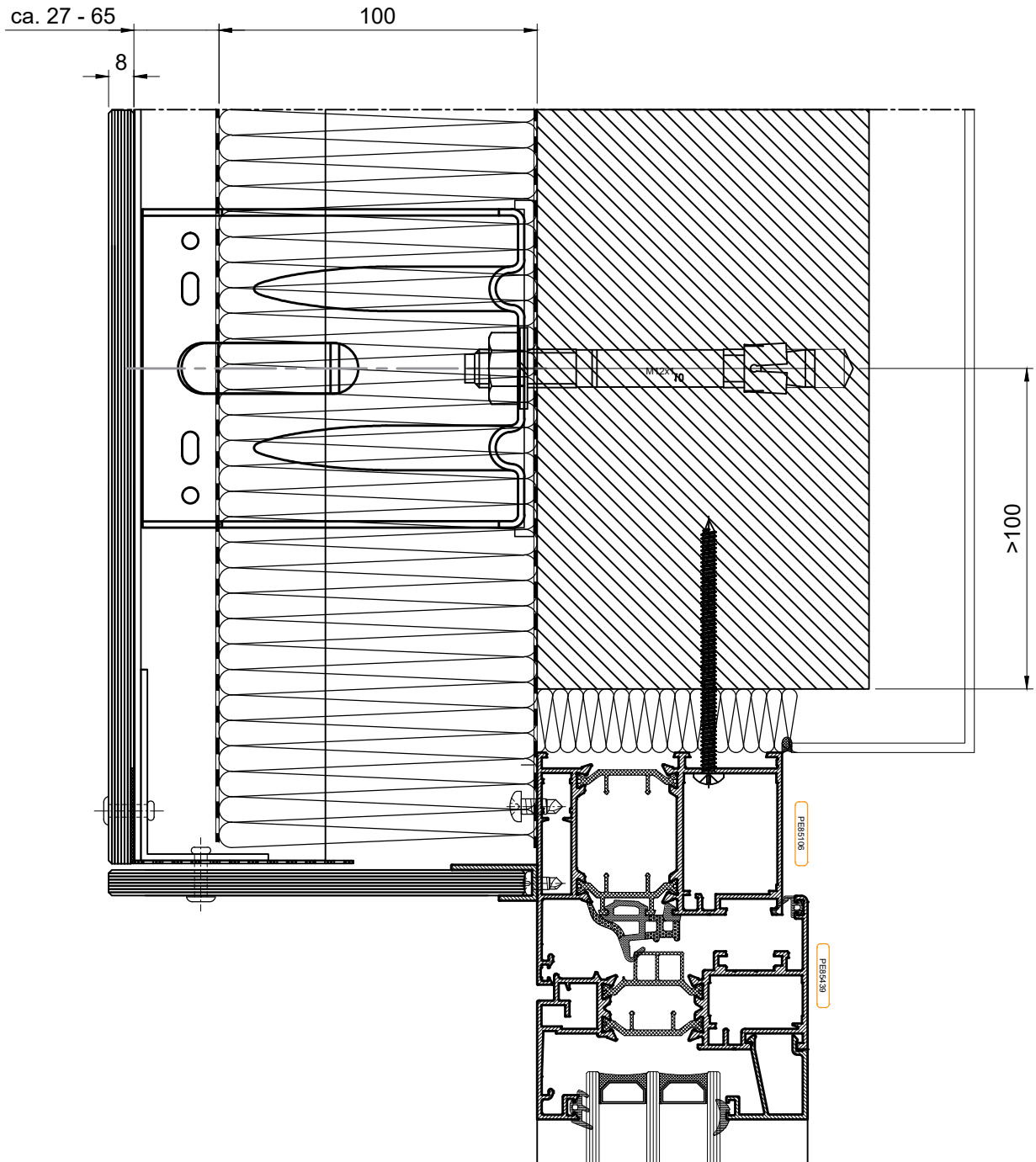
6.1



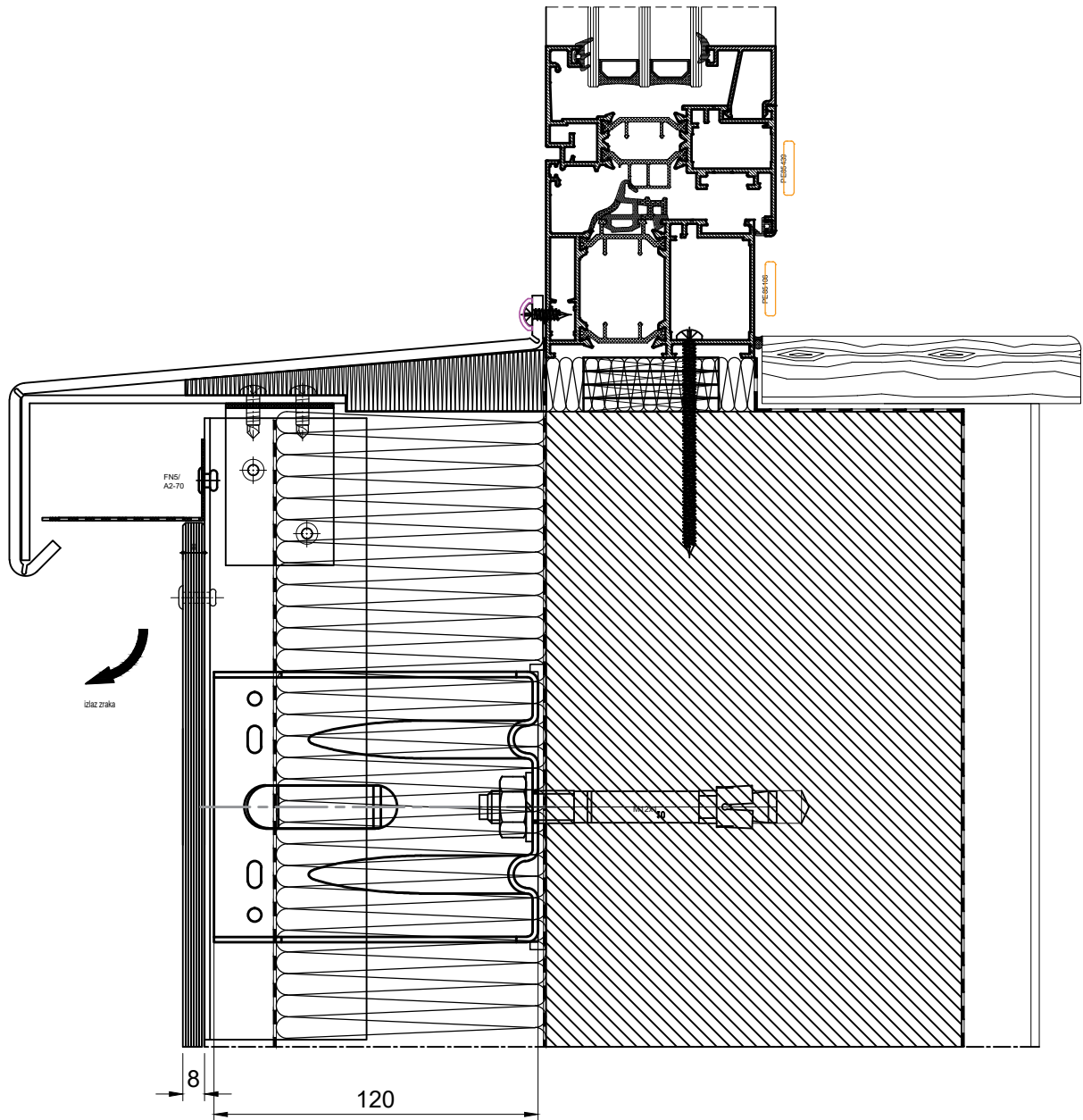
6.2



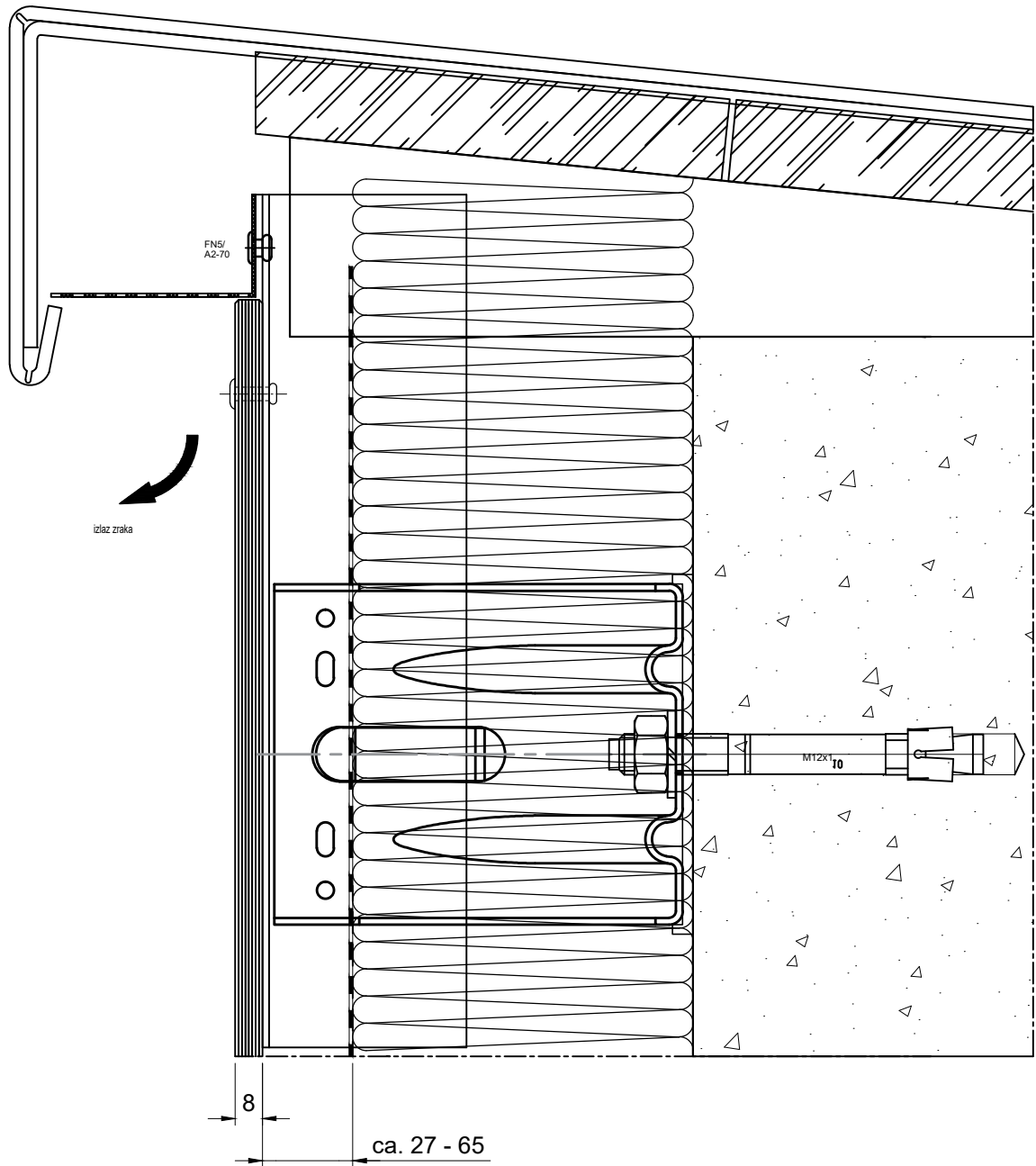
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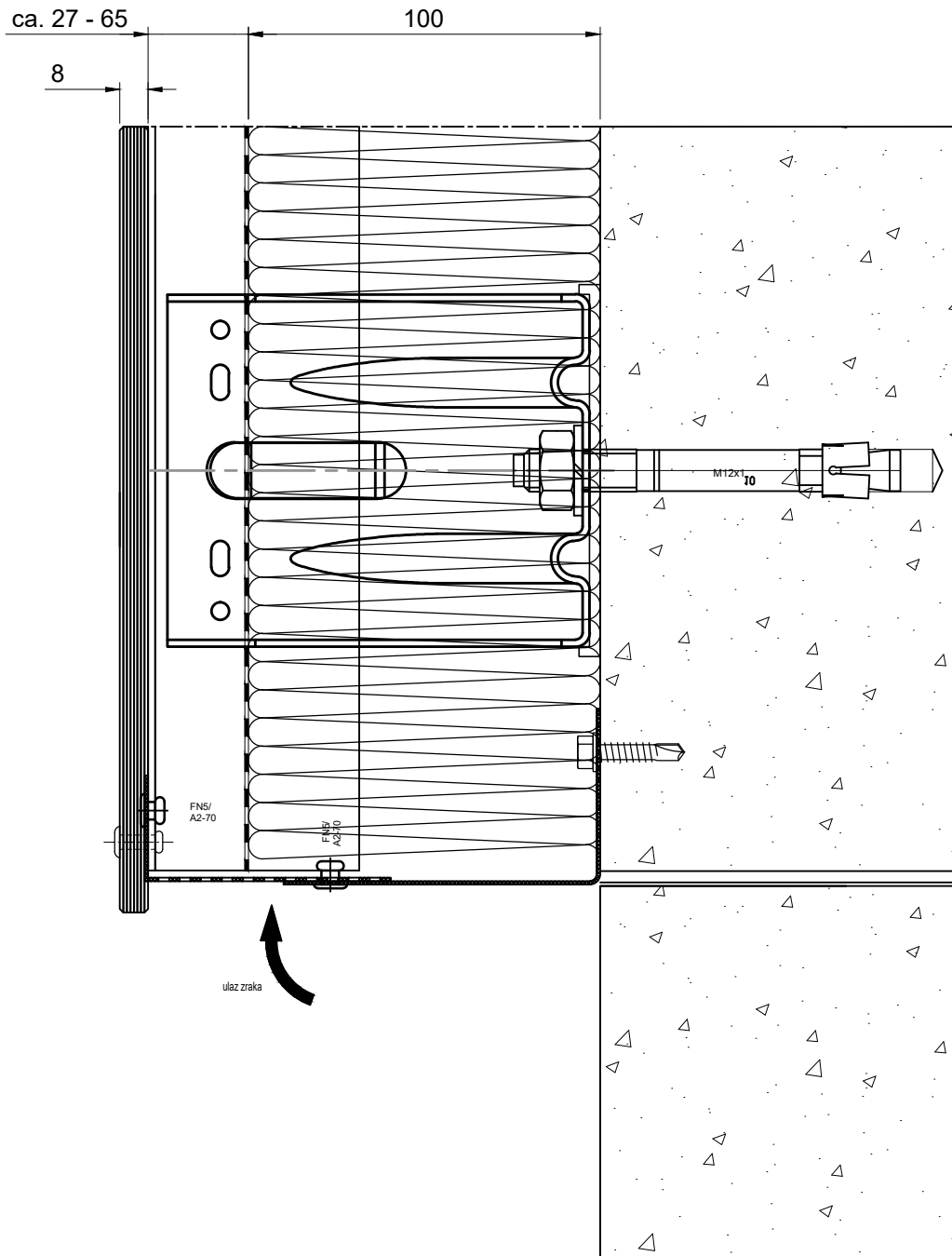
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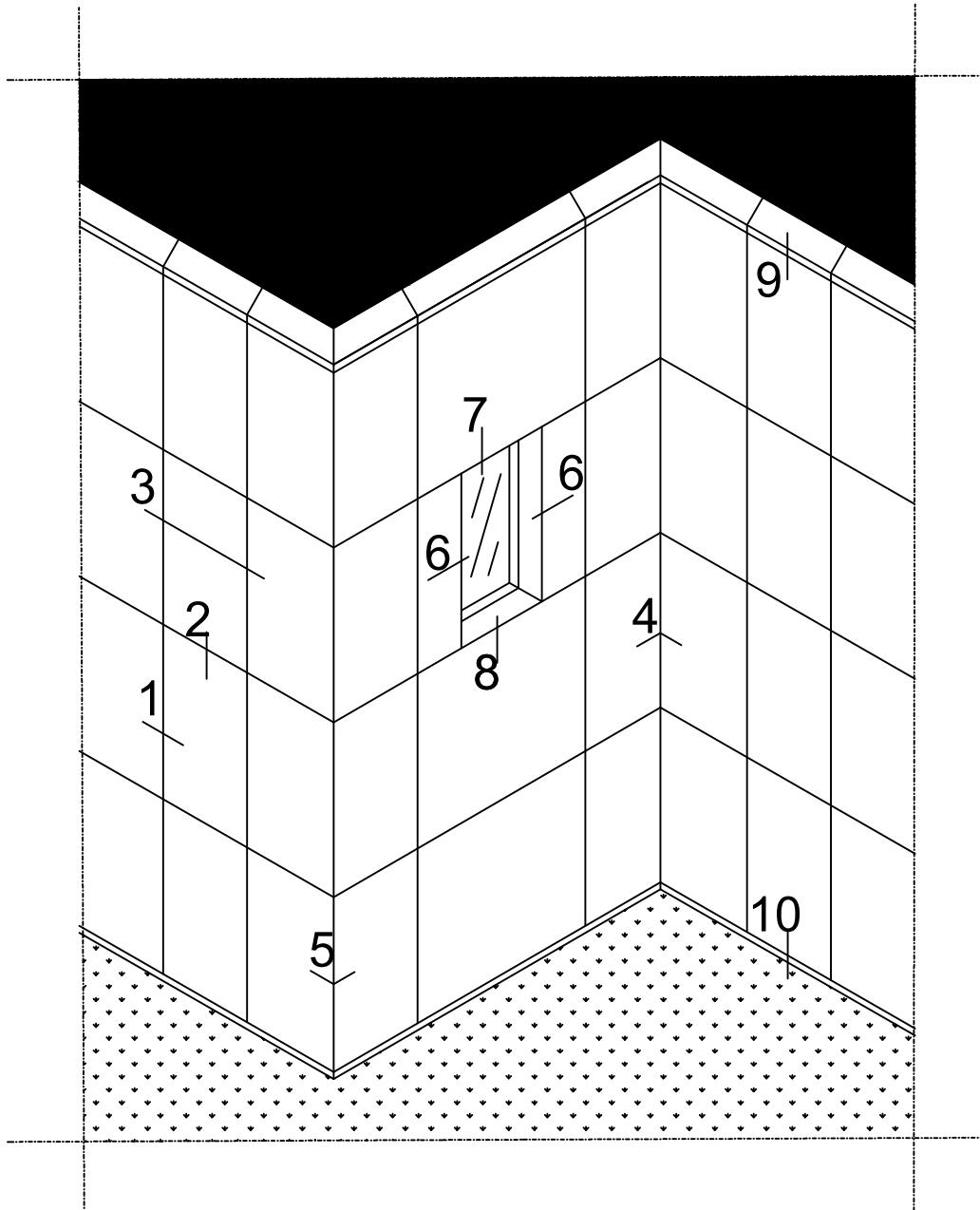
9



10



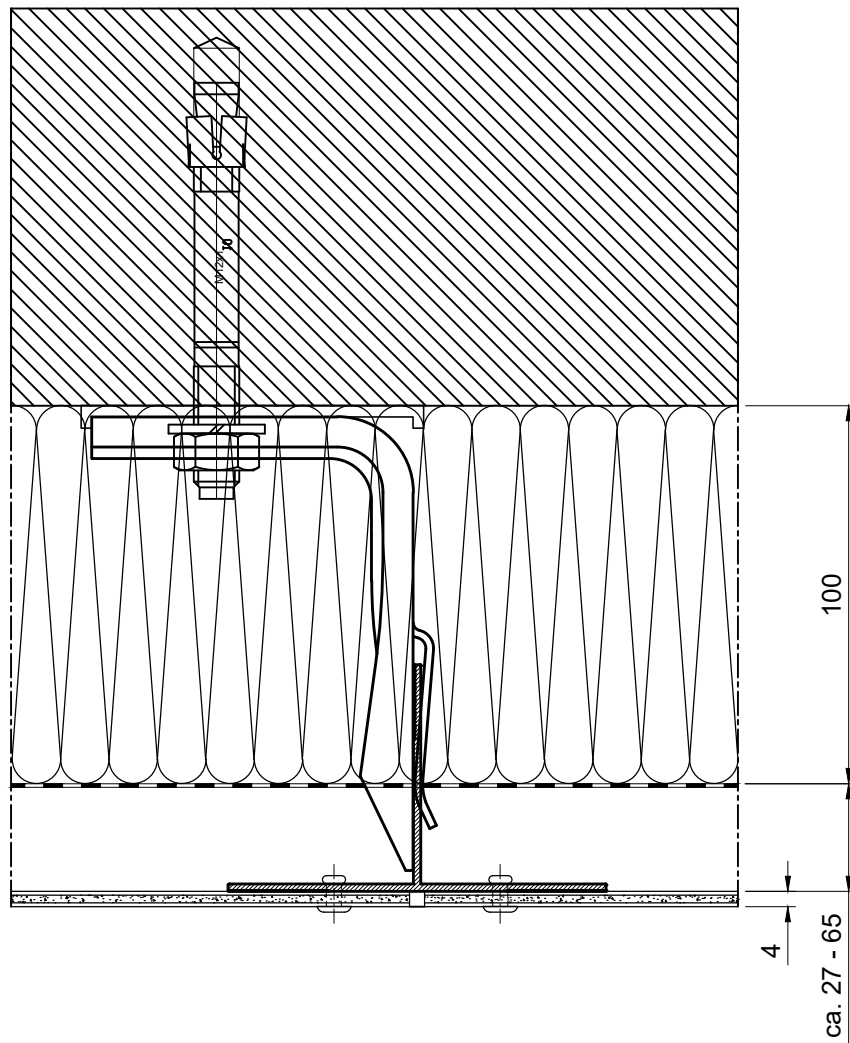
Aluminijumski kompozitni panel/ Aluminium composite panel



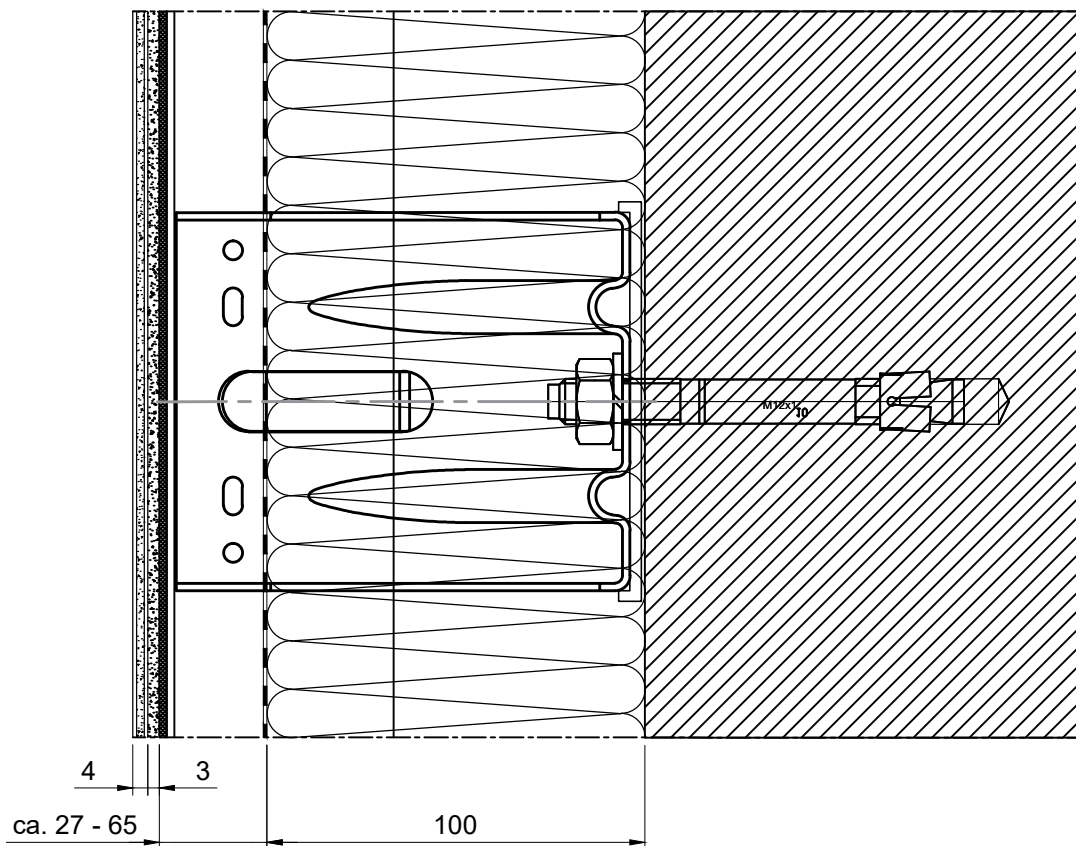
pogled na fasadu / view of cladding

Za montažu panela i razmake pričvršćenja mjerodavne su preporuke proizvođača panela!

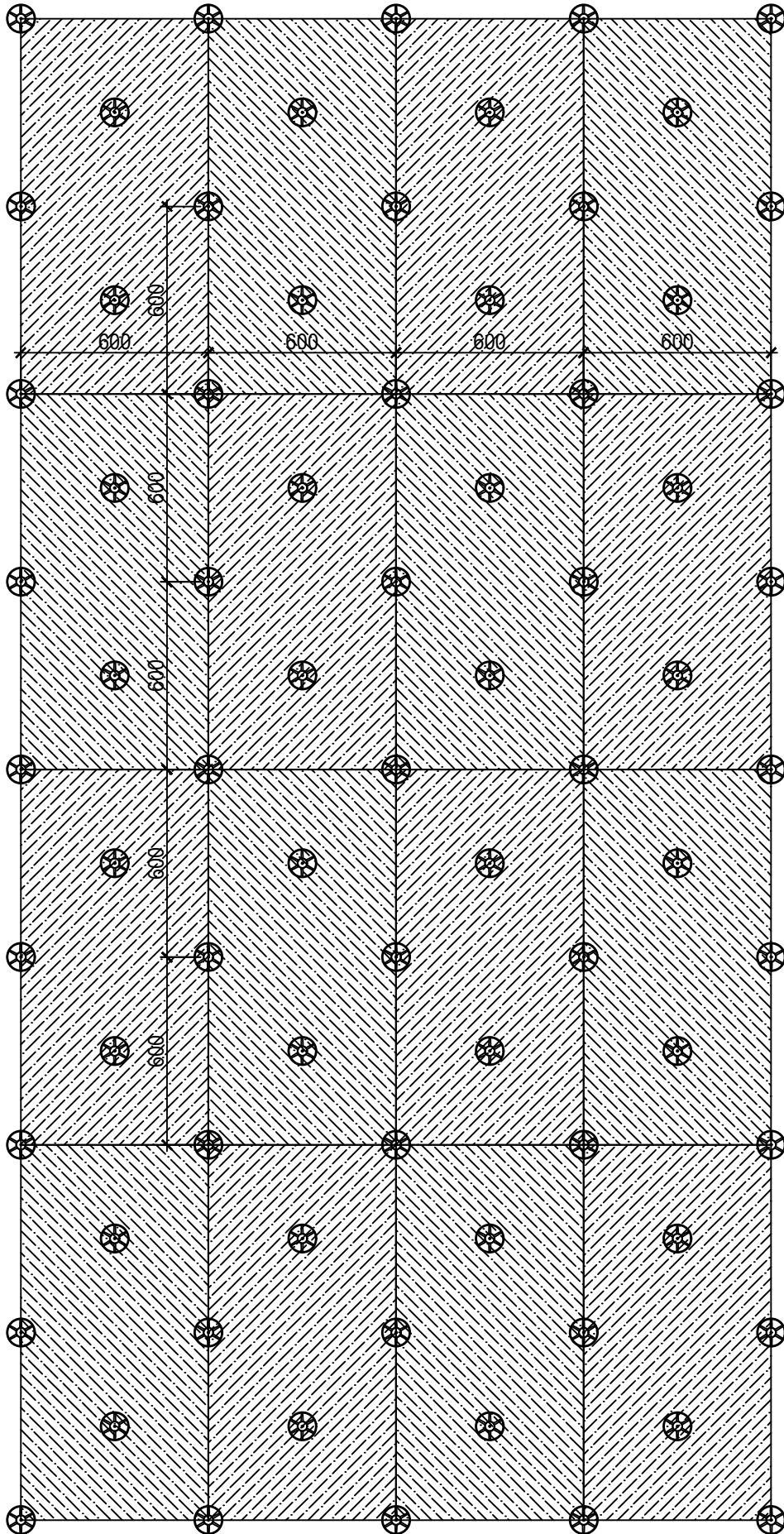
1



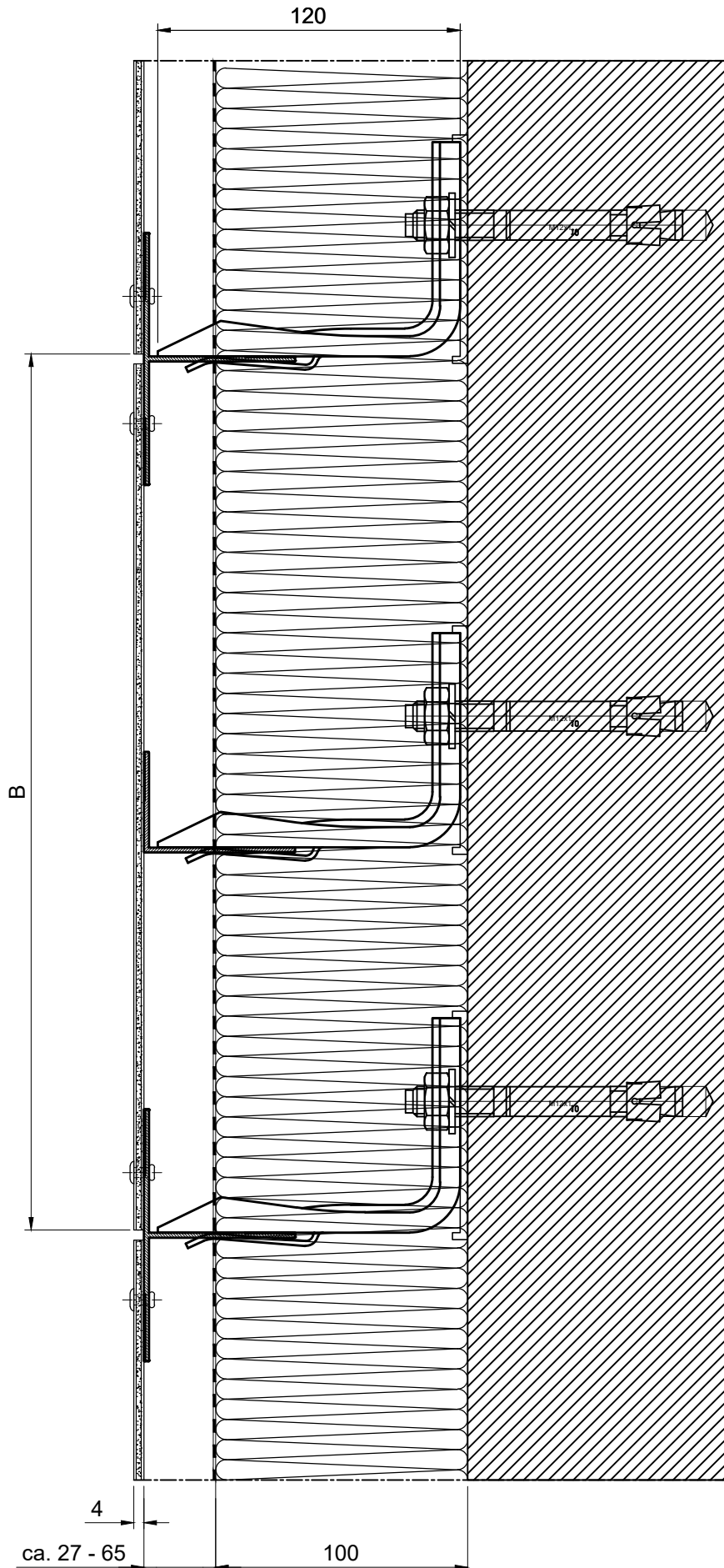
2



POSTAVLJANJE IZOLACIJE

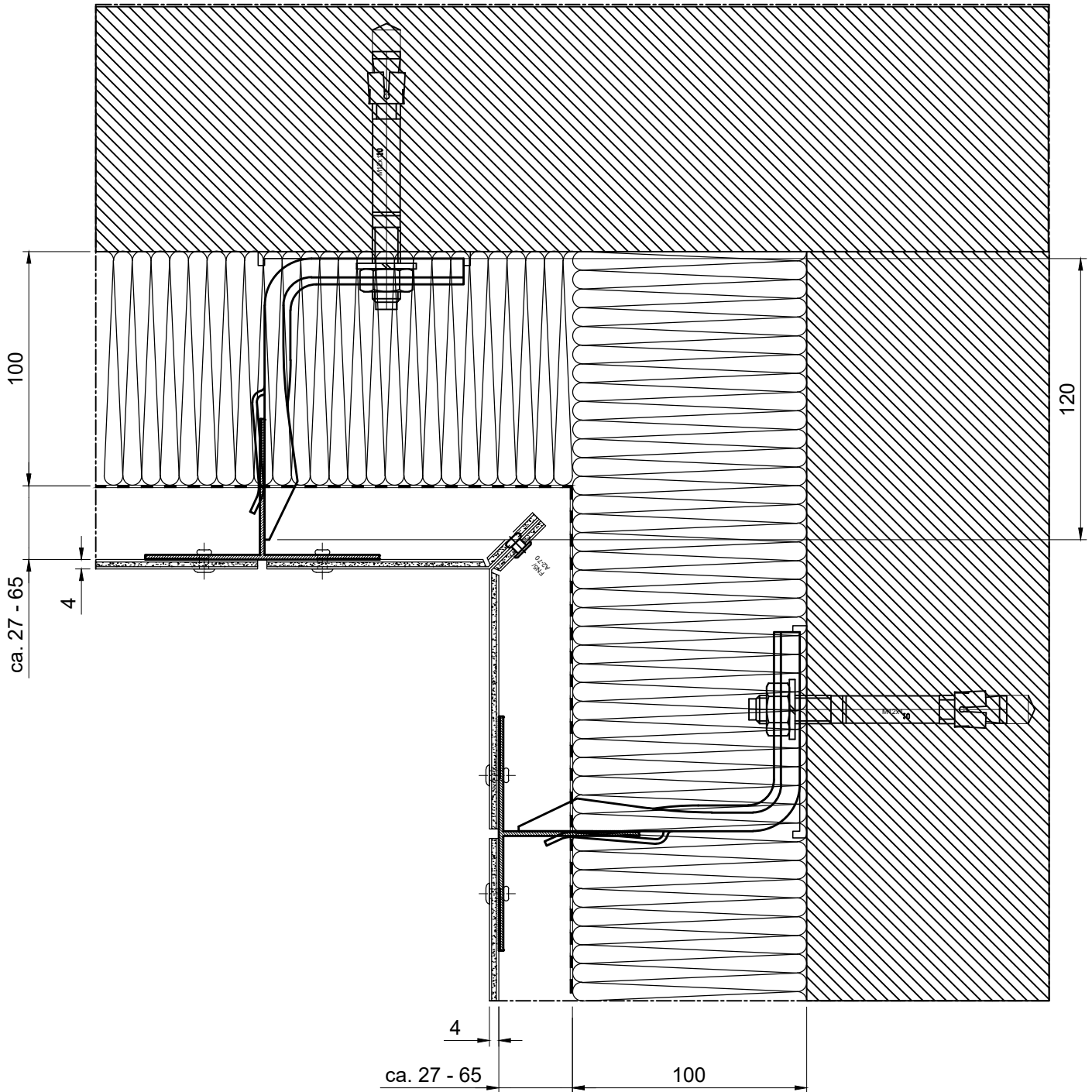


B - prema statičkom proračunu, ali ne više od 1200mm/B - according to structural analysis, but no more than 1200mm

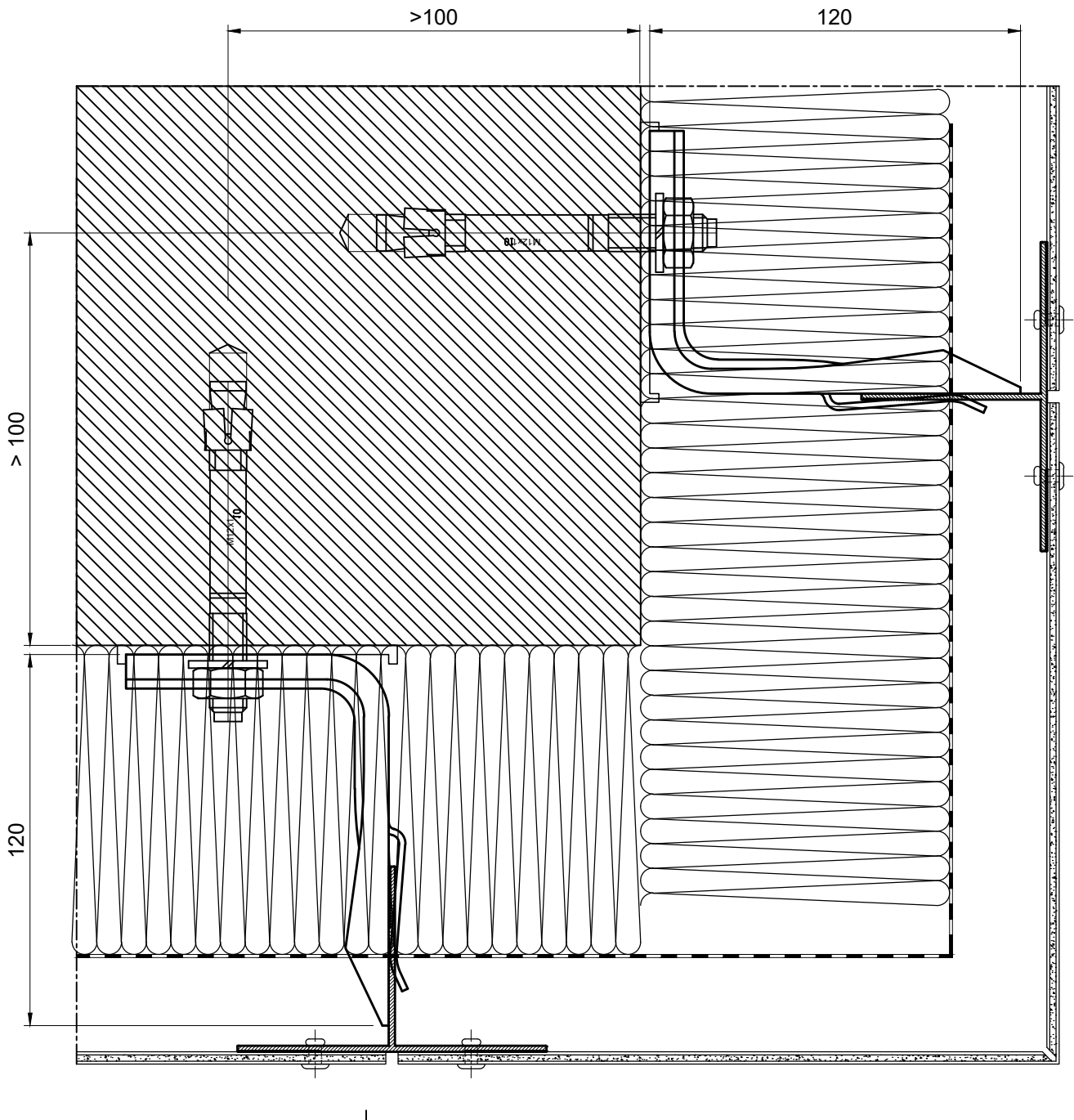


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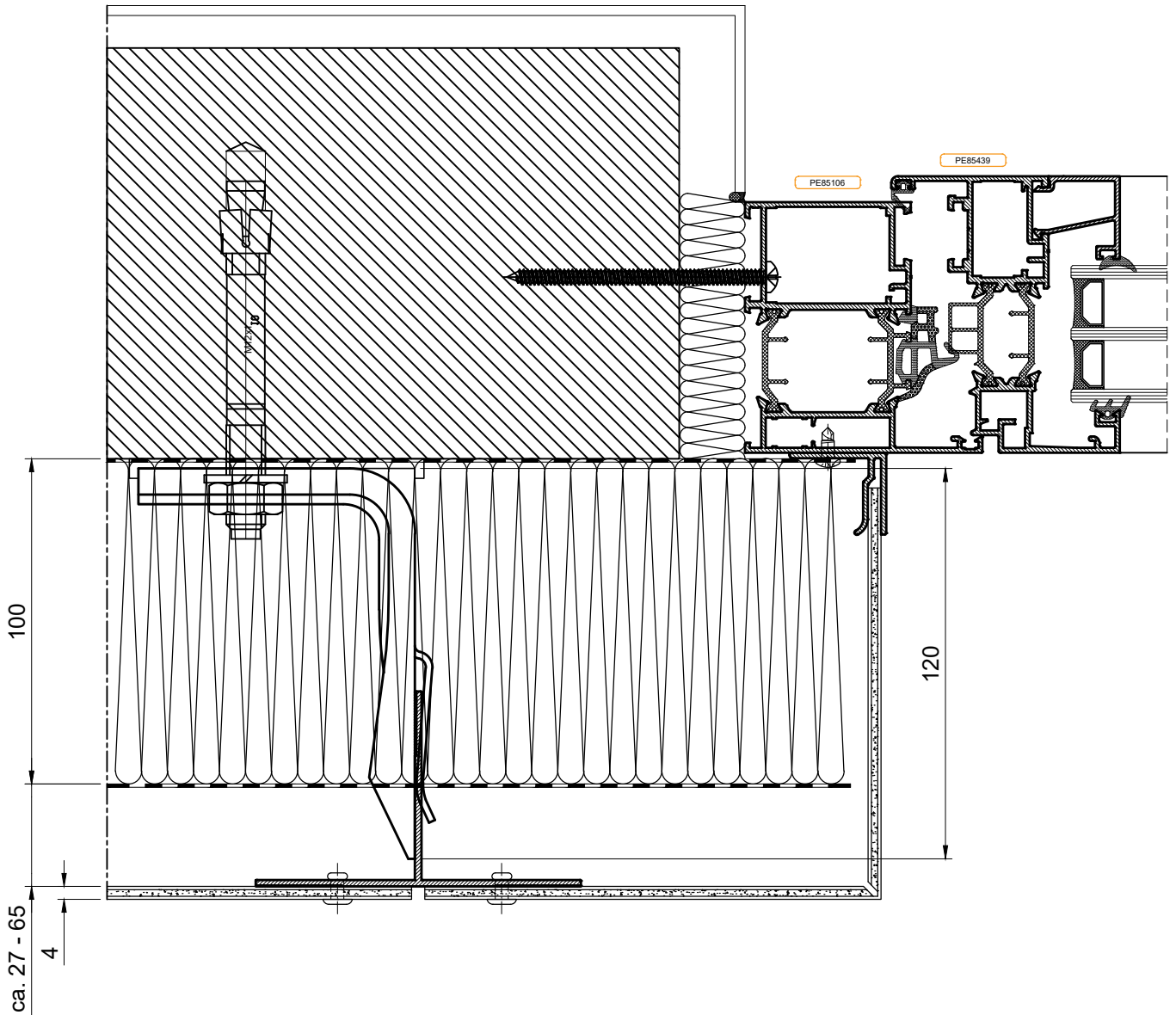
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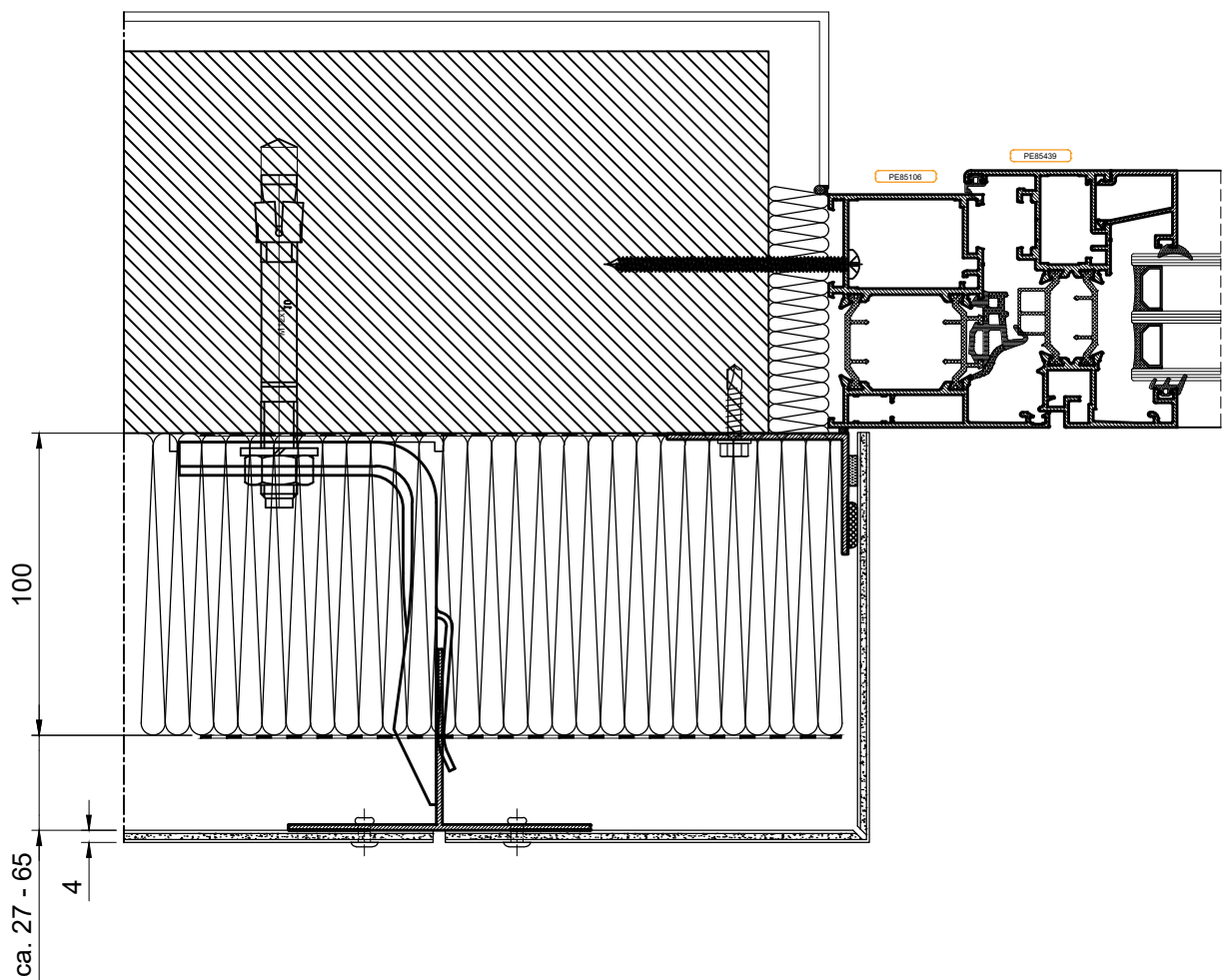
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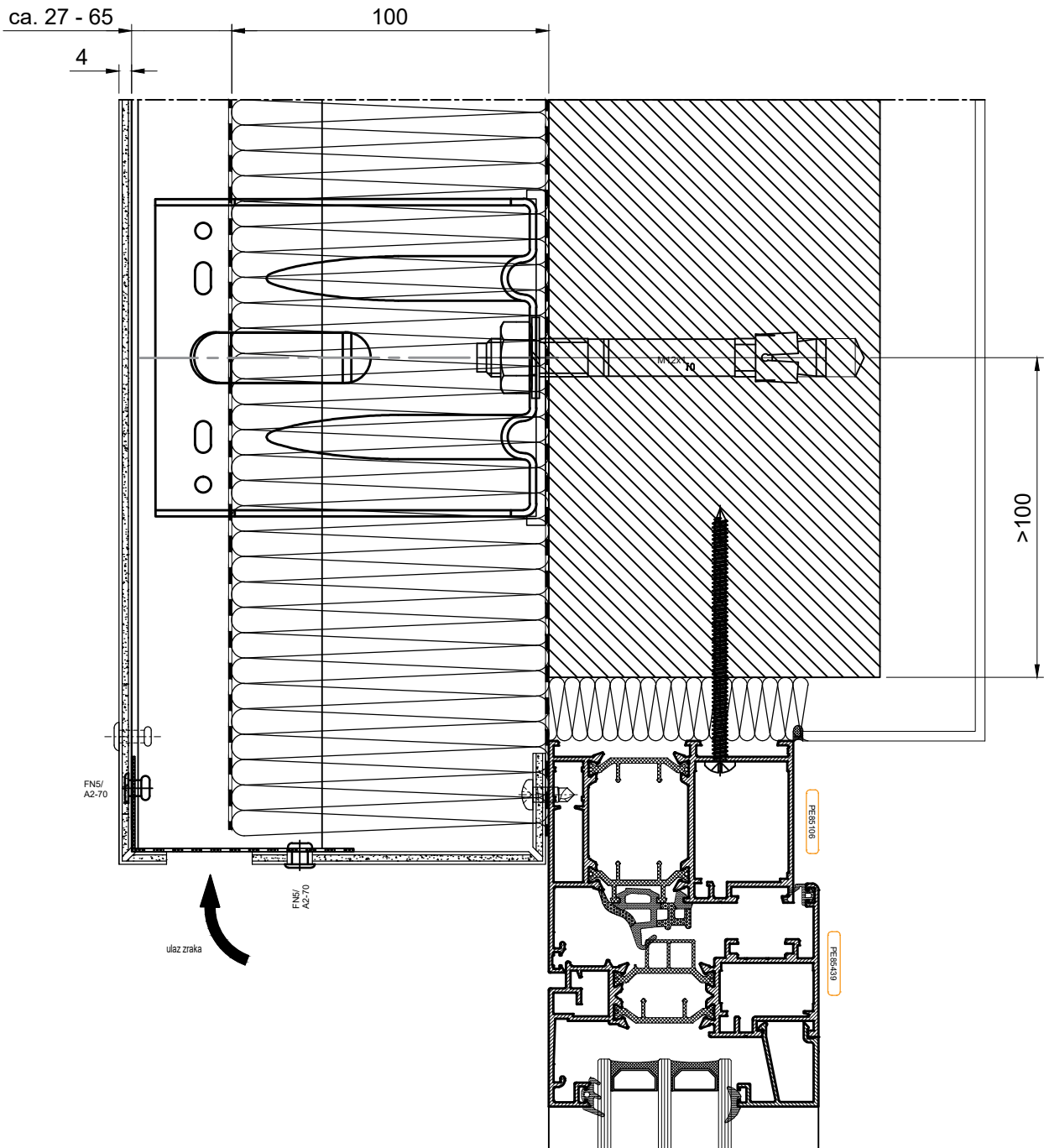
6.1



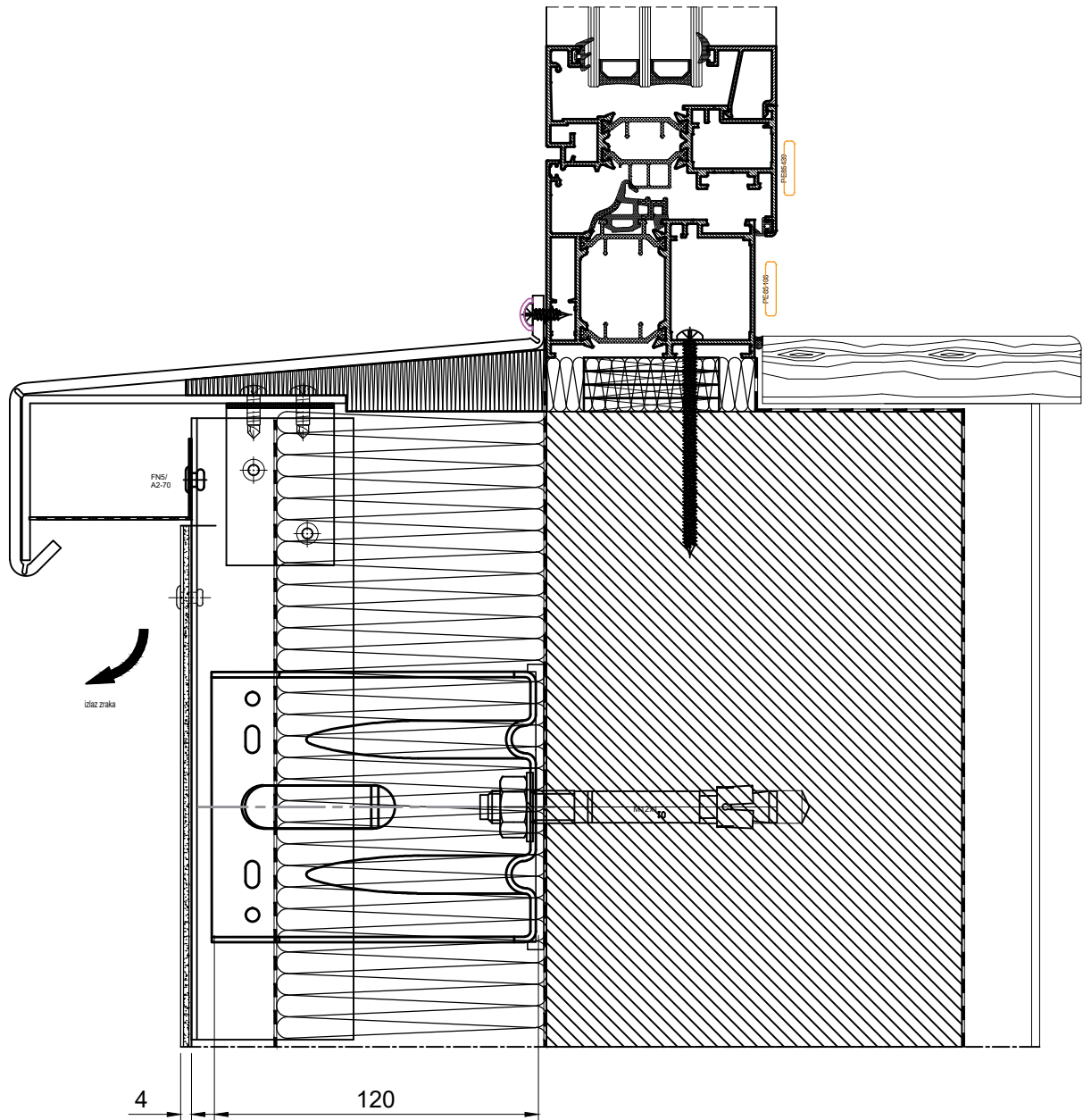
6.2



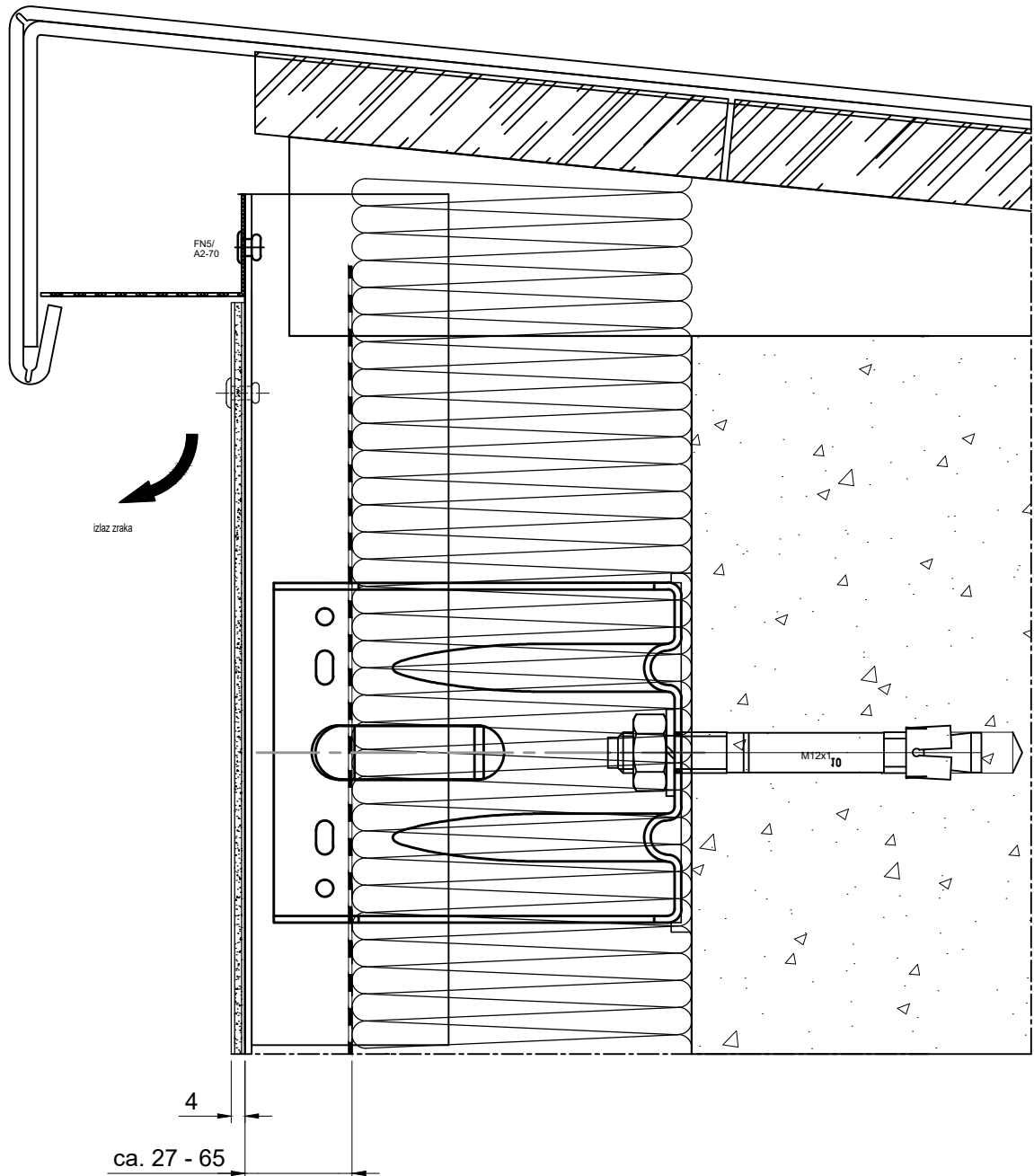
7



8



9



10

