MORAD®
SYSTEMY ALUMINIOWE

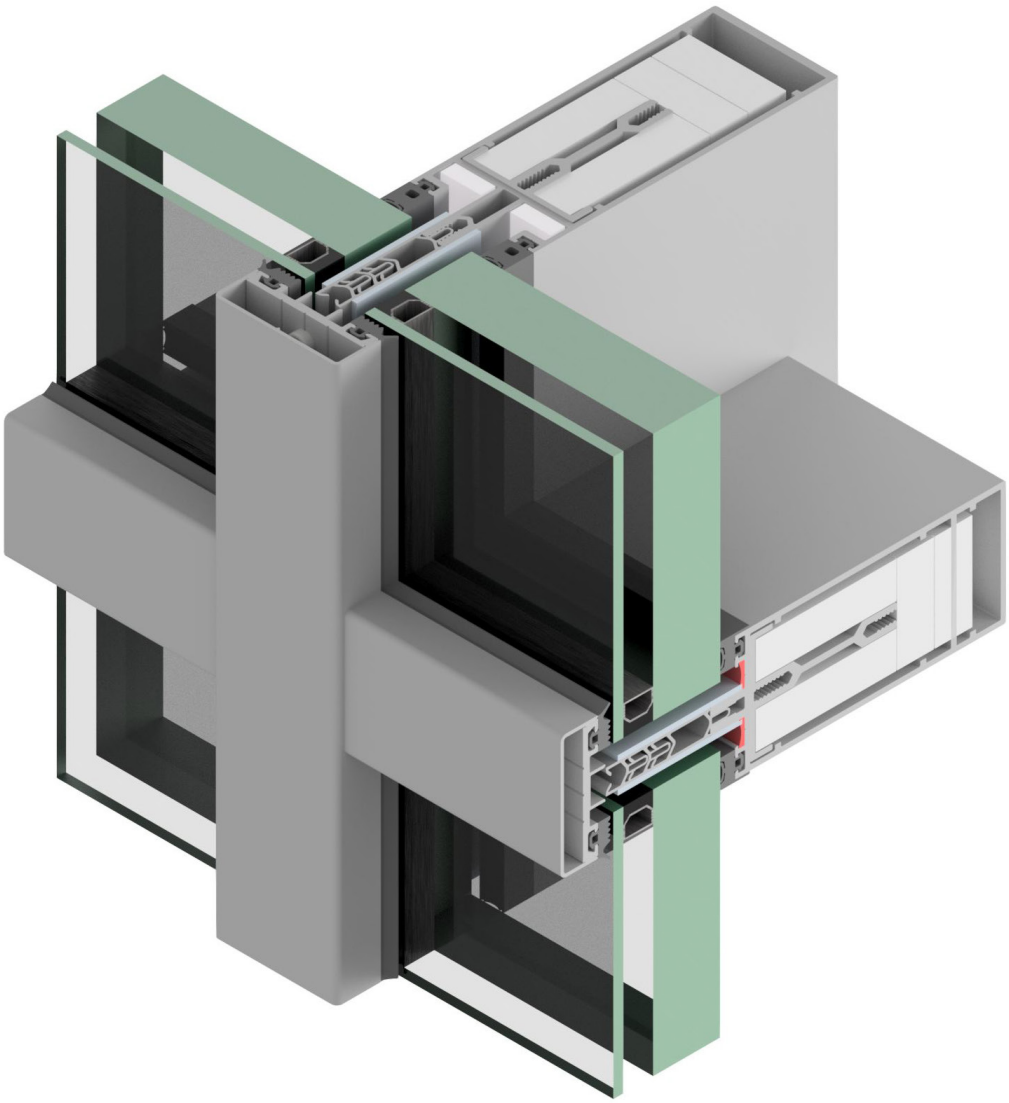
02.2021

MORAD AF-50 EI60

- ŚCIANY OSŁONOWE OGNIOODPORNE
- FIRE RESISTANT CURTAIN WALLS

Zabudowa zewnętrzna

External building



Opis systemu

System przeznaczony do wykonywania fasad ognioodpornych oraz samych pasów międzykondygnacyjnych o odporności ogniowej do 60 minut (EI60) . Konstrukcja oparta na systemie Morad AF-50, wzbogacona o dodatkowe rdzenie zabezpieczone wkładami na bazie gipsu, taśmami rozprężnymi i specjalnymi łącznikami. Fasada wymaga również zastosowania szklenia ognioodpornego Contraflam 60-3 firmy Vetrotech grubości od 43 mm. Dopuszczalna, całkowita grubość szklenia nie powinna przekraczać 56 mm.

Niniejszy katalog stanowi uzupełnienie katalogu do systemu AF-50, gdzie można znaleźć wszystkie niezbędne akcesoria, przekroje kształtowników i konstrukcji. Ponieważ konstrukcja wsporcza oparta na słupach i ryglach pozostaje niezmieniona to i obliczenia wytrzymałościowe należy przeprowadzić tak jak dla fasady AF-50.

Podobnie jak wszystkie inne systemy aluminiowe firmy Morad, fasada ognioodporna AF-50 EI60 jest również wprowadzona do programu MoradCAD firmy Fikabo Software. Program służy do ofertowania, projektowania i wspomagania produkcji. Program posiada moduł optymalizacji produkcji, tworzy listy cięć profili oraz zestawienie wszystkich akcesoriów, okuć i wypełnień. W programie MoradCAD możliwe jest także wykonanie obliczeń statycznych. Baza danych programu jest na bieżąco aktualizowana i udostępniana naszym odbiorcom.

System posiada kwalifikację ogniową zgodną z normą PN-EN 13501-2 + A1:2010. Niniejszy katalog oparty jest na tej kwalifikacji. Na życzenie klienta udostępniamy pełną wersję kwalifikacji ogniowej.

System description

The system is designed to manufacture fireproof facades and firebrake beetween cellings which provide 60 minutes of fire resistance (EI60). Construction is very similar to AF-50 facade, with addition of gypsum-based insets.The facade requires using Vetrotech's Contraflam 60-3 fire-resistant glazing (43 mm thick). The total glazing packet thickness should not exceed 56 mm.

This catalogue is an addition to the AF-50 system catalogue, where you can find all the profile, accessories and construction sections. The strength calculations should be done just like for the AF-50 facade because the supporting structure based on mullions and transoms remained unchanged.

The fireproof facade AF-50 EI60 is also available in Fikabo's MoradCAD software. That program have a module for production optimalization, it allows to create cutting lists and lists of all accessories, fittings and fulfillments. In MoradCAD it is possible to calculate static analysis. Cross-sectional design can be exported in dxf format. The datebase program includes technologies for all basic aluminium systems that are in Morad's offer. The datebase is continuously updated and it is available for our clients.

The system has a fire qualification in accordance with the standard PN-EN 13501-2 + A1:2010. This catalog is based on this qualification. On request, we provide full qualification of fire.

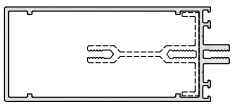
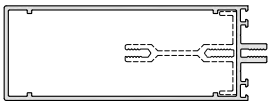
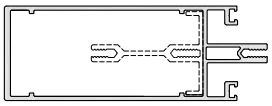
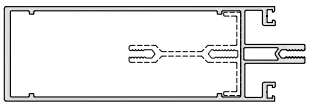
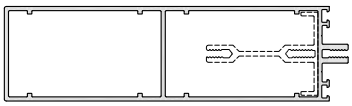
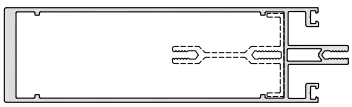
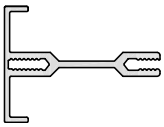
MORAD® SYSTEMY ALUMINIOWE

System AF-50 EI60

I
Profile i akcesoria
Profiles and accessories

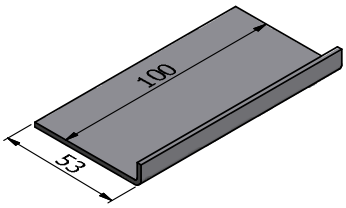
Profile
Profiles

Długość profili - 7 m
Profile length - 7 m

Artykuł Item	Przekrój Section	Waga Weight [kg/m]	Opis Description	Pow. anodow. Anodizing area [dm²/m]	Pow. malow. Painting area [dm²/m]	Ix [cm⁴]	Iy [cm⁴]
50111		2,160	Rygiel 109 mm Transom 109 mm	71,5	26,8	161,22	35,92
50113		2,411	Rygiel 129 mm Transom 129 mm	79,6	30,8	241,36	40,94
50114		2,853	Słup 123 mm Mullion 123 mm	88,1	29,6	236,24	40,59
50115		2,638	Rygiel 149 mm Transom 149 mm	87,6	34,8	345,21	45,97
50116		2,973	Słup 143 mm Mullion 143 mm	96,1	33,6	340,29	45,62
50117		3,234	Rygiel 172 mm Transom 172 mm	106,7	39,4	502,85	54,32
50118		3,621	Słup 166 mm Mullion 166 mm	104,7	38,2	608,63	53,78
50153		0,979	Rdzeń Core	-	-	-	-
50120		0,456	Listwa dociskowa Clamping strip	-	-	-	-
50121		0,304	Maskownica słupa Mullion cover	16,7	8,6	-	-
50122		0,281	Maskownica rygla Transom cover	15,6	8,0	-	-
50130		0,1	Dystans 6 mm Distance 6 mm	-	0,6	-	-
50131		0,164	Dystans 12 mm Distance 12 mm	-	1,2	-	-
50132		0,204	Dystans 18 mm Distance 18 mm	-	1,8	-	-
50159		0,435	Listwa dociskowa Clamping strip	-	-	-	-

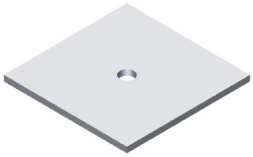
Akcesoria
Accessories

33201



Podkładka stalowa 53 mm
Steel washer 53 mm

33202

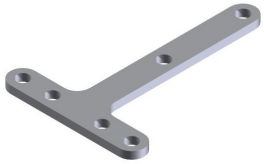


Podkładka stalowa
Steel washer

33203

Łącznik słupa z ryglem
Connector mullion to transom

33204



Łącznik słupa z ryglem
Connector mullion to transom

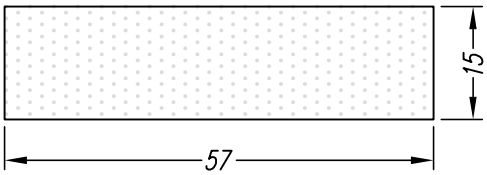
33205

Sworzeń dwustronny
Double side bolt

33206

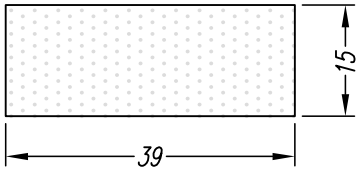
Sworzeń jednostronny
One side bolt

33207



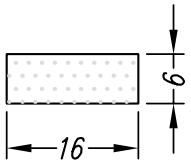
Wkład ognioodporny dł. 1,2 m
Fire resistant insert length 1,2 m

33208

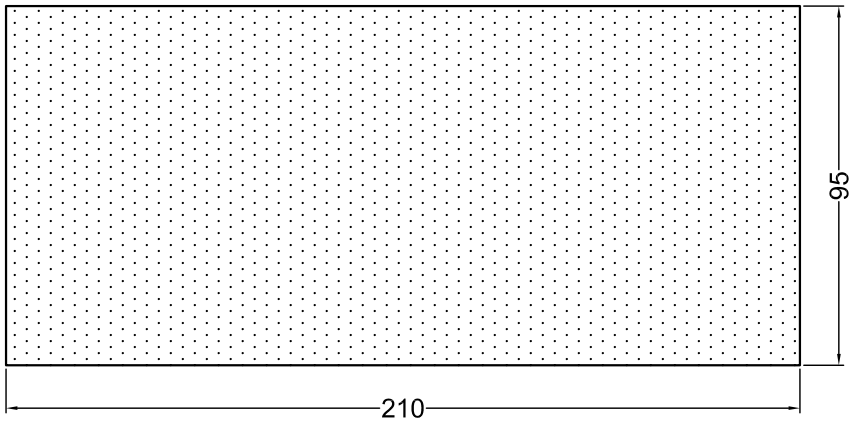


Wkład ognioodporny dł. 1,2 m
Fire resistant insert length 1,2 m

33209

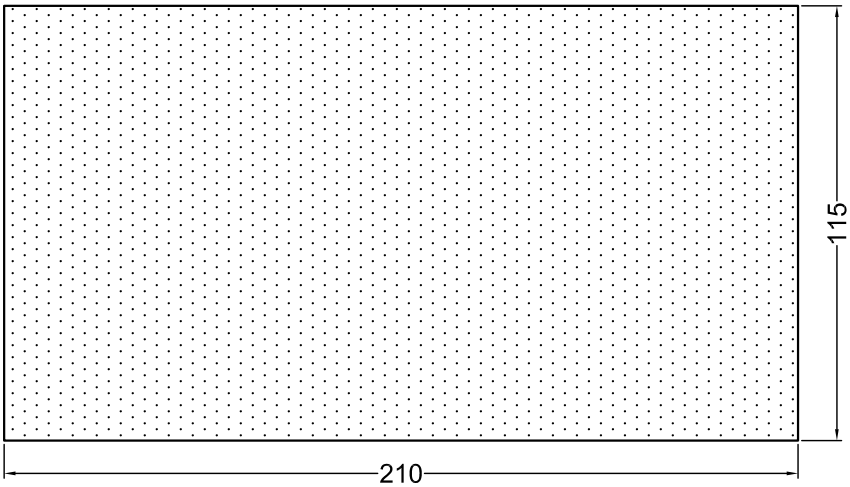


Wkład ognioodporny dł. 1,2 m
Fire resistant insert length 1,2 m

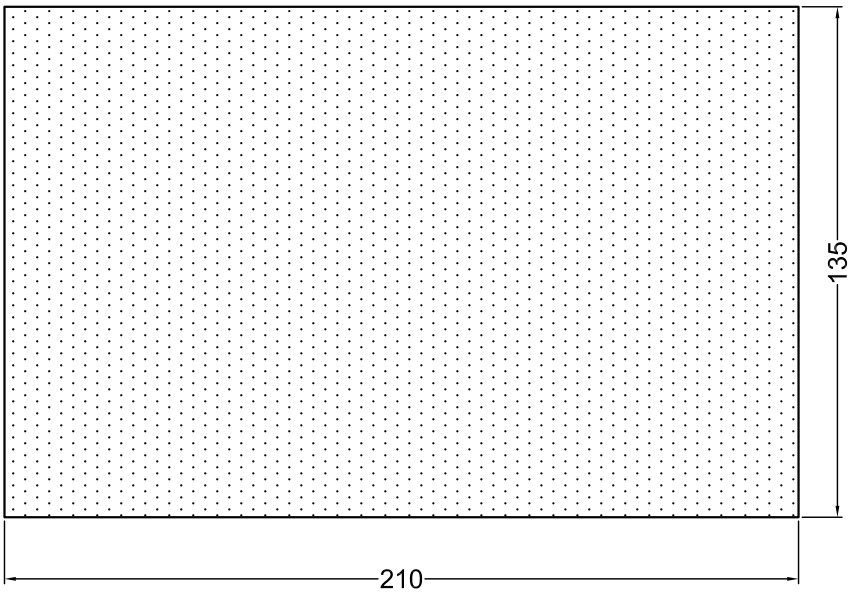


33231
Wkład ognioodporny do połączenia dylatacyjnego grubość 6 mm
Fire resistant insert for dilatation connectors thickness 6 mm

Akcesoria
Accessories

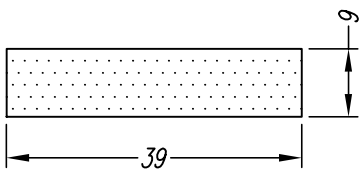


33232
Wkład ognioodporny do połączenia dylatacyjnego grubość 6 mm
Fire resistant insert for dilatation connectors thickness 6 mm



33233
Wkład ognioodporny do połączenia dylatacyjnego grubość 6 mm
Fire resistant insert for dilatation connectors thickness 6 mm

33214

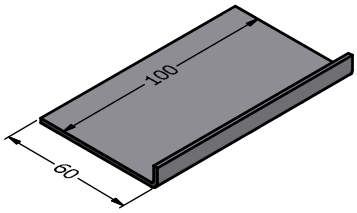


Wkład ognioodporny dł. 1,2 m
Fire resistant insert length 1,2 m

33211

Podkładka drewniana 5x50x100
Wooden washer 5x50x100

33212

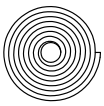


Podkładka stalowa 60 mm
Steel washer 60 mm

33213

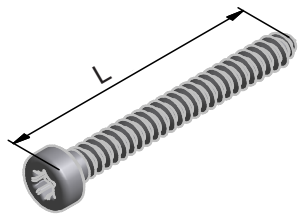
Pierścień Ø 9x1,1 DIN 6799
Ring Ø 9x1,1 DIN 6799

33210



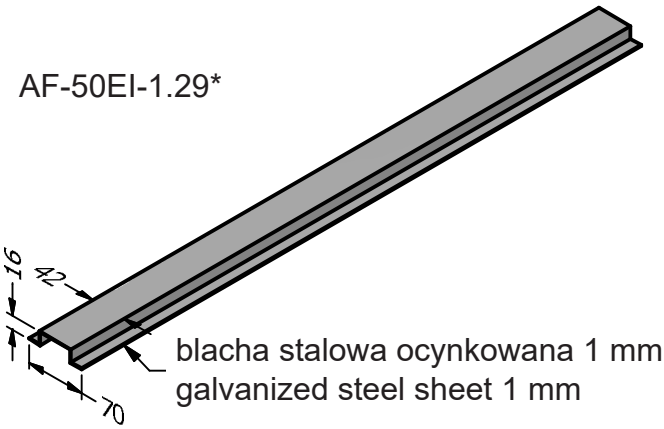
Uszczelka pęczniejąca 2x50
Expanding seal 2x50

Akcesoria
Accessories



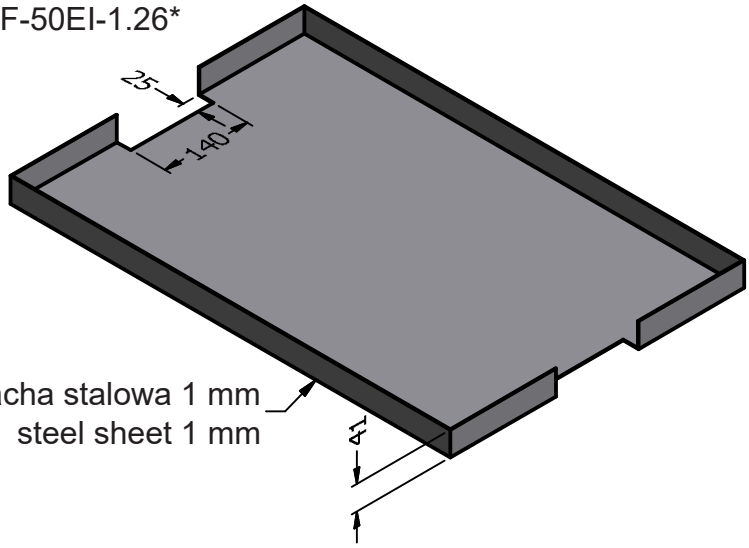
L	Nr
17	33570
32	33578
50	33574
80	33580
90	33582
100	33581
110	33583

AF-50EI-1.29*



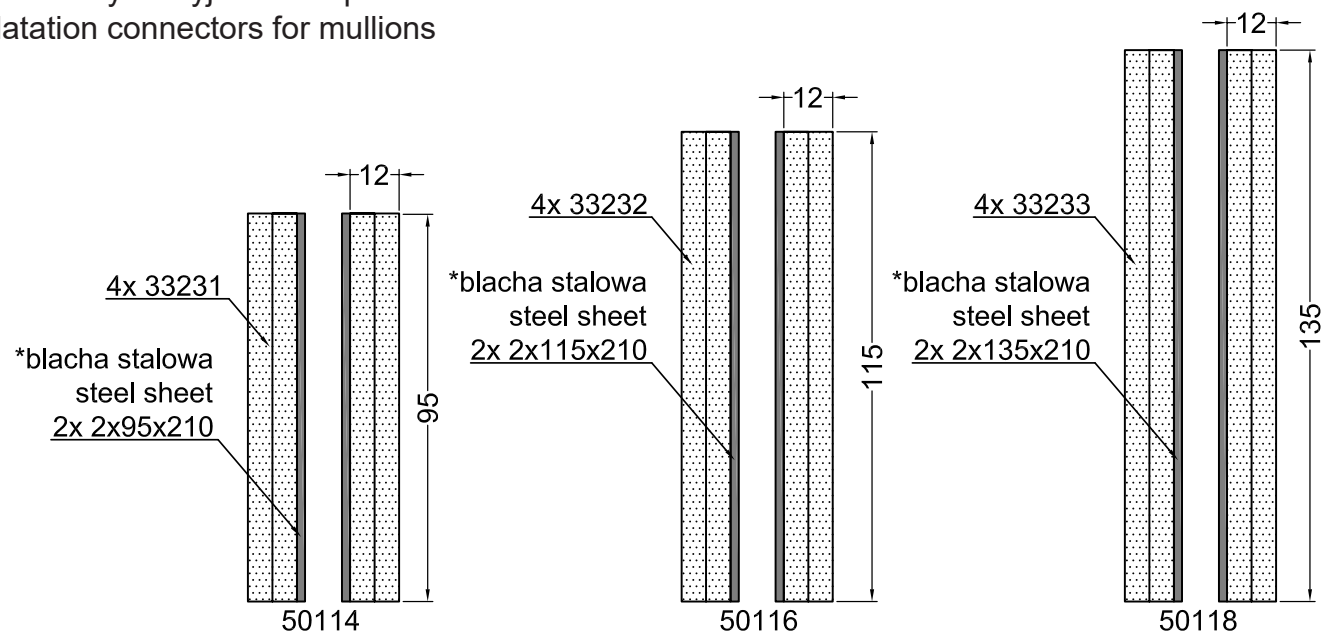
blacha stalowa ocynkowana 1 mm
galvanized steel sheet 1 mm

AF-50EI-1.26*



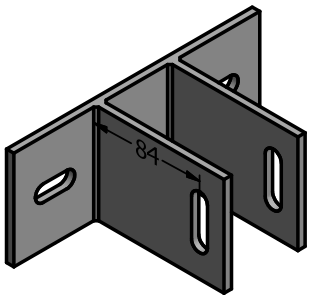
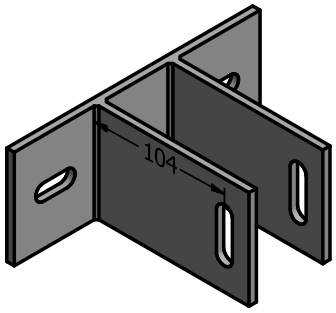
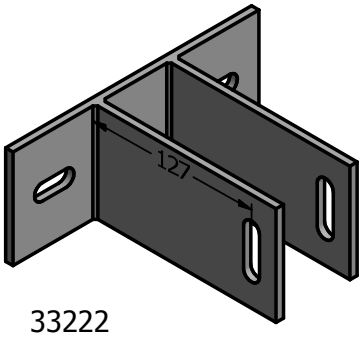
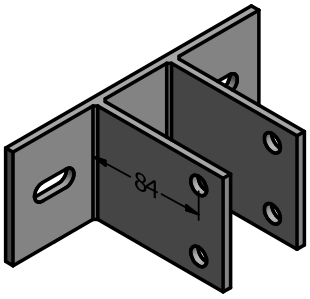
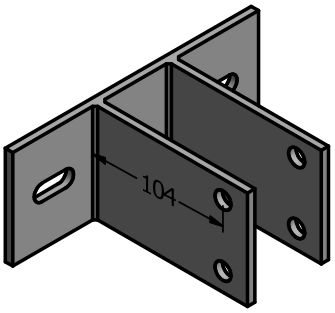
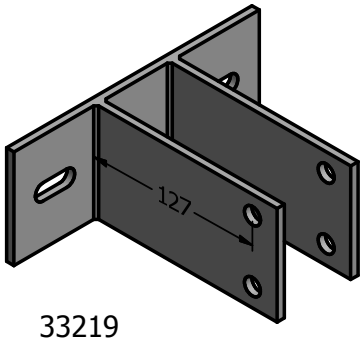
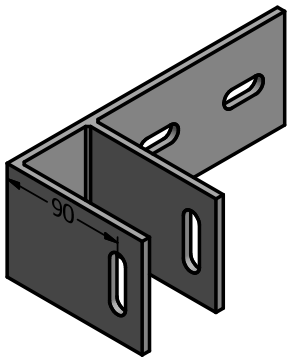
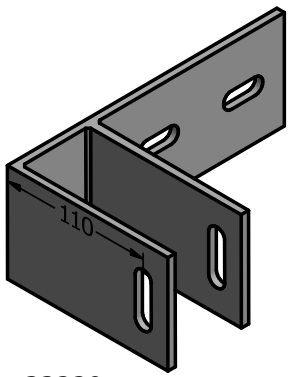
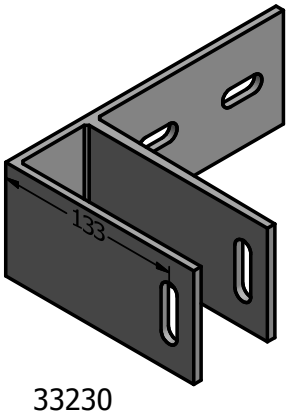
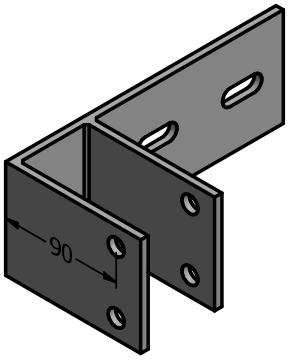
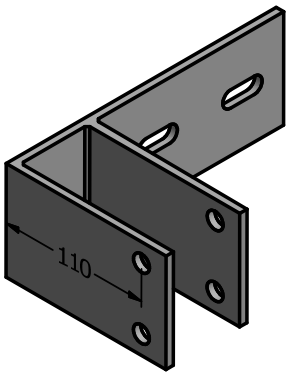
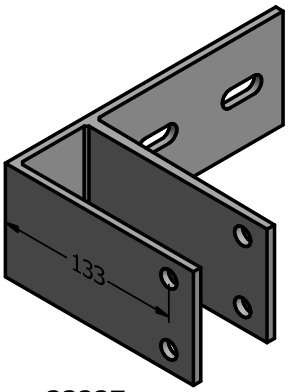
blacha stalowa 1 mm
steel sheet 1 mm

Łączniki dylatacyjne do słupów
Dilatation connectors for mullions



* - niedostarczane przez Morad
* - not delivered by Morad

Kotwy stalowe do mocowania słupów do stropu
Steel anchors for fixing mullions to the celling

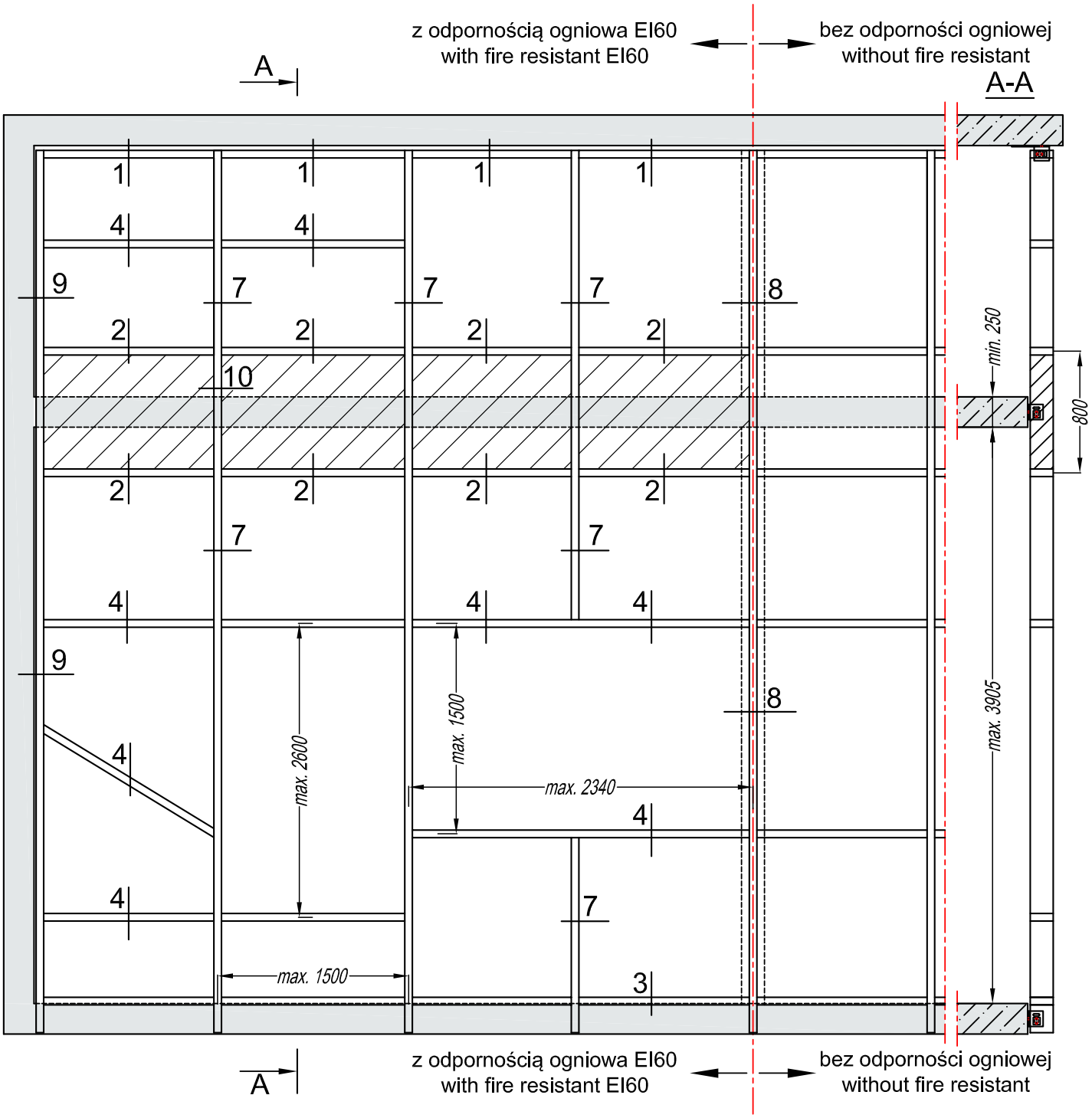
50114	50116	50118
 33216	 33221	 33222
 33217	 33218	 33219
 33228	 33229	 33230
 33225	 33226	 33227

MORAD® SYSTEMY ALUMINIOWE

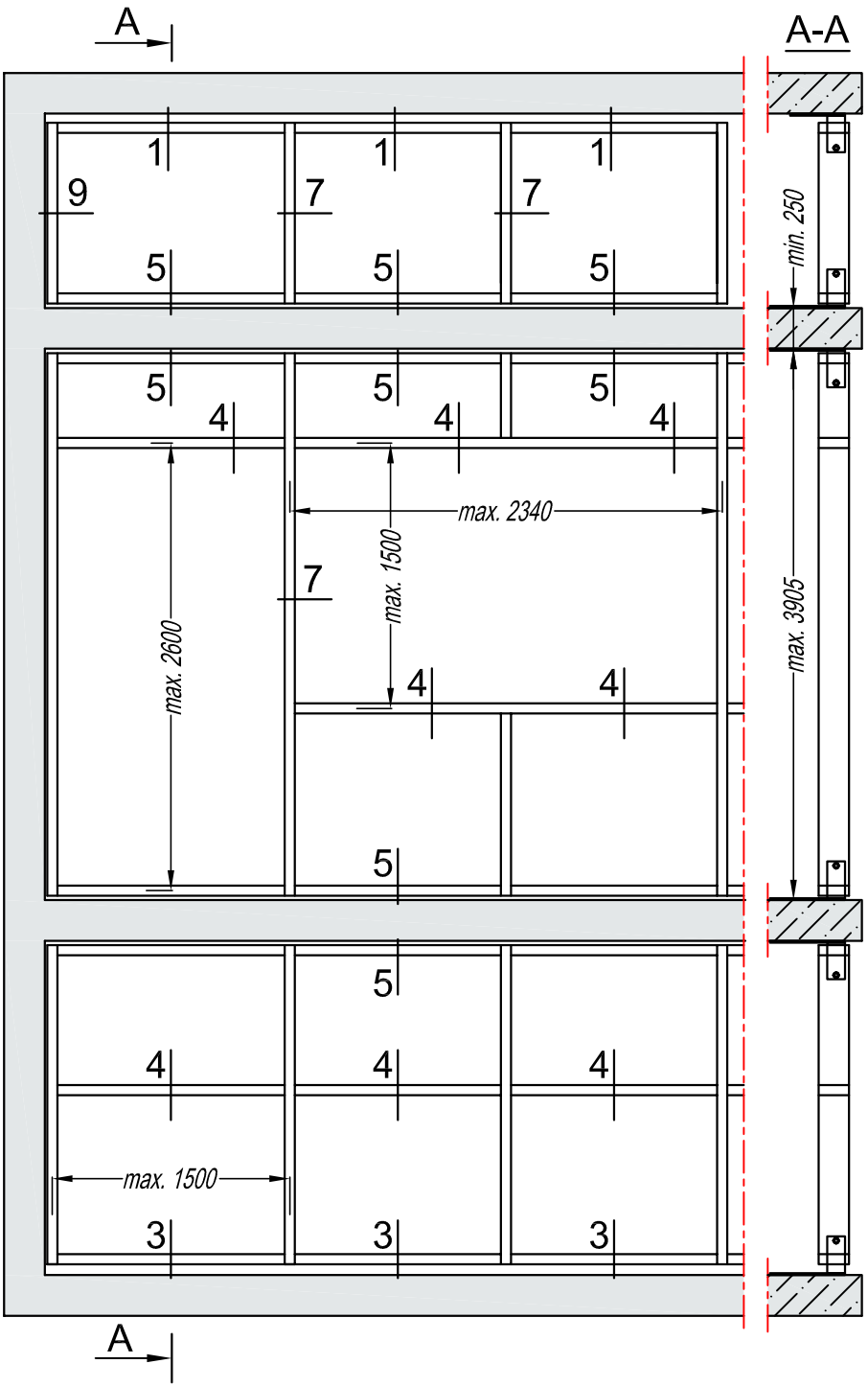
System AF-50 EI60

II
Przekroje
Sections

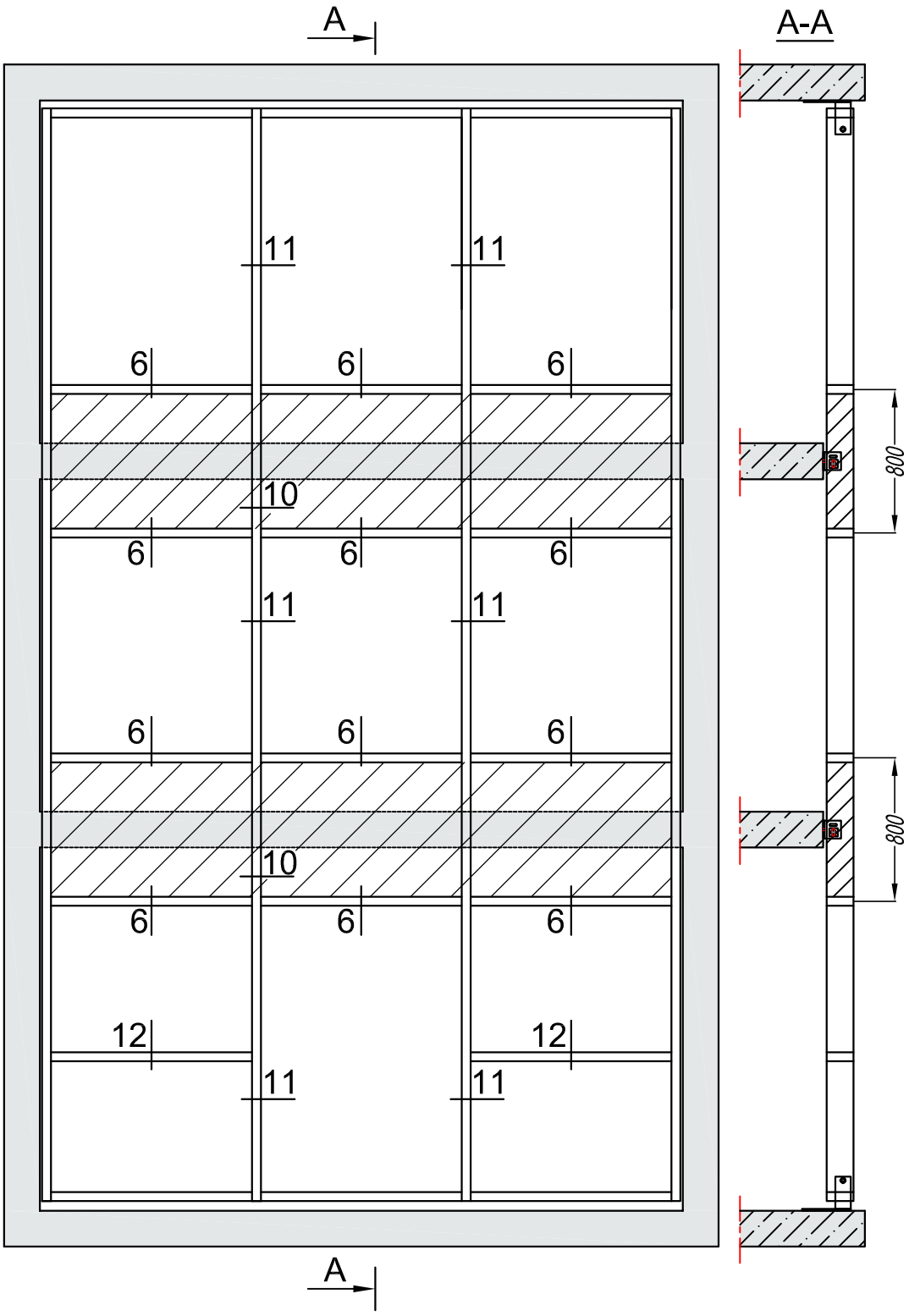
Przykładowe konstrukcje
Example constructions



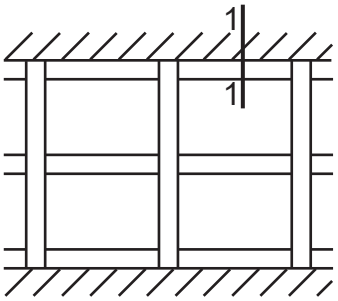
Przykładowe konstrukcje
Example constructions

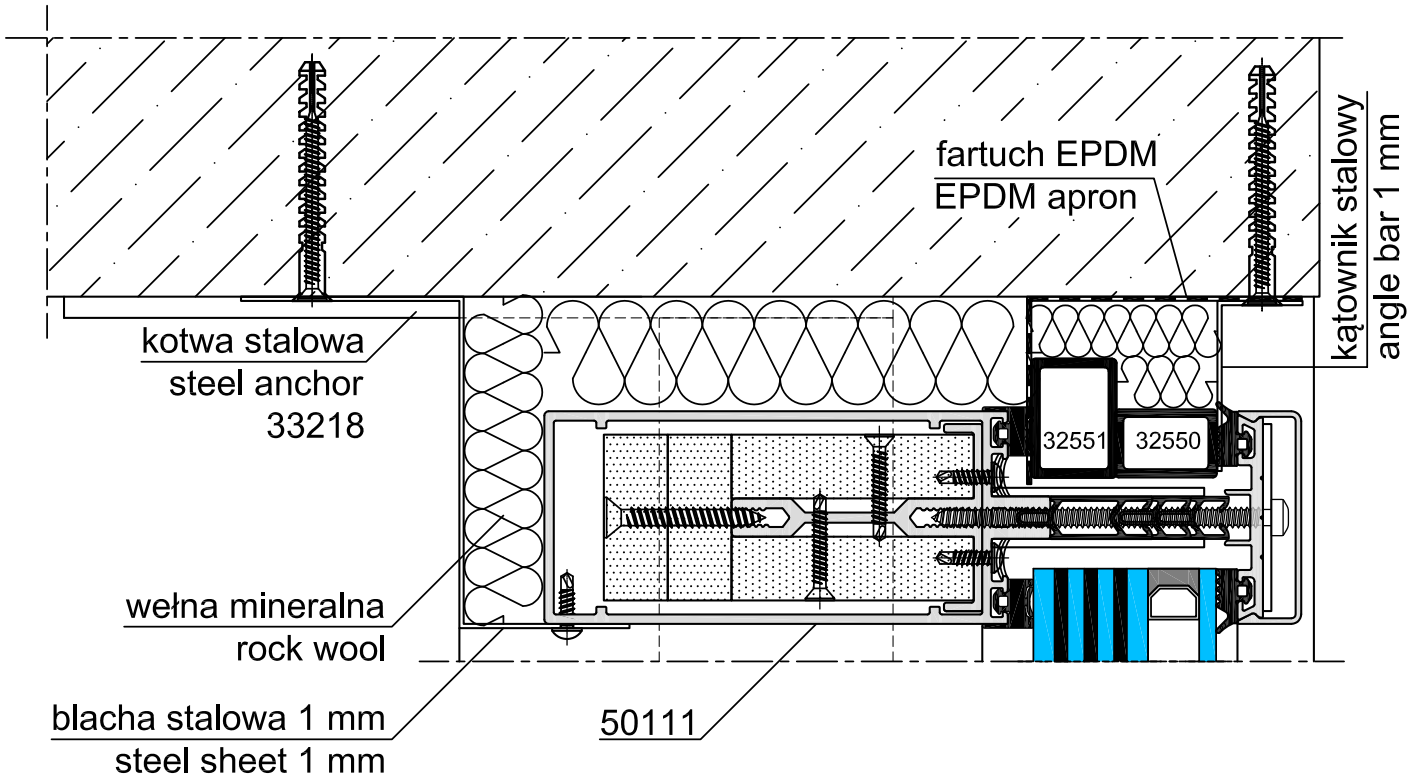


Przykładowe konstrukcje (fasada bez odporności ogniowej z pasem ognioodpornym)
Example constructions (fasade without fire resistant but with fire resistant zone)

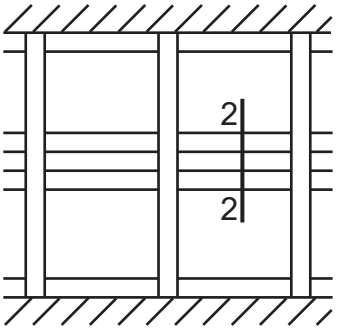


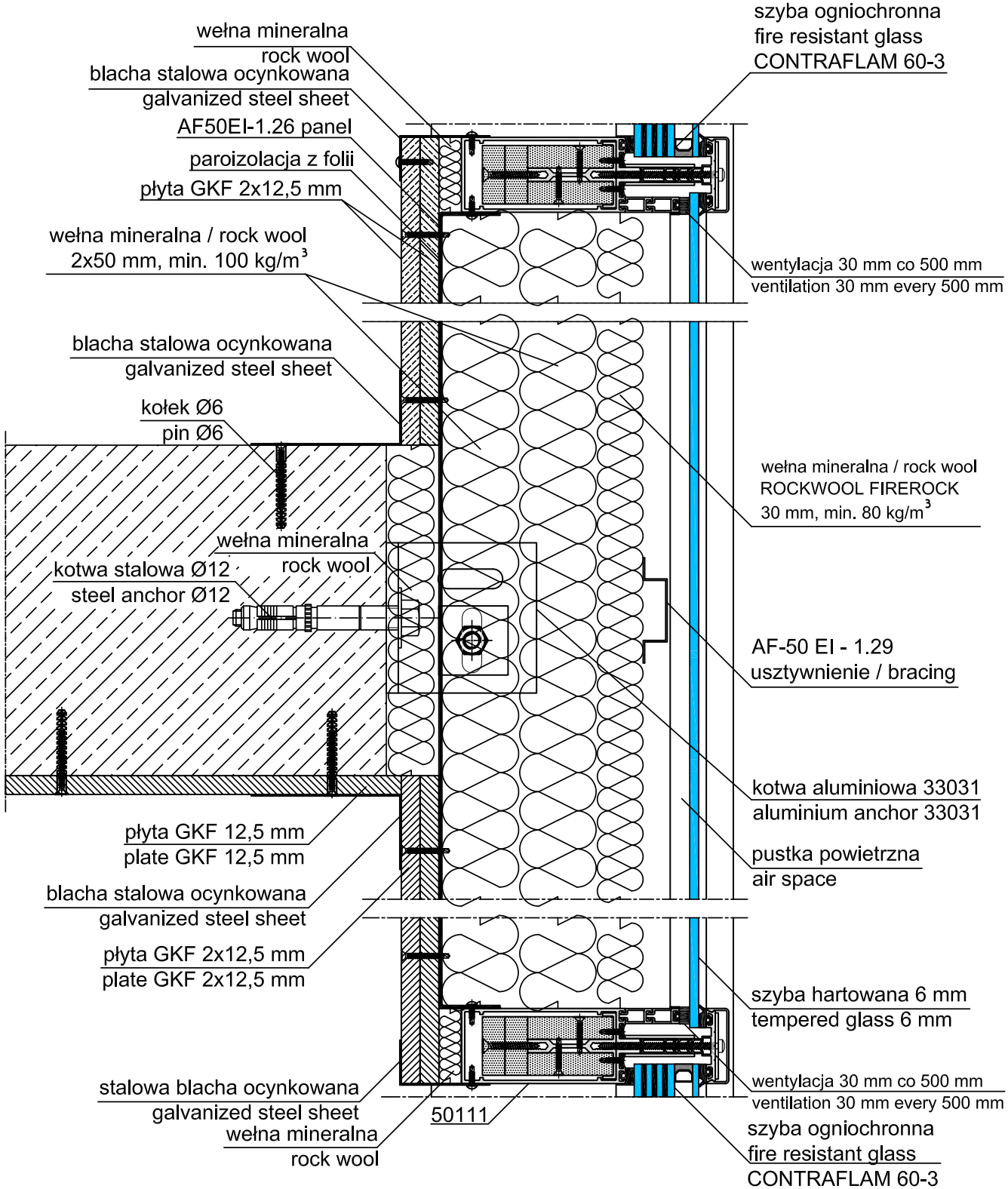
1-1


1
1

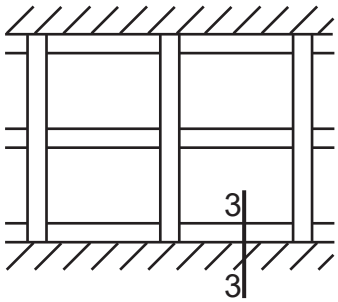

fartuch EPDM
EPDM apron
kątownik stalowy
angle bar 1 mm
kotwa stalowa
steel anchor
33218
32551
32550
wełna mineralna
rock wool
blacha stalowa 1 mm
steel sheet 1 mm
50111

2-2


2
2


szyba ogniochronna
fire resistant glass
CONTRAFLAM 60-3
wełna mineralna
rock wool
blacha stalowa ocynkowana
galvanized steel sheet
AF50EI-1.26 panel
paroizolacja z folii
płyta GKF 2x12,5 mm
wełna mineralna / rock wool
2x50 mm, min. 100 kg/m3
wentylacja 30 mm co 500 mm
ventilation 30 mm every 500 mm
blacha stalowa ocynkowana
galvanized steel sheet
kołek Ø6
pin Ø6
wełna mineralna / rock wool
ROCKWOOL FIREROCK
30 mm, min. 80 kg/m3
wełna mineralna
rock wool
kotwa stalowa Ø12
steel anchor Ø12
AF-50 EI - 1.29
usztywnienie / bracing
kotwa aluminiowa 33031
aluminium anchor 33031
pustka powietrzna
air space
płyta GKF 12,5 mm
plate GKF 12,5 mm
blacha stalowa ocynkowana
galvanized steel sheet
płyta GKF 2x12,5 mm
plate GKF 2x12,5 mm
szyba hartowana 6 mm
tempered glass 6 mm
wentylacja 30 mm co 500 mm
ventilation 30 mm every 500 mm
stalowa blacha ocynkowana
galvanized steel sheet
wełna mineralna
rock wool
50111
szyba ogniochronna
fire resistant glass
CONTRAFLAM 60-3

3-3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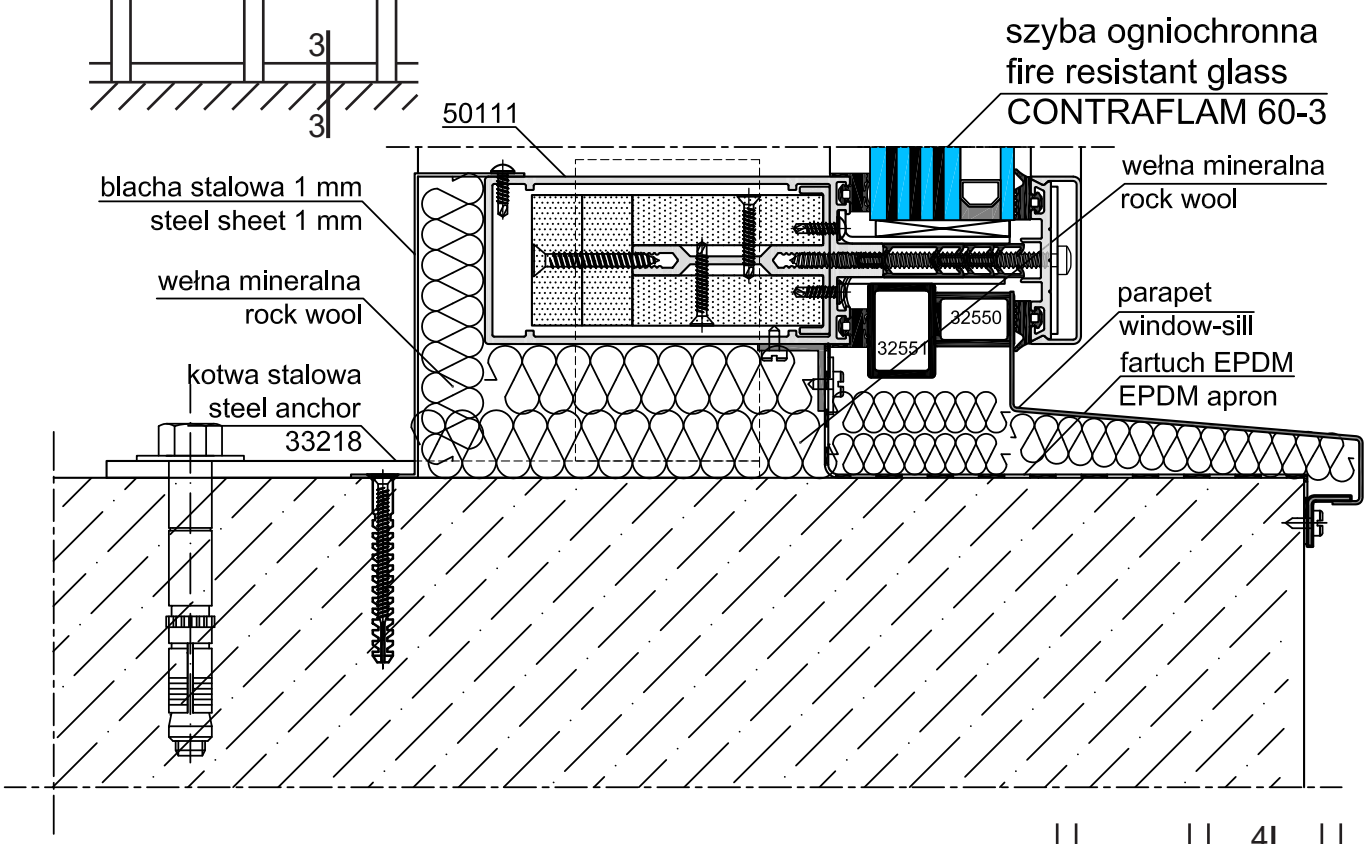
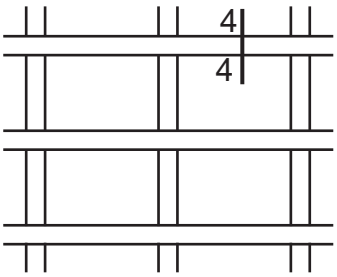

szyba ogniochronna
fire resistant glass
CONTRAFLAM 60-3
50111
blacha stalowa 1 mm
steel sheet 1 mm
wełna mineralna
rock wool
wełna mineralna
rock wool
parapet
window-sill
32550
32551
fartuch EPDM
EPDM apron
kotwa stalowa
steel anchor
33218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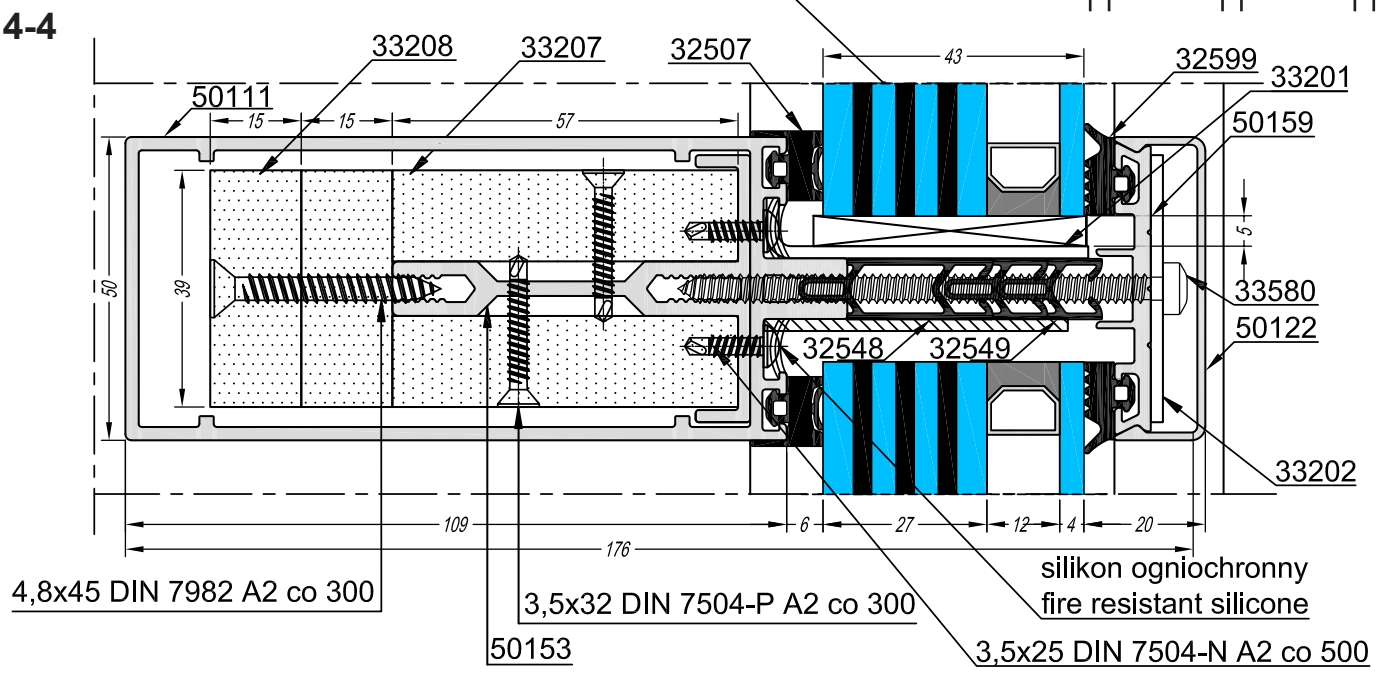
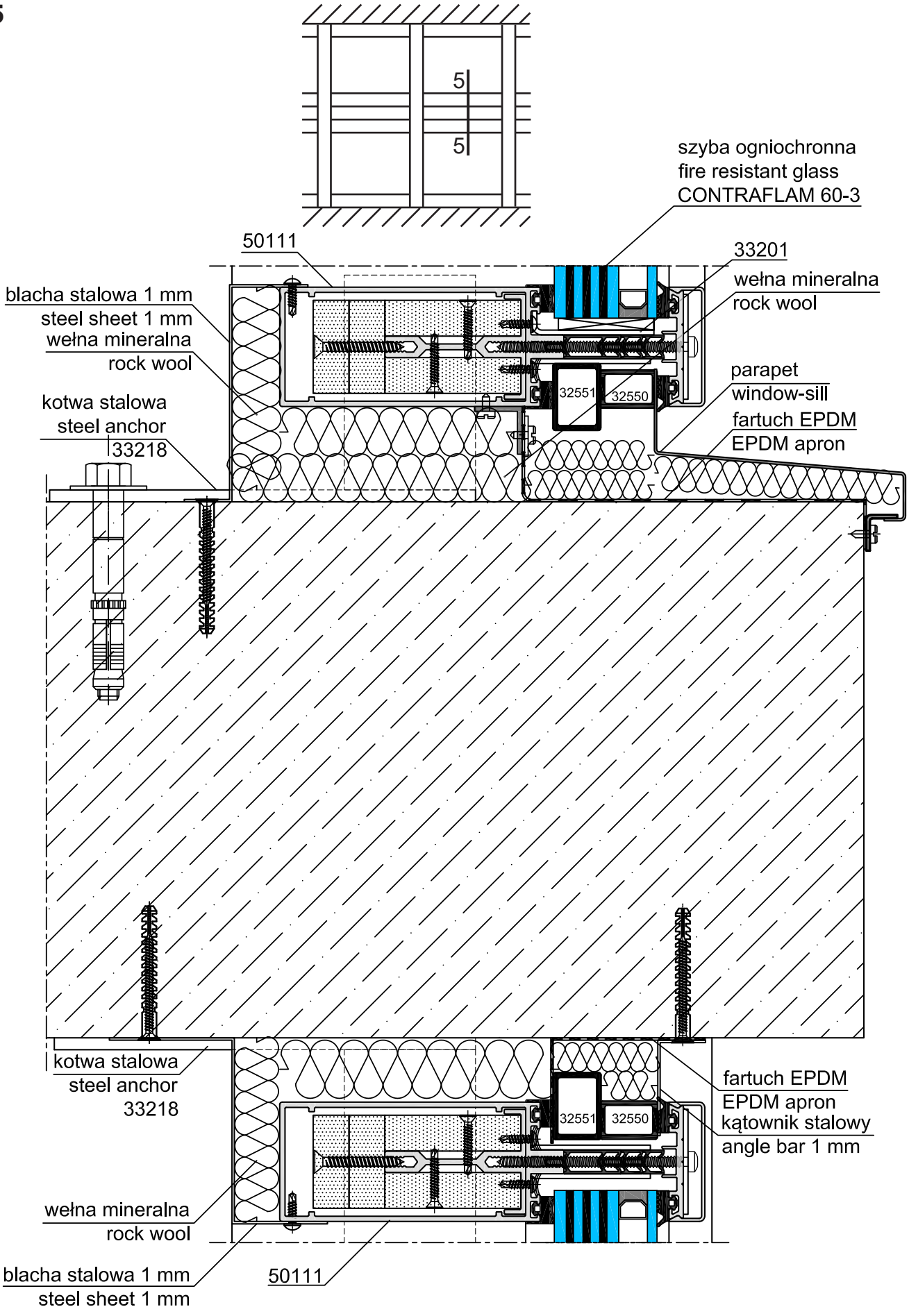
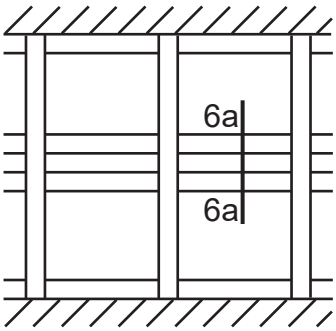
4-4

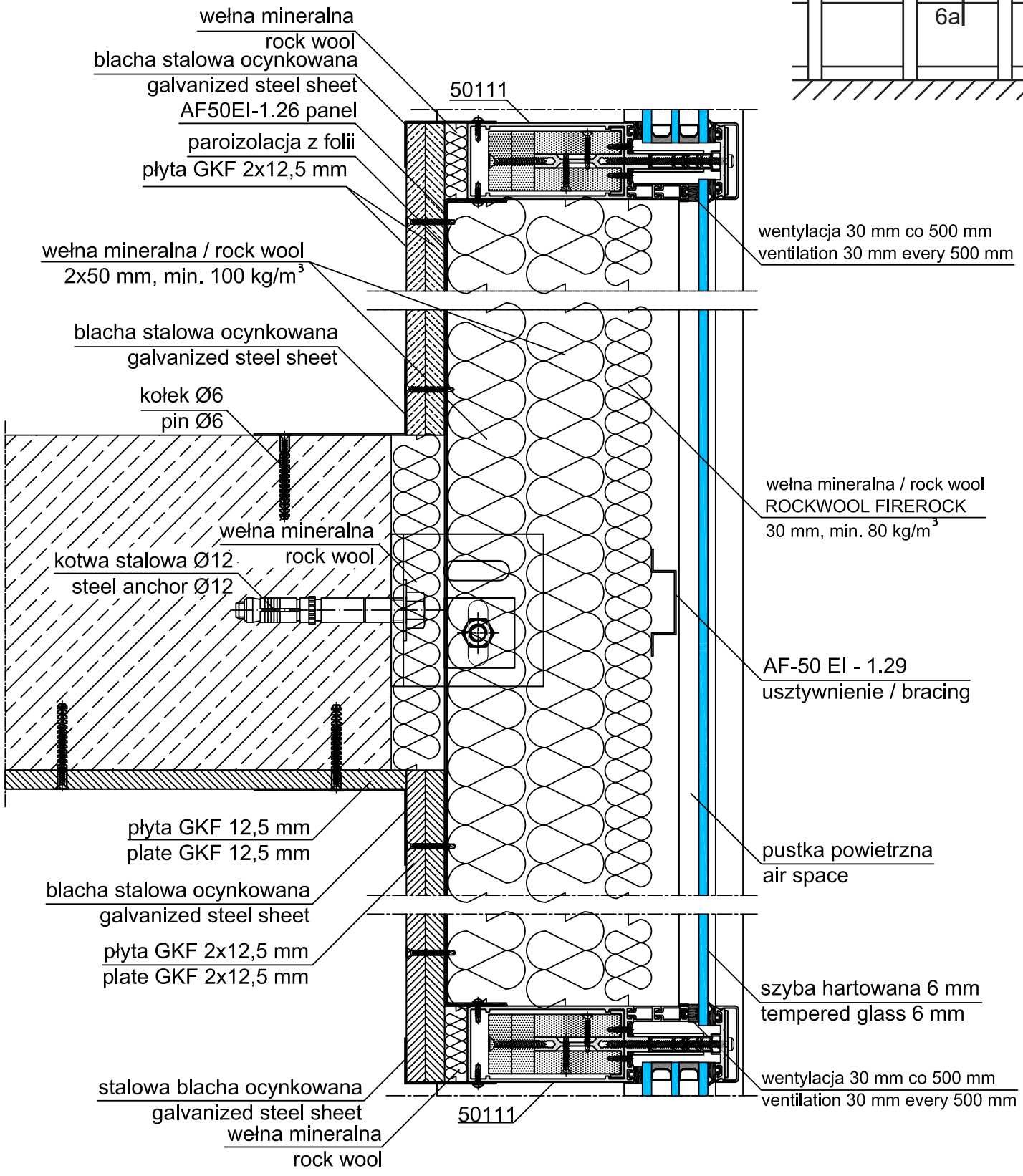

szyba ogniochronna
fire resistant glass
CONTRAFLAM 60-3
33208
33207
32507
43
32599
33201
50111
15
15
57
50159
50
39
5
33580
50122
32548
32549
33202
109
6
27
12
4
20
176
4,8x45 DIN 7982 A2 co 300
3,5x32 DIN 7504-P A2 co 300
50153
silikon ogniochronny
fire resistant silicone
3,5x25 DIN 7504-N A2 co 500

5-5

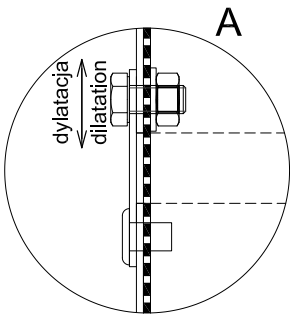

5
5
szyba ogniochronna
fire resistant glass
CONTRAFLAM 60-3
50111
33201
wełna mineralna
rock wool
blacha stalowa 1 mm
steel sheet 1 mm
wełna mineralna
rock wool
parapet
window-sill
kotwa stalowa
steel anchor
33218
32551
32550
fartuch EPDM
EPDM apron
kotwa stalowa
steel anchor
33218
fartuch EPDM
EPDM apron
kątownik stalowy
angle bar 1 mm
32551
32550
wełna mineralna
rock wool
blacha stalowa 1 mm
steel sheet 1 mm
50111

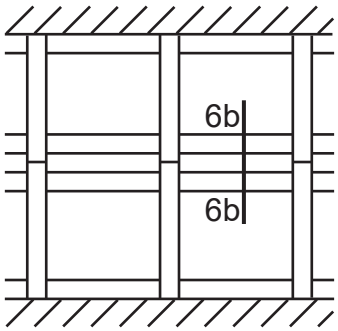
6a-6a


6a
6a


wełna mineralna
rock wool
blacha stalowa ocynkowana
galvanized steel sheet
AF50EI-1.26 panel
paroizolacja z folii
płyta GKF 2x12,5 mm
50111
wentylacja 30 mm co 500 mm
ventilation 30 mm every 500 mm
wełna mineralna / rock wool
2x50 mm, min. 100 kg/m3
blacha stalowa ocynkowana
galvanized steel sheet
kołek Ø6
pin Ø6
wełna mineralna / rock wool
ROCKWOOL FIREROCK
30 mm, min. 80 kg/m3
wełna mineralna
rock wool
kotwa stalowa Ø12
steel anchor Ø12
AF-50 EI - 1.29
usztywnienie / bracing
płyta GKF 12,5 mm
plate GKF 12,5 mm
pustka powietrzna
air space
blacha stalowa ocynkowana
galvanized steel sheet
płyta GKF 2x12,5 mm
plate GKF 2x12,5 mm
szyba hartowana 6 mm
tempered glass 6 mm
wentylacja 30 mm co 500 mm
ventilation 30 mm every 500 mm
stalowa blacha ocynkowana
galvanized steel sheet
50111
wełna mineralna
rock wool

6b-6b

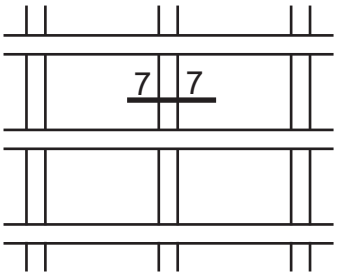




wełna mineralna
rock wool
blacha stalowa ocynkowana
galvanized steel sheet
AF50EI-1.26 panel
paroizolacja z folii
płyta GKF 2x12,5 mm
50111
wełna mineralna / rock wool
2x50 mm, min. 100 kg/m³
wentylacja 30 mm co 500 mm
ventilation 30 mm every 500 mm
blacha stalowa ocynkowana
galvanized steel sheet
kołek Ø6
pin Ø6
wełna mineralna / rock wool
ROCKWOOL FIREROCK
30 mm, min. 80 kg/m³
wełna mineralna
rock wool
kotwa stalowa Ø12
steel anchor Ø12
AF-50 EI - 1.29
usztywnienie / bracing
płyta GKF 12,5 mm
plate GKF 12,5 mm
pustka powietrzna
air space
blacha stalowa ocynkowana
galvanized steel sheet
płyta GKF 2x12,5 mm
plate GKF 2x12,5 mm
szyba hartowana 6 mm
tempered glass 6 mm
wentylacja 30 mm co 500 mm
ventilation 30 mm every 500 mm
stalowa blacha ocynkowana
galvanized steel sheet
wełna mineralna
rock wool
50111

AF-50 EI60

7-7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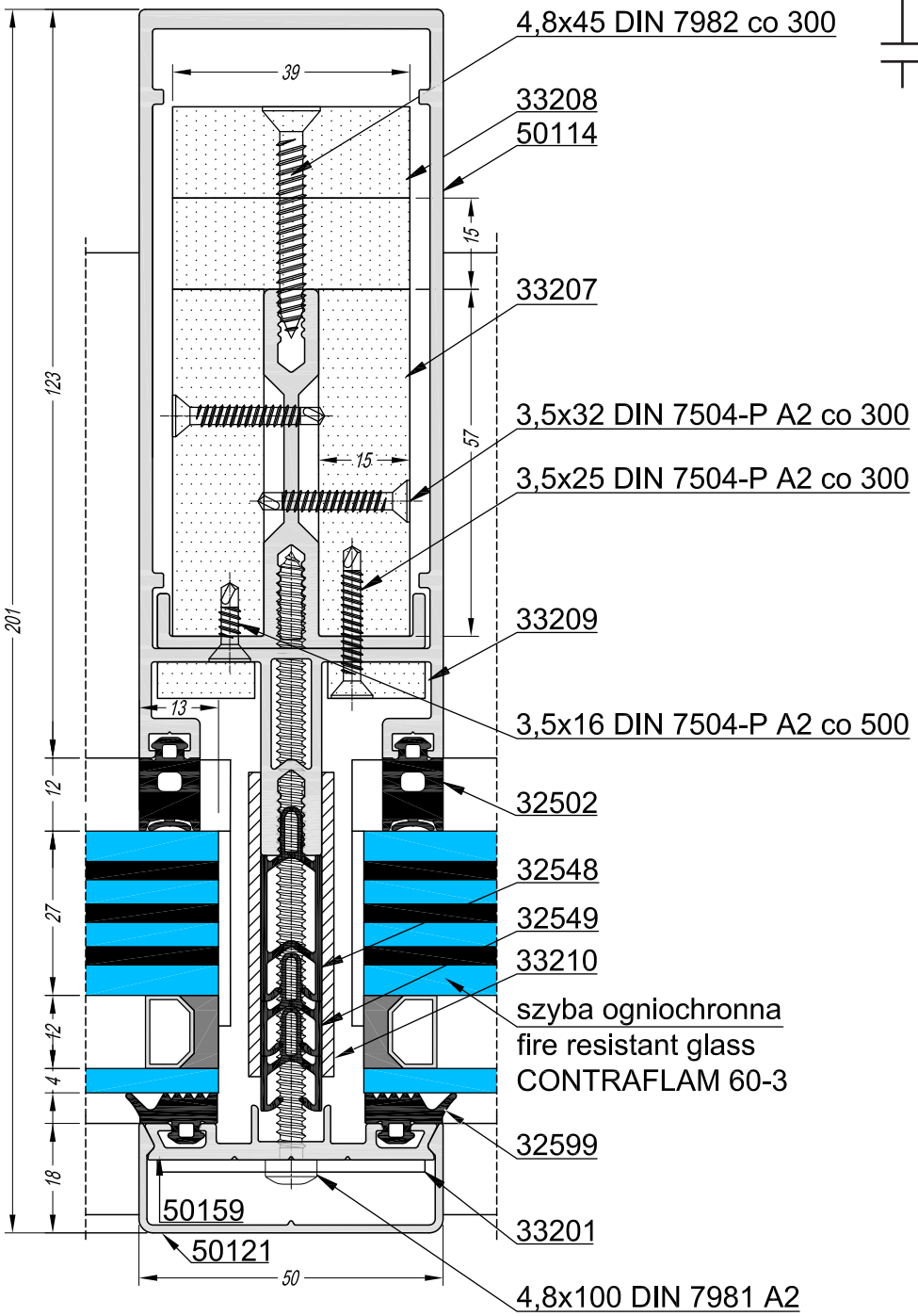
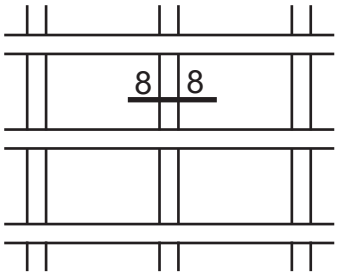
7


4,8x45 DIN 7982 co 300
33208
50114
33207
3,5x32 DIN 7504-P A2 co 300
3,5x25 DIN 7504-P A2 co 300
33209
3,5x16 DIN 7504-P A2 co 500
32502
32548
32549
33210
szyba ogniochronna
fire resistant glass
CONTRAFLAM 60-3
32599
33201
4,8x100 DIN 7981 A2
50159
50121
39
15
57
15
13
123
201
12
27
12
4
18
50

8-8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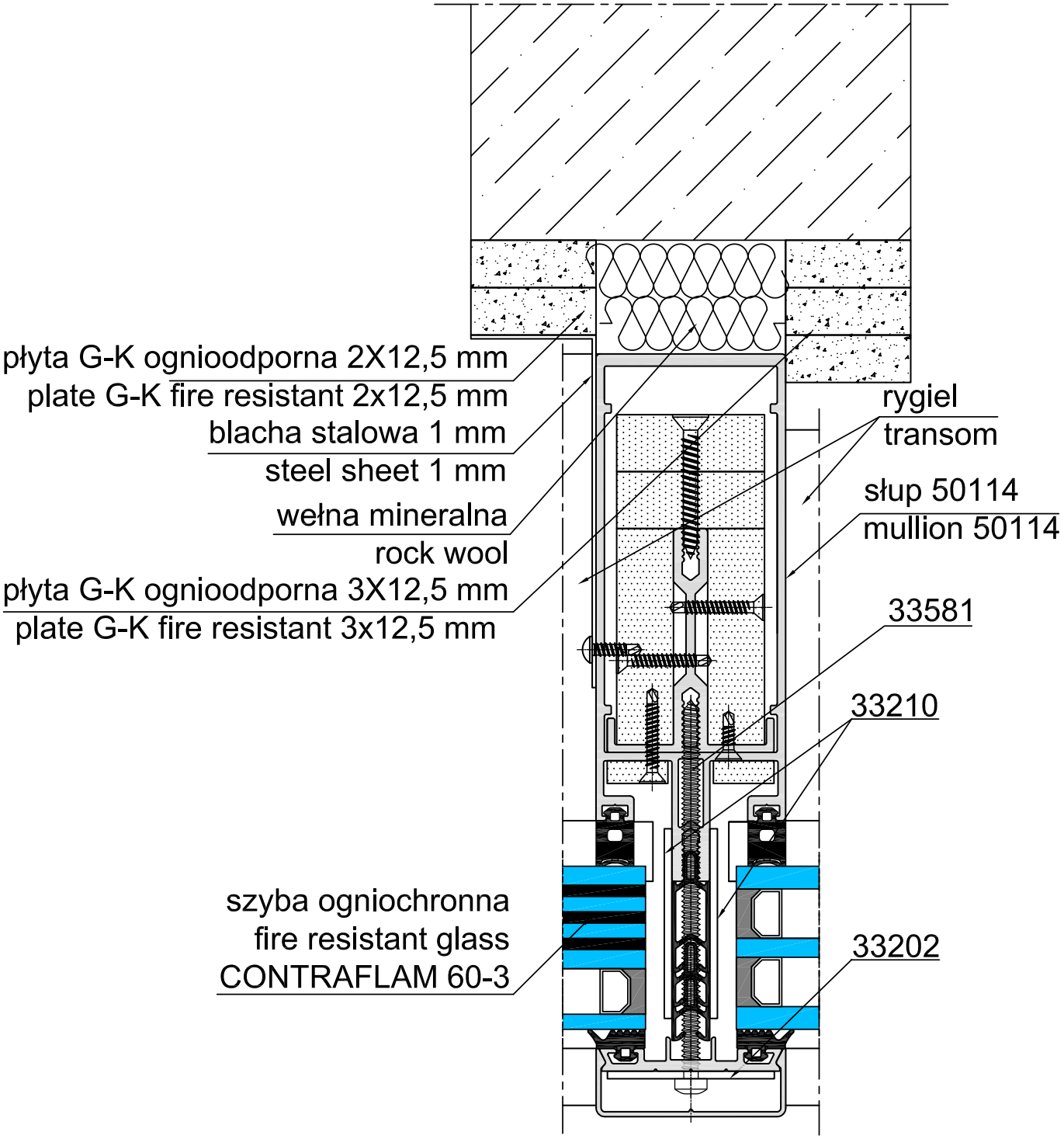
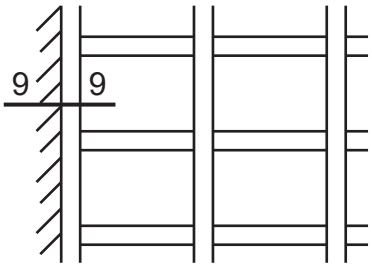
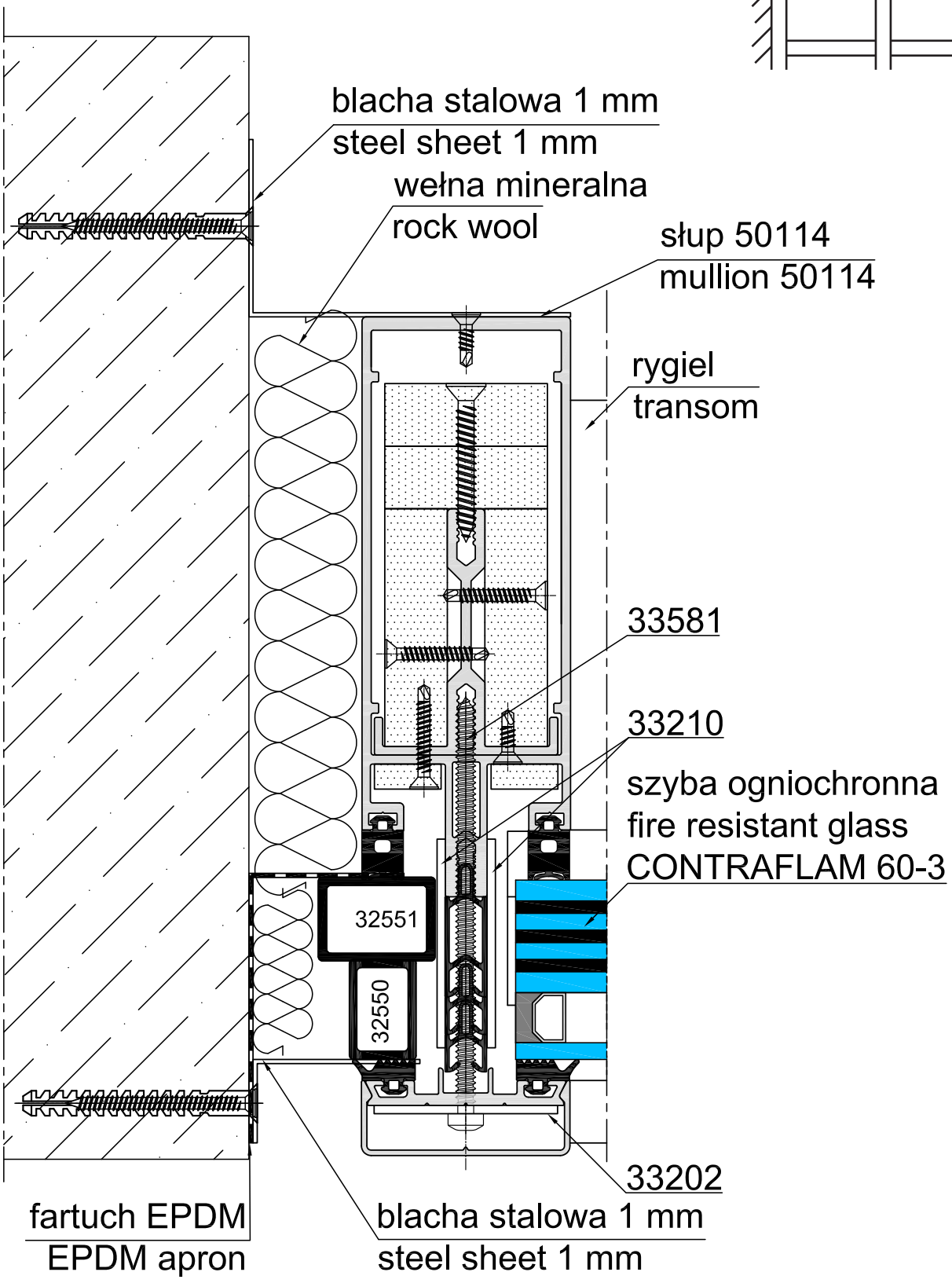
8

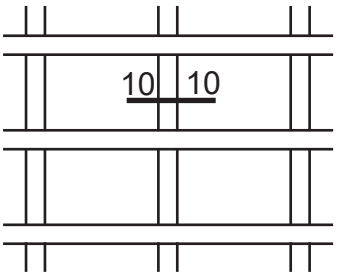

płyta G-K ognioodporna 2X12,5 mm
plate G-K fire resistant 2x12,5 mm
blacha stalowa 1 mm
steel sheet 1 mm
wełna mineralna
rock wool
płyta G-K ognioodporna 3X12,5 mm
plate G-K fire resistant 3x12,5 mm
szyba ogniochronna
fire resistant glass
CONTRAFLAM 60-3
rygiel
transom
słup 50114
mullion 50114
33581
33210
33202

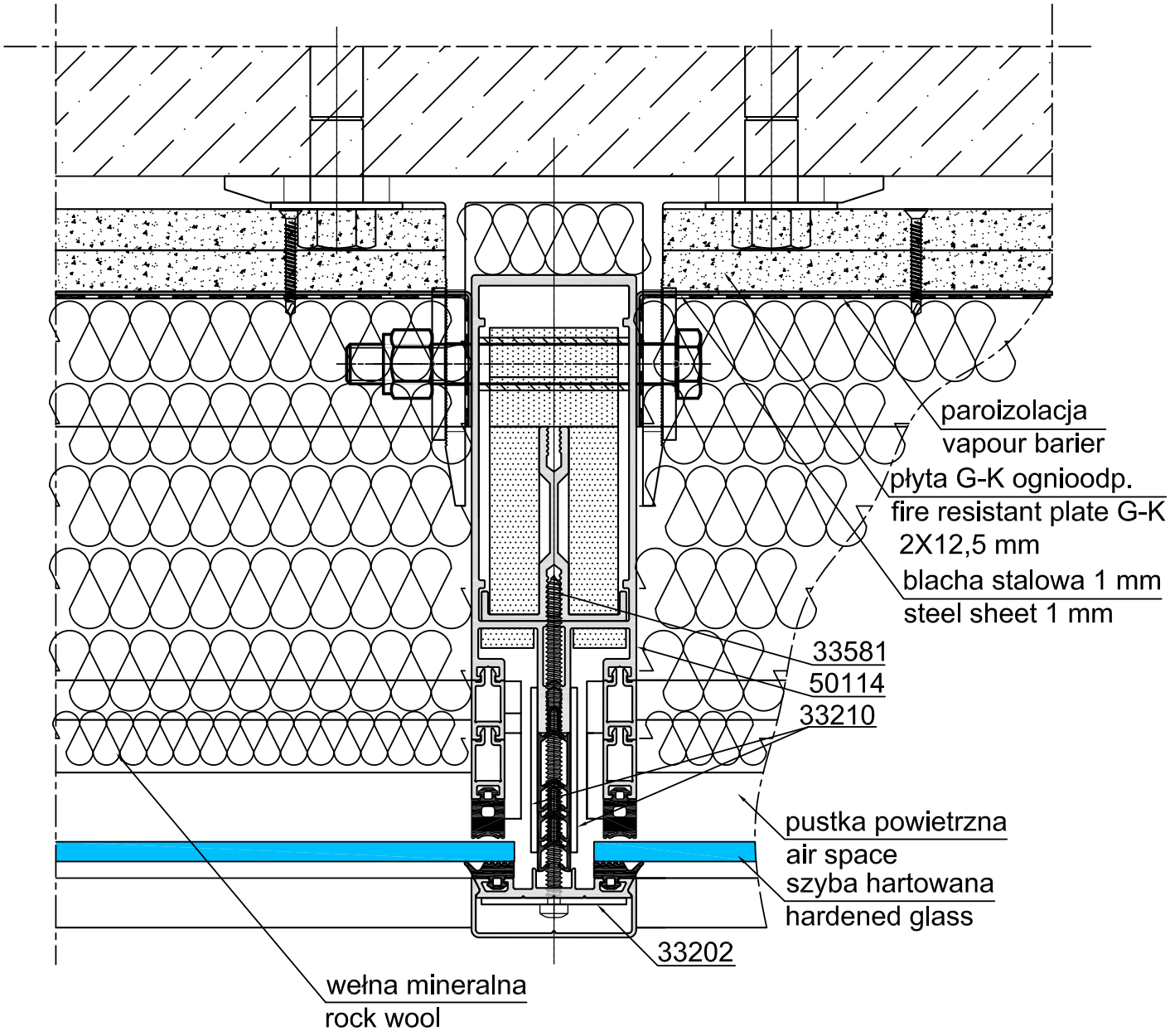
9-9


9
9

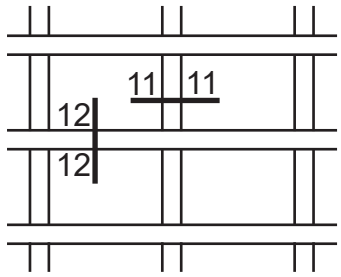

blacha stalowa 1 mm
steel sheet 1 mm
wełna mineralna
rock wool
słup 50114
mullion 50114
rygiel
transom
33581
33210
szyba ogniochronna
fire resistant glass
CONTRAFLAM 60-3
32551
32550
33202
fartuch EPDM
EPDM apron
blacha stalowa 1 mm
steel sheet 1 mm

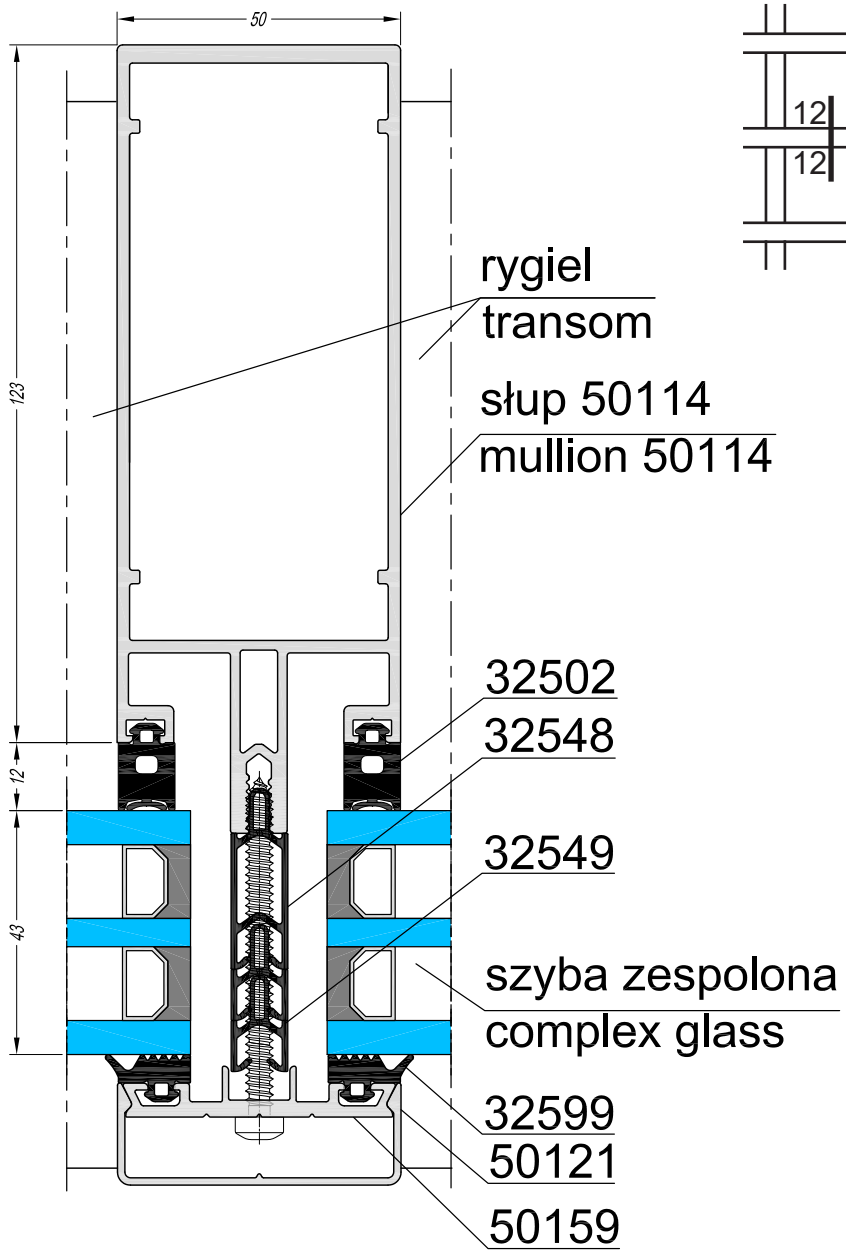
10-10


10
10

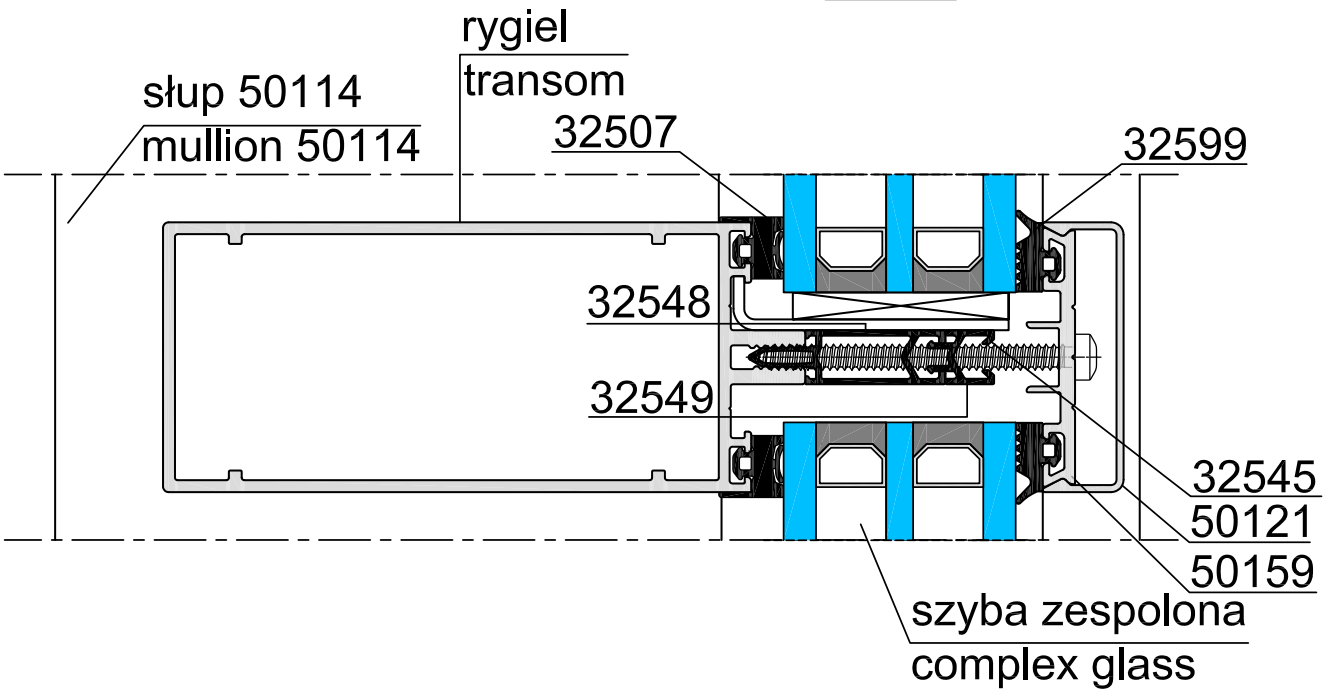

paroizolacja
vapour barier
płyta G-K ognioodp.
fire resistant plate G-K
2X12,5 mm
blacha stalowa 1 mm
steel sheet 1 mm
33581
50114
33210
pustka powietrzna
air space
szyba hartowana
hardened glass
33202
wełna mineralna
rock wool

11-11
bez odporności ogniowej
without fire resistant





12-12
bez odporności ogniowej
without fire resistant



Notatki
Notes

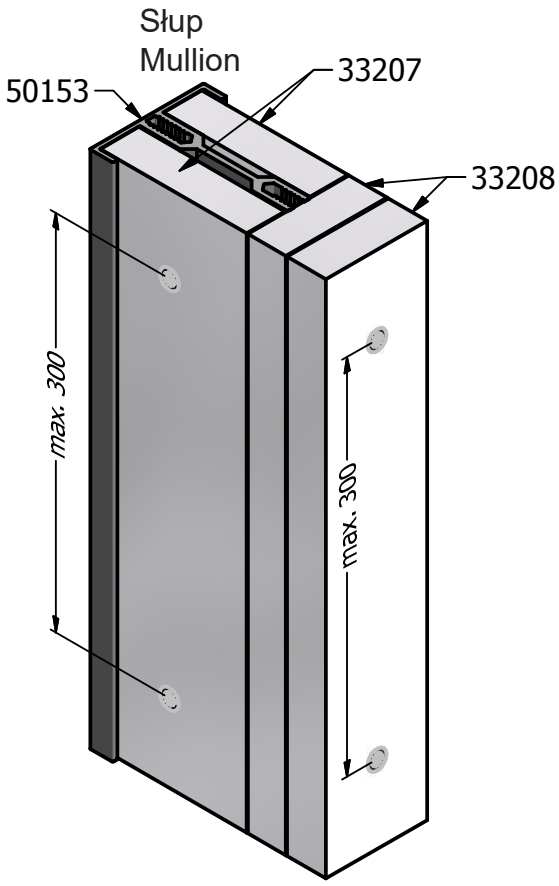
MORAD® SYSTEMY ALUMINIOWE

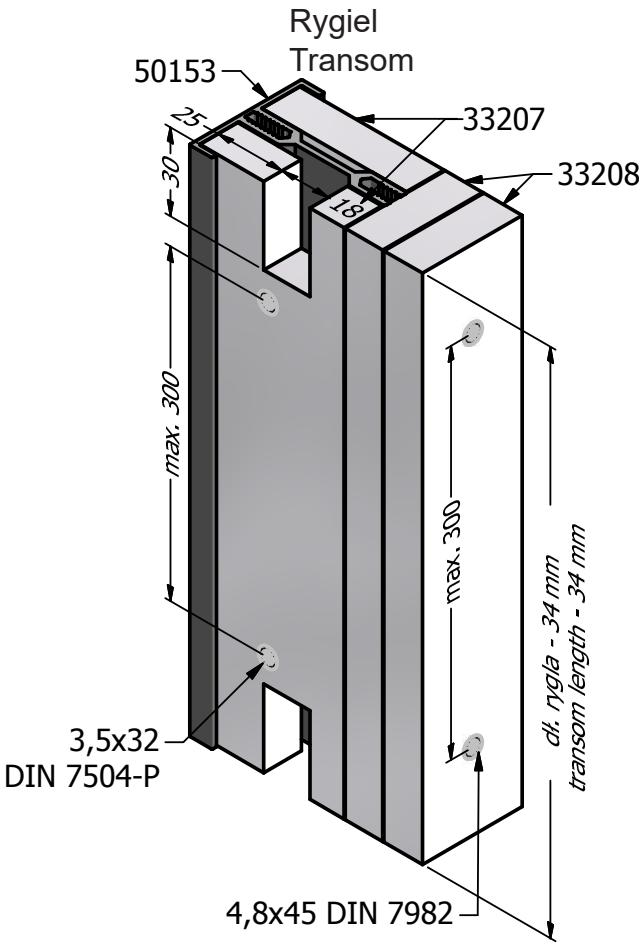
System AF-50 EI60

III
Obróbka i montaż
Machining and assembly

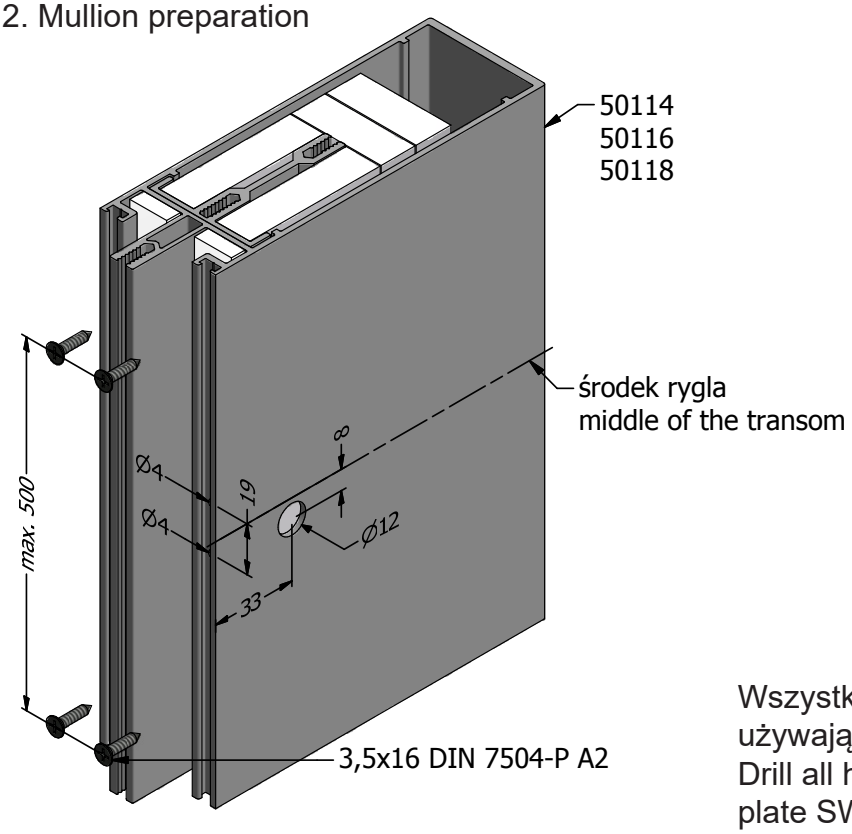
Kolejność montażu
The sequence of assembly

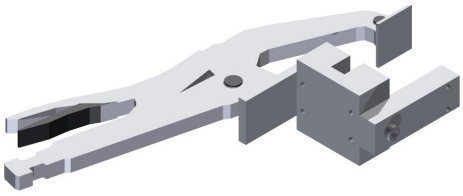
1. Przygotowanie rdzeni do słupów i rygli
1. Cores preparation for mullions and transoms





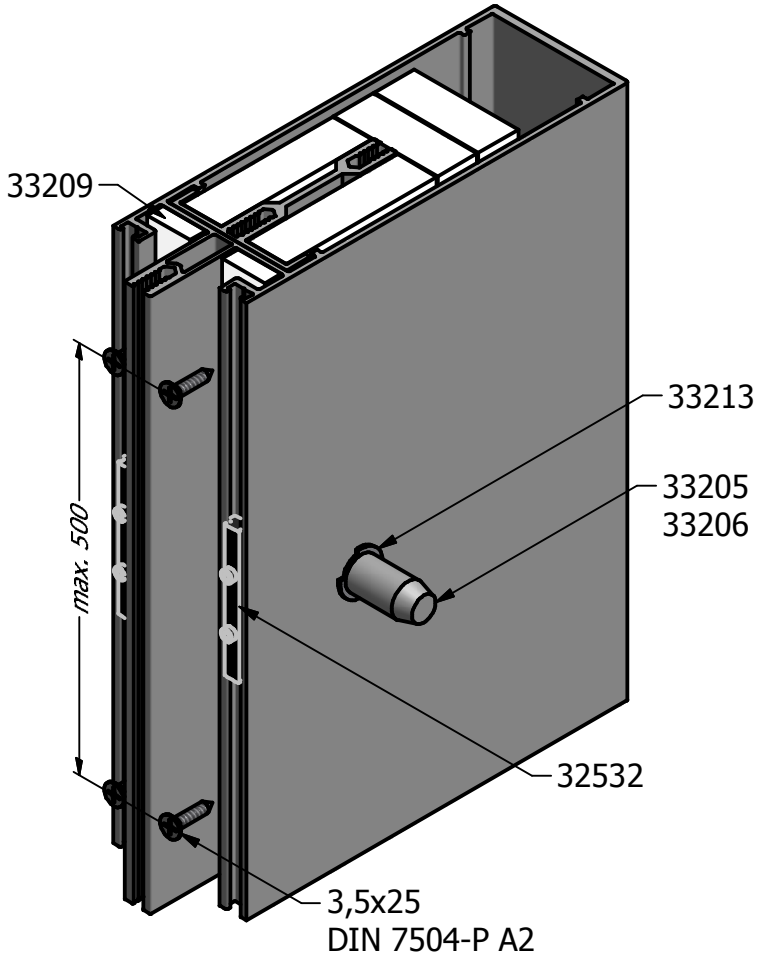
2. Przygotowanie słupów
2. Mullion preparation



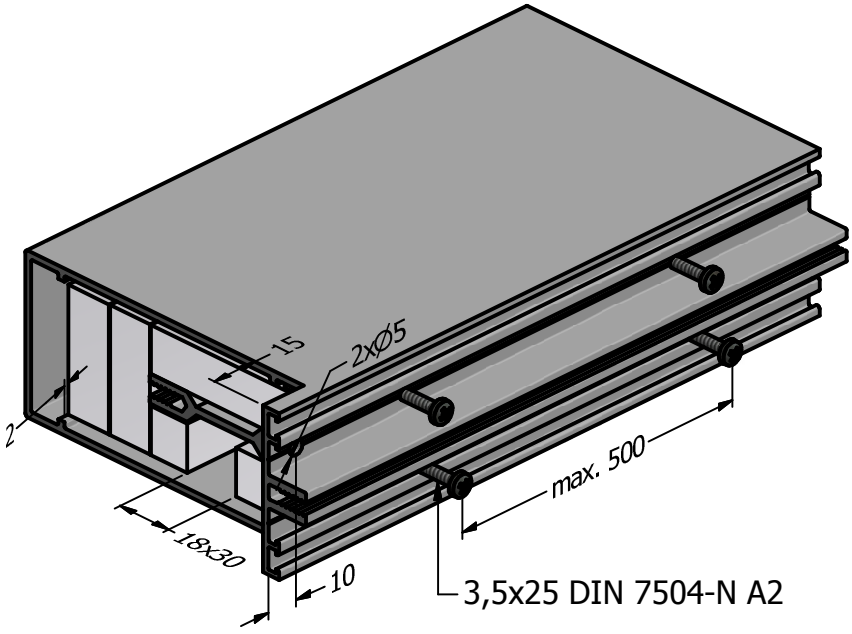


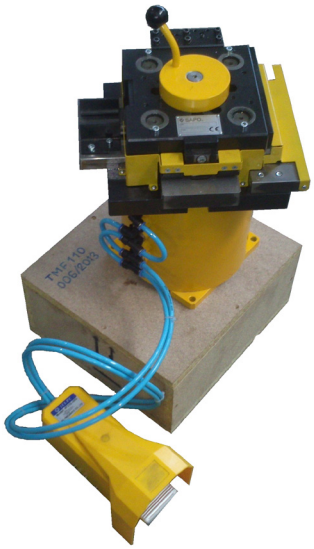
SW-50SEI

Wszystkie otwory w słupie można wiercić używając szablonu wiertarskiego SW-50SEI
Drill all holes in mullion with use drilling template SW-50SEI



3. Przygotowanie rygli
3. Transom preparation

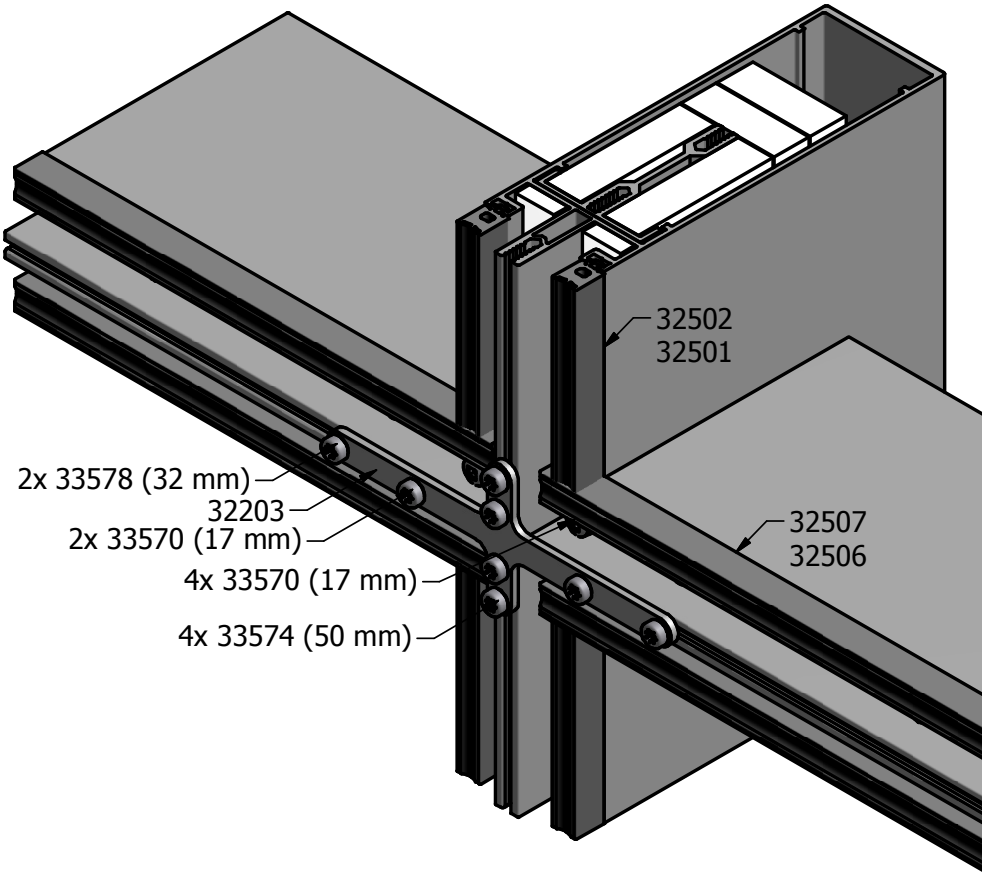


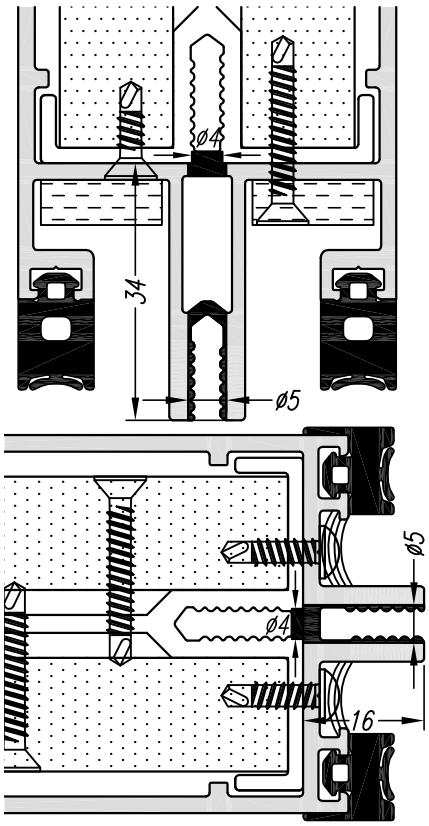


TMF-110+TMS-100

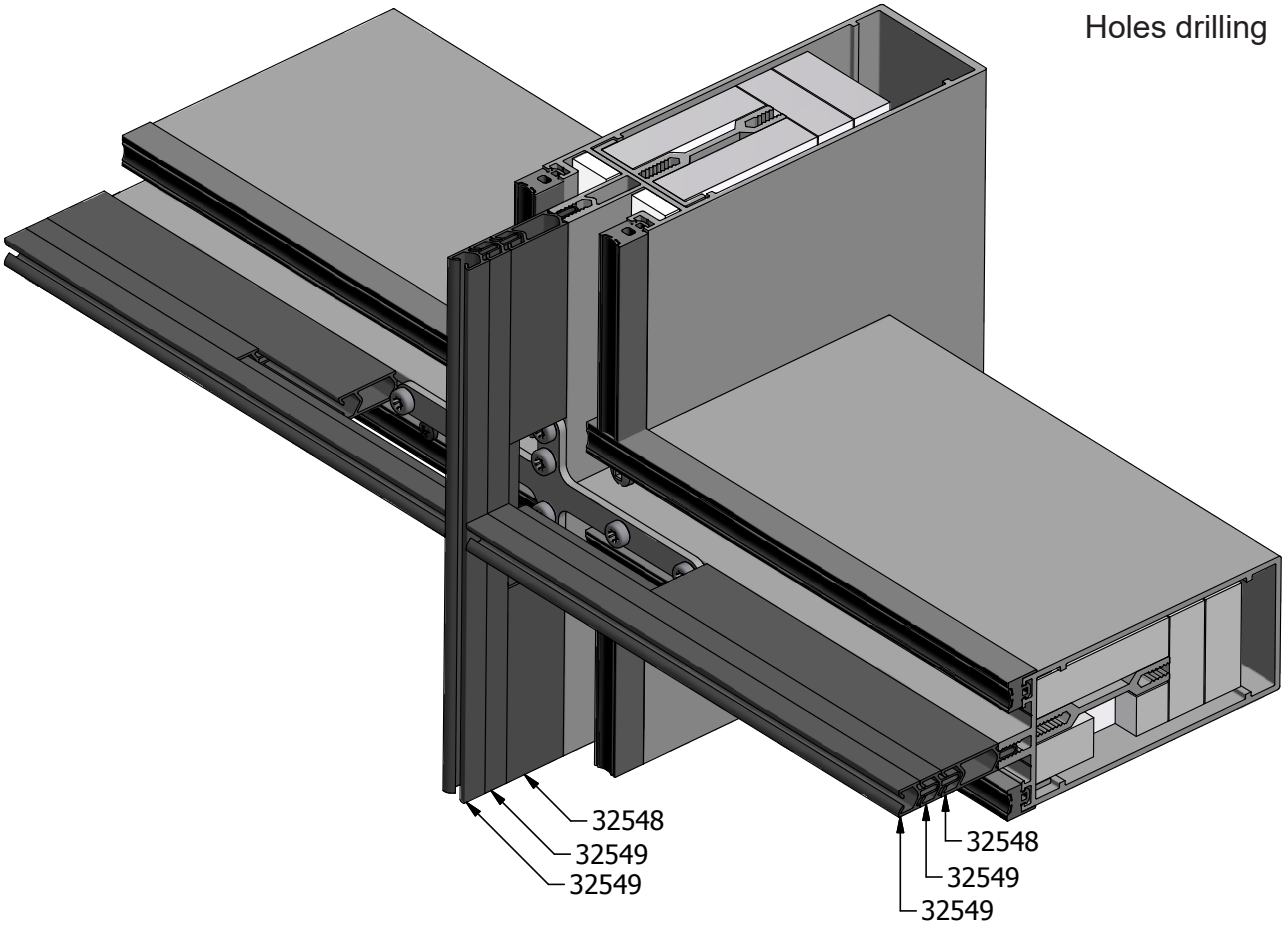
Otwory i podcięcie rygla można wykonać praską TMF-110 z siłownikiem TMS-100
Holes and transom punching can be done by using press TMF-110 with actuator TMS-100

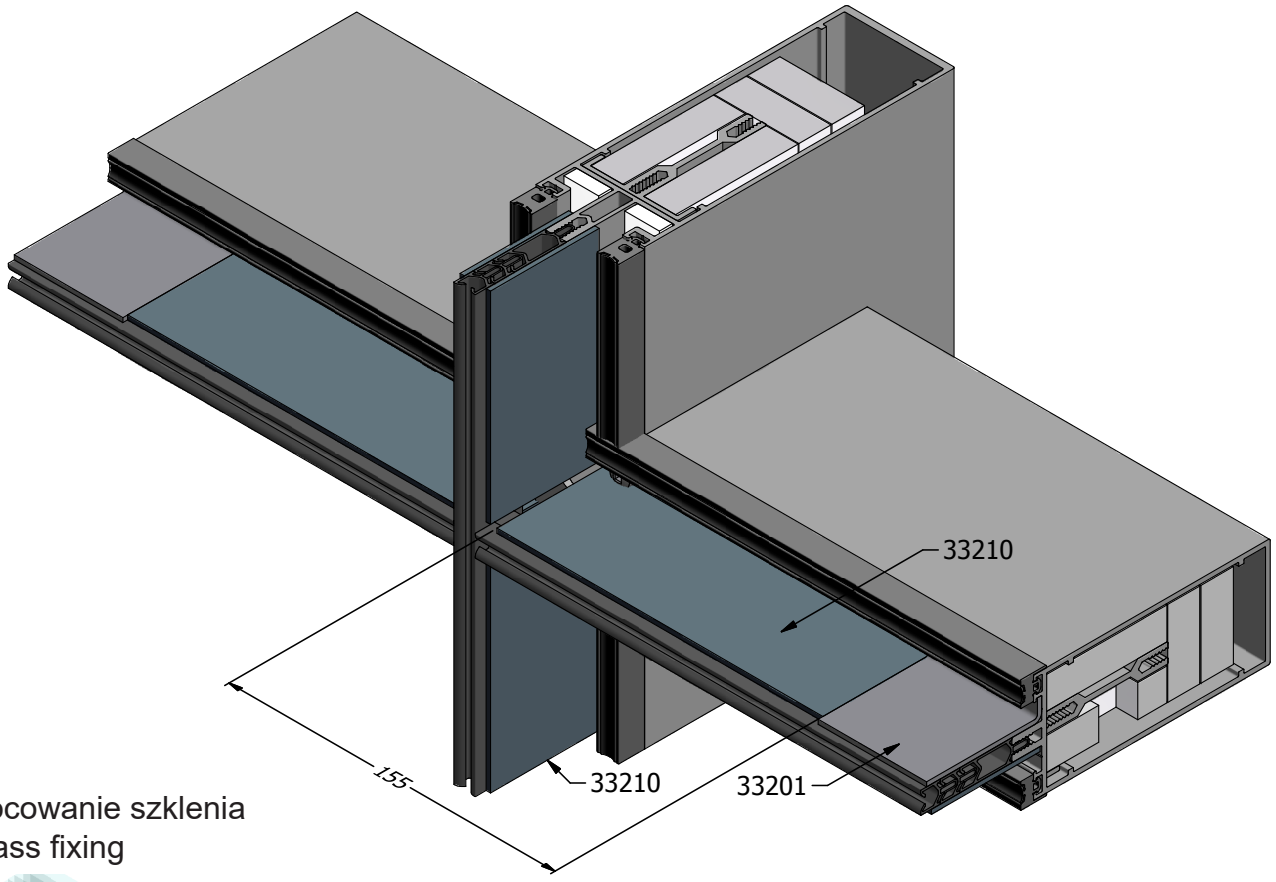
4. Montaż fasady
4. Facade assembly



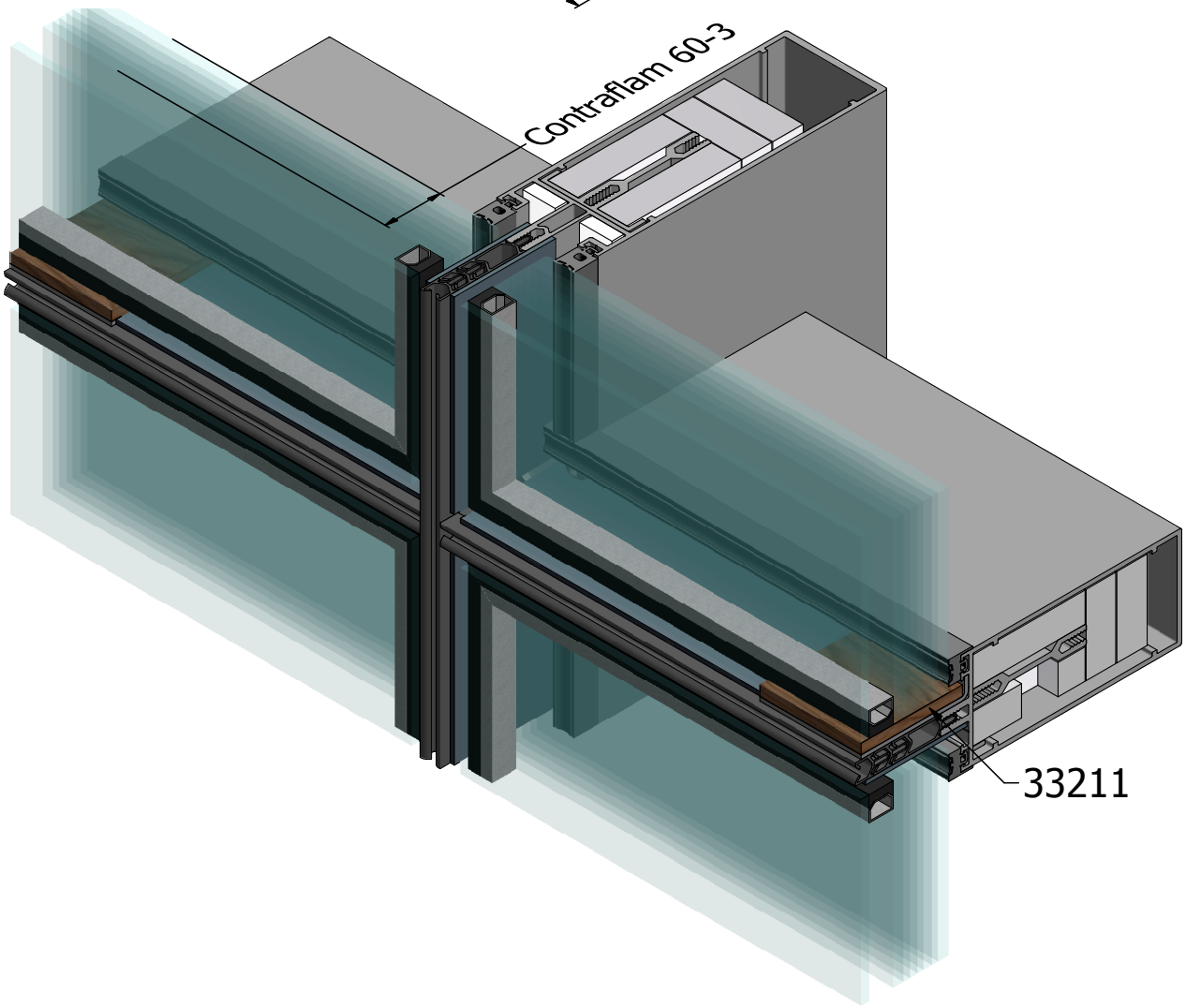


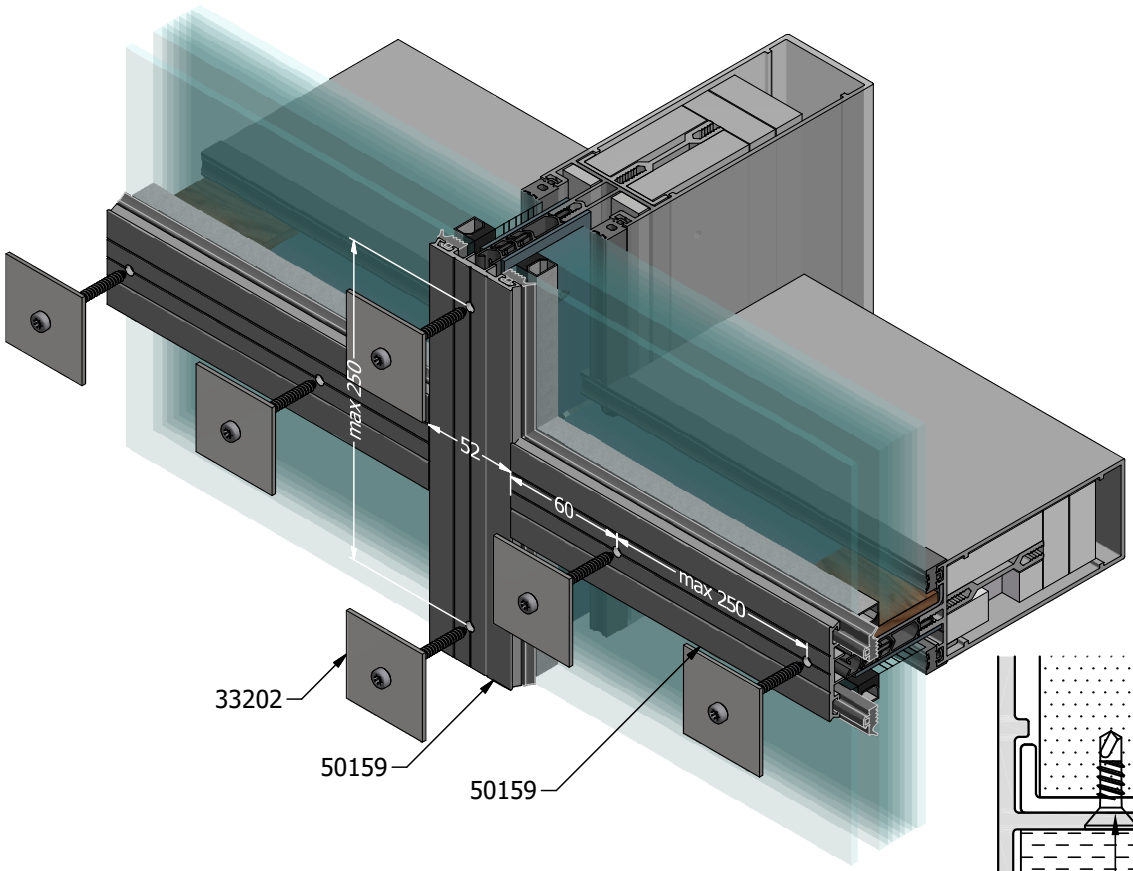
Wiercenie otworów
Holes drilling

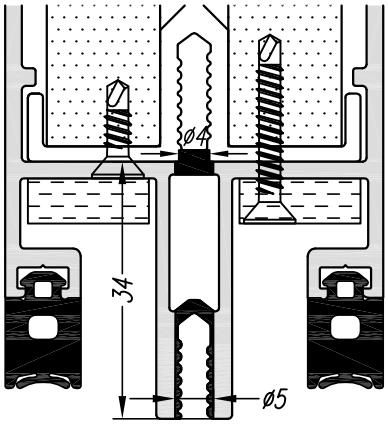


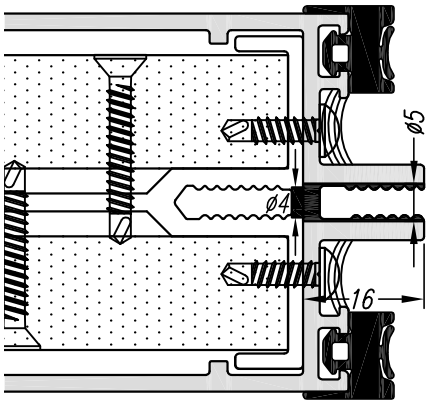


5. Mocowanie szklenia
5. Glass fixing

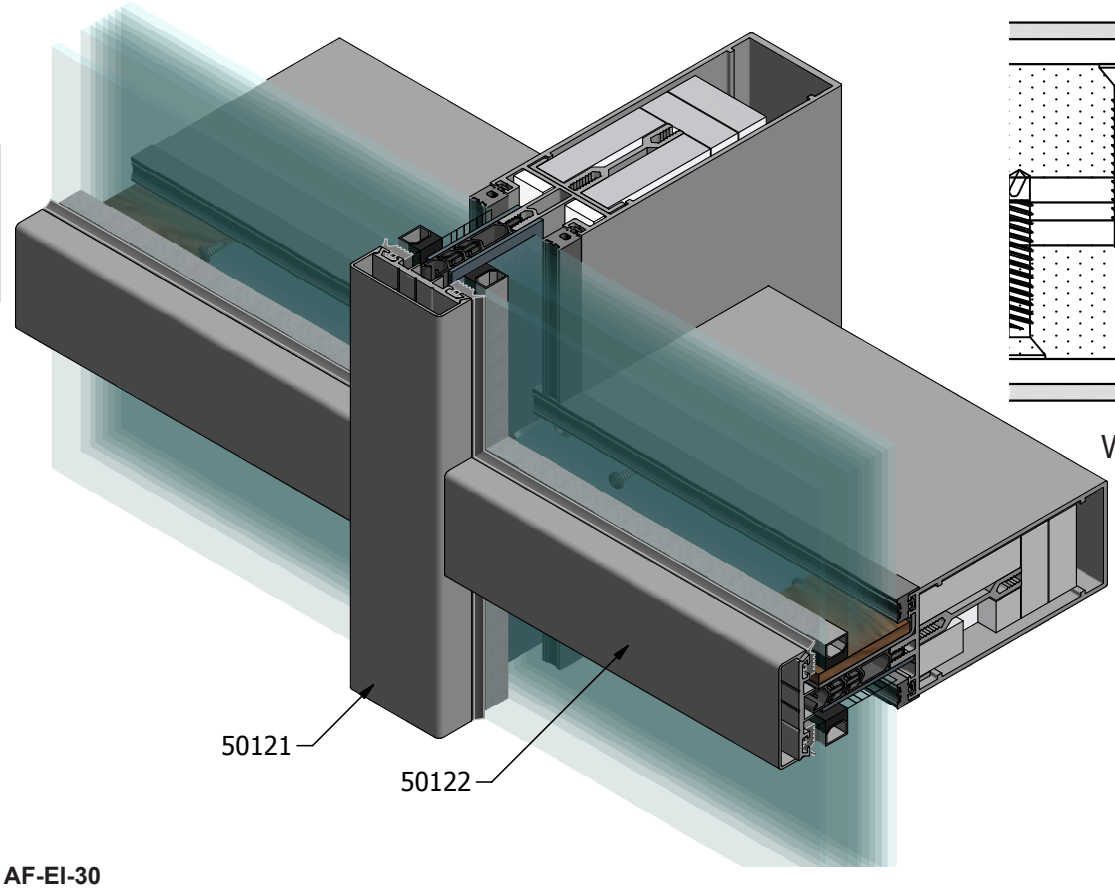




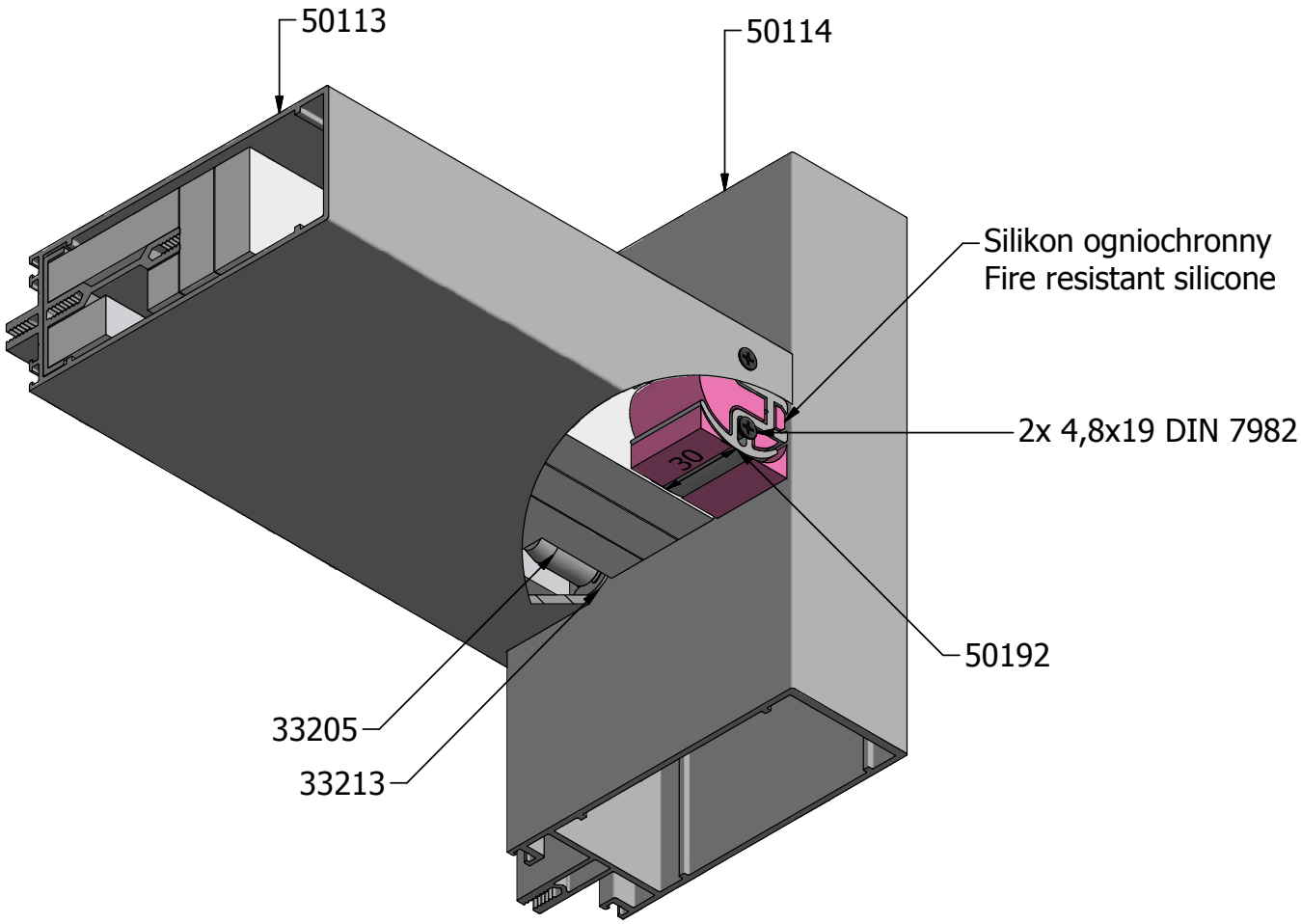


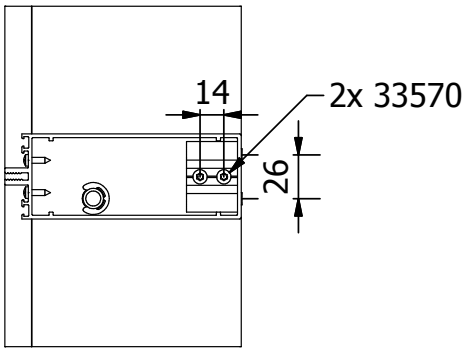


Wiercenie otworów
Holes drilling

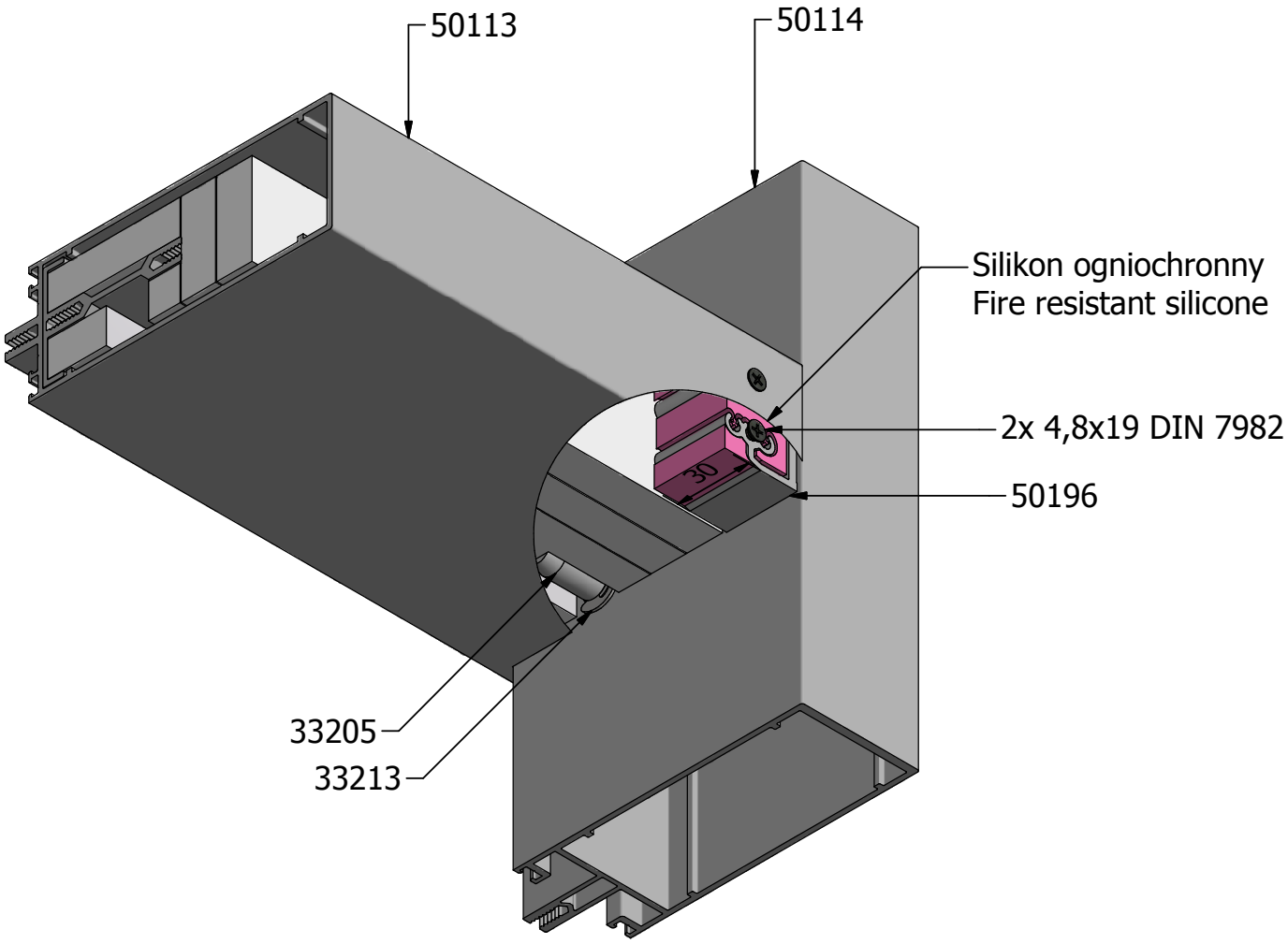


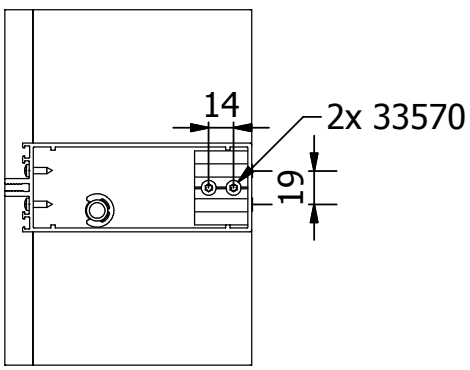
Montaż łącznika rygla
Fixing of transom connector



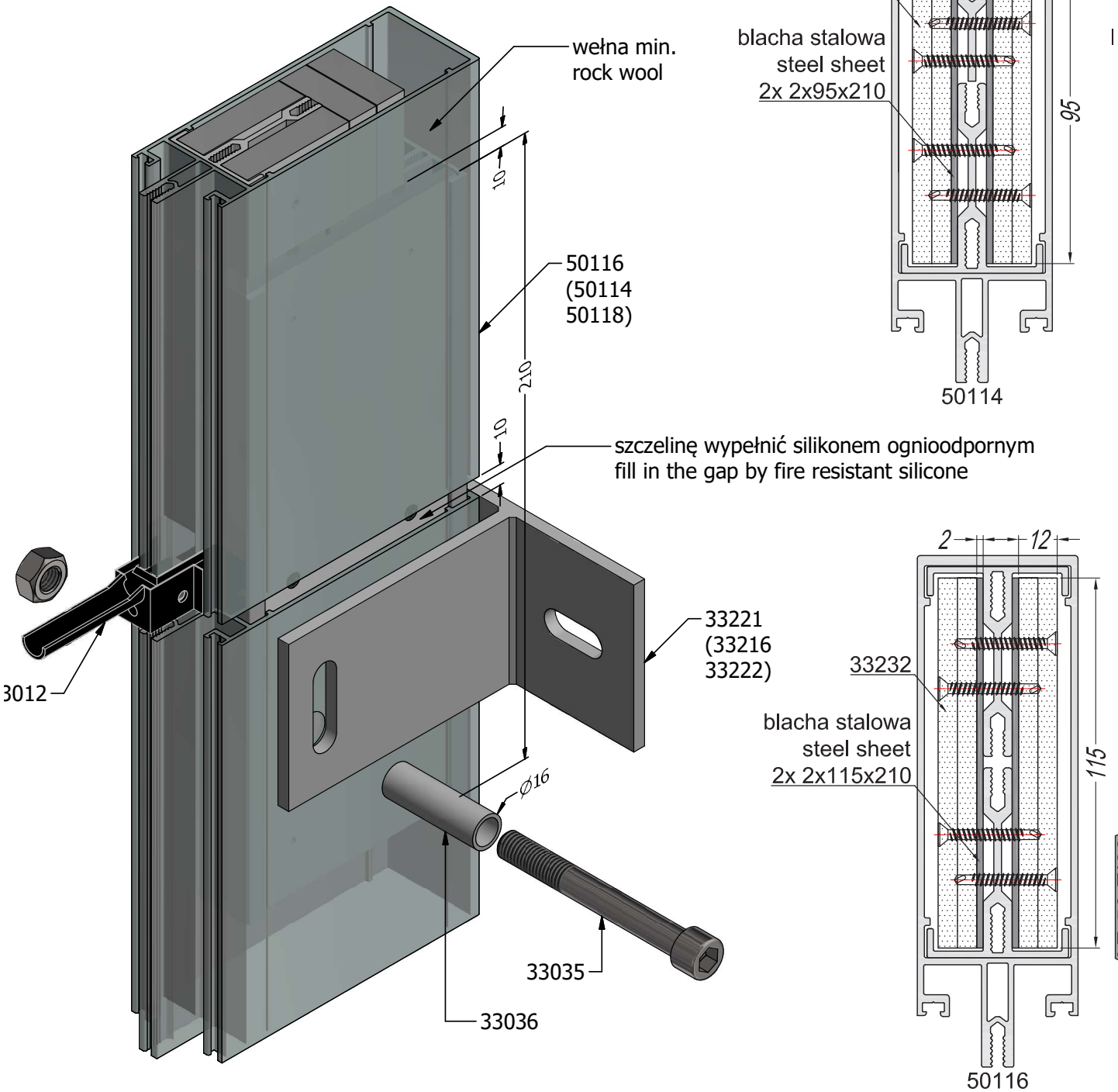


Montaż łącznika rygla 90°
Fixing of transom 90° connector

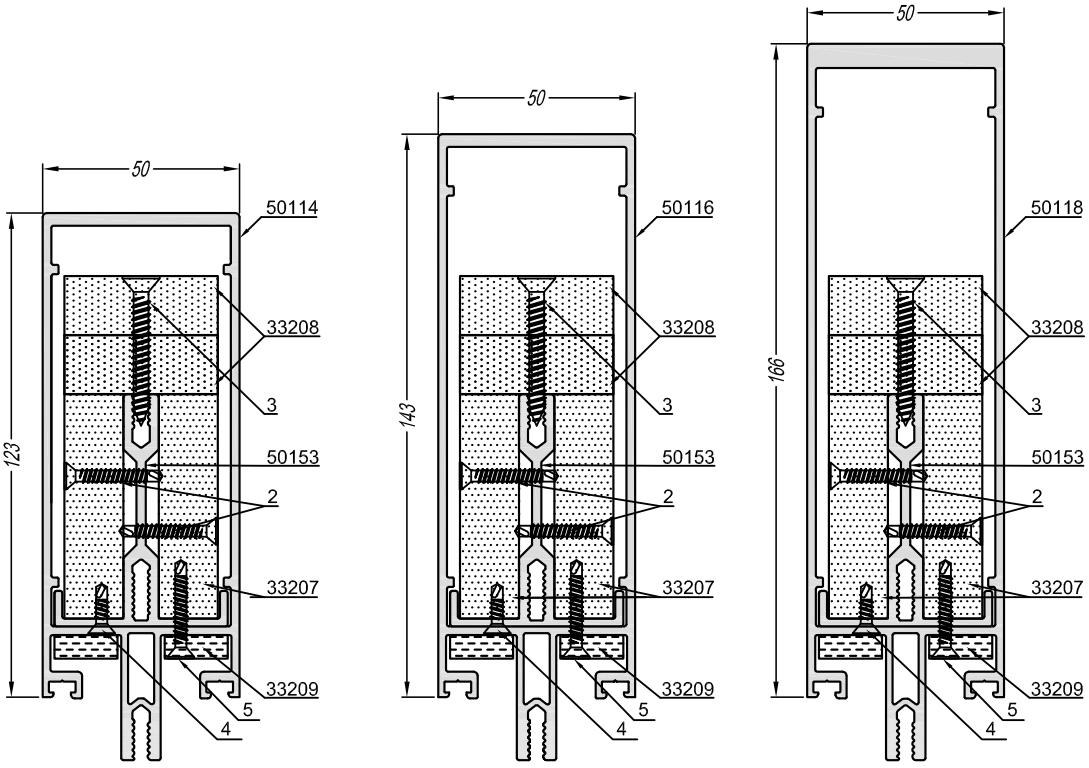




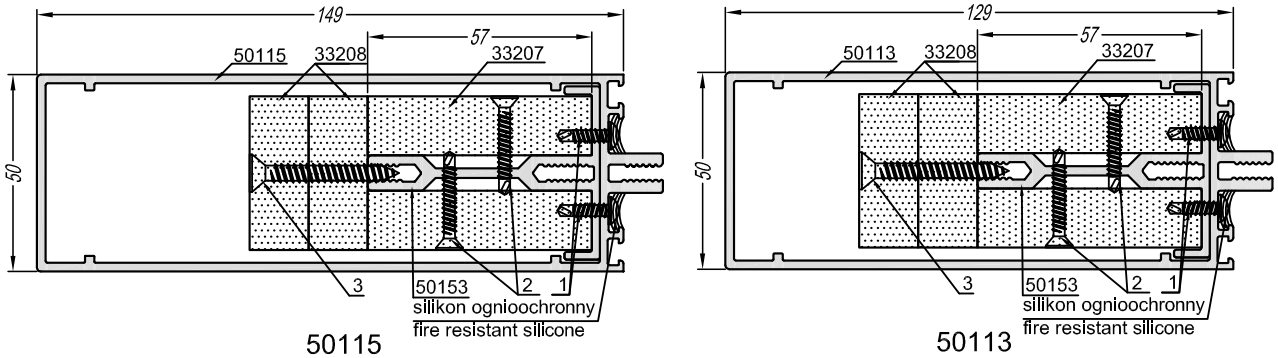
Łączenie słupów
Mullions connection



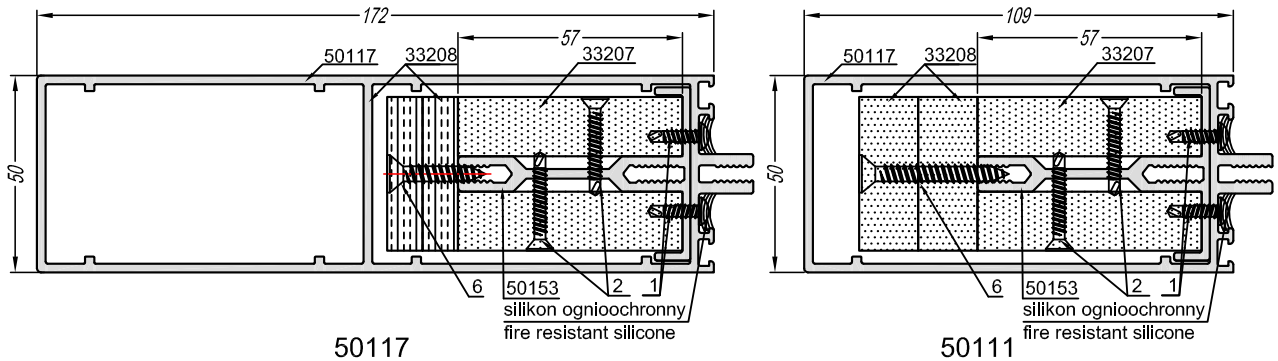
Wypełnienie rygli i słupów wkładami ogniochronnymi
Filling mullions and transoms by fire resistant inserts



50114 50116 50118



50115 50113

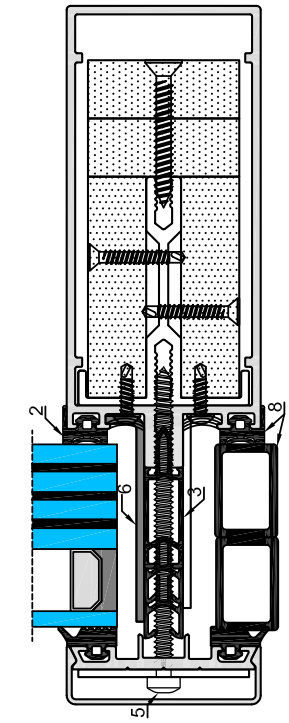


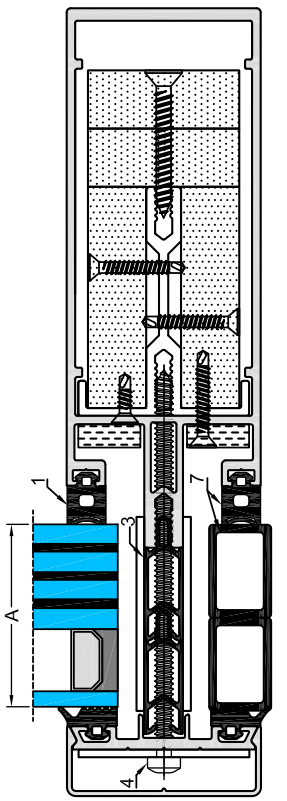
50117 50111

1 - wkręt 3,5x25 DIN 7504-N A2 co 500
2 - wkręt 3,5x32 DIN 7504-P A2 co 300
3 - wkręt 4,8x45 DIN 7982 A2 co 300
4 - wkręt 3,5x16 DIN 7504-P A2 co 500
5 - wkręt 3,5x25 DIN 7504-P A2 co 300
6 - wkręt 4,8x25 DIN 7982 A2 co 300

Tabela szklenia
Glazing table

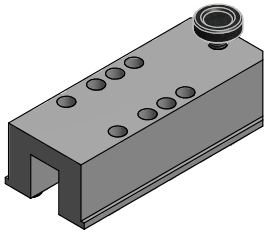
A	1	2	3	4	5	6	7	8	słup przy oknie	rygiel przy oknie	A
42÷43	32502	32507	32548	33581 - 100 mm	33580 - 80 mm	33201	2x 32551+32503	2x 32551+32508	32503 50132 50132	32508 50132 50132	42÷43
44÷45	32501	32506	32548 32549 32549								44÷45
46÷47	32501	32506					32550+32551+32502	32550+32551 +32507	32501 50131 50132	32506 50131 50131 50132	46÷47
48÷49	32503	32508	32548	33583 - 110 mm	33582 - 90 mm	33212	2x32550+32503	2x32550+32508	32501 50131 50132 50132	32506 50131 50132 50132	48÷49
50÷51	32502	32507									50÷51
52÷53	32501	32506	32548				32550+32551+32502	32550+32551 +32507	32501 50132 50132 50132 50131	32506 50132 50132 50132 50131	52÷53
54÷55										32507 50132 50132 50131	54÷55
56							32550+32551+32503	32550+32551 +32508	32502 50132 50132 50132 50131	32507 50132 50132 50132 50132	56



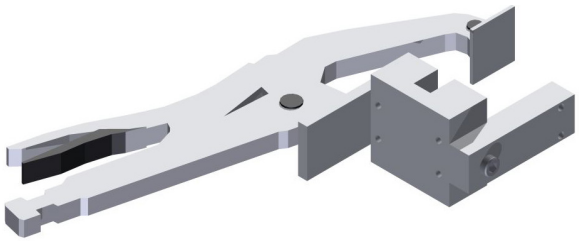


Oprzyrządowanie
Devices

SW-50R - Szablon wiertarski do otworowania rygla
SW-50R - Drilling template for making holes into the transom

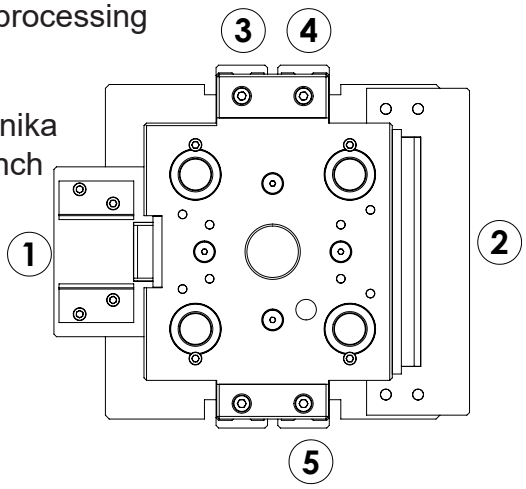


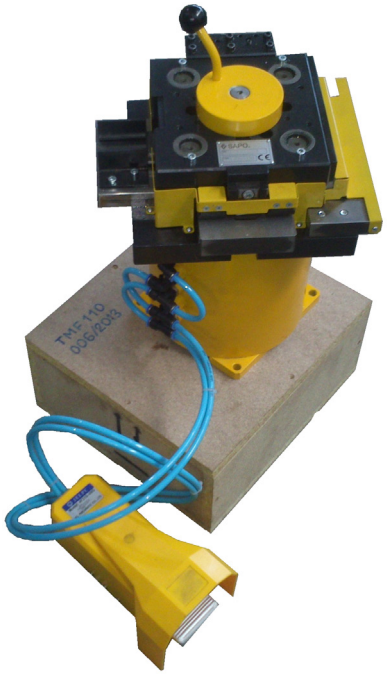
SW-50SEI - Szablon wiertarski do otworowania słupa
SW-50SEI - Drilling template for making holes in mullion



TMF-110 - wykrojnik do obróbki profili
TMF-110 - punch for profiles processing

TMS-100 - siłownik do wykrojnika
TMS-100 - actuator to the punch





1. Wykrawanie podcięcia rygla 15 mm lub 22 mm na tylnej ścianie rygla.
2. Wykrawanie podcięcia rygla 15 mm lub 22 mm na bocznej ścianie rygla.
3. Wybijanie 2 lub 4 otworów ø5 przy podcięciu rygla 15 mm.
4. Wybijanie 2 lub 4 otworów ø5 przy podcięciu rygla 22 mm.
5. Wykrawanie otworu odwodnienia listwy dociskowej i maskującej.