



# Instytut Techniki Budowlanej

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## CLASSIFICATION OF FIRE RESISTANCE IN ACCORDANCE WITH EN 13501-2:2016

<b>Order No:</b>	<b>01036/23/R765NZP</b>
<b>Owner of this report:</b>	<b>ALUPROF® S.A.</b> ul. Warszawska 153 43-300 Bielsko-Biała Poland
<b>Prepared by:</b>	<b>Instytutu Techniki Budowlanej</b> 1, Filtrowa St. PL 00-611 Warsaw  <b>Fire Research Department</b> Building Research Institute 21, Ksawerów St. PL 02-656 Warsaw
<b>Name of product:</b>	Curtain walls of ALUPROF® <b>MB-SR50N EI EI60</b> system
<b>Classification Report No.:</b>	<b>01036.4/23/R765NZP/ENG</b>
<b>Issue number:</b>	<b>1</b>
<b>Date of issue:</b>	<b>2023.12.07</b>
<b>Appendix</b>	<b>55 pages</b>

This classification report consists of 20 pages and may only be used or reproduced in its entirety.

## **1. INTRODUCTION**

The classification report defines the resistance classification assigned to the elements – aluminium framed, straight and faceted curtain walls of ALUPROF® MB-SR50N EI EI60 system, in accordance with the procedures given in PN-EN 13501-2:2016-07.

## **2. DETAILS OF CLASSIFIED PRODUCT**

### **2.1. Product and its functions**

The element – aluminium framed, curtain wall of ALUPROF® MB-SR50N EI EI60 system is defined as fire rated curtain wall.

### **2.2. Technical description**

#### **2.2.1. General information**

Schemes of non-load-bearing, aluminium, profiled curtain walls of the Aluprof® MB-SR50N EI60 system along with dimensions are shown in fig. 54, 55 in the Appendix.

Straight walls (see 2.2.2.) and faceted walls (see 2.2.3.) are allowed.

In both cases, the permissible vertical slope of the facade plane is 15°.

#### **2.2.2. Straight curtain walls**

The transom - mullion structures of the ALUPROF® MB-SR50N EI EI60 system are intended for constructing curtain walls and between floors walls in buildings. The components and exemplary cross-sections of the walls of the ALUPROF® MB-SR50N EI EI60 system are presented in fig. 1 - 46 in the Appendix.

### **Dimensions**

Maximum external dimensions of the curtain walls of the ALUPROF® MB-SR50N EI EI60 system:

- height: without restrictions (with maximum spacing of fixing points as described below),
- span length (spacing between floor slabs): 5850 mm,
- maximum axial spacing between mullions: 3050 mm,
- width: without restrictions.

### **Construction**

Straight curtain wall of the MB-SR50N EI system type EI60, are of transom - mullion structure. They are made of system aluminum profiles in accordance with tables below.

**Mullions**

cat. №	Mullion cross - section [mm] (width x depth)	Maximum allowed span length [mm] (distance between fixing points)
K430482X	50 x 85	4640
K430483X	50 x 105	
K430484X	50 x 125	
K431525X	50 x 145	5850
K431526X	50 x 165	
K431527X	50 x 185	
K431528X	50 x 205	
K431529X	50 x 225	

## Transoms:

cat. №	Transom cross - section [mm] (width x depth)
K431543X K431542X	50 x 69,5
K430491X K432153X	50 x 89,5
K430492X K432154X	50 x 109,5
K430493X K432155X	50 x 129,5
K431531X K432156X	50 x 149,5
K431532X K432157X	50 x 169,5
K431533X K432158X	50 x 189,5

It is necessary to use horizontal expansion joints along the length of the mullions (at every storey) and vertical expansion joints in the places of the building expansion joints.

The load-bearing profiles of the structure (transoms and mullions) are reinforced with aluminum profiles and insulated with fire-resistant material made of type F plasterboards. Load-bearing profiles in are presented in fig. 1 - 6 in the Appendix.

The reinforcement profiles are jointed to the profiles of mullions and transoms using steel pins, cat. no. 80312107 (transom) and 80312108 (mullion).

The profiles of mullions and transoms are jointed with each other by means of overlays and additional steel connectors, cat. no. 80376051, 80376052 (one- and double-sided, respectively), attached to the vertical mullion on which the horizontal transoms were placed

Diagonal (angular) transom – mullion connections are allowed for the full range of angles.

## Fillings

### Transparent fillings

ALUPROF® MB-SR50N type EI60 curtain wall aluminium, framed structure is filled with insulating glazed units in accordance with the table below:

№	Glass type	min. thickness [mm]	max. glass dimensions in vertical arrangement	max. glass dimensions in horizontal arrangement	Manufacturer
1	Contraflam 60 TGU	67	w = 1800 mm h = 3600 mm A = 5,445 m <sup>2</sup>	w = 3000 mm h = 1800 mm A = 4,54 m <sup>2</sup>	Vetrotech Saint-Gobain
2	Pyrobel 25 EI60 TGU	66,6	w = 1680 mm h = 3100 mm A = 4,74 m <sup>2</sup>	w = 3000 mm h = 1620 mm A = 4,08 m <sup>2</sup>	AGC

Approved glass unit construction:

- Contraflam 60 TGU (ESG 6 ÷ 12/14 ÷ 24/ ESG 6 ÷ 12 /14 ÷ 24 / Contraflam EI60 27 mm,
- Pyrobel 25EG TGU (ESG 6 ÷ 12/14 ÷ 24/ ESG 6 ÷ 12 /14 ÷ 24 / Pyrobel 25EG 30,4 mm.
- Pyrobel 25 TGU (VSG 33.1 ÷ 66.2/14 ÷ 24/ ESG 6 - 12//14 ÷ 24/ Pyrobel 25 26,6 mm.

ESG 6 - 12 glass can be replaced with the following VSG or VSG ESG glass:

- 33.1, 33.2, 44.1, 44.2, 55.1, 55.2, 66.1, 66.2.

Approved material for making inter-pane frames thickness of 14 - 24: steel.

### Non-transparent fillings

It is allowed to make non-transparent panels with the following structure: double-sided cladding made of steel sheet thickness min. 0.8 mm, filling min. 2 x type F plasterboards thickness of min. 15 mm each (fixed in the same way as transparent fillings) and rock mineral wool thickness min. 120 mm and density min. 80 kg/m<sup>3</sup> / steel sheet thickness. min. 1.5 mm.

Permitted panel dimensions:

- 650 x 3000 mm (width x height).

## **Fixing fillings**

The clamp beads cat. No. K417890X K417895X, K432163X, K431512X, K430412X are used as external fixing of the glazed unit, fastened to the internal structure through steel pressure plates cat. No 80322091 with M6 steel screws (cat. No. 80371326) spaced every 250 mm. The length of the M6 steel screws is selected depending on the thickness of the insulated glass in accordance with fig. 48 - 51 in the Appendix.

The sealing functions in the structure are fulfilled by system gaskets cat. No 120480 - 120489 made of EPDM and intumescent tape cat. No. 127108 or 127109:

- Kerafix made of Flexpan 200 NG-A material, manufactured by SVT,
- PUD manufactured by Carboline.

The intumescent tape is circumferentially glued to the mullions and transoms in the vicinity of infills and glazing units.

## **Spandrel**

The spandrel is made in an opaque version, with the following arrangement of layers (on the heated side):

- glazed unit: ESG 6 mm / spacer 16 mm / ESG 6 mm;
- rock mineral wool, thickness of 100 mm (at the level of the slab + 50 mm) with a density of 80 kg/m<sup>3</sup>.

Steel sheet angles with 0,80 mm thickness are screwed with 3.5×16 screws spaced by 400 mm to transoms limiting the inter-storey spandrel, and are cladded with 12,5 mm type F plasterboards.

The structure is bind on the inside with 1,5 mm steel angles mounted with steel rivets (cat. No. 87252403) in 400 mm spacing.

Load-bearing mullions are interrupted in the floor level with 10 mm dilatation allowing mullion expanding. The dilatation is made with system aluminium profile selected according to the mullion profile used. Dilatation profile is filled and cladded with type Promatect H insulation boards and spaced by insulators. System expansion joint profiles (including filling) are shown in fig. 28 - 29 in the Appendix.

## **Sealing of the horizontal linear gap**

Horizontal linear gap, maximum width of 50 mm, between the curtain wall of the ALUPROF® MB-SR50N EI EI60 system and the concrete slab. The horizontal linear gap is covered with multi-layer construction of following structure (layers from the inside):

- mineral wool with a minimum nominal density of 80 kg/m<sup>3</sup>,
- steel sheet. 0.8 mm,
- min. one layer of gypsum board type F min. 12,5 mm thick, fixed to the upper and lower plane of the concrete slab with 3.5 x 16 mm screws at a spacing of 400 mm.

### **Sealing of the vertical linear gap**

The vertical linear gap between the mullion of the PONZIO PF 152 system curtain wall and the associated wall (brick or reinforced) is tightly filled with mineral wool minimum density of 80 kg/ m<sup>3</sup>, protected with fire-retardant silicone and covered with in. one layer of gypsum board type F min. 12,5 mm thick, fig. 40 in the Appendix.

### **Fixing the curtain wall**

The MB-SR50N EI 60 curtain wall mullions are fixed using aluminium or steel brackets presented in fig. 21 – 25 in the Appendix.

The brackets are fixed to the mullions through steel sleeves by means of M12 x 95 mm screws. Fixed consoles are used in the upper slab floor level, and sliding consoles are used in the lower slab floor level.

The brackets are fixed to reinforced concrete floor slabs thickness of min. 200 mm using steel connectors (pins/pins/anchors) with a cross-section of 12 mm. The fixings are completely covered with rock mineral wool with a density of min. 40 kg/m<sup>3</sup>.

Examples of curtain walls fixing are presented in fig. 26, 27 in the Appendix.

### **2.2.3. Facated curtain walls**

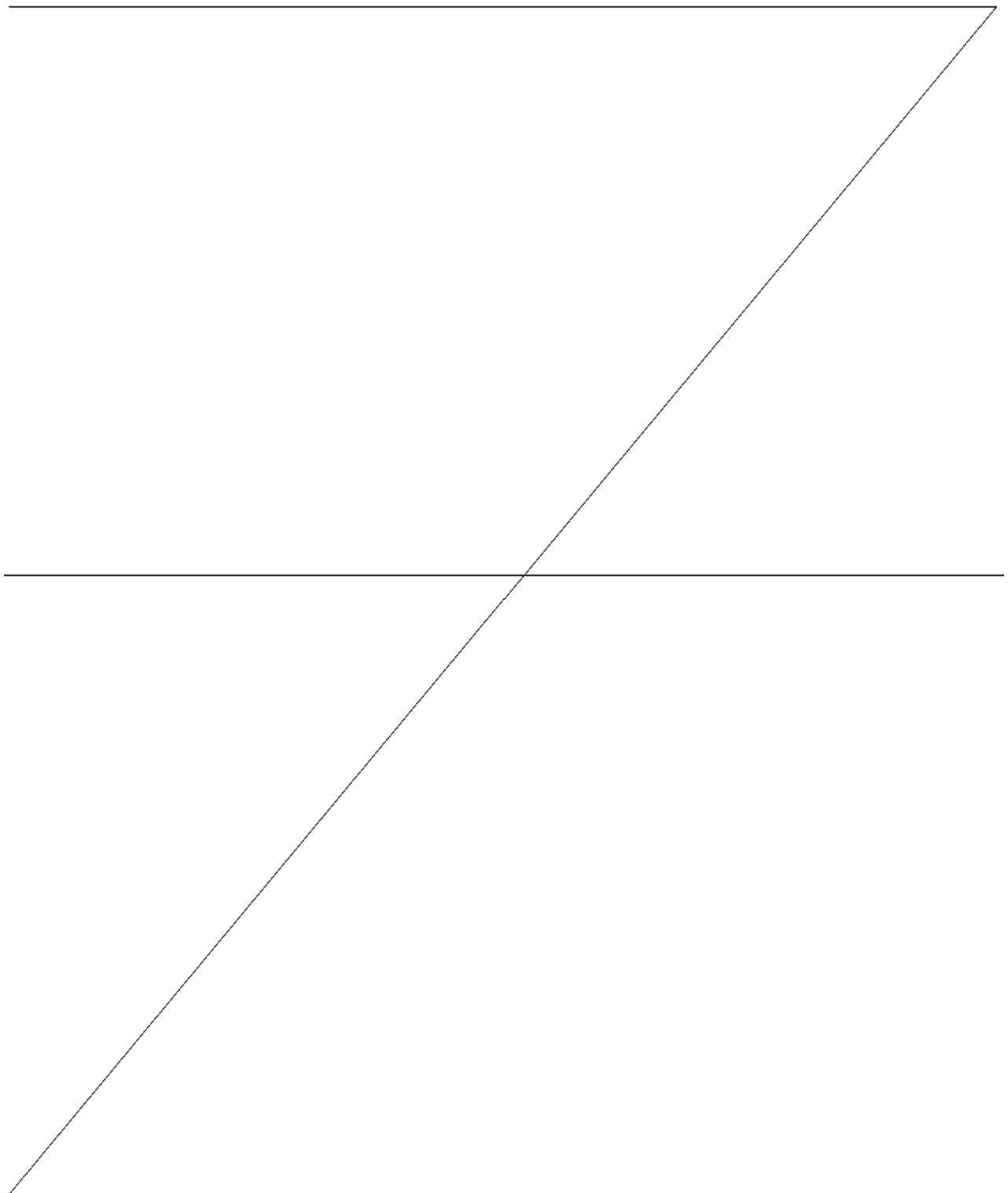
It is possible to build facated curtain walls of the ALUPROF® MB-SR50N EI EI60 system with facated angles for a full range of angles between adjacent segments. The structure of the facated curtain walls is the same as the ALUPROF® MB-SR50N EI EI60 curtain walls in the straight variant. Angle corners of facated curtain walls are made as opaque panels.

Construction of opaque panels: double-sided cladding in the form of steel sheet, thickness. min. 0.8 mm/ double plasterboard, type F, thickness 15 mm/stone mineral wool, thickness min. 120 mm and density 80 kg/m<sup>3</sup> / steel sheet, thickness. 1.5 mm. From the inside, the corners are stiffened with steel angles 1.5 mm thick, fastened with steel rivets, cat. no. 87252403, spaced every 400 mm.

Facet angles max  $\pm 7.5^\circ$  can be made without constructing non-transparent corners, using system gaskets cat No. 120492, 121578, 121579, 121580, 121581, 120493, 120887, 120552, 120888, 120594. Examples shown in fig. 32 – 33 in the Appendix. Selection of materials in accordance with fig. 51 - 52 in the Appendix.

### 3. NOTES

It is also possible to connect fire rated curtain walls of the MB-SR50N EI EI60 system with walls without fire resistance. In such a case, the curtain wall retains its nominal class, but the side wall mullion must be covered on both sides with min. 1 layer of GKF boards, and the gap between the curtain wall mullion, the fire-resistant wall of the building structure cannot be larger than 50 mm and must be tightly filled with mineral wool. An example of a solution for the vertical edge of fire walls is shown in fig. 46 in the Appendix.



#### 4. EXTENDED APPLICATION REPORTS AND TEST RESULTS IN SUPPORT OF THIS EXTENDED APPLICATION REPORT

##### 4.1. Fire resistance test reports of Aluprof® MB-SR50N EI60 curtain walls

Name of laboratory	Name of sponsor	Test report ref. No.	Date	Symbol
Fire Testing Laboratory Instytutu Techniki Budowlanej ul. Przemysłowa 2, 26-670 Pionki	ALUPROF® S.A.	LZP02-01036/22/R685NZN	30.12.2022	R1
Fire Testing Laboratory Instytutu Techniki Budowlanej ul. Przemysłowa 2, 26-670 Pionki	ALUPROF® S.A.	LZP03-01036/22/R685NZN	31.03.2023	R2
Fire Testing Laboratory Gryfitlab ul. Prosta 2, Łozienica 72-100 Goleniów	ALUPROF® S.A.	LBO-425/13	04.10.2013	R3
Fire Testing Laboratory Instytutu Techniki Budowlanej ul. Przemysłowa 2, 26-670 Pionki	ALUPROF® S.A.	LBO-447/13	28.02.2014	R4
Fire Testing Laboratory Instytutu Techniki Budowlanej ul. Przemysłowa 2, 26-670 Pionki	ALUPROF® S.A.	LPP05-1036/14/R148NP	01.08.2014	R5
Fire Testing Laboratory Instytutu Techniki Budowlanej ul. Przemysłowa 2, 26-670 Pionki	ALUPROF® S.A.	LZP01-1036/16/R239NP	30.06.2016	R6
Fire Testing Laboratory Instytutu Techniki Budowlanej ul. Przemysłowa 2, 26-670 Pionki	ALUPROF® S.A.	LPP01-01036/23/R756NP	22.08.2023	R7
Fire Testing Laboratory Instytutu Techniki Budowlanej ul. Przemysłowa 2, 26-670 Pionki	ALUPROF® S.A.	LPP01-01036/23/R756NP	24.08.2023	R8



#### 4.2. Test reports of doors/ windows of Aluprof system tested in Aluprof® MB-SR50N EI60 curtain walls

Name of laboratory	Name of sponsor	Test report ref. No.	Date	Symbol
Fire Testing Laboratory Gryfitlab ul. Prosta 2, Łozienica 72-100 Goleniów	ALUPROF® S.A.	LBO-839/16	26.06.2016	S1
FIRES Osloboditeľov 282, 059 35 Batizovce, Slovakia	ALUPROF® S.A.	FIRES-FR-103-11-AUNE	05.06.2011	S2

#### 4.3. Test reports of doors/ windows of Aluprof system tested in Aluprof® MB-SR50N EI60 curtain walls

Name of laboratory	Name of sponsor	Test report ref. No. / date of issue	Method/ standard
Fire Testing Laboratory Instytutu Techniki Budowlanej ul. Przemysłowa 2, 26-670 Pionki	ALUPROF® S.A	01036.2/23/R765NZP Issue No 1: 07.12.2023	PN-EN 15254-6:2014

#### 4.4. Test results

##### 4.4.1. Aluprof® MB-SR50N EI60 curtain walls tests results

Test method, number and date	Parameter	Results	
EN 1364-3:2014 LZP02- 01036/22/R685NZN  06-10-2022  ALUPROF MB-SR50N EI60 system curtain wall straight specimen  Max fillings dimensions 1500 x 3000 mm, 2500 x 1500 mm [width x height]  Curtain wall dimensions:  4098 x 5130 mm [width x height]  <b>(R1)</b>	<b>supporting construction</b>	Slabs: reinforced concrete slabs 200 mm  Associated walls: aerated concrete blocks thickness of 240 mm and density 600 kg/m <sup>3</sup>	
	<b>heating side</b>	From the outside	
	<b>Heating curve</b>	External	
	<b>integrity</b>	Cotton pad sustained flaming Gap gauges	75 min no failure 75 min no failure 75 min no failure
	<b>thermal insulation</b>	I	75 min no failure

Test lasted 75'27".

Test method, number and date	Parameter	Results
EN 1364-3:2014 LZP03- 01036/22/R685NZN  13-10-2022  ALUPROF MB-SR50N EI60 system curtain wall straight specimen  Max fillings dimentions 1500 x 3000 mm, 2500 x 1500 mm [width x height]  Curtain wall dimentions:  4622 x 5667 mm [width x height]  <b>(R2)</b>	<b>supporting construction</b>	Slabs: reinforced concrete slabs 200mm  Associated walls: aerated concrete blocks thickness of 240 mm and density 600 kg/m <sup>3</sup>
	<b>heating side</b>	From the inside
	<b>Heating curve</b>	Standard
	<b>integrity</b>	71 min no failure
	Cotton pad	71 min no failure
	sustained flaming	71 min no failure
Gap guages	71 min no failure	
<b>thermal insulation</b>	71 min no failure	

Test lasted 71'31".

Test method, number and date	Parameter	Results
EN 1364-3:2014 LBO-425/13  24-05-2013  ALUPROF MB-SR50N EI60 system curtain wall straight specimen  Max fillings dimentions 1500 x 3000 mm, 2400 x 1500 mm [width x height])  Curtain wall dimentions:  3998 x 4850 mm [width x height])  <b>(R3)</b>	<b>supporting construction</b>	Slabs: reinforced concrete slabs 250 mm  Associated walls: aerated concrete blocks thickness of 200 mm and density 600 kg/m <sup>3</sup>
	<b>heating side</b>	From the outside
	<b>Heating curve</b>	External
	<b>integrity</b> Cotton pad sustained flaming Gap guages	70 min no failure 70 min no failure 70 min no failure
	<b>thermal insulation</b> I	70 min no failure

Test lasted 70'09"

Test method, number and date	Parameter	Results
EN 1364-3:2014 LBO-447/13 18.07.2013  ALUPROF MB-SR50N EI60 system curtain wall straight specimen  Max fillings dimentions 1500 x 3000 mm, 2400 x 1500 mm [width x height] Curtain wall dimentions: 4638 x 4900 mm [width x height]  (R4)	<b>supporting construction</b>	Slabs: reinforced concrete slabs 200 mm  Associated walls: aerated concrete blocks thickness of 200 mm and density 600 kg/m <sup>3</sup>
	<b>heating side</b>	From the inside
	<b>Heating curve</b>	Standard
	<b>integrity</b> Cotton pad sustained flaming Gap guages	61 min no failure 61 min no failure 61 min no failure
	<b>thermal insulation</b> I	61 min no failure

Test lasted 61'16"

Test method, number and date	Parameter	Results
EN 1364-3:2014 LPP05-1036/14/R148NP  15-07-2014  ALUPROF MB-SR50N EI60 system curtain wall straight specimen  Max fillings dimentionions 1500 x 3000 mm, 2400 x 1500 mm [width x height]) Curtain wall dimentionions: 4522 x 5667 mm [width x height])  <b>R5</b>	<b>supporting construction</b>	Slabs: reinforced concrete slabs 200 mm  Associated walls: aerated concrete blocks thickness of 200 mm and density 600 kg/m <sup>3</sup>
	<b>heating side</b>	From the inside
	<b>Heating curve</b>	Standard
	<b>integrity</b>	Cotton pad 63 min no failure sustained flaming 63 min no failure Gap guages 63 min no failure
	<b>thermal insulation</b>	I 63 min no failure

Test lasted 61'16"

Test method, number and date	Parameter	Results
EN 1364-3:2014 LZZP01- 1036/16/R239NP  20-06-2016  ALUPROF MB-SR50N EI60 system curtain wall facated specimen  Max fillings dimentions 1231 x 3000 [width x height]) Curtain wall dimentions:  5678 x 5400 mm [width x height])  (R6)	<b>supporting construction</b>	Slabs: reinforced concrete slabs 200 mm  Associated walls: aerated concrete blocks thickness of 240 mm and density 600 kg/m <sup>3</sup>
	<b>heating side</b>	From the inside
	<b>Heating curve</b>	Standard
	<b>integrity</b> Cotton pad sustained flaming Gap guages	67 min no failure 67 min no failure 67 min no failure
	<b>thermal insulation</b> 	67 min no failure

Test lasted 67'06".

<b>Test method, number and date</b>	<b>Parameter</b>	<b>Results</b>	
EN 1364-3:2014 LZP01- 01036/23/R756NZN  22-08-2023  ALUPROF MB-SR50N EI60 system curtain wall straight specimen  Max fillings dimentions 1400 x 2800 mm 2500 x 1350 mm [width x height]) Curtain wall dimentions: 4522 x 5667 mm [width x height])  <b>(R7)</b>	<b>supporting construction</b>	Slabs: reinforced concrete slabs 200 mm  Associated walls: aerated concrete blocks thickness of 240 mm and density 600 kg/m <sup>3</sup>	
	<b>heating side</b>	From the inside	
	<b>Heating curve</b>	Standard	
	<b>integrity</b>	Cotton pad sustained flaming Gap guages	68 min no failure 68 min no failure 68 min no failure
	<b>thermal insulation</b>	I	68 min no failure

Test lasted 68'01".



Test method, number and date	Parameter	Results
EN 1364-3:2014 LZP02- 01036/23/R756NZZP  24-08-2023  ALUPROF MB-SR50N EI60 system curtain wall straight specimen  Max fillings dimentions 1400 x 2800 mm 2500 x 1350 mm [width x height]) Curtain wall dimentions: 3998 x 5130 mm [width x height])  <b>(R8)</b>	<b>supporting construction</b>	Slabs: reinforced concrete slabs 200 mm  Associated walls: aerated concrete blocks thickness of 240 mm and density 600 kg/m <sup>3</sup>
	<b>heating side</b>	From the outside
	<b>Heating curve</b>	External
	<b>integrity</b> Cotton pad sustained flaming Gap guages	68 min no failure 68 min no failure 68 min no failure
	<b>thermal insulation</b> I	68 min no failure

Test lasted 68'36".

#### 4.4.2. Test results of Aluprof® system doors/ windows in MB-SR50N EI60 curtain walls

Test method, number and date	Parameter	Results
EN 1634-1:2014 and EN 1364-3:2014 LBO-839/16	<b>supporting construction</b>	Slabs: reinforced concrete slabs 200 mm  Associated walls: aerated concrete blocks thickness of 240 mm and density 600 kg/m <sup>3</sup>
26-08-2016	<b>heating side</b>	From the inside
Double leaf doors of MB-78EI system in ALUPROF MB-SR50N EI60 system between floors curtain wall	<b>Heating curve</b>	Standard
Max fillings dimentions 1500 x 3000 mm, [width x height])	<b>integrity</b> Cotton pad sustained flaming Gap guages	62 min no failure 62 min no failure 62 min no failure
Curtain wall dimentions: 4554 x 4574 mm [width x height])  <b>(S1)</b>	<b>thermal insulation</b>  I	62 min no failure

Test lasted 62'12".

Test method, number and date	Parameter	Results
EN 1634-1:2009 FIRES-FR103-11-AUNE	<b>supporting construction</b>	Associated walls: aerated concrete blocks thickness of 240 mm and density 600 kg/m <sup>3</sup>
05-05-2011	<b>heating side</b>	From the inside
Double leaf doors of MB-78EI system in ALUPROF	<b>Heating curve</b>	Standard
MB-SR50N EI60 system between floors curtain wall  Max fillings dimentions 1000 x 2120 mm, [width x height]	<b>integrity</b>  Cotton pad  sustained flaming  Gap guages	70 min  70 min  35 min
Curtain wall dimentions:  4834 x 4000 mm [width x height]  <b>(S2)</b>	<b>thermal insulation</b>  I	64 min

Test lasted 74'10".

## 5. CLASSIFICATION AND FIELD OF APPLICATION

### 5.1. Reference of classification

This classification has been carried out in accordance with Clause 7.5.3. of PN-EN 13501-2:2016-07.

### 5.2. Classification

The elements – aluminium framed, transom – mullions curtain walls of ALUPROF® Aluprof® MB-SR50N EI60 system, described in section 2, are classified according to the following combinations of performance parameters and classes as appropriate:

R	E	I	W	t	t	-	M	S	C	IncSlow	sn	ef	r
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Fire resistance classification: EI 60 (o ↔ i) / EI 45 (o ↔ i)

## 6. FIELD OF APPLICATION

The classification, given in p. 5.2, is valid for direct field of application acc. to p. 13 of PN-EN 1364-3:2014 standard.

The classification, given in p. 5.2, is valid for extended field of application acc. to PN-EN 15254-6:2014 standard. Extended field of application according to PN-EN 15254-6:2014 is given in ITB work № 01036.3/23/R765NZZP/ENG.

Direct and extended field of application is included in point 2 of this classification report.

## 7. LIMITATIONS

This classification document does not represent type approval or certification of the product. This fire resistance classification has been issued in 2 copies. Additional signed copies can be issued by Fire Research Department of ITB on the request of the report's owner only.

**Appendix:** Technical documentation.

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2023-12-07, Warsaw

**Appendix**  
**To work № 01036.4/23/R765NZP/ENG**

*Issue No 1*

**Technical documentation**

**Curtain walls of ALUPROF® MB-SR50N EI EI60**

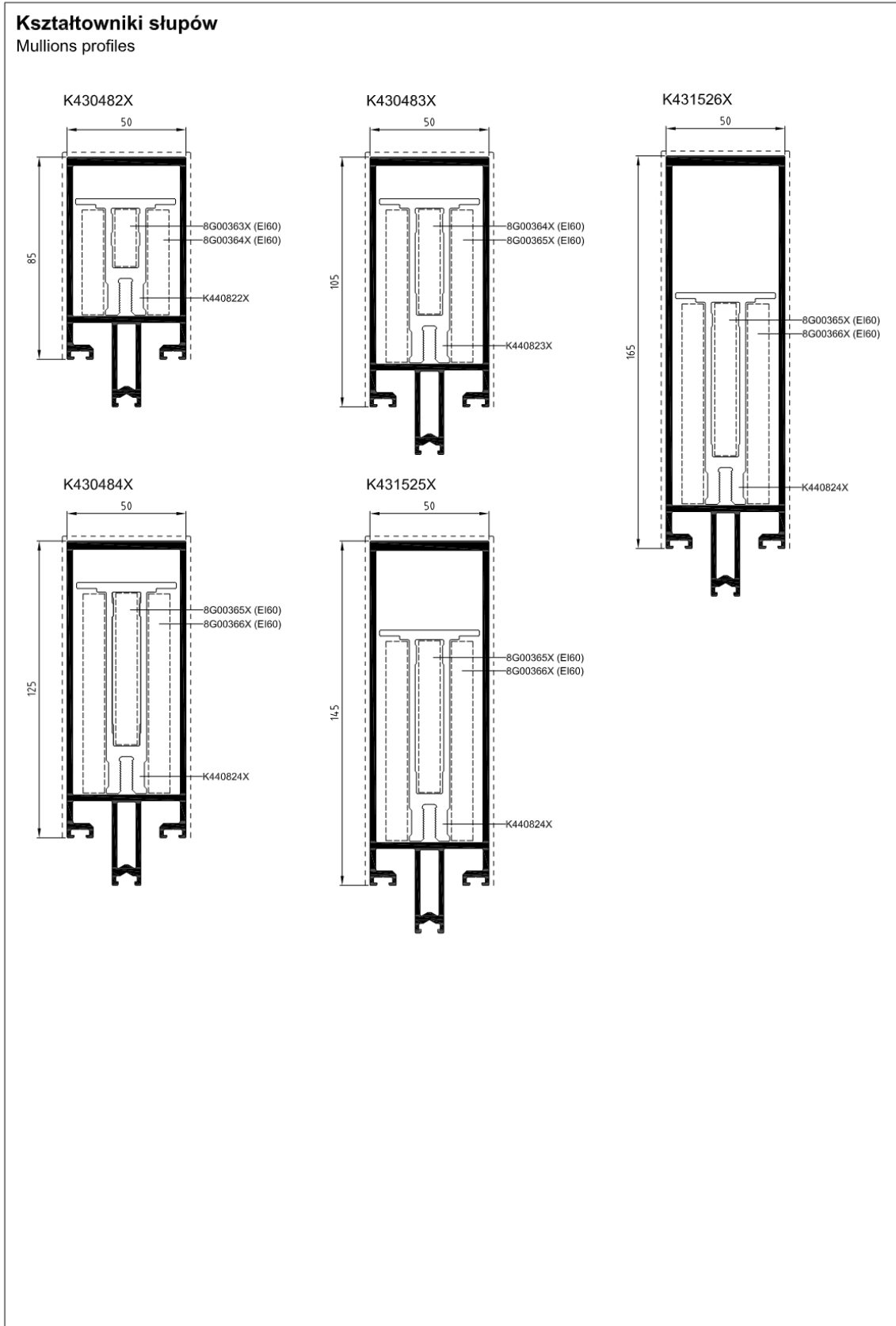


Fig. 1. MB-SR50N EI EI60 system mullions

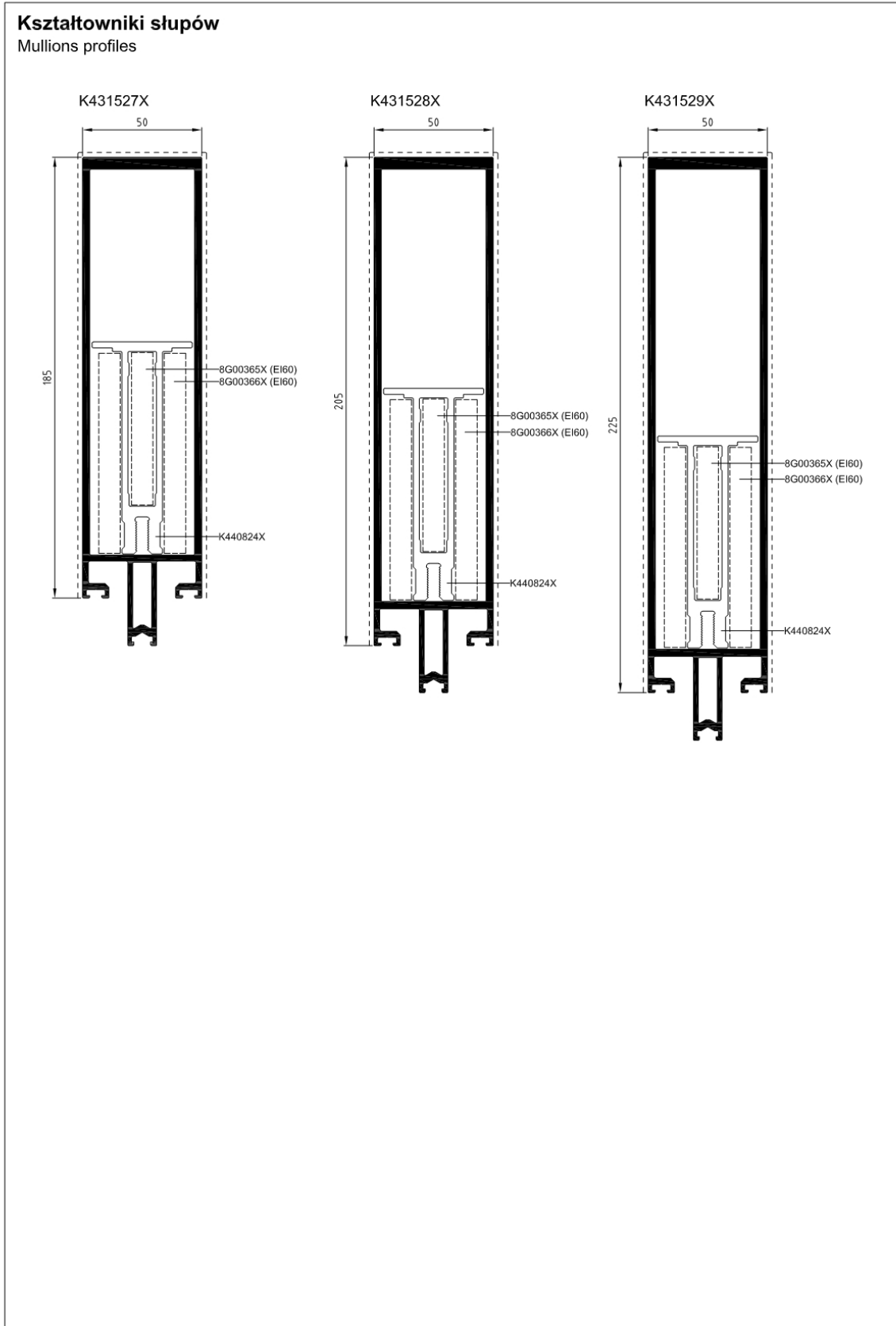
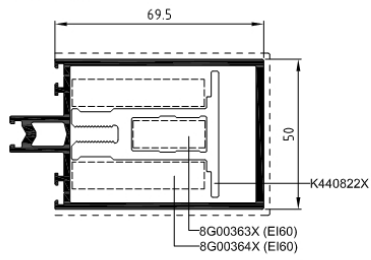


Fig. 2. MB-SR50N EI EI60 system mullions

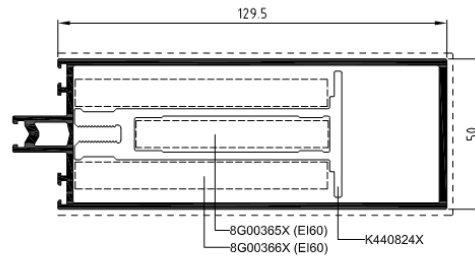
**Kształtowniki rygli**

Transom profiles

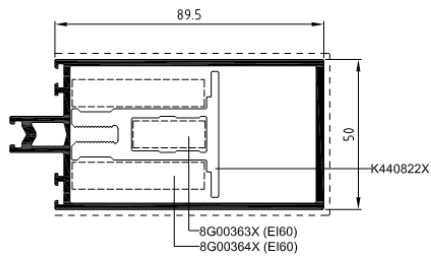
K431543X



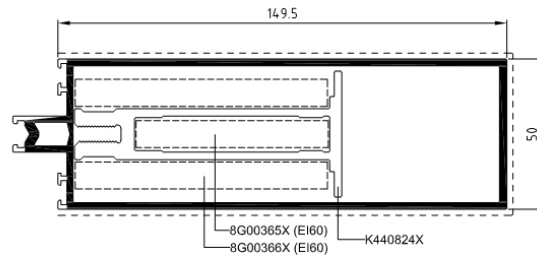
K430493X



K430491X



K431531X



K430492X

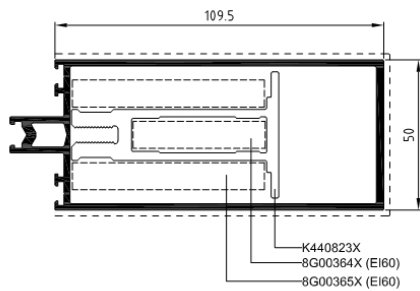


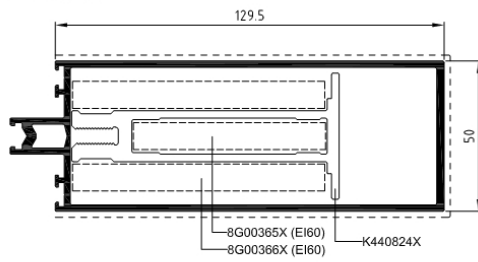
Fig. 3. MB-SR50N EI EI60 system transoms



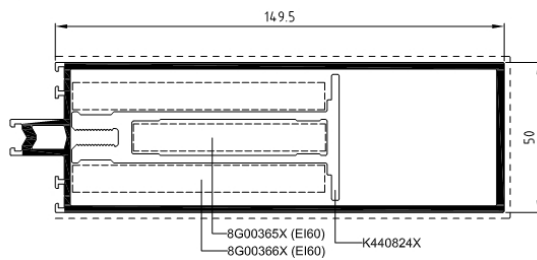
**Kształtowniki rygli**

Transom profiles

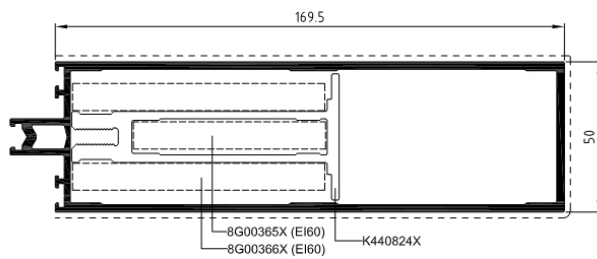
K430493X



K431531X



K431532X



K431533X

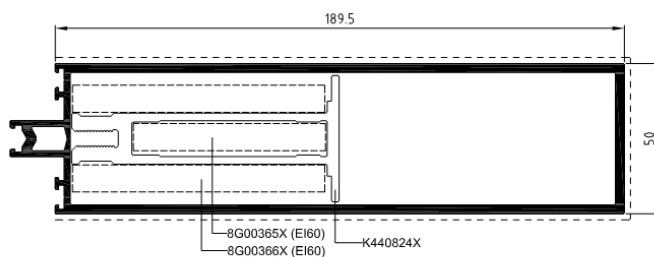


Fig. 4. MB-SR50N EI EI60 system transoms

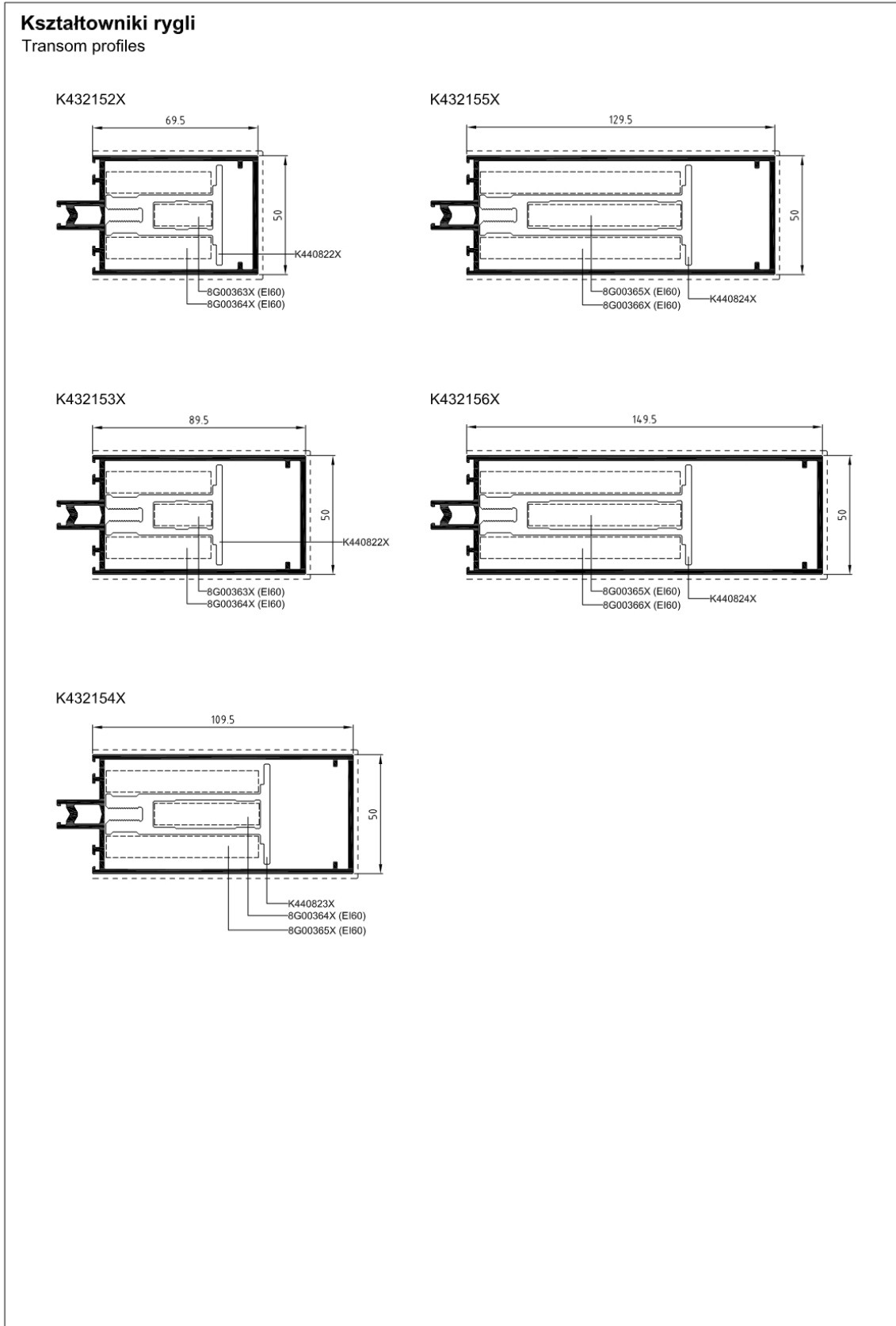


Fig. 5. MB-SR50N EI EI60 system transoms

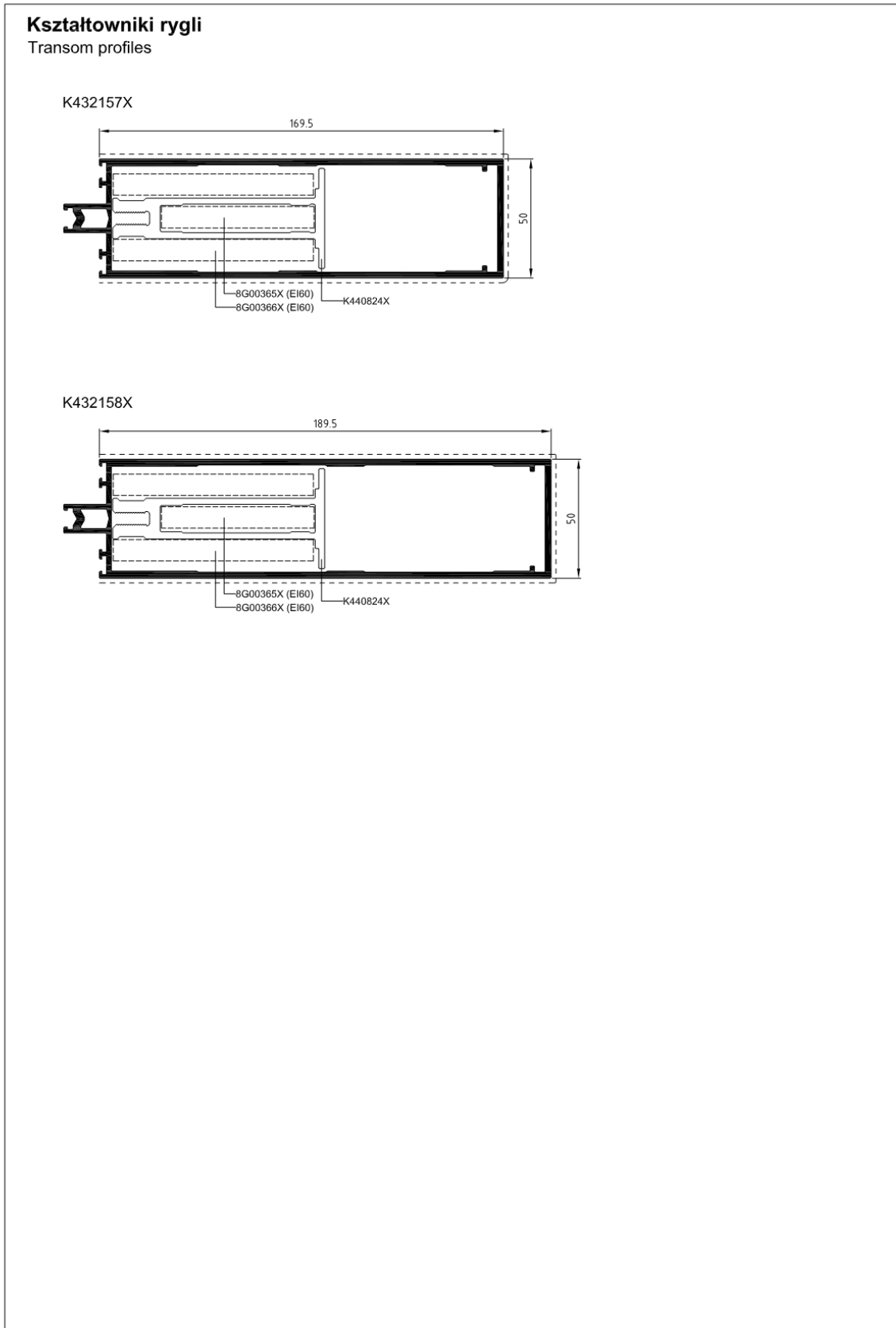


Fig. 6. MB-SR50N EI EI60 system transoms

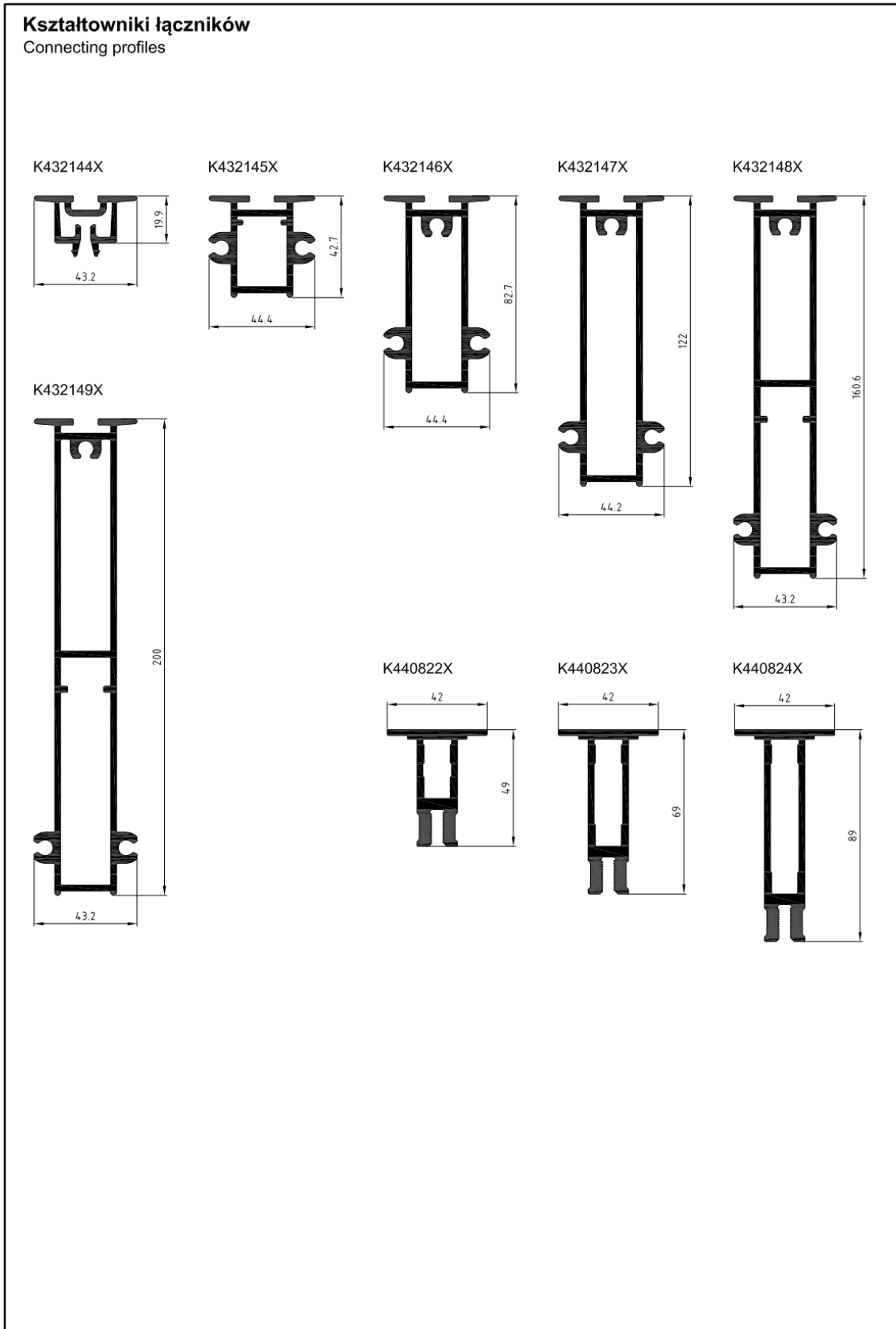


Fig. 7. MB-SR50N EI EI60 system connecting profiles

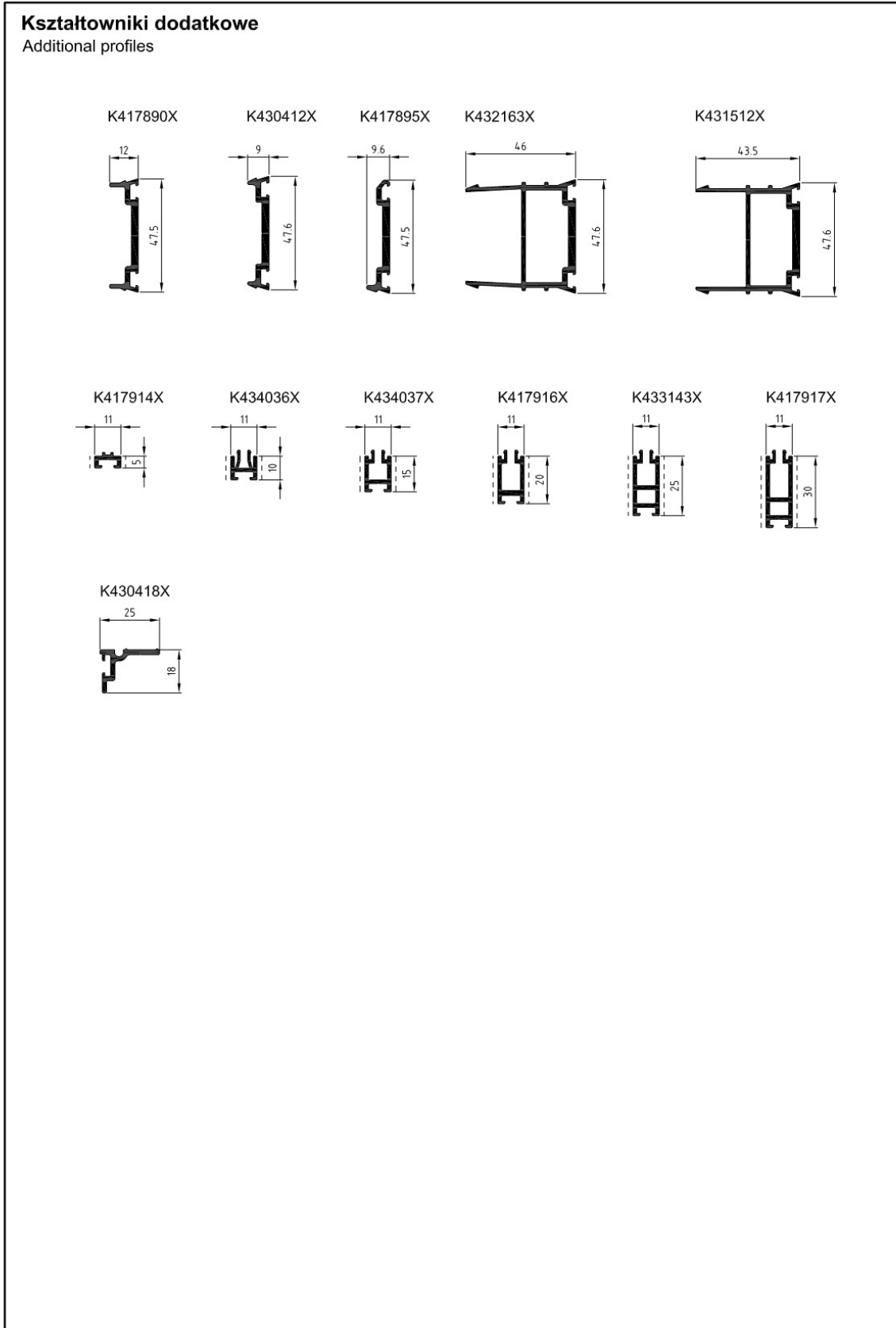


Fig. 8. MB-SR50N EI EI60 system additional profiles

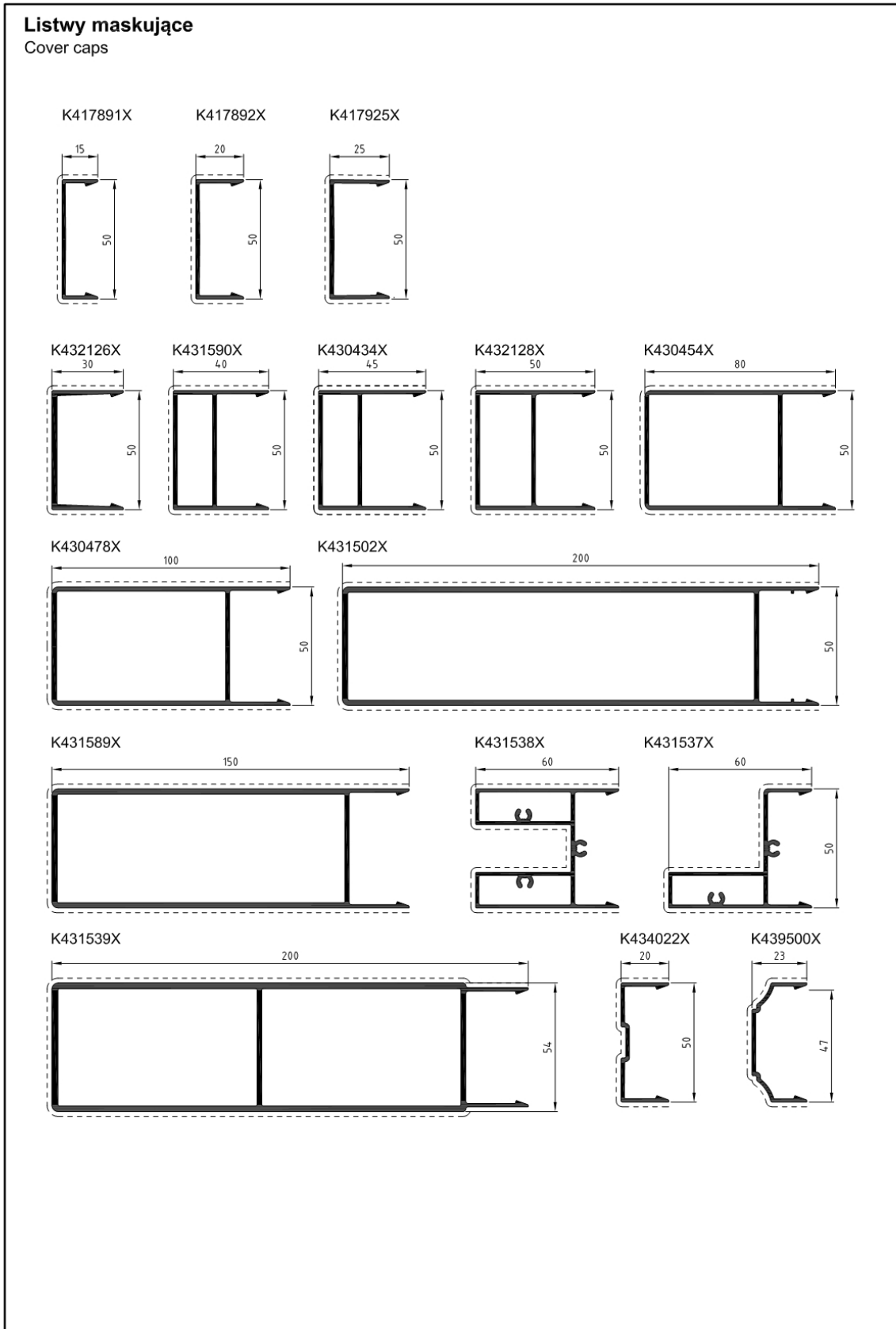


Fig. 9. MB-SR50N EI EI60 system cover caps

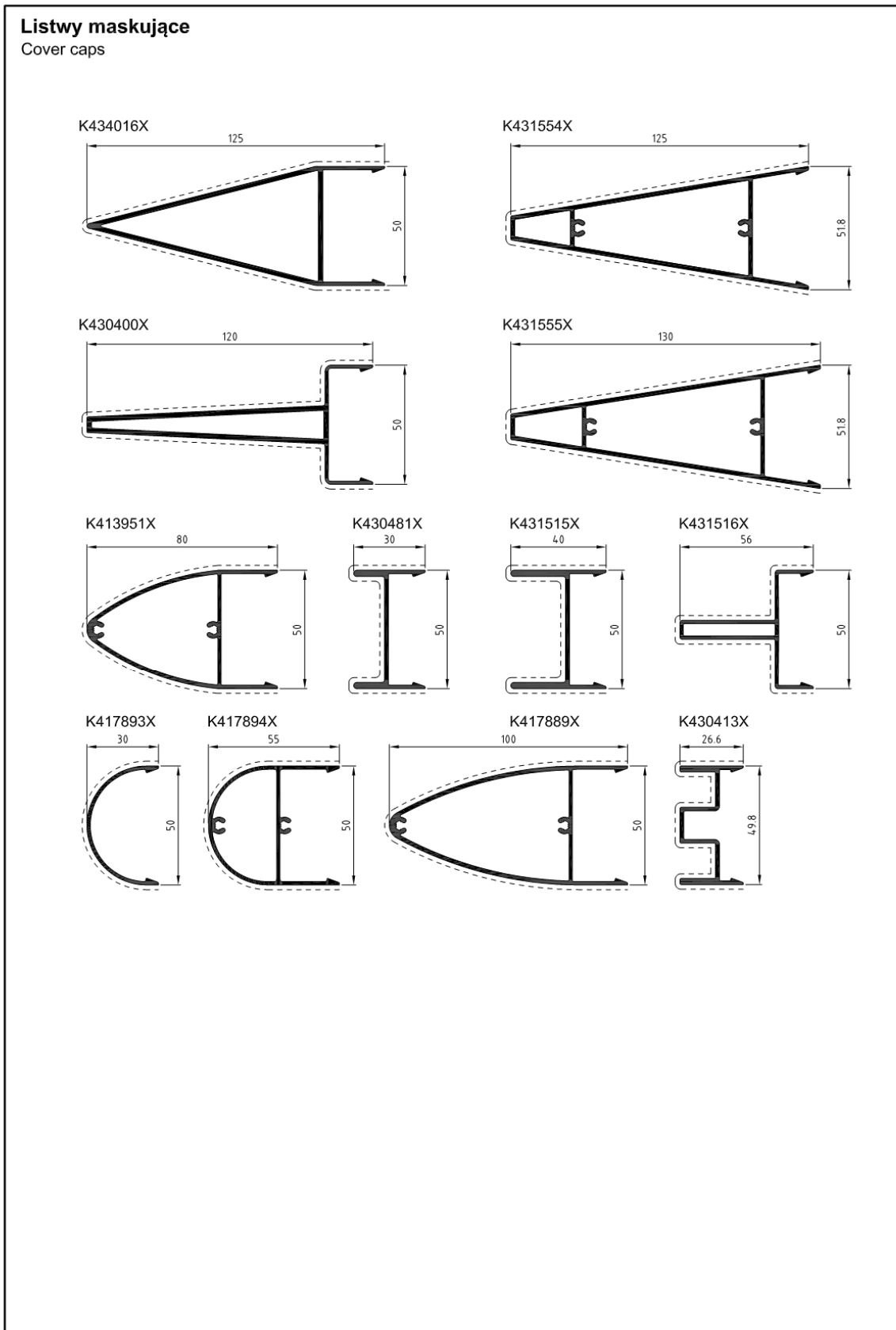


Fig. 10. MB-SR50N EI EI60 system cover caps

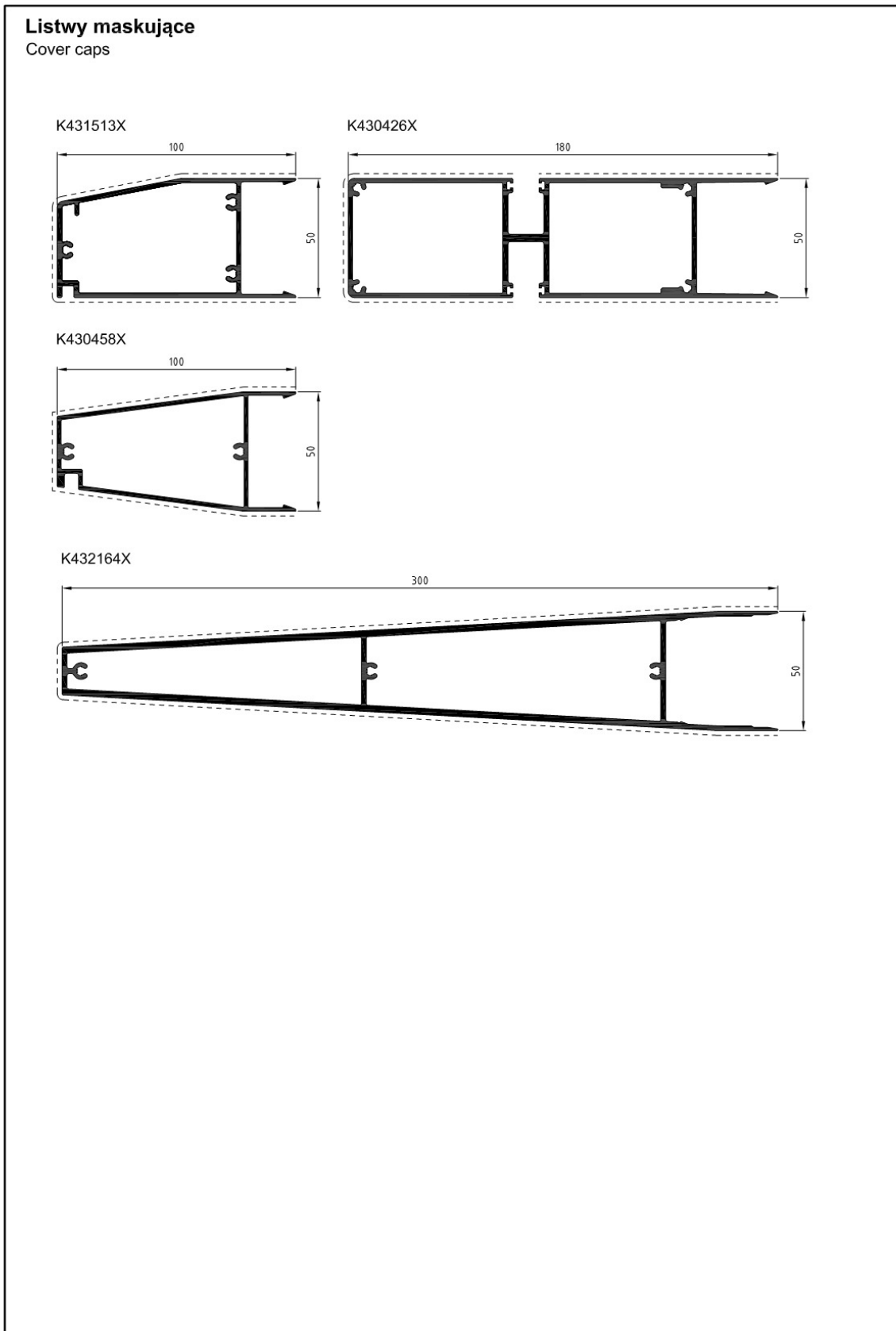


Fig. 11. MB-SR50N EI EI60 system cover caps



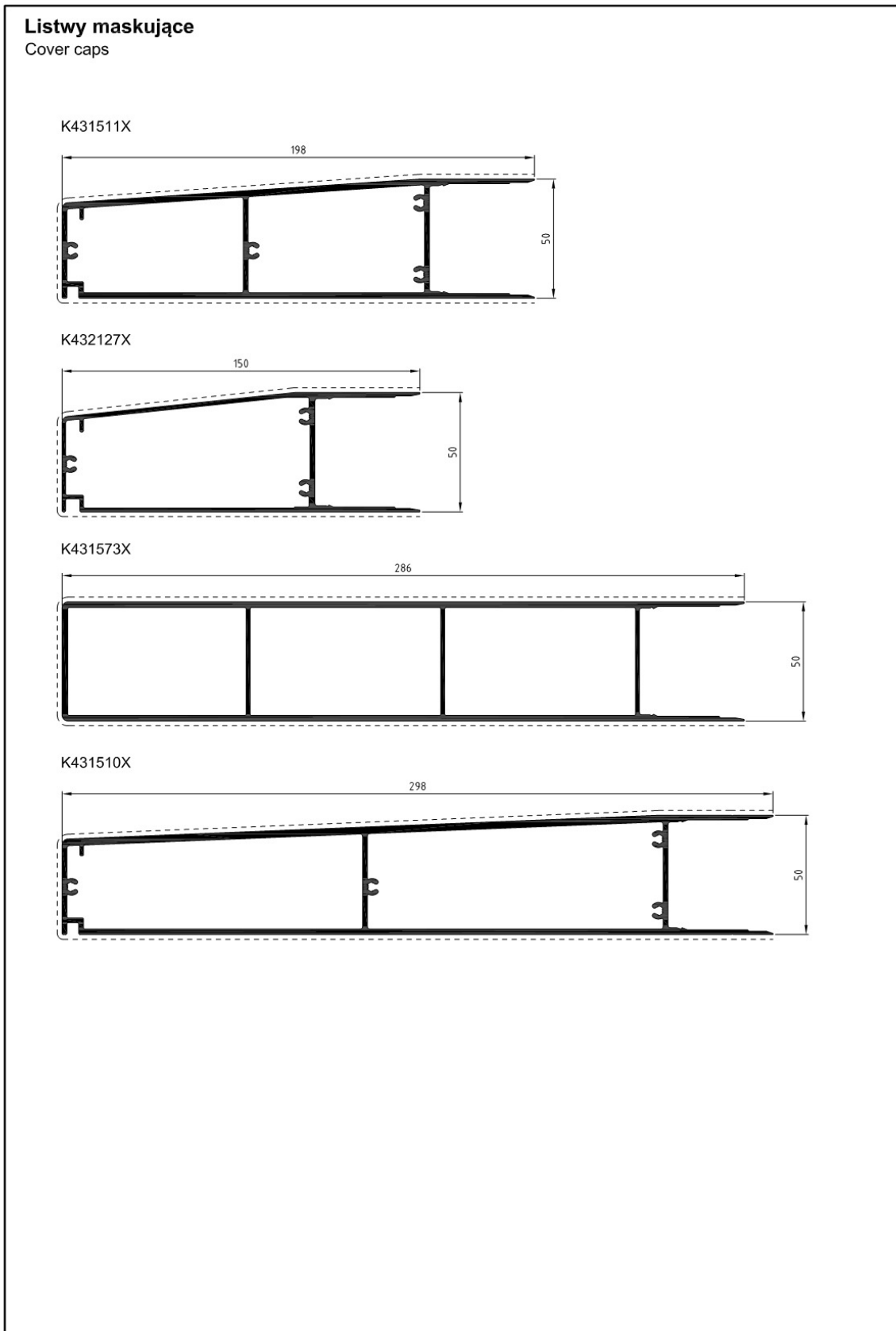


Fig. 12. MB-SR50N EI EI60 system cover caps

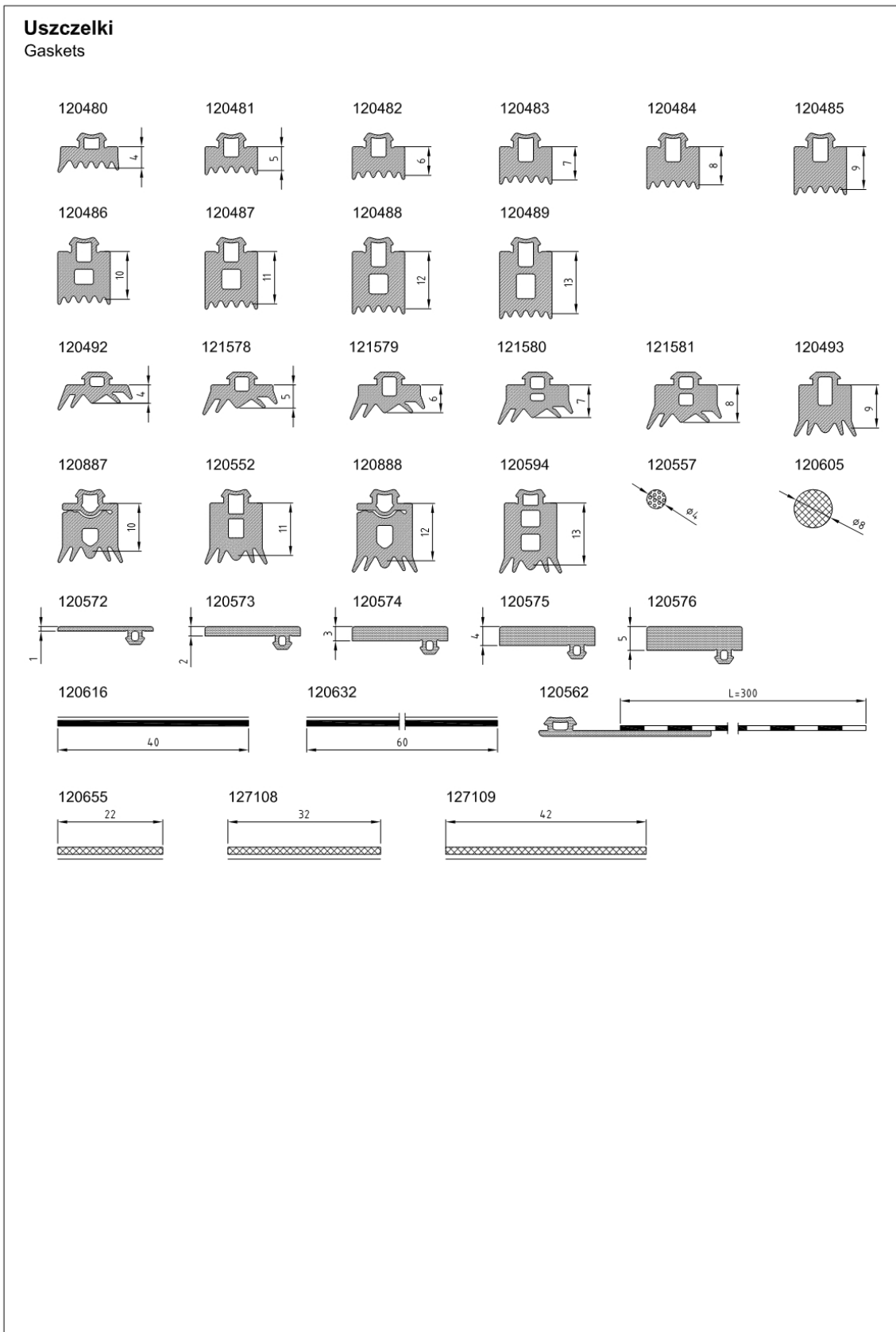


Fig. 13. MB-SR50N EI EI60 system gaskets

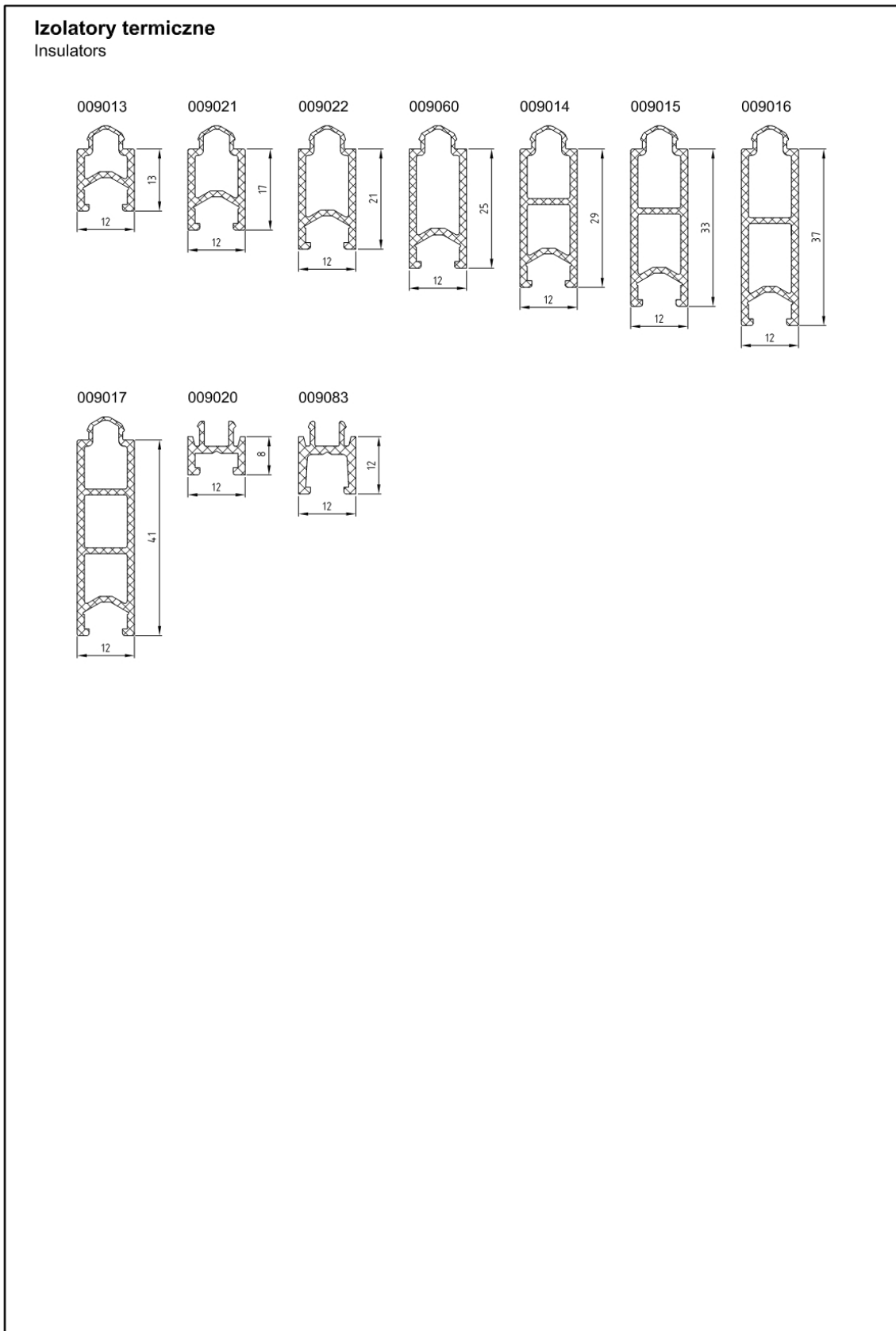


Fig. 14. MB-SR50N EI EI60 system gaskets thermal insulators

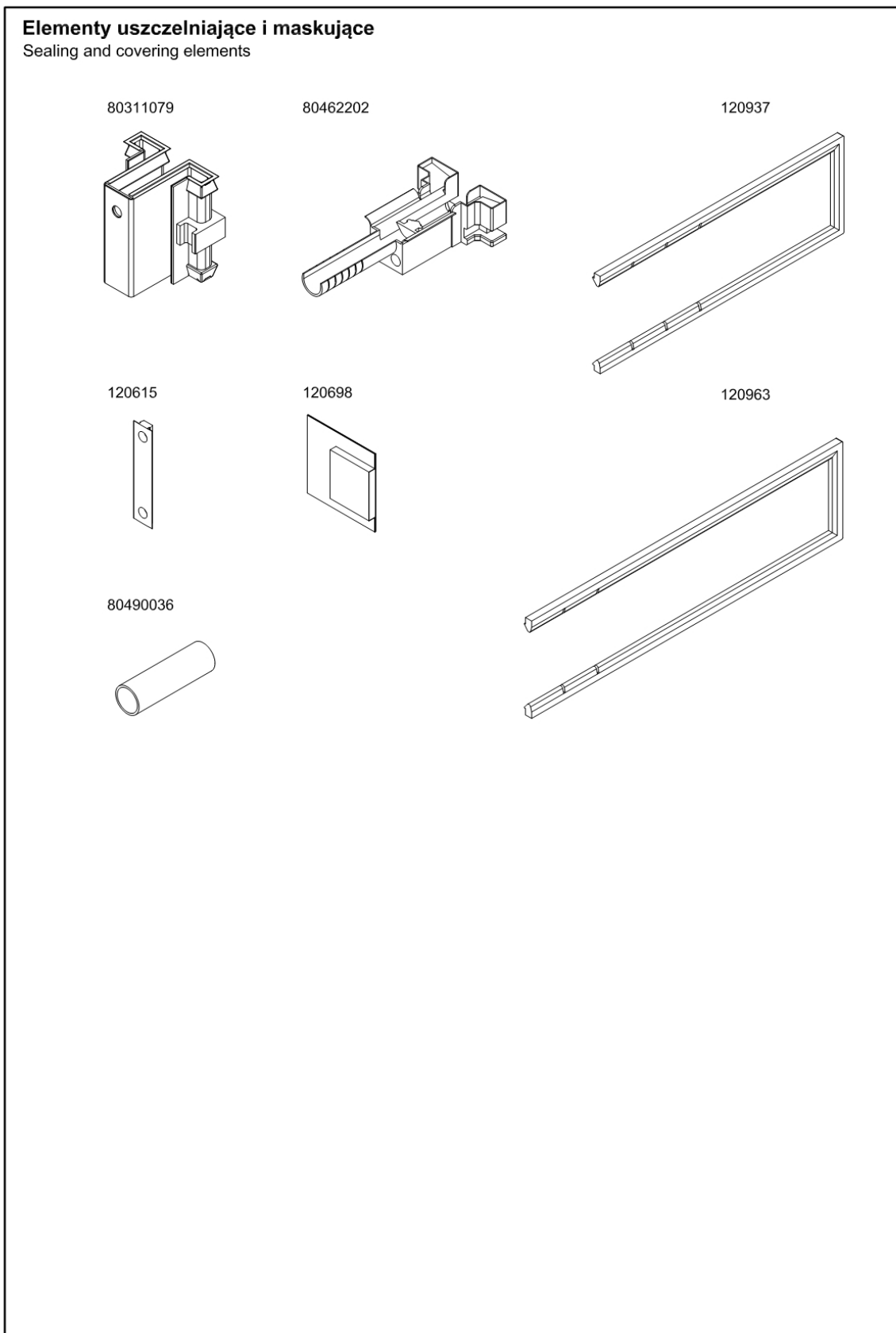


Fig. 15. MB-SR50N EI EI60 system sealing and covering elements

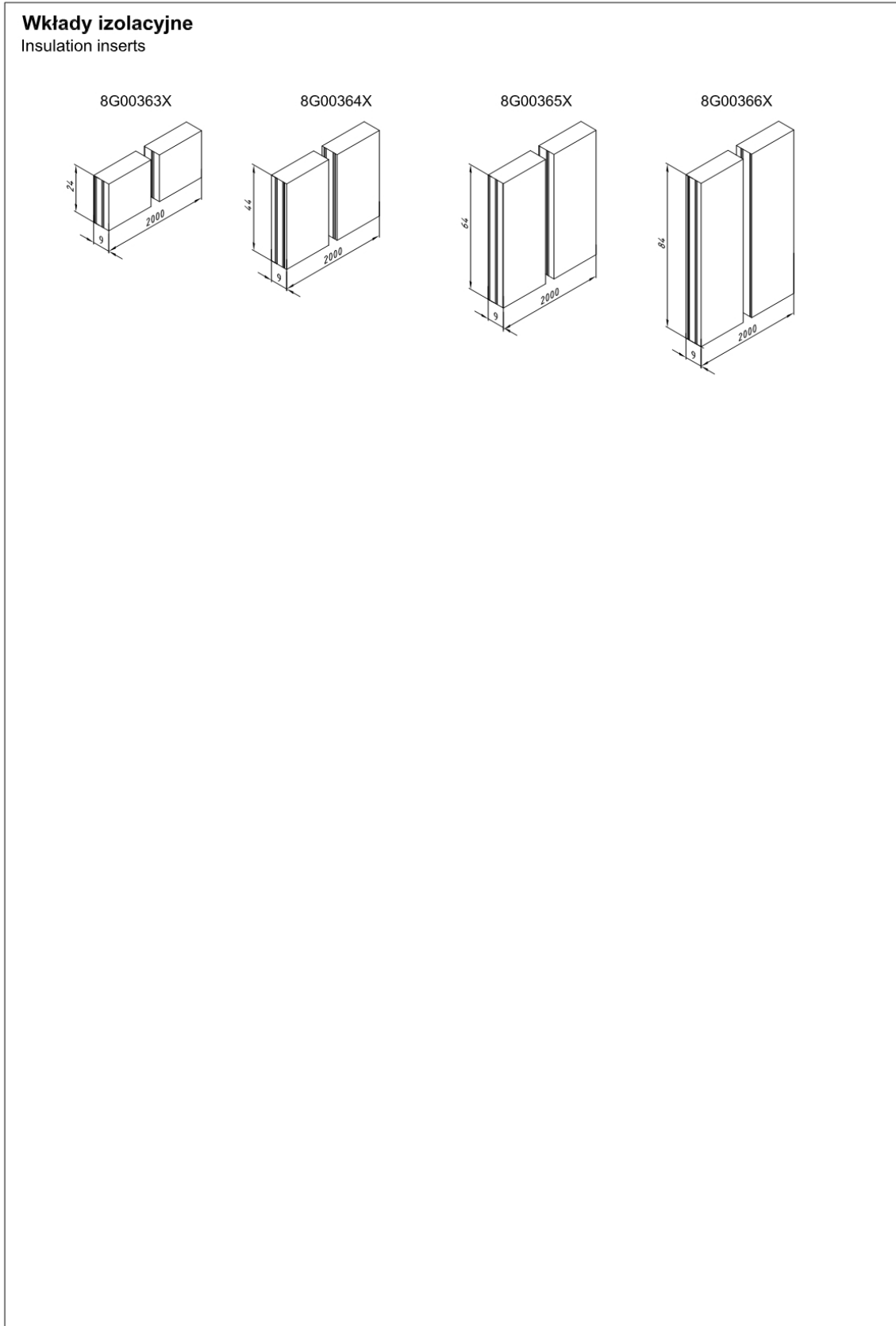


Fig. 16. MB-SR50N EI EI60 system insulation inserts

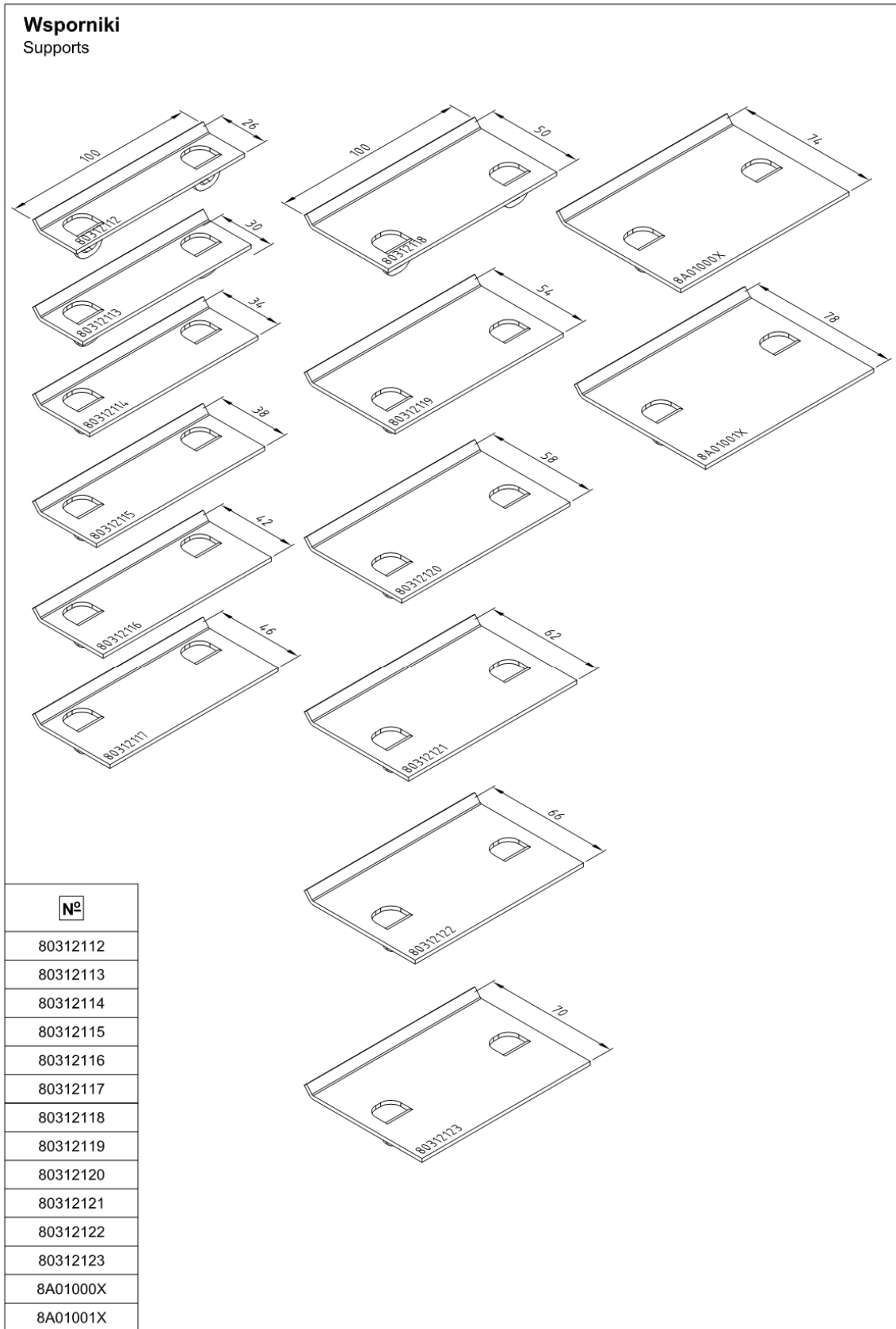


Fig. 17. MB-SR50N EI EI60 system supports

**Podkładki pod szybę**

Glazing shims pane

N°	B [mm]	L [mm]	H [mm]
80957048	20	100	1
80957049	24	100	1
80957050	28	100	1
80957051	32	100	1
80957052	36	100	1
80957053	40	100	1
80957054	44	100	1
80957055	48	100	1
80957056	52	100	1
80957057	56	100	1
80957058	60	100	1
80957059	64	100	1
8A01053X	68	100	1
8A01055X	72	100	1
80957061	20	100	3
80957062	24	100	3
80957063	28	100	3
80957064	32	100	3
80957065	36	100	3
80957066	40	100	3
80957067	44	100	3
80957068	48	100	3
80957069	52	100	3
80957070	56	100	3
80957071	60	100	3
80957072	64	100	3
8A01054X	68	100	3
8A01056X	72	100	3

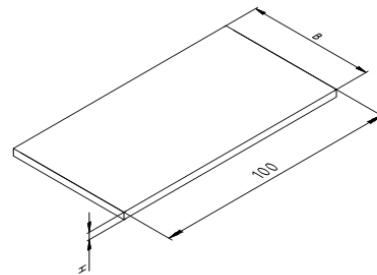


Fig. 18. MB-SR50N EI EI60 system setting blocks

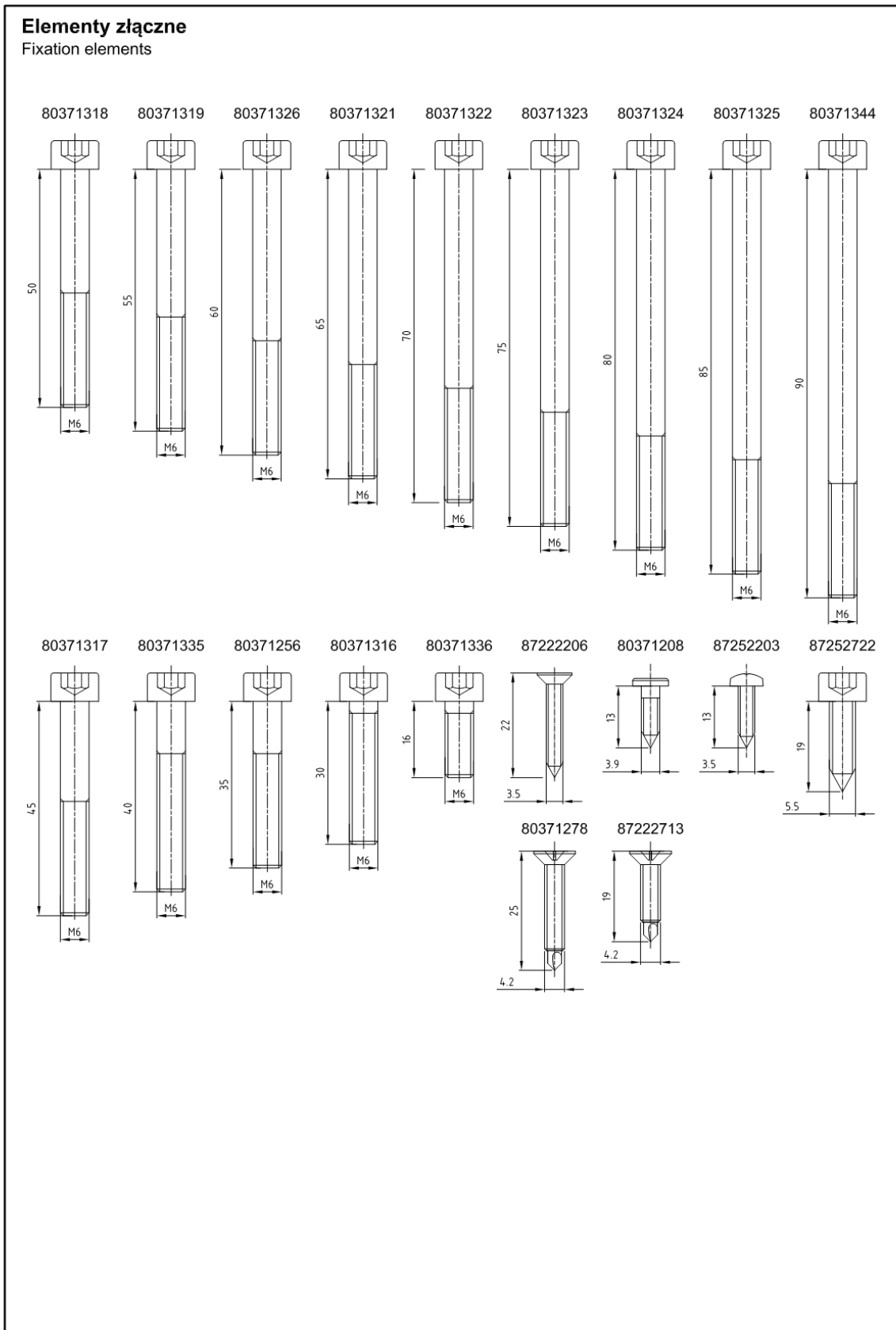


Fig. 19. MB-SR50N EI EI60 system fixing elements



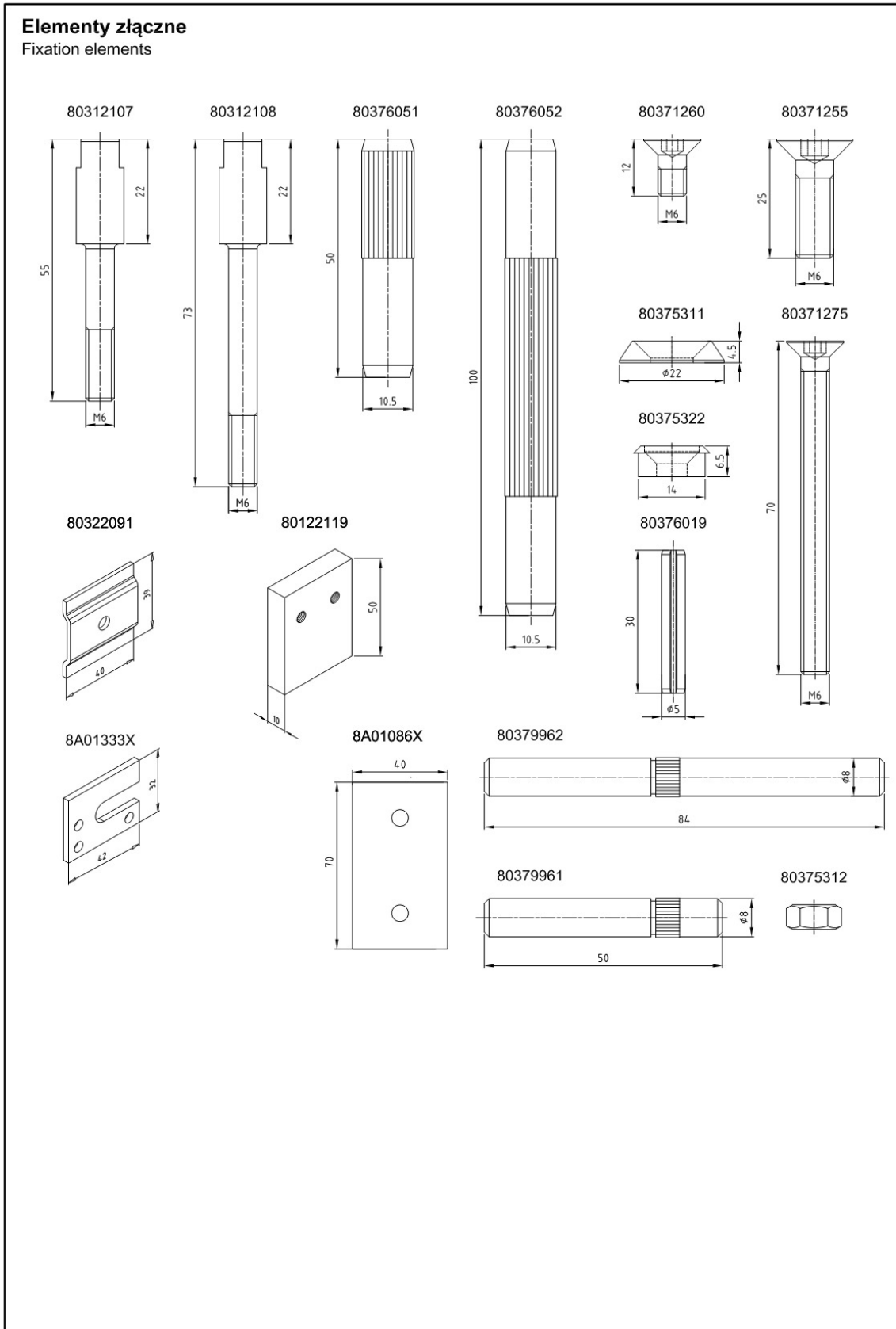


Fig. 20. MB-SR50N EI EI60 system fixing elements

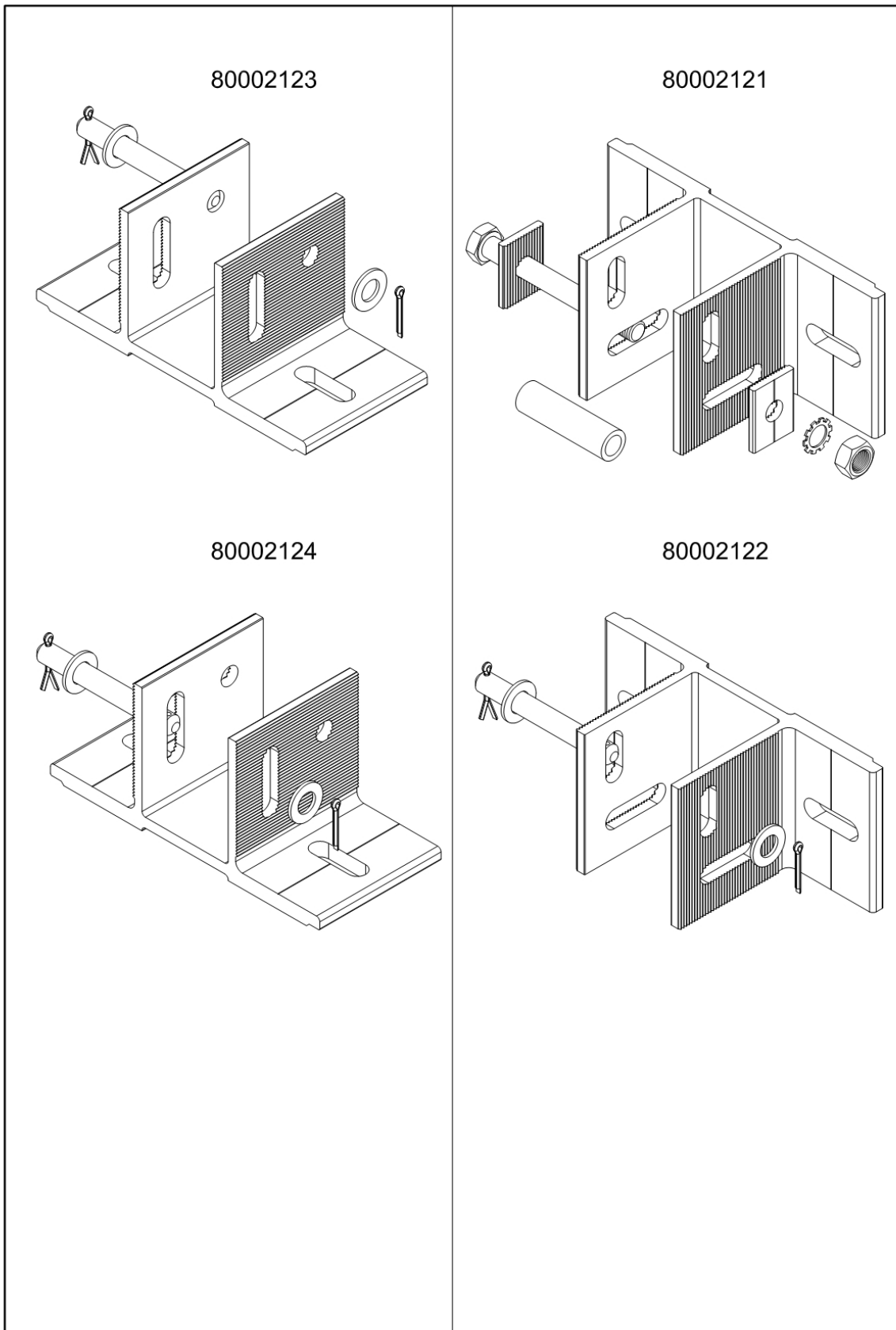


Fig. 21. MB-SR50N EI EI60 system fixing brackets

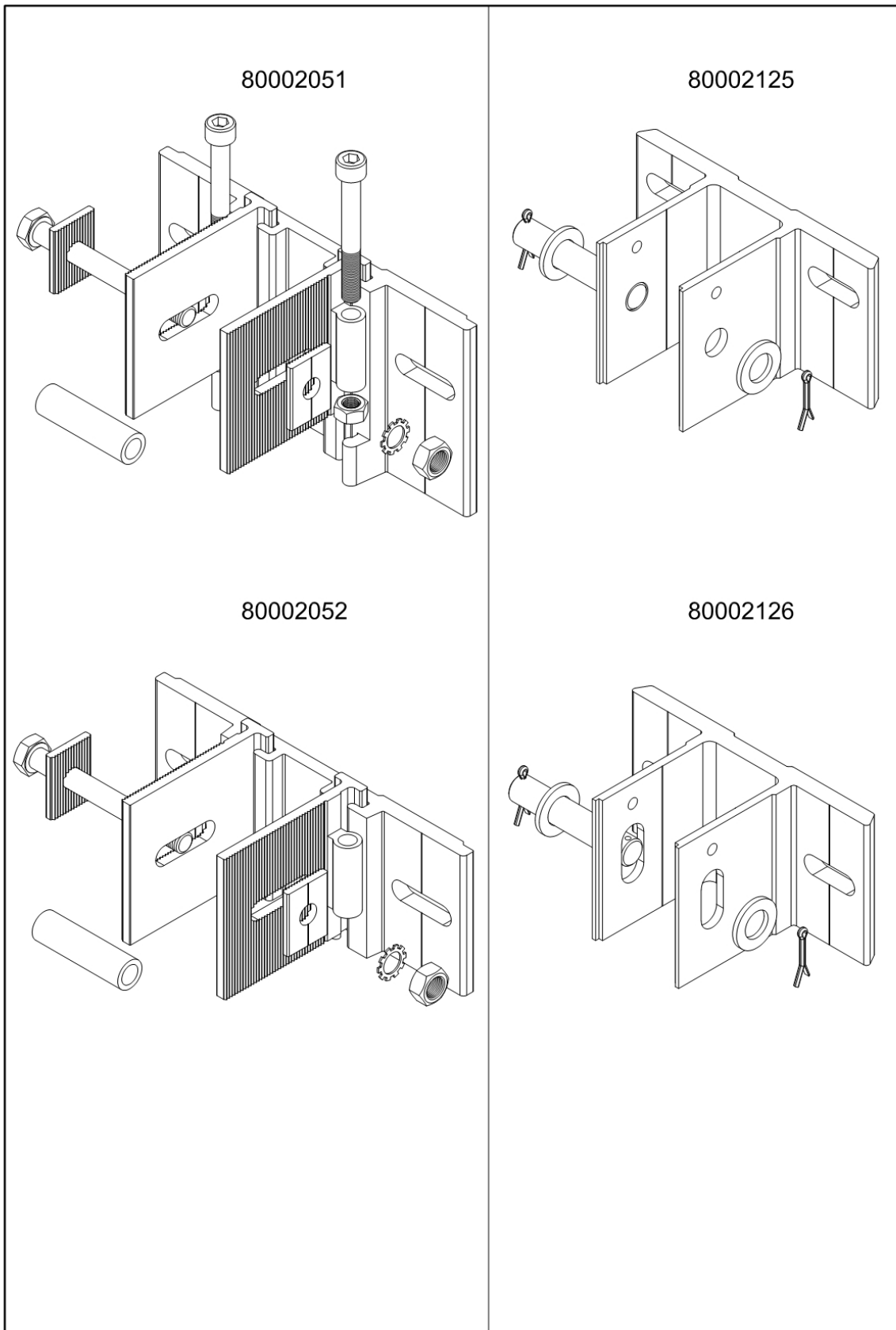


Fig. 22. MB-SR50N EI EI60 system fixing brackets

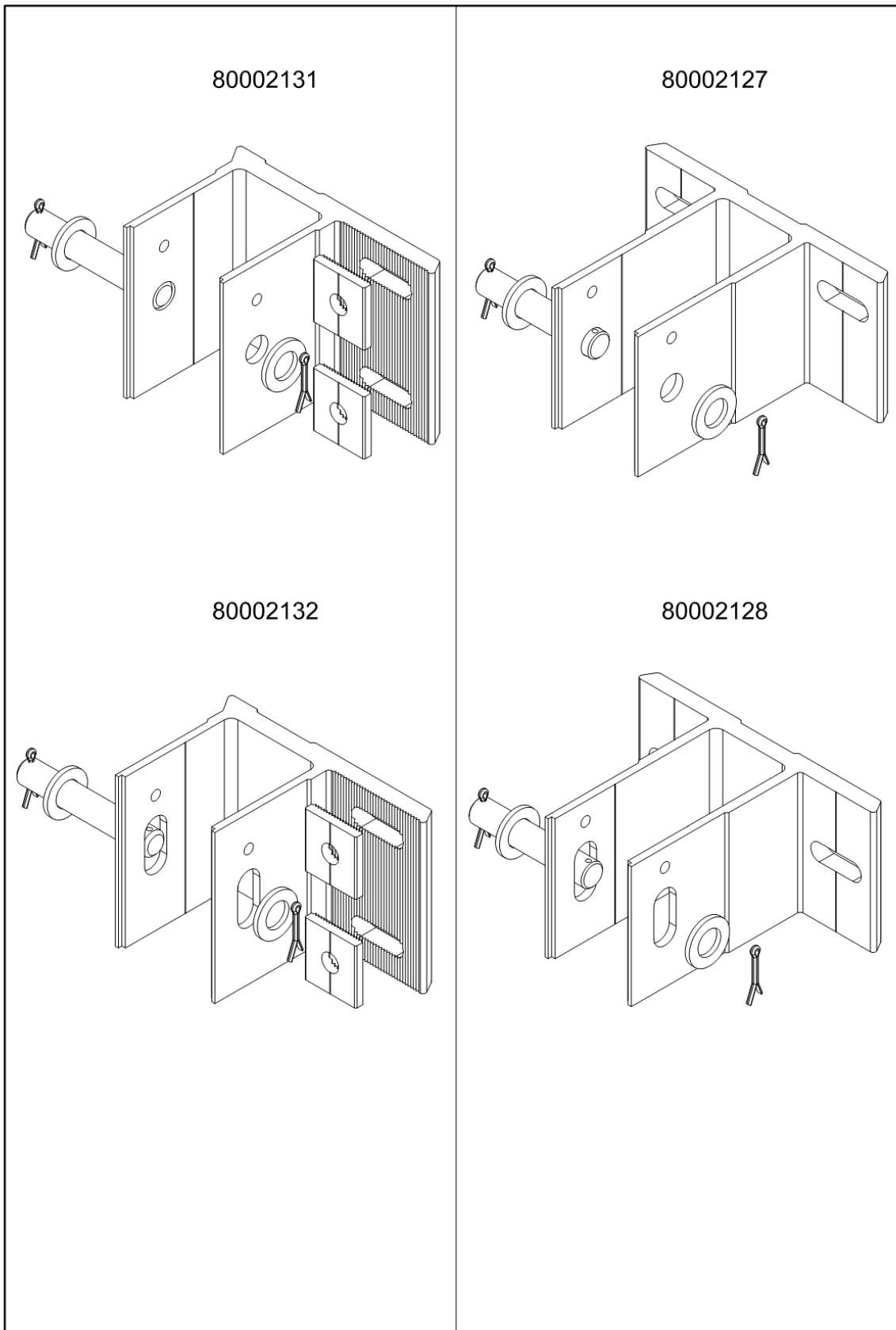


Fig. 23. MB-SR50N EI EI60 system fixing brackets

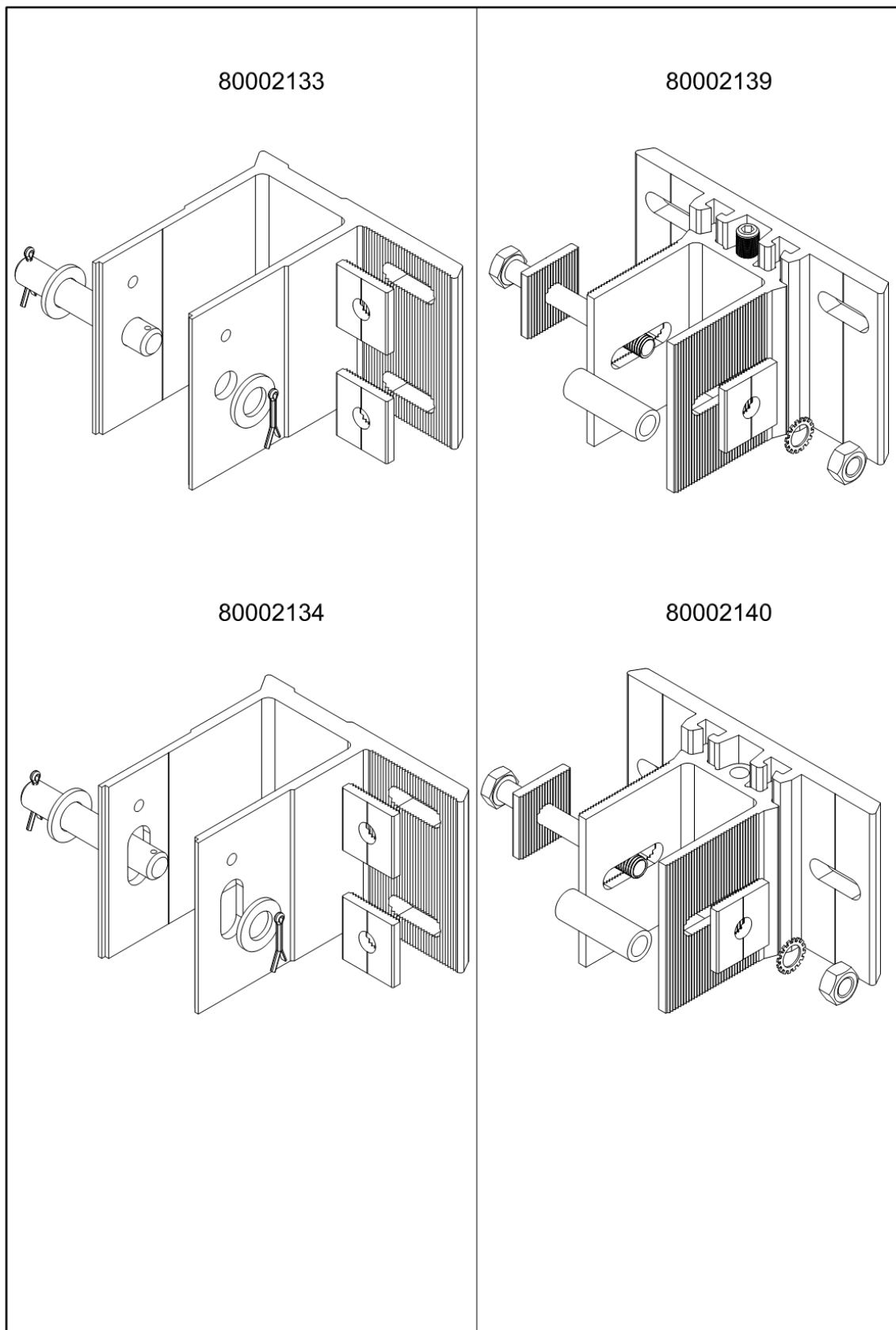


Fig. 24. MB-SR50N EI EI60 system fixing brackets

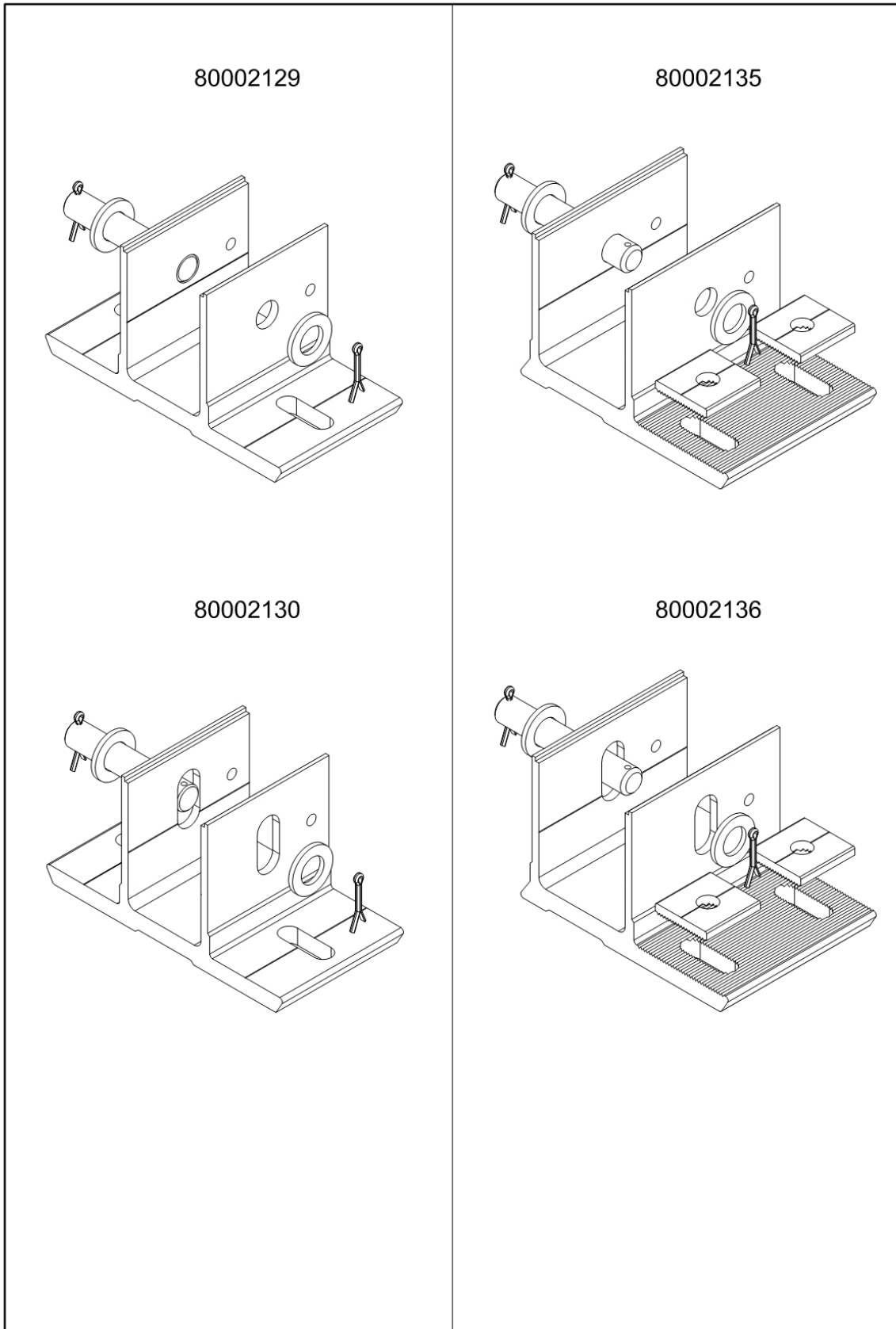


Fig. 25. MB-SR50N EI EI60 system fixing brackets

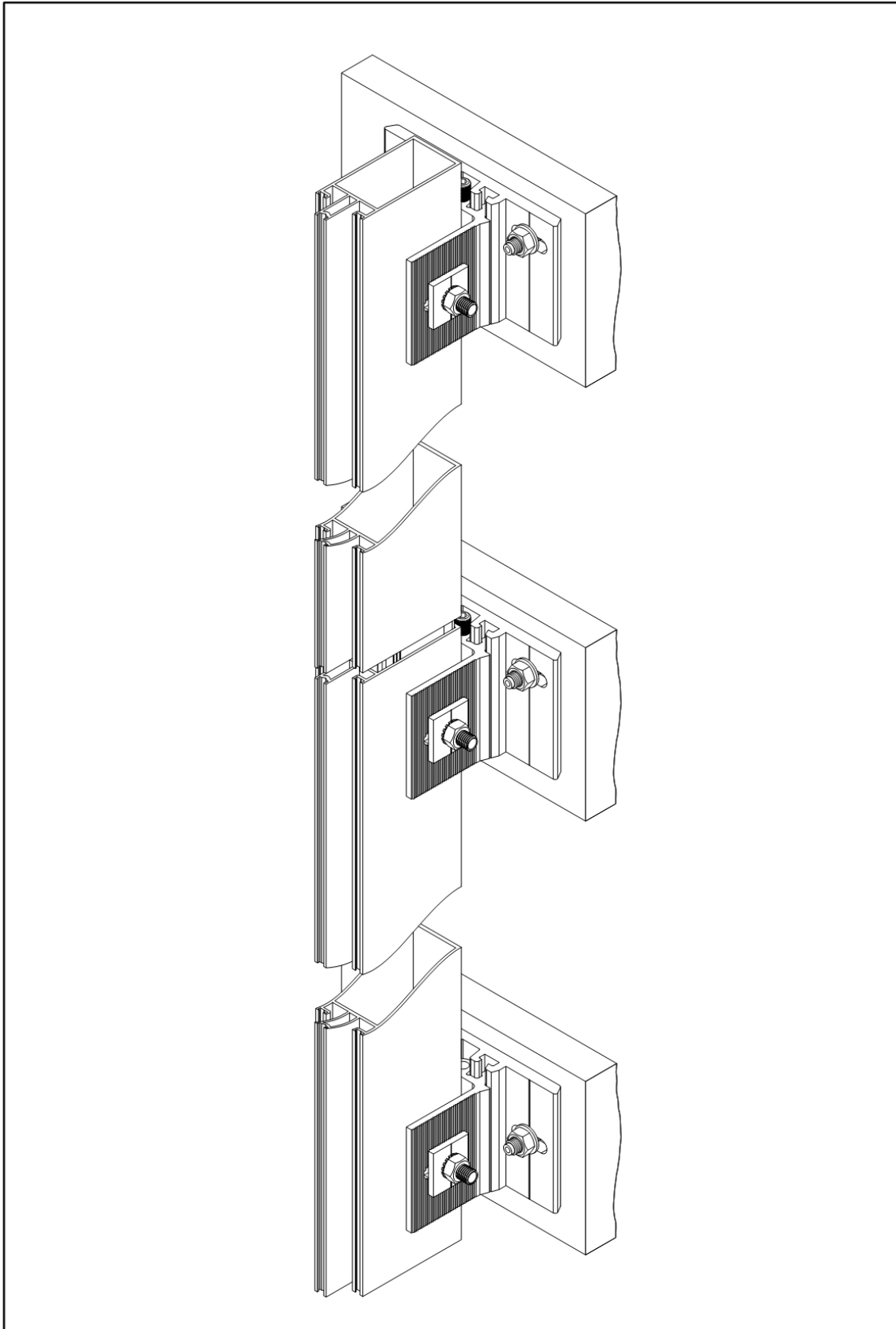


Fig. 26. MB-SR50N EI EI60 system fixing brackets mounting diagram

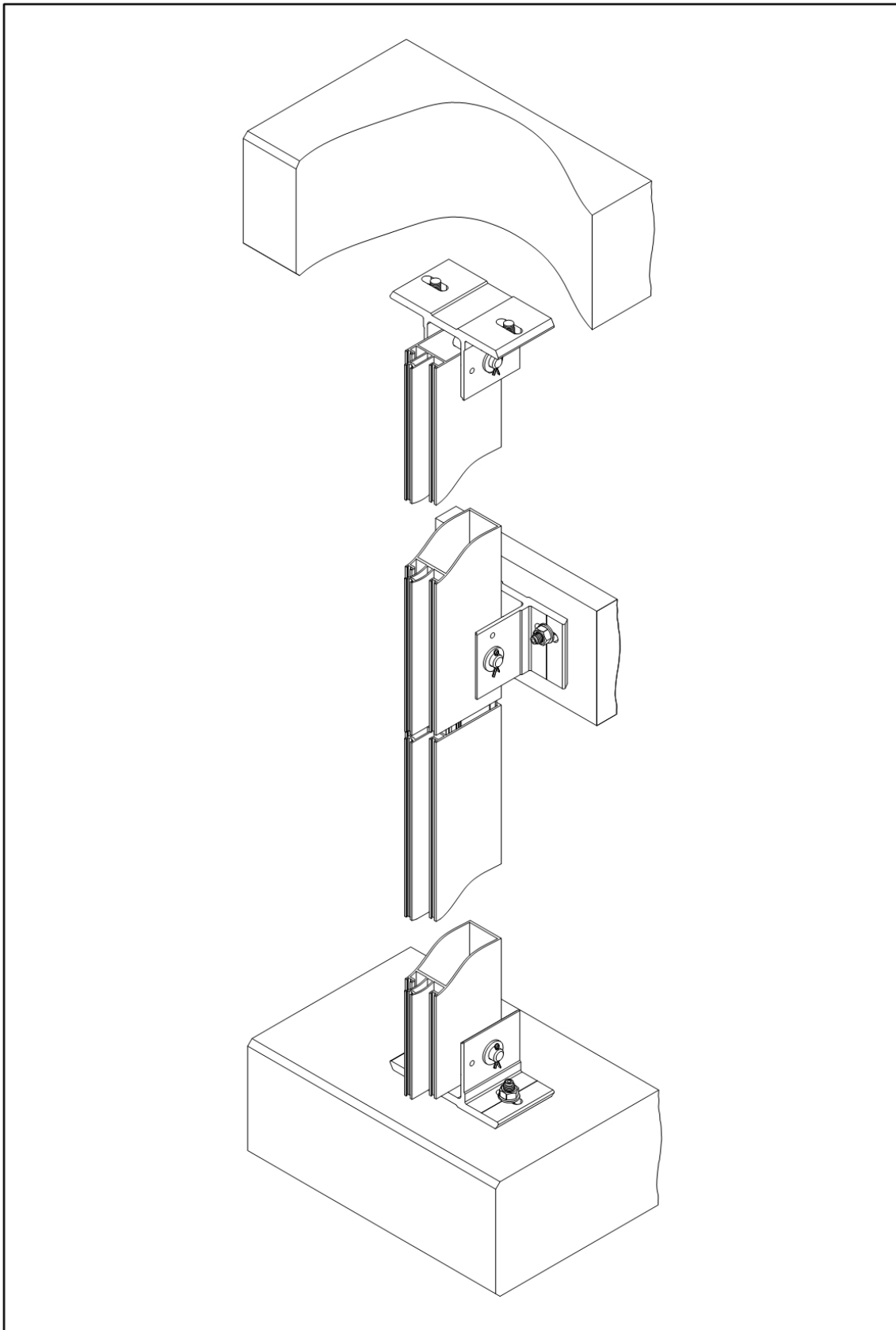


Fig. 27. MB-SR50N EI EI60 system fixing brackets mounting diagram



**Połączenie międzyprzęsłowe słup - słup**  
 Inter-span connection of mullion - mullion

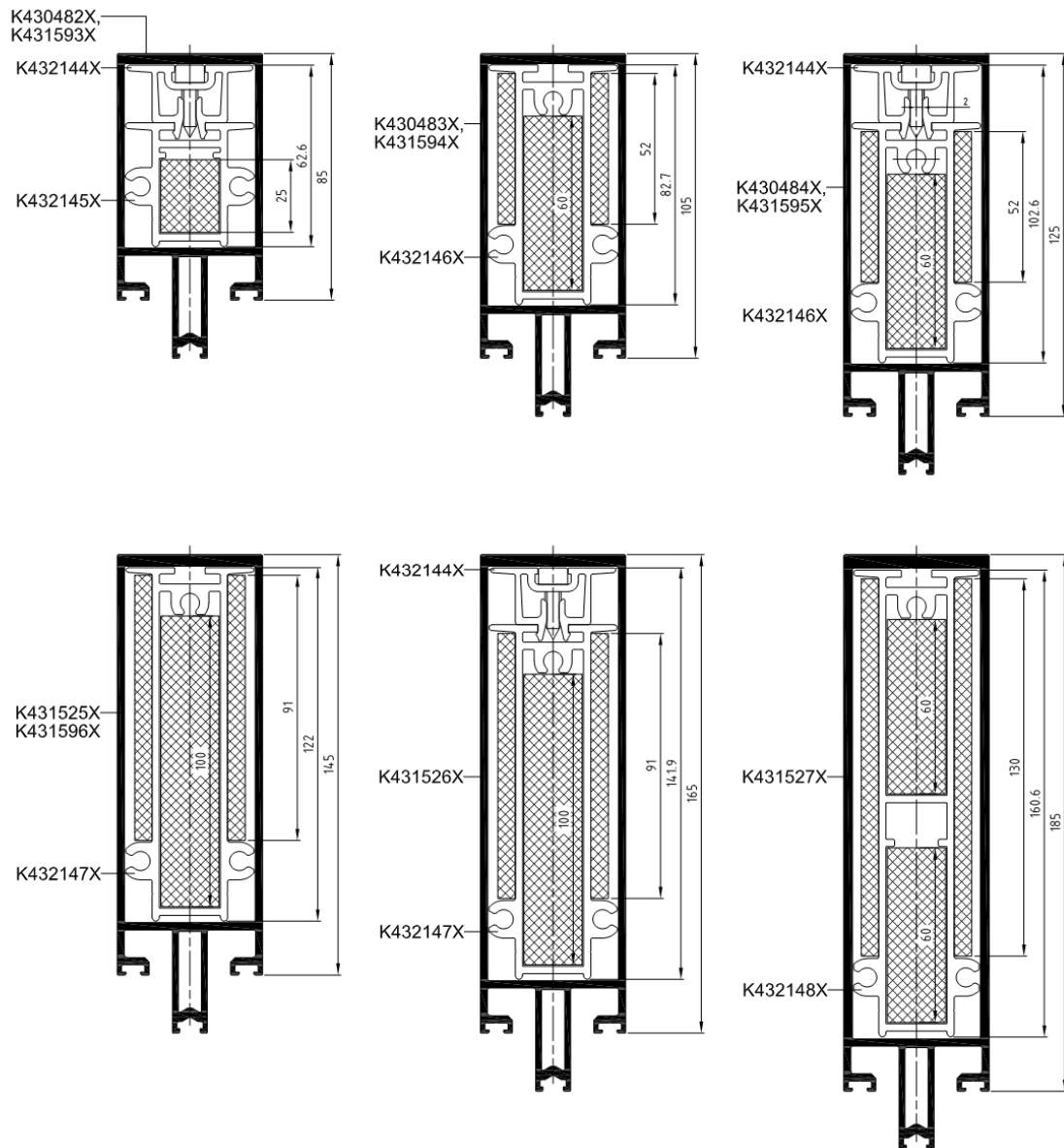


Fig. 28. MB-SR50N EI EI60 system - dilatation joints

**Połączenie międzyprzęsłowe słup - słup**  
Inter-span connection of mullion - mullion

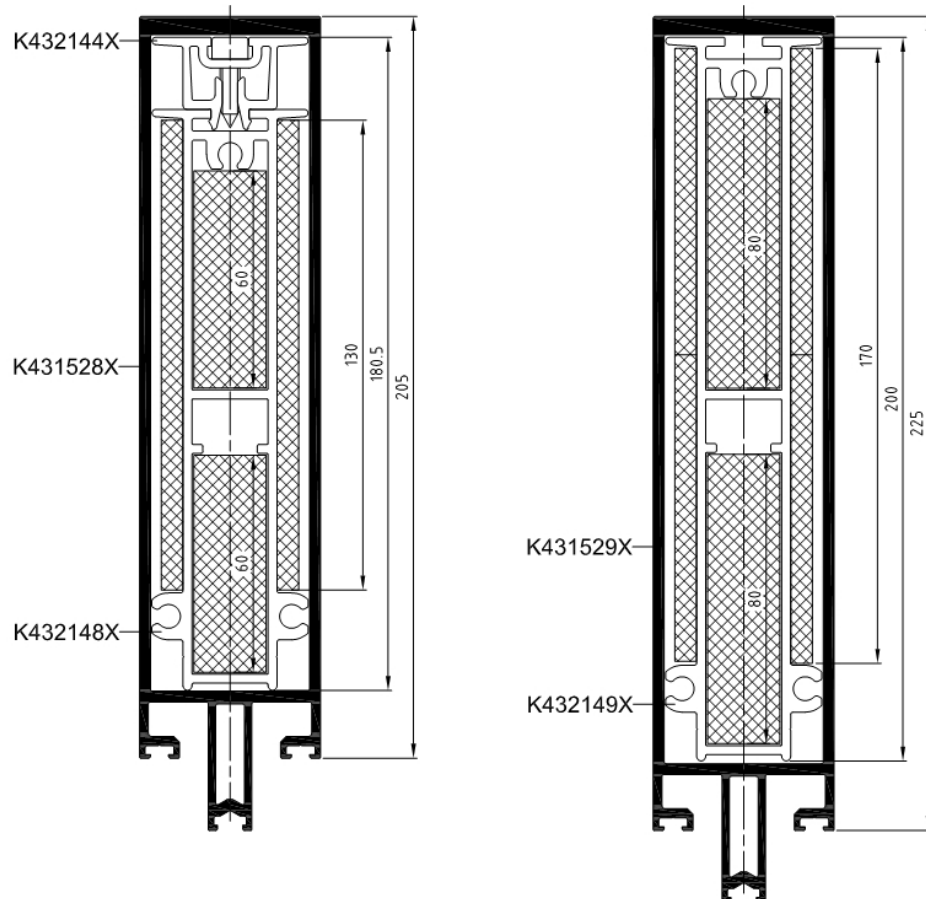


Fig. 29. MB-SR50N EI EI60 system - dilatation joints

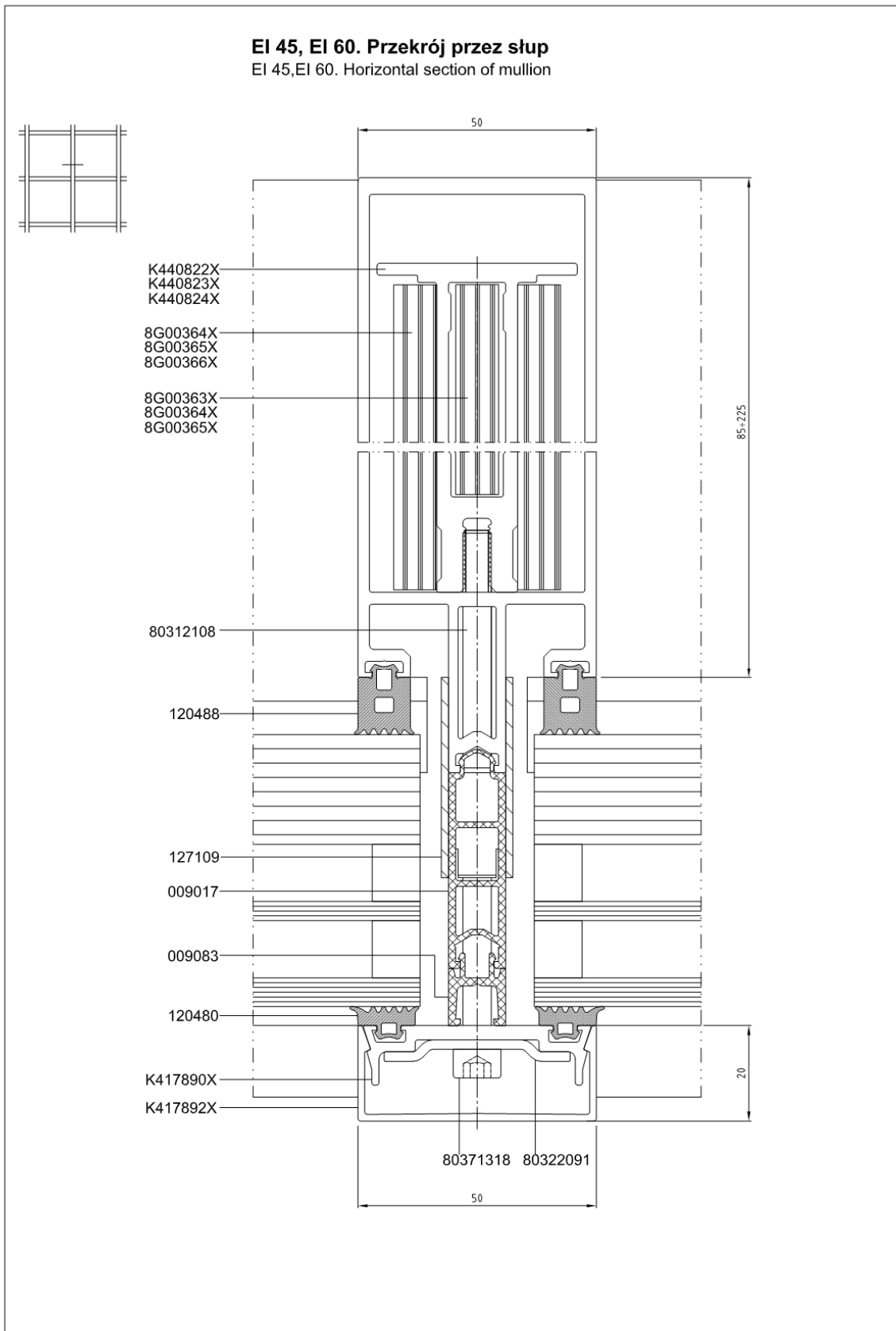


Fig. 30. Cross-section through the typical MB-SR50N EI EI60 system mullion

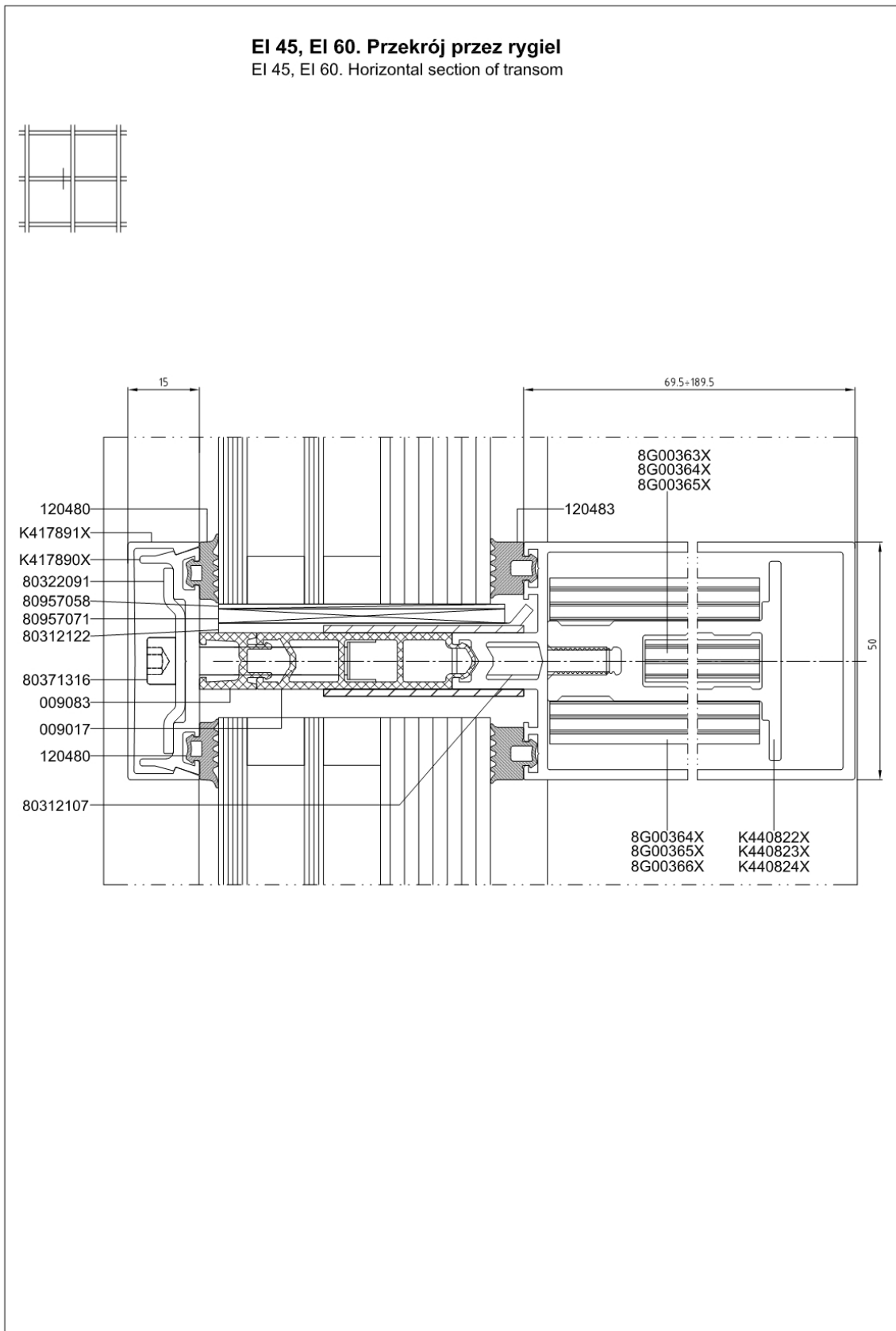


Fig. 31. Cross-section through the typical MB-SR50N EI EI60 system transom

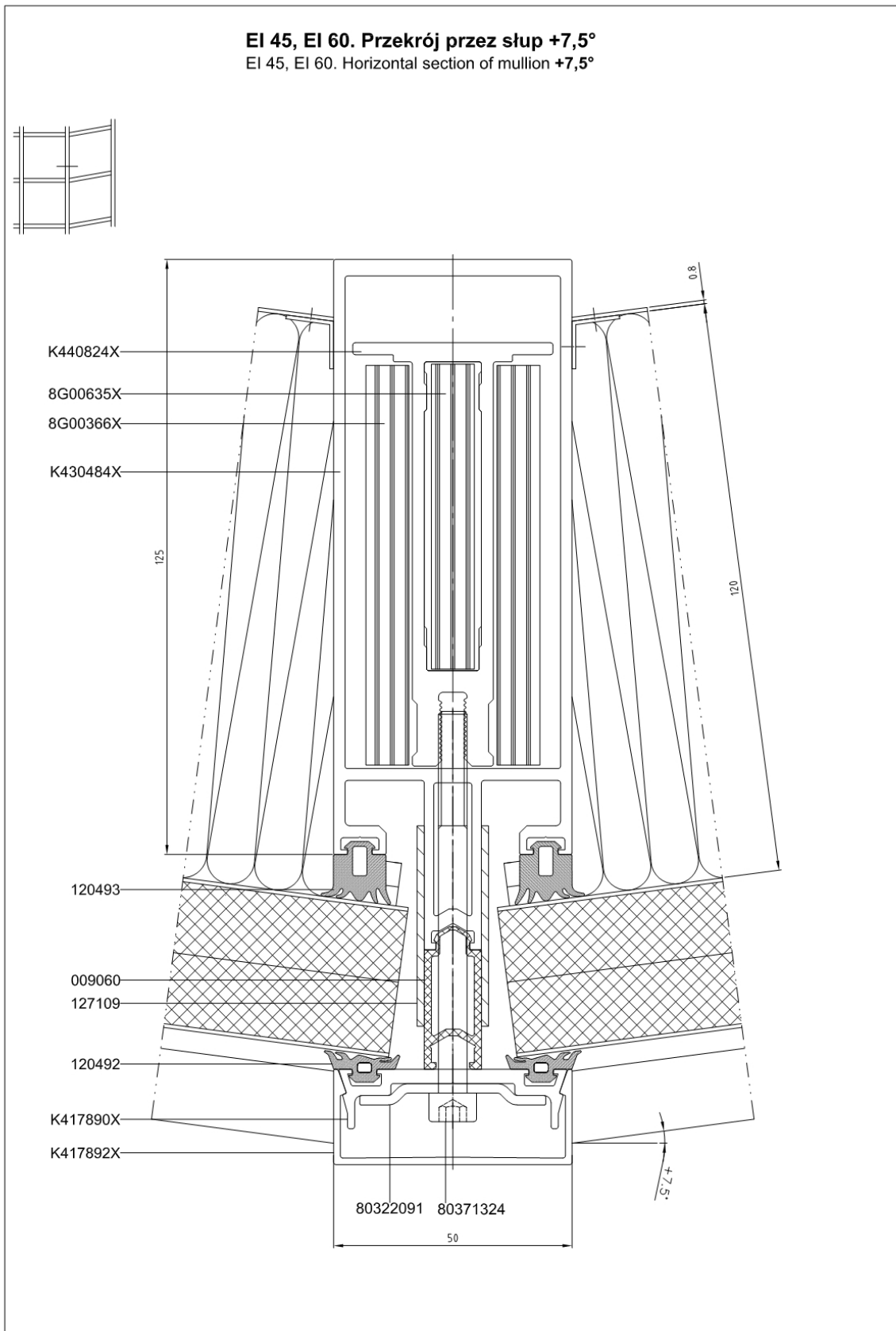


Fig. 32. Cross-section through the typical MB-SR50N EI EI60 system mullion for small (up to 7.5 degrees) angles between adjacent curtain wall segments

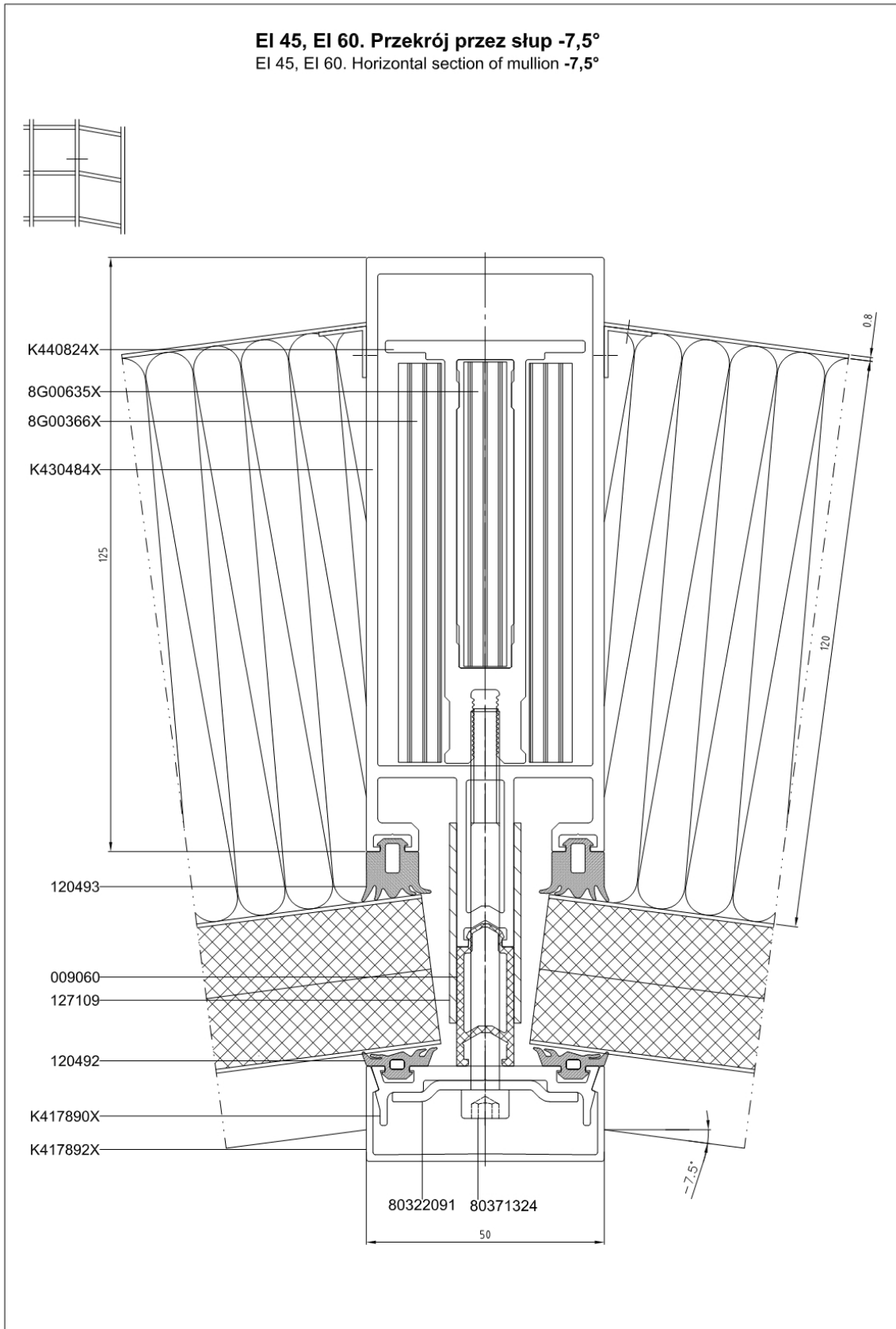


Fig. 33. Cross-section through the typical MB-SR50N EI EI60 system mullion for small (up to 7.5 degrees) angles between adjacent curtain wall segments

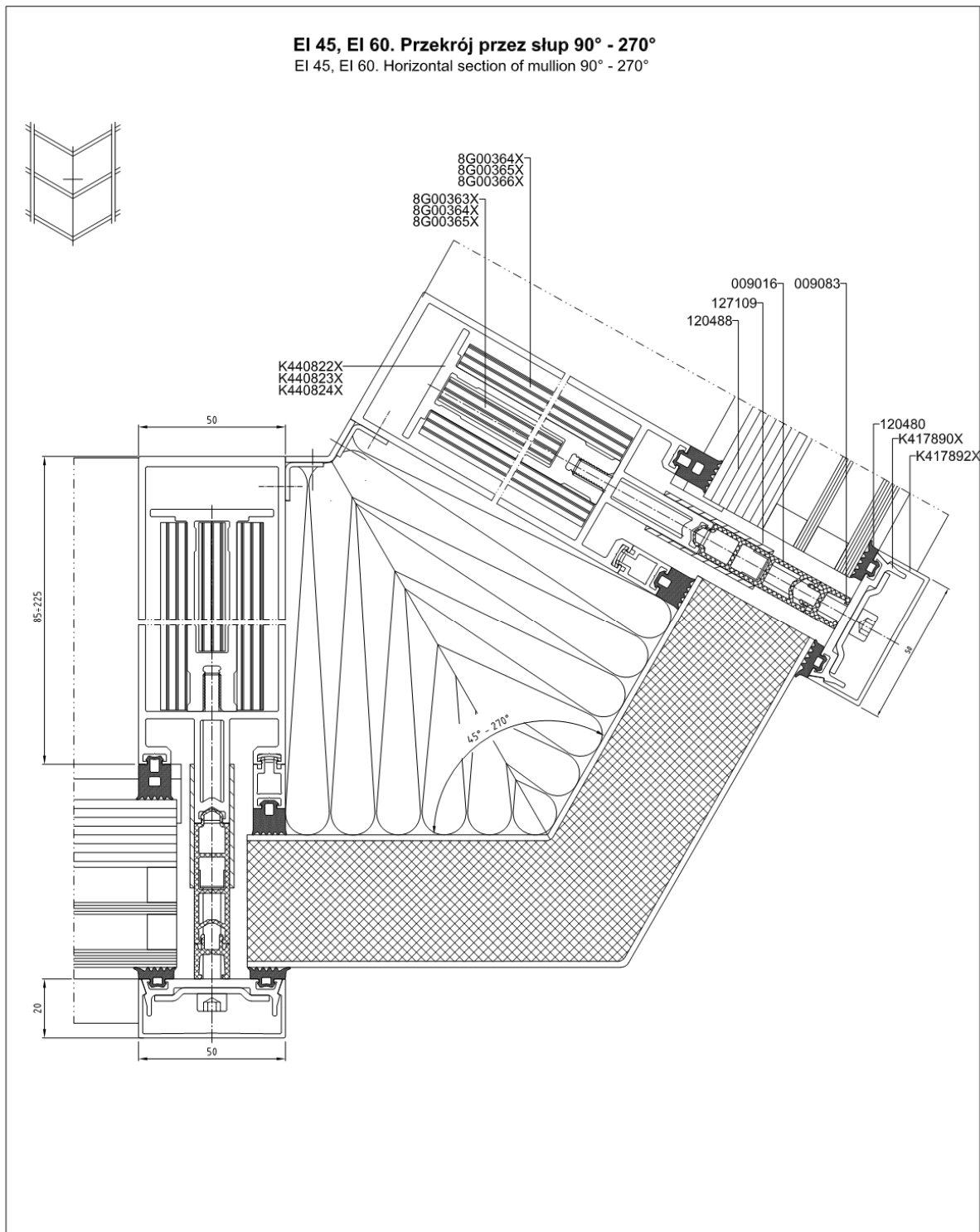


Fig. 34. Typical cross-section through the corner of MB-SR50N EI EI60 system curtain wall

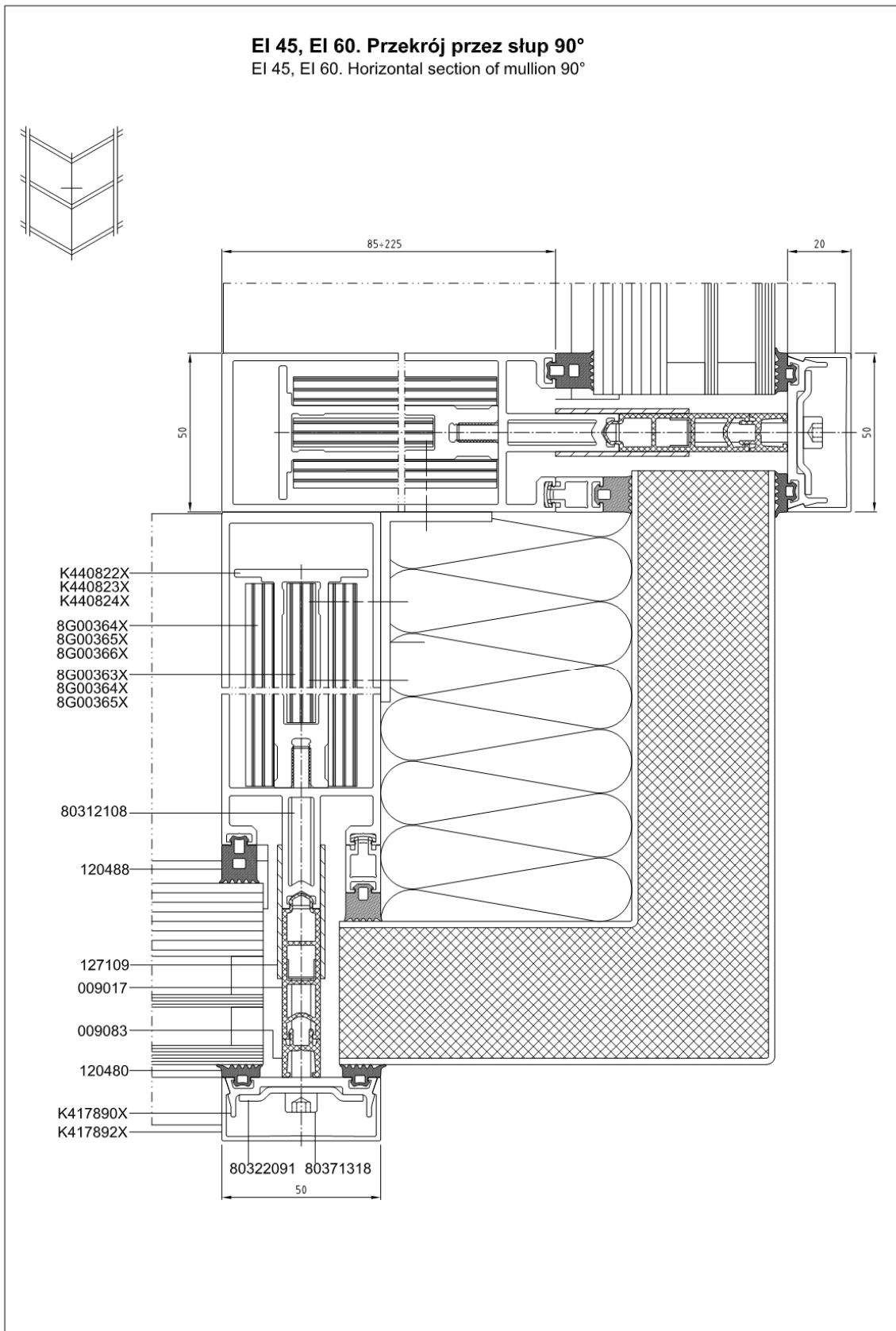


Fig. 35. Typical cross-section through the corner of MB-SR50N EI EI60 system curtain wall



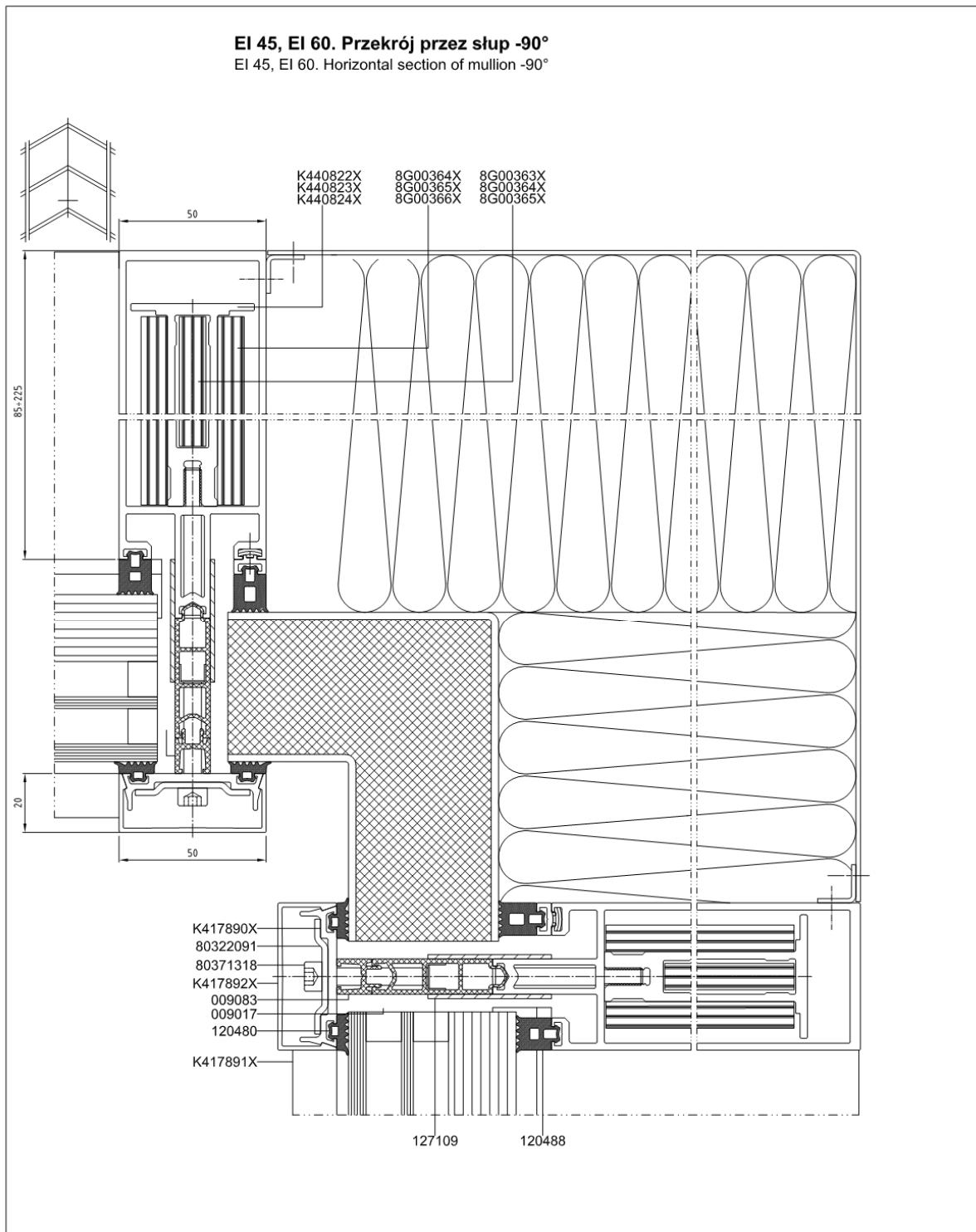


Fig. 36. Typical cross-section through the corner of MB-SR50N EI EI60 system curtain wall

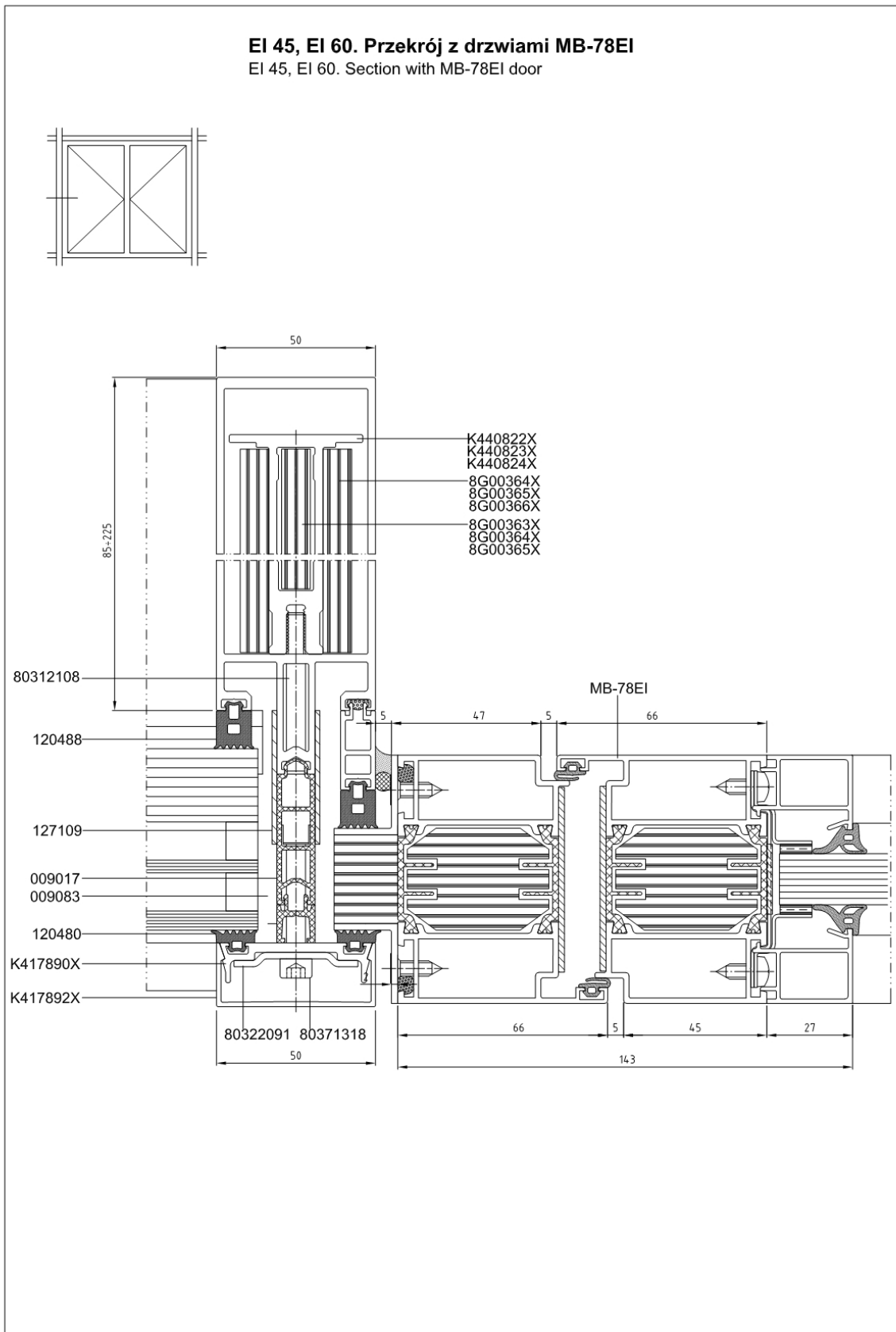


Fig. 37. Installation scheme of the MB-78EI system door fixed in the MB-SR50N EI EI60 system wall (fixing details according to the MB-78EI door system classification –

horizontal

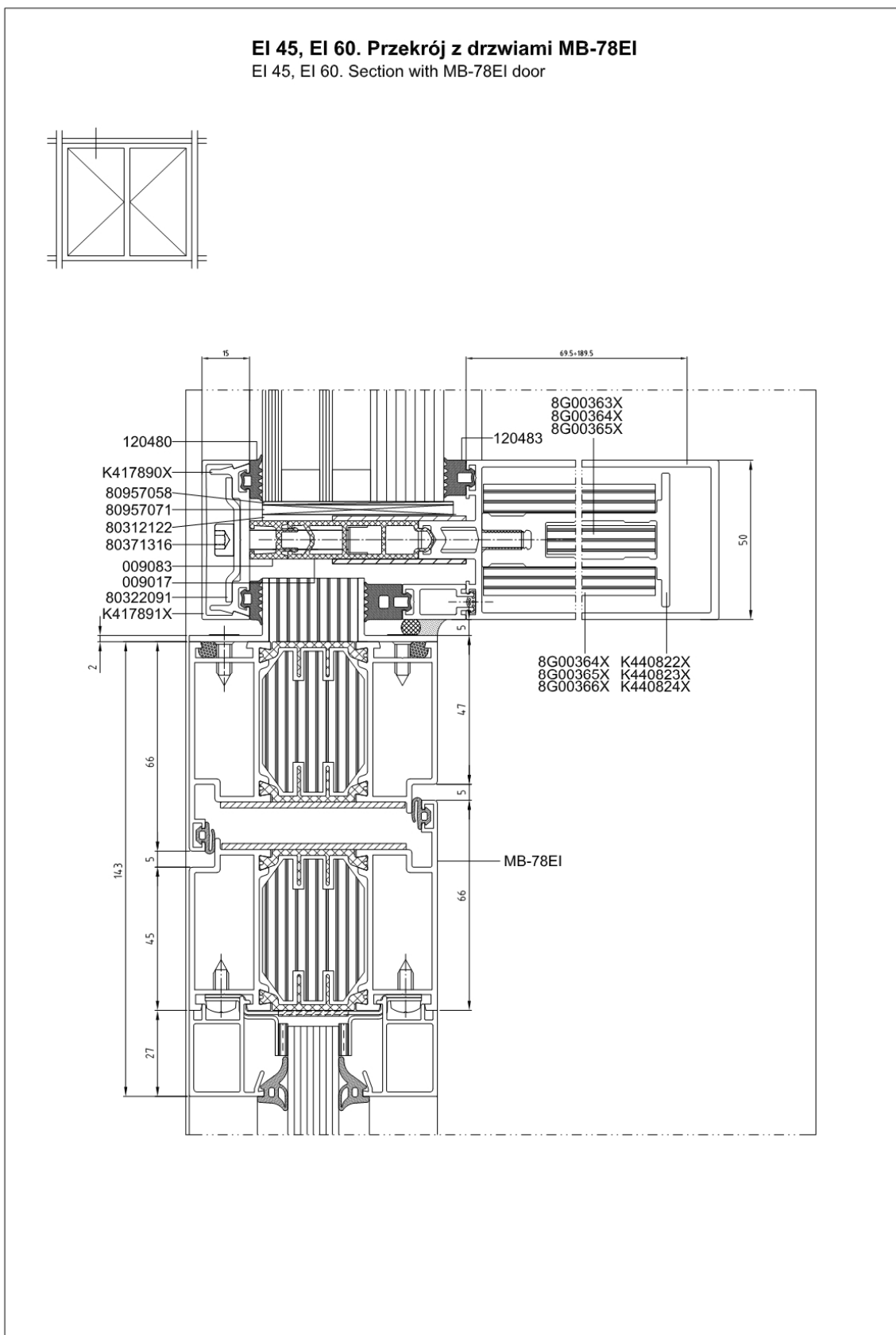


Fig. 38. Installation scheme of the MB-78EI system door fixed in the MB-SR50N EI EI60 system wall (fixing details according to the MB-78EI door system classification – vertical section)

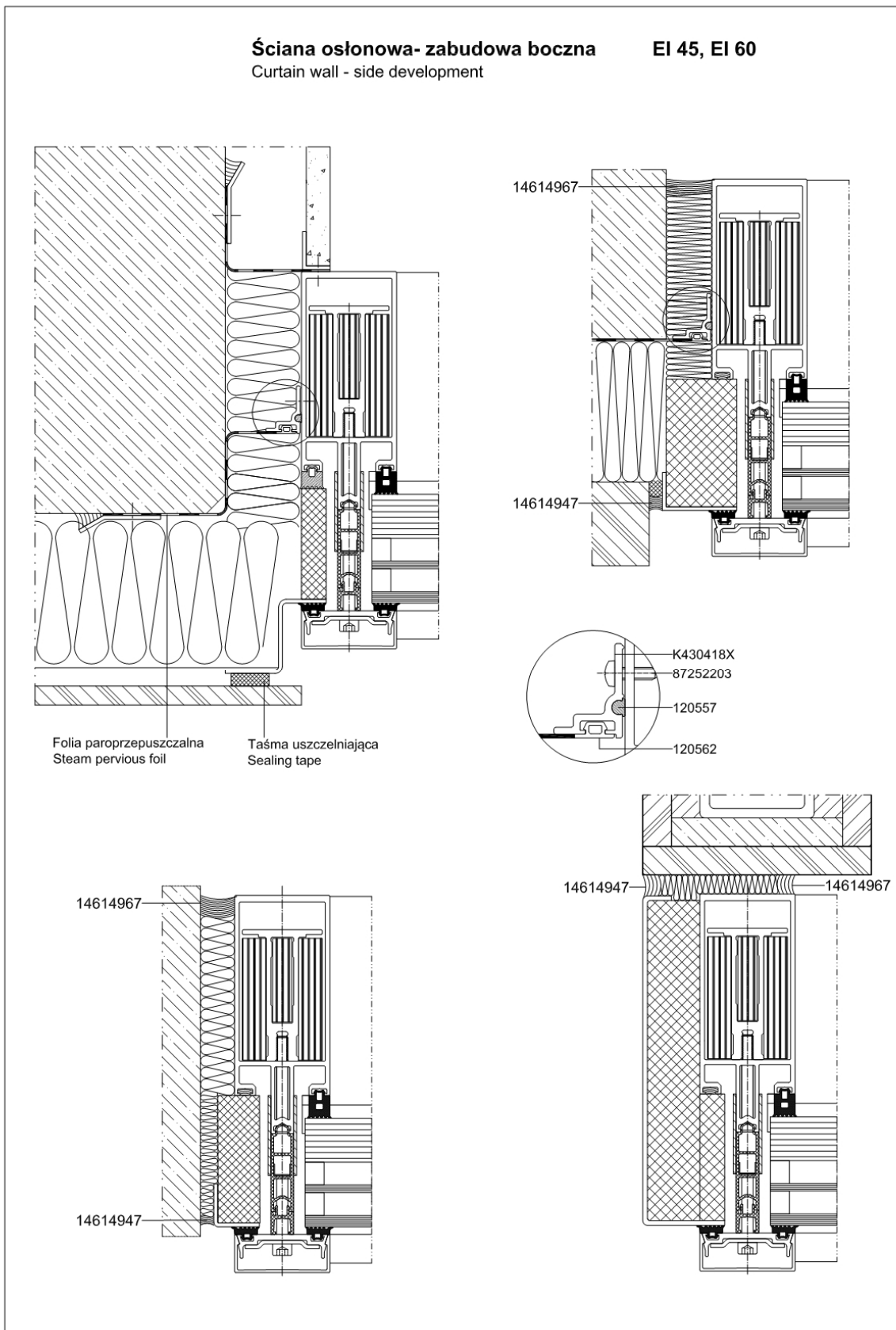


Fig. 39. MB-SR50N EI EI60 system curtain wall side fixing solutions

**Ściana osłonowa-przekrój poziomy**  
Curtain wall - horizontal section

**EI 45, EI 60**

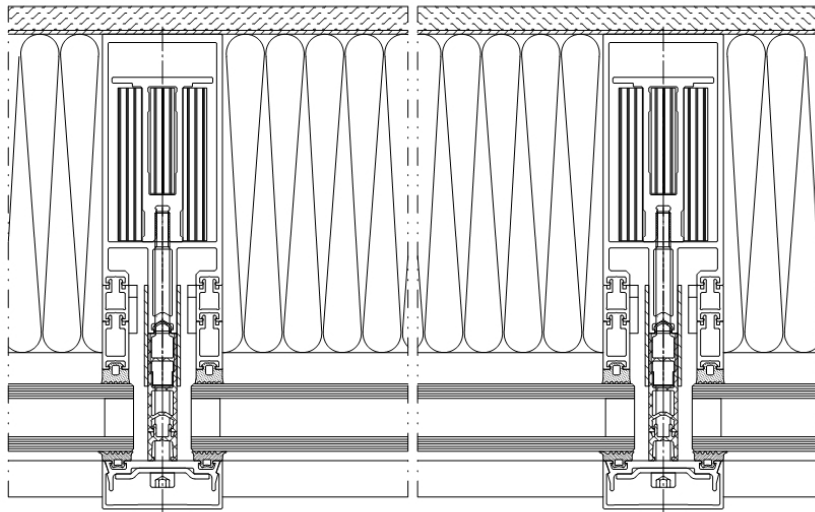


Fig. 40. MB--SR50N EI EI60 system spandrel solution cross - section

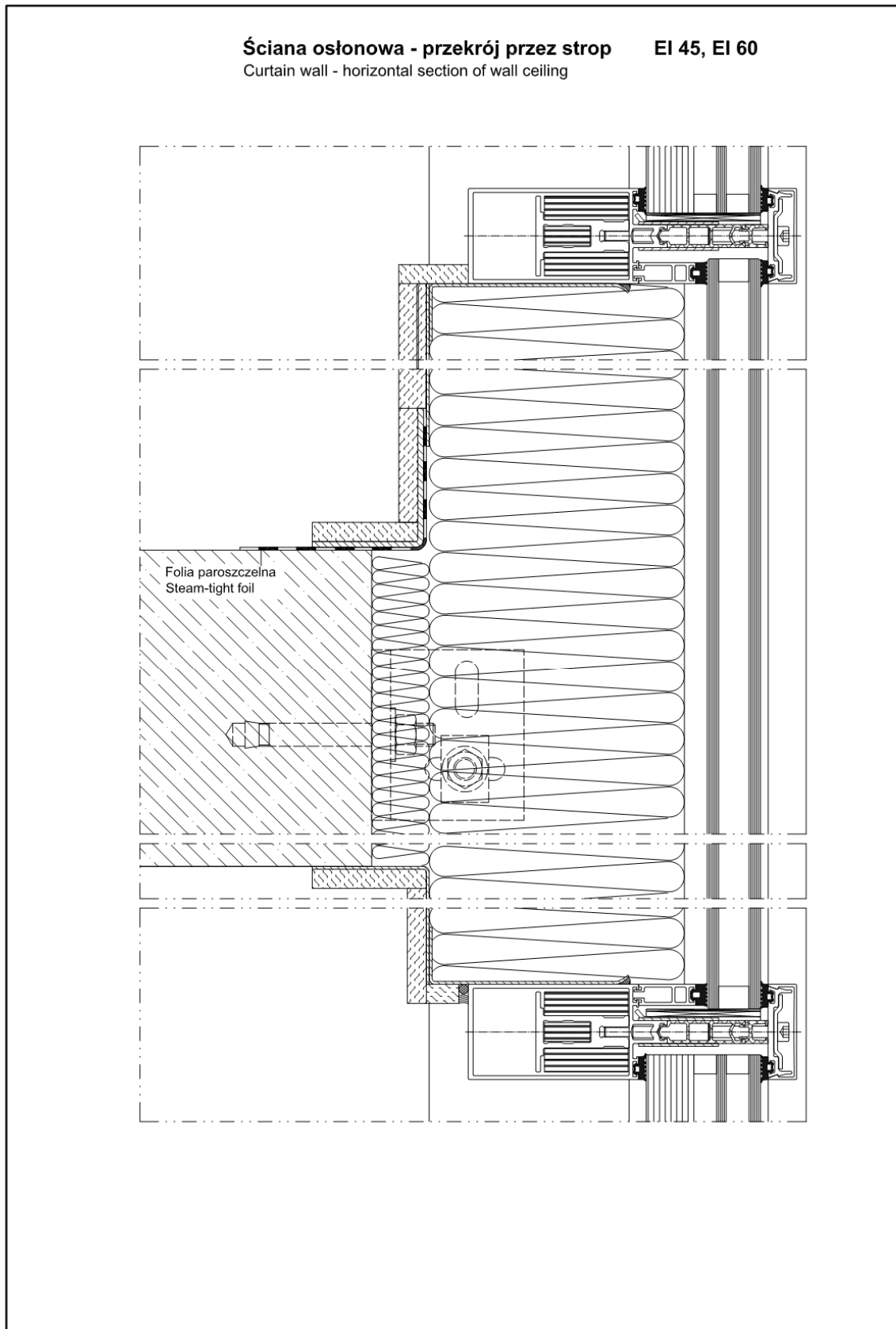


Fig. 41. MB-SR50N EI EI60 system spandrel solution - vertical cross section

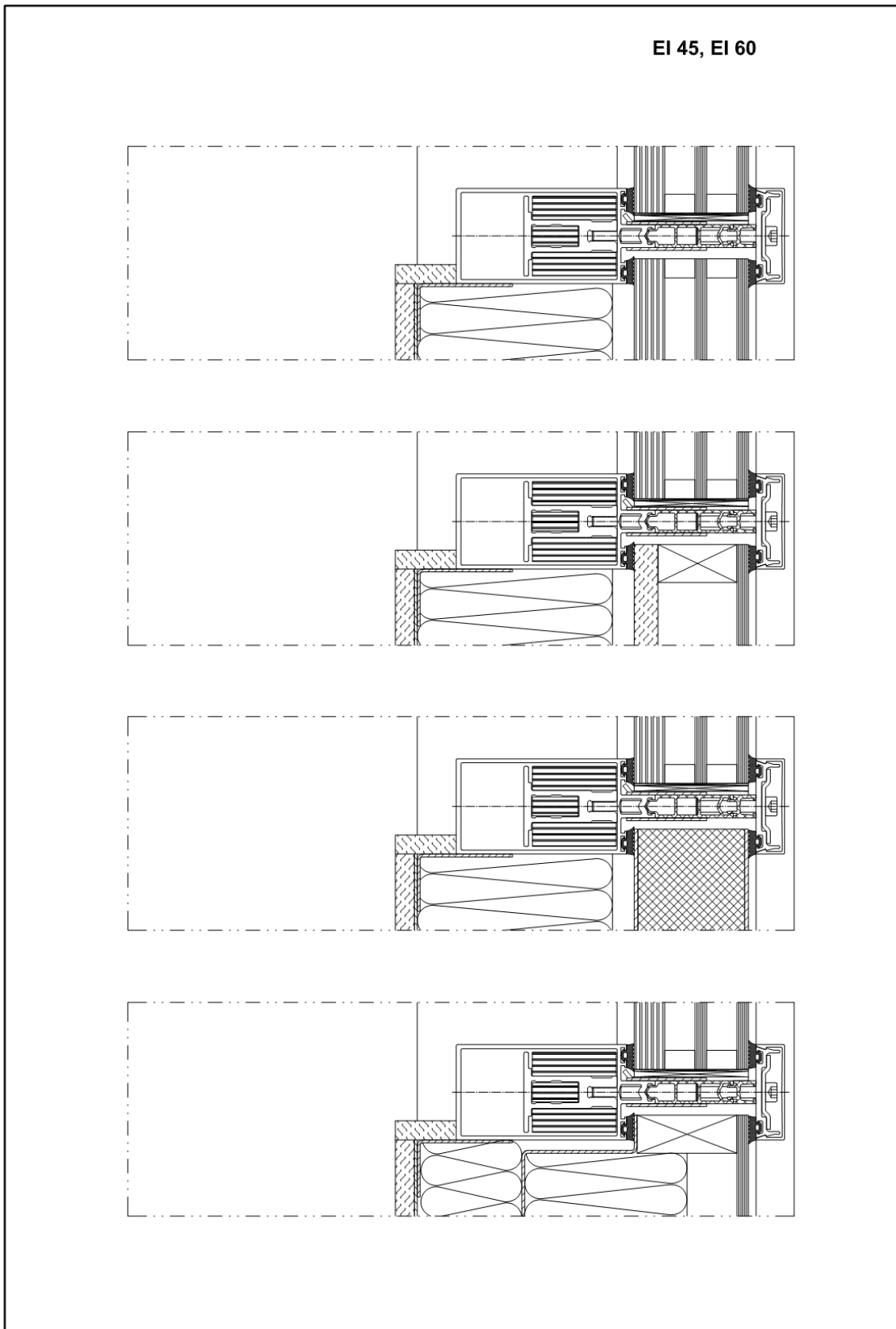


Fig. 42. MB-SR50N EI EI60 system spandrel solution - top transom detail

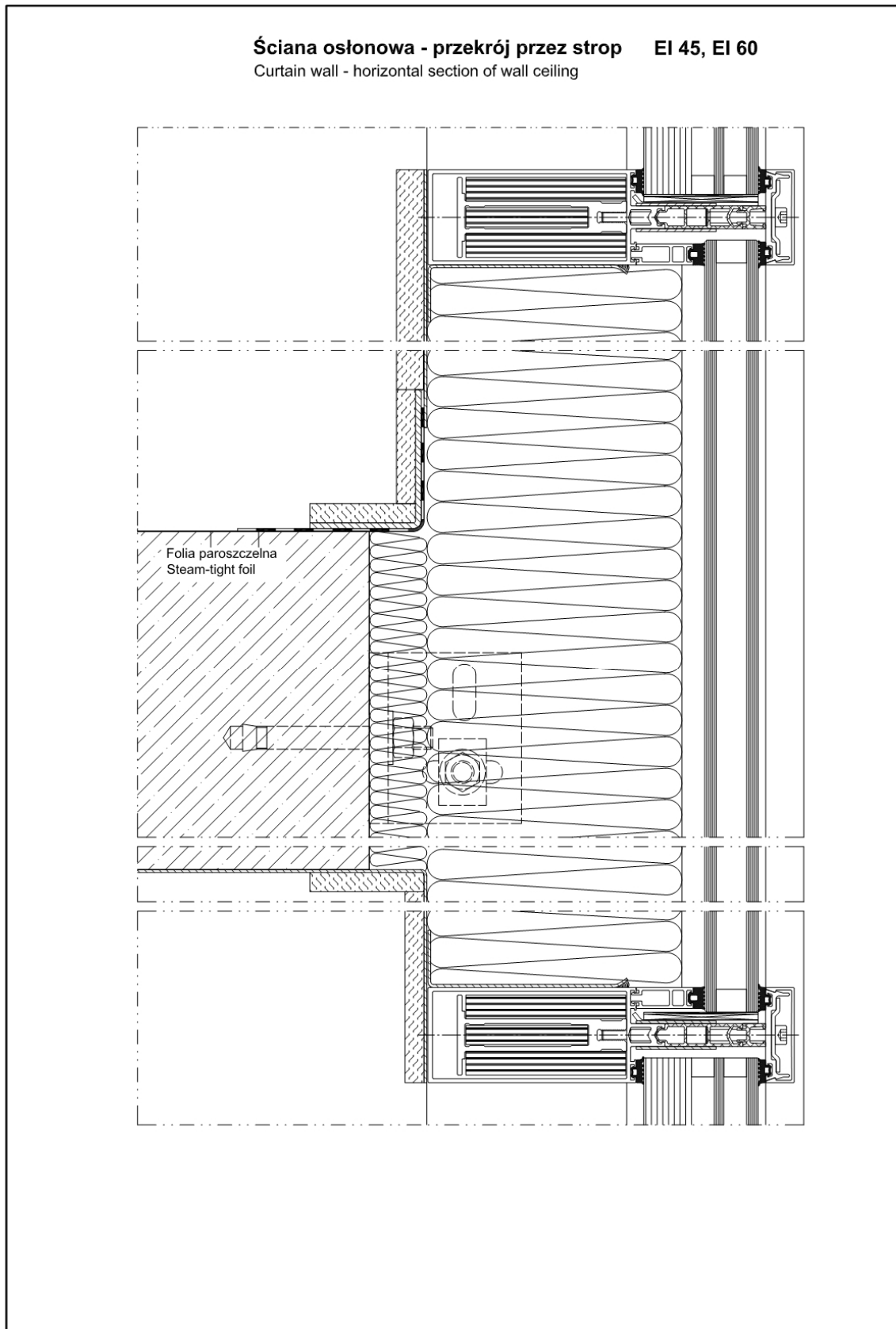


Fig. 43. MB-SR50N EI EI60 system spandrel solution - vertical cross section



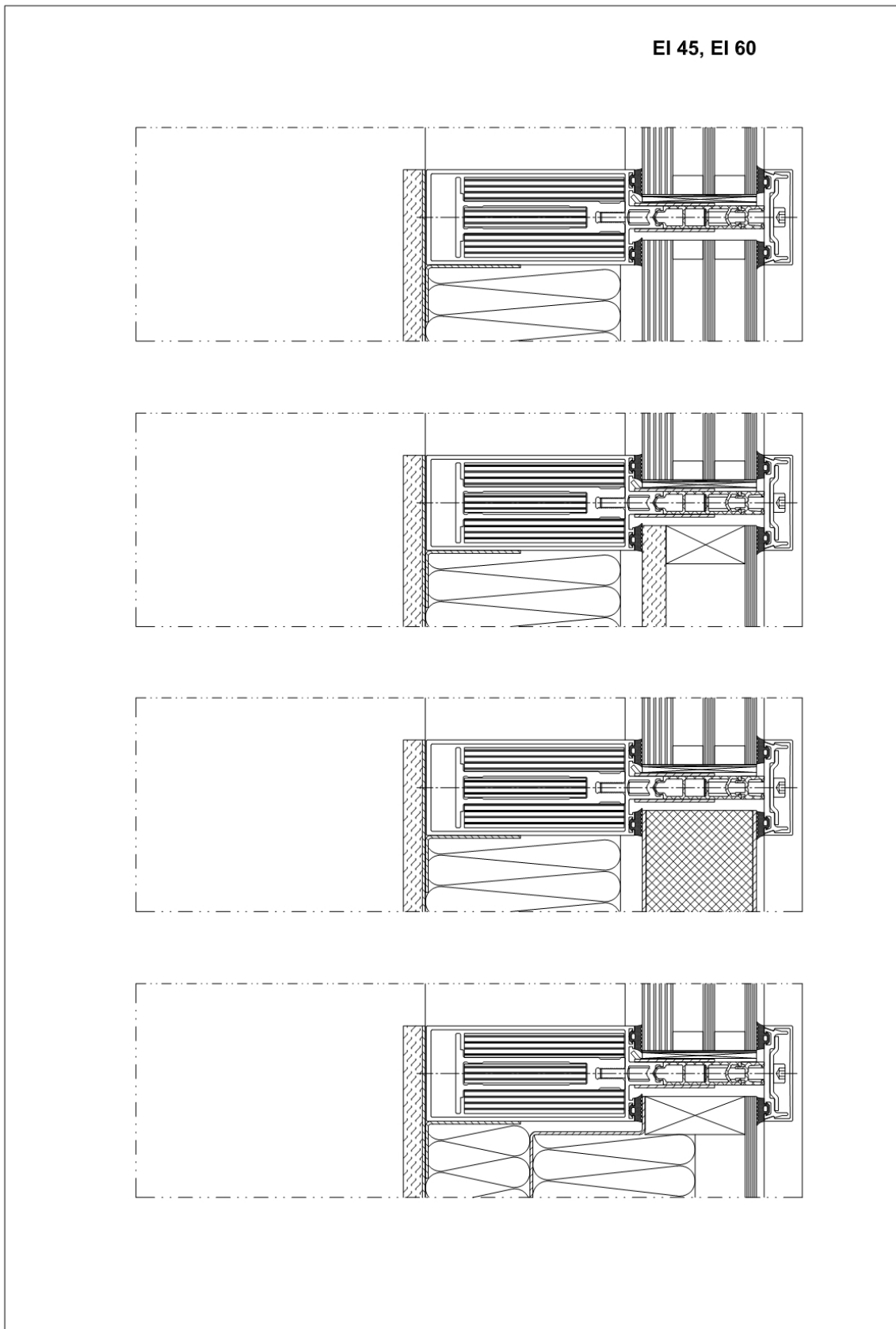


Fig. 44. MB-SR50N EI EI60 system spandrel solution - top transom detail

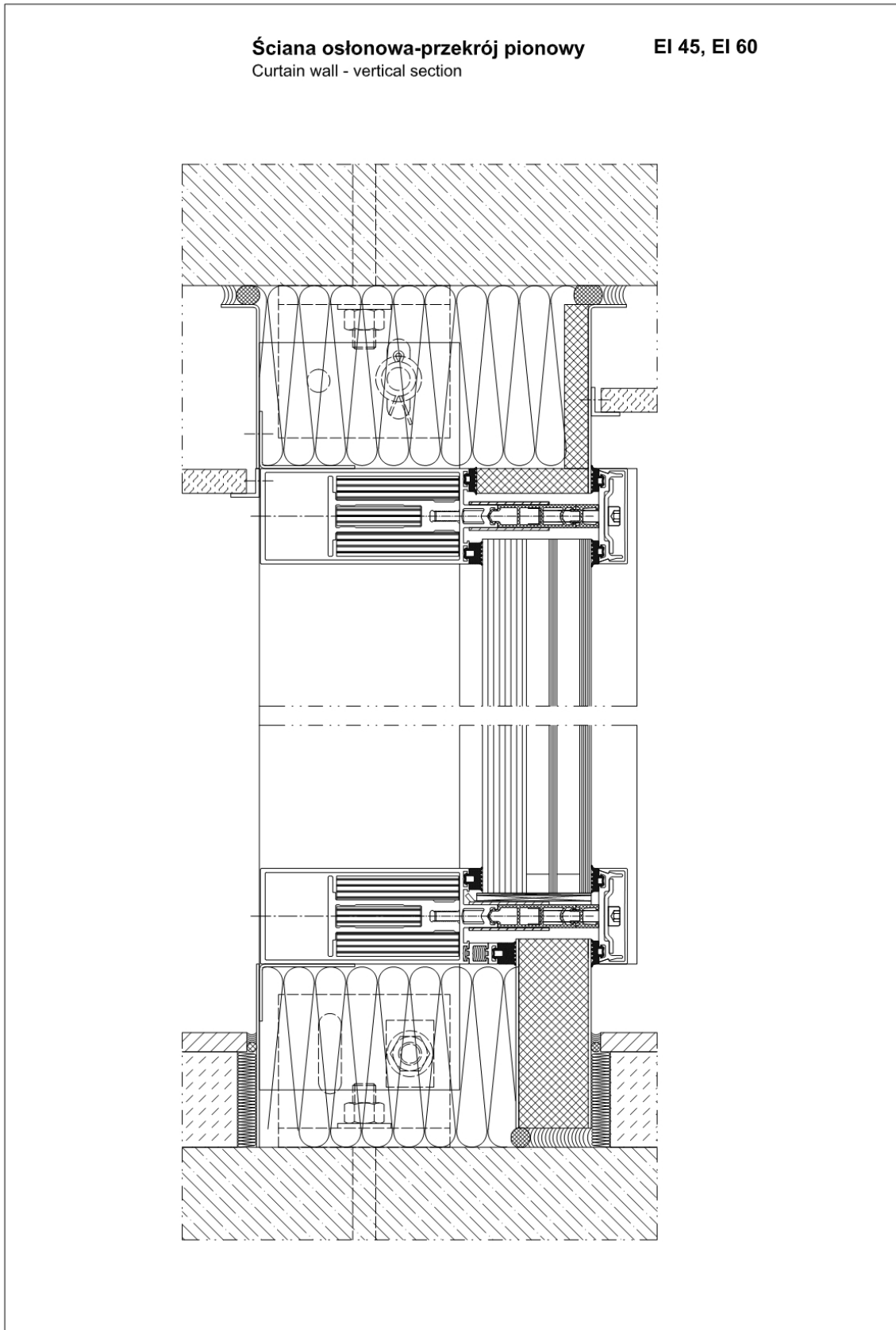


Fig. 45. MB-SR50N EI EI60 system between floors curtain wall - vertical cross section

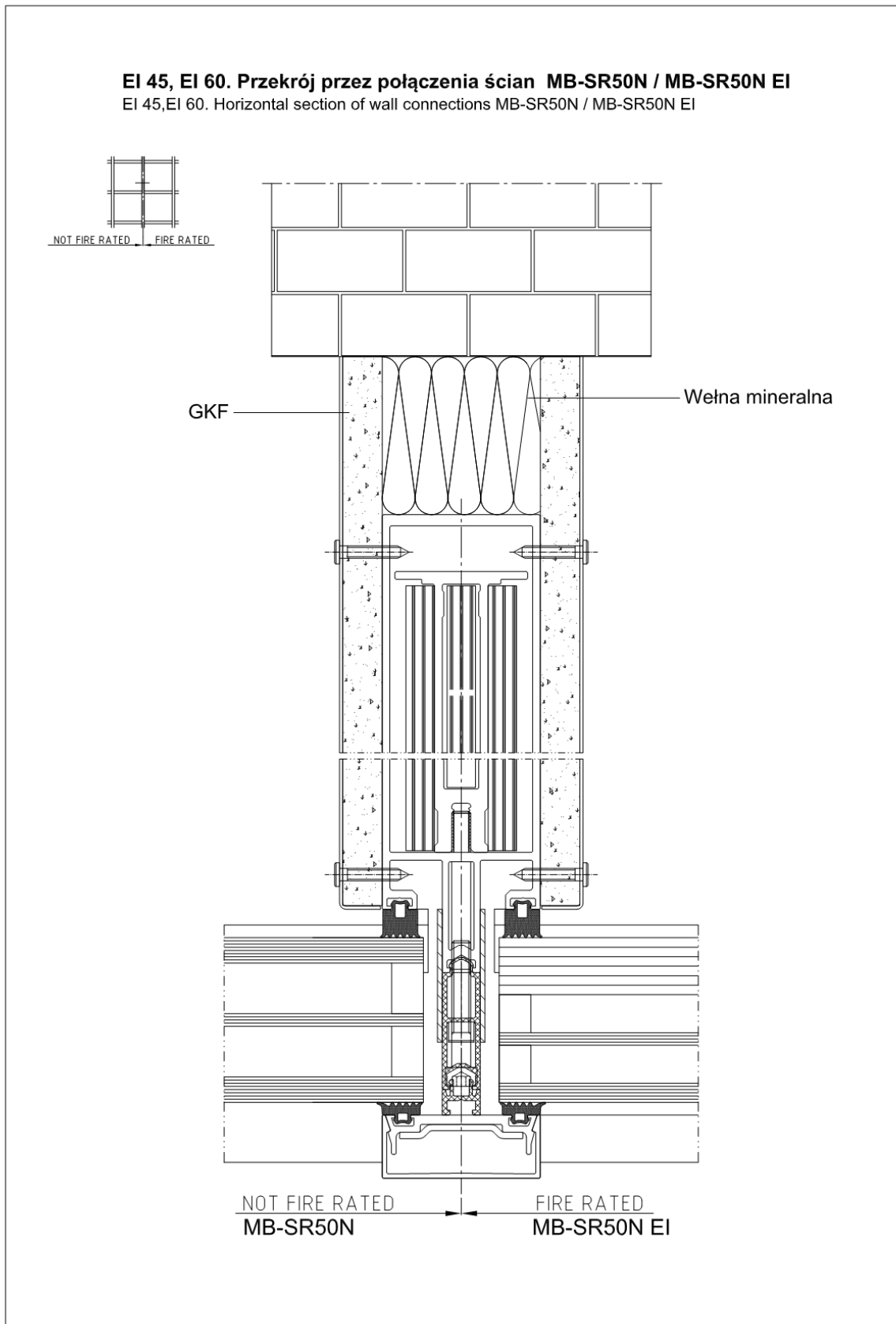


Fig. 46. Cross-section through the connection of the MB-SR50N EI EI60 system wall with non - fire rated MB-SR50N system wall

**Tabela szklenia**  
Glazing table

Schemat szklenia Glazing diagram		28<G≤32								32<G≤36								36<G≤40							
		S		R		S		R		S		R		S		R									
Akcesoria szklenia Glazing accessories		28	29	30	31	32	6	8	10	32	33	34	35	36	6	8	10	36	37	38	39	40	6	8	10
Szyby /Panes																									
120480	4 mm					R								R								R			SR
120481	5 mm				R								R				SR				R				
120482	6 mm			R				SR			R									R					SR
120483	7 mm		R								R					SR			R						
120484	8 mm	R						SR	R										R					SR	
120485	9 mm					S								S	SR							S			
120486	10 mm				S	SR							S								S				
120487	11 mm			S								S									S				
120488	12 mm		S									S								S					
120489	13 mm	S										S								S					
127108	S=32	SR																							
127109	S=42									SR								SR							
009060	25 mm	SR																							
009014	29 mm	SR																							
009015	33 mm	SR																							
K434037X	15 mm																								
K417916X	20 mm	R																							
K433143X	25 mm	S																							
K417917X	30 mm	S																							
80371326	L=60	R																							
80371321	L=65	R																							
80371322	L=70	R																							
80371324	L=80	S																							
80371325	L=85	S																							
80371344	L=90	S																							
R - rygiel transom	S - Stup mullion	 80957051 80957064 80312115 80371256								 80957052 80957065 80312116 80371256								 80957053 80957066 80312117 80371256							

Fig. 47. Tables with glazing fixig accessories selection for MB-SR50N EI EI60 system, part 1/4

**Tabela szklenia**  
Glazing table
























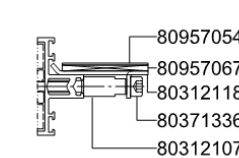
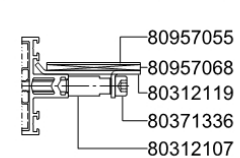
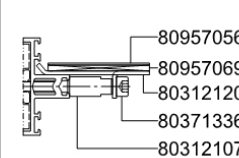
Schemat szklenia Glazing diagram	40<G≤44										44<G≤48										48<G≤52									
	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R												
Akcesoria szklenia Glazing accessories																														
Szyby /Panee	40	41	42	43	44	6	8	10	44	45	46	47	48	6	8	10	48	49	50	51	52	6	8	10						
120480 4 mm 					R								R								R									
120481 5 mm 				R									R								R									
120482 6 mm 				R									R								R			SR						
120483 7 mm 			R										R			SR		R												
120484 8 mm 	R							SR	R									R						SR						
120485 9 mm 					S								S		SR						S									
120486 10 mm 				S		SR							S								S		SR							
120487 11 mm 			S										S		SR						S									
120488 12 mm 			S			SR							S								S									
120489 13 mm 	S								S								S													
127109 S=42 	SR										SR										SR									
009020 8 mm 																					SR									
009016 37 mm 	SR																				SR									
009017 41 mm 											SR																			
K434037X 15 mm 											S										R									
K417916X 20 mm 											S										2xS, R									
K433143X 25 mm 																					SR									
K417917X 30 mm 											R																			
80312107 	R										R										R									
80312108 	S										S										S									
80371316 L=30 	SR																													
80371256 L=35 											SR																			
80371335 L=40 																					SR									
R - rygiel transom S - Stup mullion																														

Fig. 48. Tables with glazing fixig accessories selection for MB-SR50N EI EI60 system, part 2/4

**Tabela szklenia**

Glazing table

Schemat szklenia Glazing diagram		52<G≤56								56<G≤60								60<G≤64									
		S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R	S	R		
Akcesoria szklenia Glazing accessories																											
Szyby /Panee		52	53	54	55	56	6	8	10	56	57	58	59	60	6	8	10	60	61	62	63	64	6	8	10		
120480	4 mm					R								R			SR							R			
120481	5 mm				R			SR				R										R					
120482	6 mm			R								R				SR					R						
120483	7 mm		R					SR			R										R						
120484	8 mm	R									R				SR				R								SR
120485	9 mm					S	SR							S								S					
120486	10 mm				S								S								S			SR			
120487	11 mm			S								S									S						
120488	12 mm		S								S								S					SR			
120489	13 mm	S								S								S									
127109	S=42	SR								SR								SR									
009020	8 mm	SR																2xSR									
009083	12 mm									SR																	
009017	41 mm	SR								SR								SR									
K417916X	20 mm									R								SR									
K433143X	25 mm									2xS, R								S, 2xR									
K417917X	30 mm																	S									
80312107		R								R								R									
80312108		S								S								S									
80371317	L=45	SR																									
80371318	L=50									SR																	
80371319	L=55																	SR									
R - rygiel transom	S - Stup mullion																										
		80957057 80957070 80312121 80371336 80312107								80957058 80957071 80312122 80371336 80312107								80957059 80957072 80312123 80371336 80312107									

Fig. 49. Tables with glazing fixig accessories selection for MB-SR50N EI EI60 system, part 3/4

**Tabela szklenia**  
Glazing table

Schemat szklenia Glazing diagram		64<G≤68								68<G≤72																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Fig. 50. Tables with glazing fixig accessories selection for MB-SR50N EI EI60 system, part 4/4

**Tabela szklenia kątownego symetrycznego**  
 Table for symmetric angular glazing

$\alpha = 1^\circ \div 7,5^\circ$

Schemat szklenia Glazing diagram	$\alpha = 1^\circ \div 7,5^\circ$														
	20 ≤ G ≤ 24				24 < G ≤ 28				28 < G ≤ 32						
Aksesoria szklenia Glazing accessories															
Szyby /Panels	20	21	22	23	24	24	25	26	27	28	28	29	30	31	32
120493 9 mm					S					S					S
120887 10 mm				S					S					S	
120552 11 mm			S					S					S		
120888 12 mm		S					S					S			
120594 13 mm	S					S					S				
127108 S=32	S				S				S						
009021 17 mm	S														
009022 21 mm					S										
009060 25 mm									S						
80371322 L=70	S														
80371323 L=75					S										
80371324 L=80									S						

G - wypełnienie \ fill-in  
 S - słup \ mullion

Fig. 51. Tables with non-transparent filling fixing accessories selection for MB-SR50N EI EI60 system. Facet angles up to 7,5 degrees, part 1/2



**Tabela szklenia kąowego symetrycznego**  
 Table for symmetric angular glazing

$\alpha = 1^\circ \div 7,5^\circ$

Schemat szklenia Glazing diagram	$\alpha = 1^\circ \div 7,5^\circ$									
	32 < G ≤ 36					36 < G ≤ 40				
Aksesoria szklenia Glazing accessories										
Szyby /Panels	32	33	34	35	36	36	37	38	39	40
120493 9 mm					S					S
120887 10 mm				S					S	
120552 11 mm			S					S		
120888 12 mm		S					S			
120594 13 mm	S					S				
127108 S=32	S					S				
009014 29 mm	S									
009015 33 mm						S				
80371325 L=85	S									
80371344 L=90						S				

G - wypełnienie \ fill-in  
 S - słup \ mullion

Fig. 52. Tables with non-transparent filling fixing accessories selection for MB-SR50N EI EI60 system. Facet angles up to 7,5 degrees, part 2/2

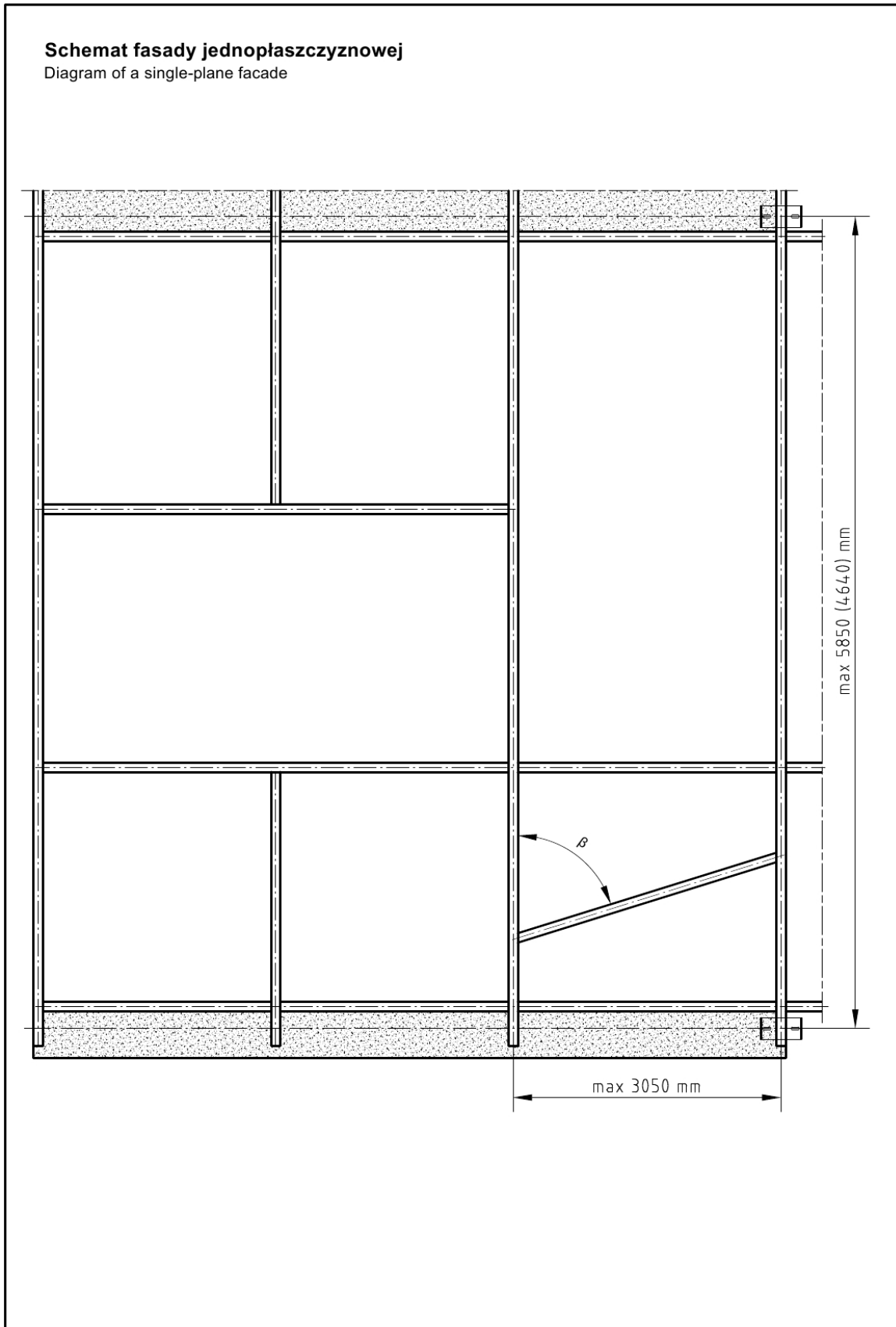


Fig. 53. Straing curtain wall – one storey view

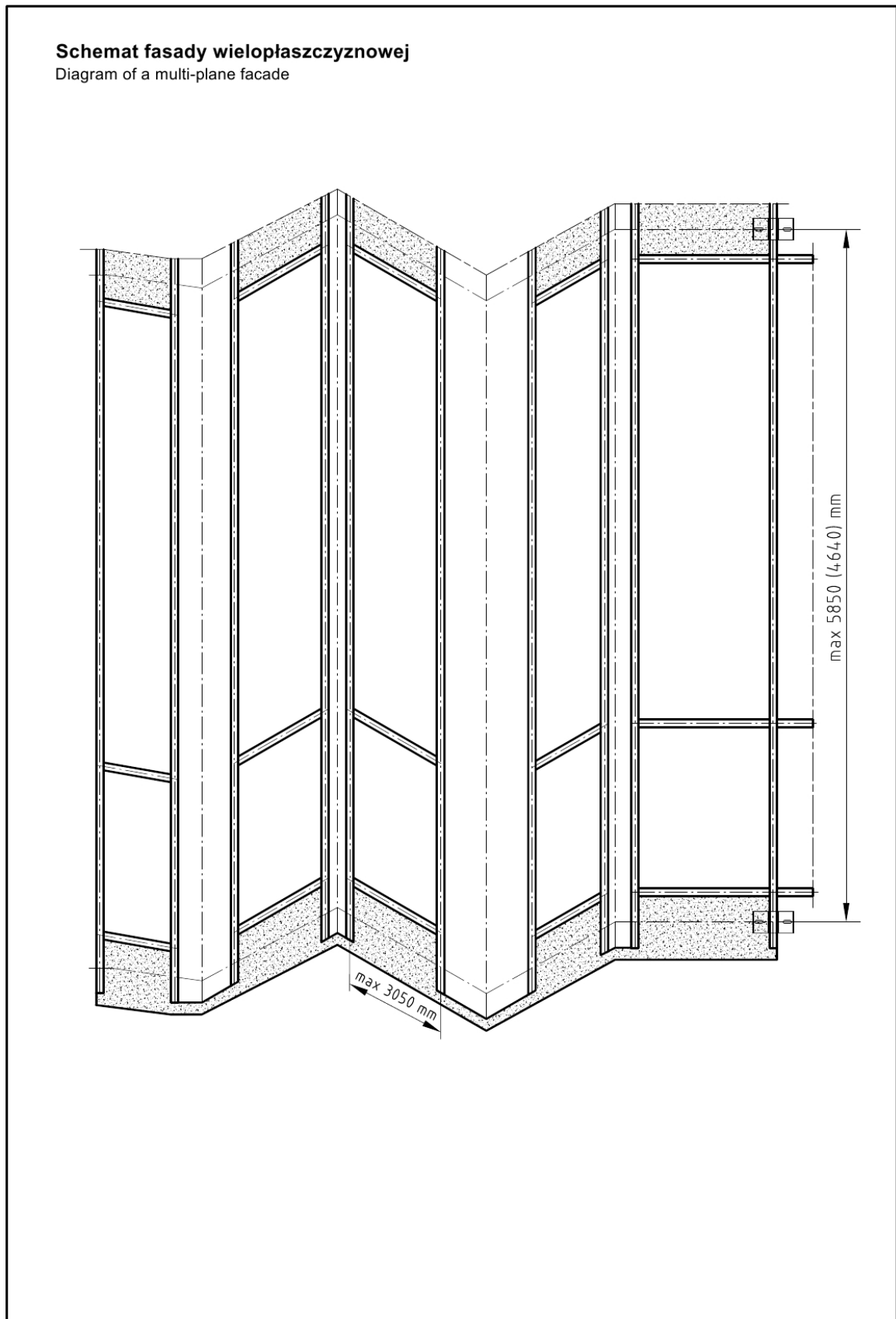


Fig. 54. Faceted curtain wall – one storey view