

TRI MO QBISS ONE

TECHNICAL DOCUMENT QBISS ONE F

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1.0 System Description

The Qbiss One F modular façade system is a self-contained, insulating, and fireproof façade, with a smooth and elegant external design, representing a significant advantage in comparison to other similar products. Such competitive products are usually not self-contained and developed only for the purpose of attractive design. Such façade emphasises the purity of architectural form.

The modular façade system Qbiss One F is a smooth façade with minimalist joints where individual façade elements enable modular construction and fit easily into the desired surface.

The system is based on Qbiss One F modular façade elements, available in different sizes and colours.

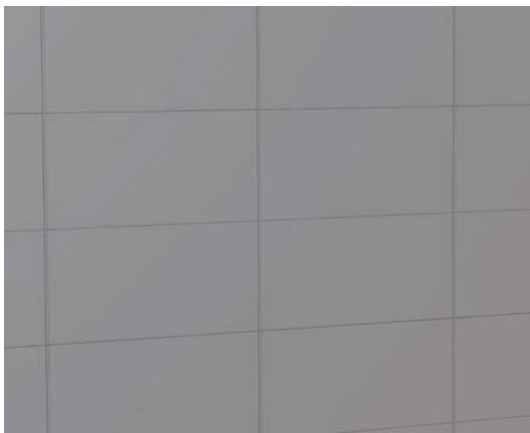
1.1 Installation Methods

Qbiss One F modular façade elements are same for all installation methods.

Installation methods differ with regard to sealing and the sequence of executing certain details.

Horizontal Installation

Fig. 1.1: Horizontal installation method



The horizontal modular façade system is composed of individual façade elements, joined in a horizontal direction (longitudinal) with a tongue -groove system, and fixed to the supporting structure in a vertical direction (transversal).

Longitudinal sealing of joints is accomplished with gaskets, integrated in both longitudinal joints; transversal joints (vertical joints) are sealed with a specially profiled gasket.

Vertical Installation method

Fig. 1.2: Vertical installation



The horizontal modular façade system is composed of individual façade elements, joined in a horizontal direction (longitudinal) with a tongue -groove system, and fixed to the supporting structure in a vertical direction (transversal).

The system of sealing and fixing is specific and slightly different to that used for the classical horizontal method of assembly of façade elements.

The differences between the installation method are described in Assembly document QF 01 - Assembly Instructions - horizontal assembly.

1.2 System Composition

The system's main parts are as follows: corner elements, windows, window and door frames, flashing, façade elements, corner elements, windows, window and door frames, flashing ...

The dimensions of the façade system are defined by the raster length - R and the module width - M of the façade element. In the system, the façade elements form a longitudinal and transversal joint (Figure 1.3).

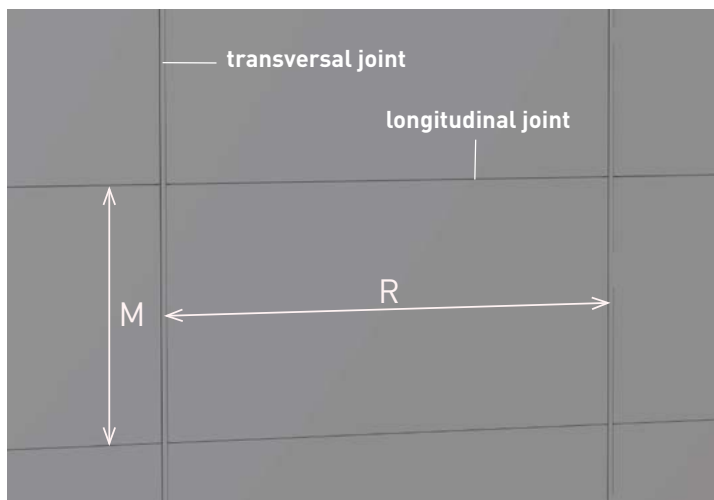
The longitudinal joint is formed by tongue and groove in the façade element. The width of the joint is 3 mm.

The completion or sealing of **the transversal joint** is performed by inserting a sealing and decorative profile ensuring a waterproof and air-tight joint for the entire façade system.

The decorative profile is merely a decorative finishing element. It can be delivered in colours, different to the colours of the façade elements.

The Horizontal and Brick Structured Horizontal Installation

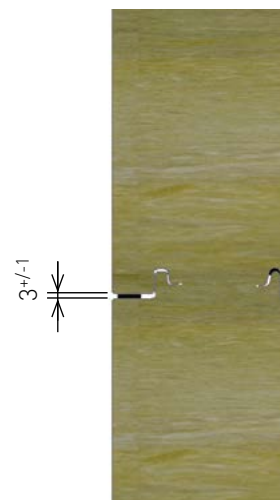
Fig. 1.3: Horizontal installation method



R - distance between supports (façade element length)

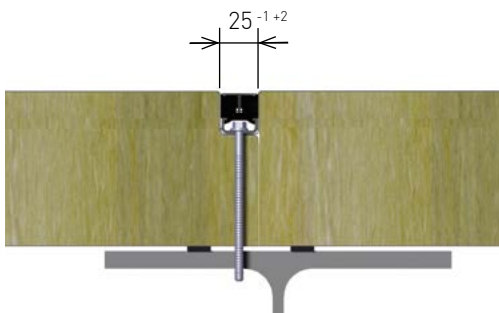
M - module width

Longitudinal joint



The width of the longitudinal joint is 3 mm.

Transversal joint



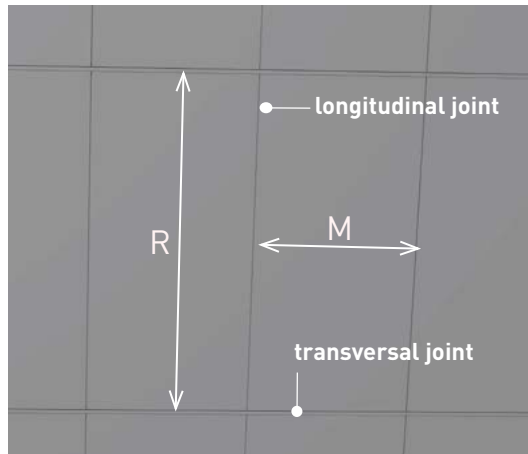
The width of the transversal joint is 25 mm.

Vertical Installation method

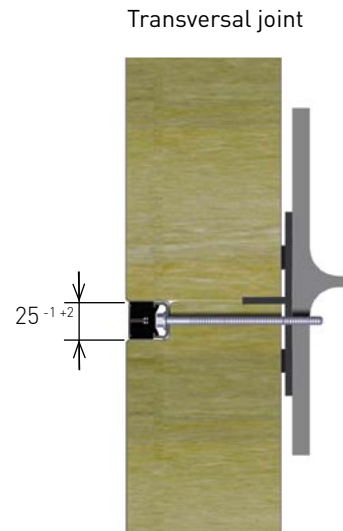
The installation system depends on the load-bearing capacity of façade elements. Each horizontal joint (transversal joint) includes a load bearing profile, fixed to the internal side. This profile supports the façade element and provides stability for the entire façade system.

Functionality of the sealing system is subject to complete drainage of the horizontal (transversal) joint. This is achieved with an additional steel plate and the application of sealant.

Fig. 1.4: Vertical Installation

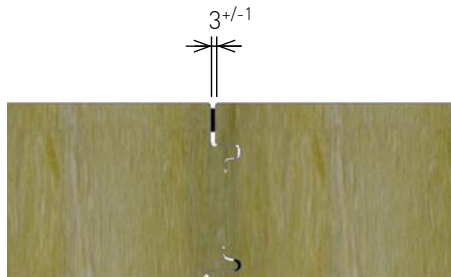


R - distance between supports (façade element length)
M - module width



The width of the transversal joint is 25 mm.

Longitudinal joint

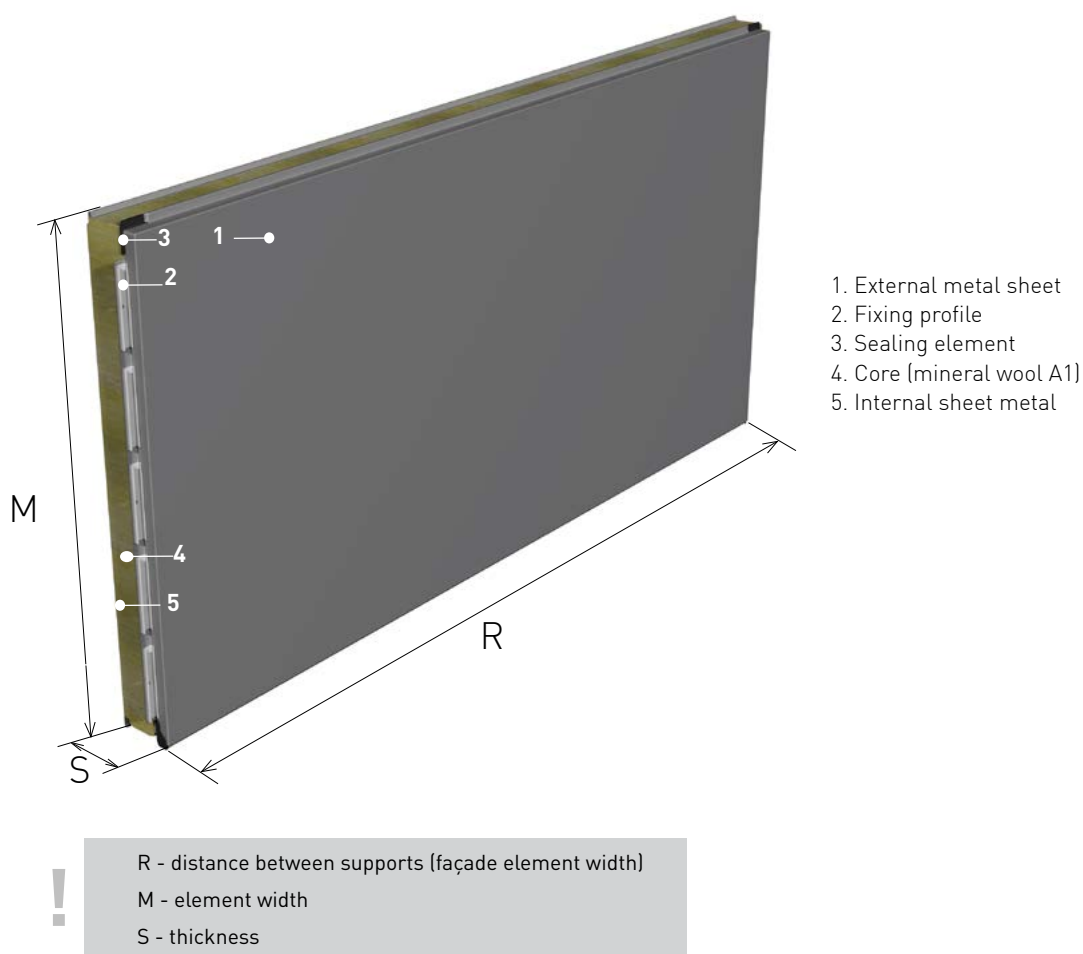


The width of the longitudinal joint is 3 mm.

1.3 Element Composition

The façade element is a basic element of the Qbiss One F modular façade system.

Fig. 1.5: Composition of modular façade element Qbiss



The Qbiss One F façade element consists of two galvanized and painted metal sheets. The metal sheets are bonded to the core made of non-combustible mineral wool (class A1, EN 13501-1), which ensures excellent thermal and sound insulation and the fire-resistance properties of the Qbiss One F façade element. The metal sheets are bonded to the core made of non-combustible mineral wool (class A1, EN 13501-1), which ensures excellent thermal and sound insulation and the fire-resistance properties of the Qbiss One F façade element.

These three layers make a solid Qbiss One f façade element with a thickness of 80 - 240 mm. Such an element ensures the necessary load - bearing capacity, tightness, and required composure.

Protective polyethylene foil is applied to the element surface to protect it during handling, transport and assembly. The foil has to be removed after the assembly is completed.

Table 1.1: Basic technical data

Thickness (S)	80, 100, 120, 133, 150, 172, 200, 240 mm
Element width (M)	standard 1000 mm non-standardized widths available between 600 -1200 mm
Element length (R):	530 - 6500 mm
External surface (side A)	smooth
Core	mineral wool
Internal surface (side B)	G, g, s, v, v2, m2 - profile

1.4 Profile shapes

Fig. 1.6: Profile types

Smooth profile (G, g)



S - profile (standard profile)



V - profile (v)



V - profile (v2)



Profile Type	A	B
Smooth (G)	•	
Smooth (g, G)		•
S - profile (s)		•
V - profile (v, v2)		•

Side A is the external side of a panel.

1.5 Technical Data

1.5.1 General Technical Data

Table 1.2: Technical data for façade elements Qbiss One F

		Q - 80	Q - 100	Q - 120	Q - 133	Q - 150	Q - 172	Q - 200	Q - 240
Element thickness (mm)		80	100	120	133	150	172	200	240
Weight (kg/m ²)	Fe 0,7/Fe 0,6	21.4	23.8	26.2	27.7	29.8	32.5	35.8	40.6
U - Thermal conductivity (W/m ² K)* [EN 14509]		0.49	0.40	0.33	0.30	0.27	0.24	0.20	0.17
Fire resistance class [EN 1364-1]** [EN 13501-2]		/	EI 30	EI 90	EI 120	EI 120	EI 120	EI 120	EI 120
Weight Qbiss One F Power T (kg/m ²)		18.2	20.0	21.8	23.2	24.5	26.5	29.0	32.6
U Thermal transmittance (W/m ² K)* Qbiss One Power T		0.45	0.36	0.30	0.28	0.25	0.21	0.19	0.16
Fire resistance class Qbiss One Power T**		/	/	EI 90	EI 120	EI 120	EI 120	EI 120	EI 120
Weight Qbiss One F Power S (kg/m ²)		20.0	22.3	24.6	26.4	28.0	30.6	33.8	38.3
U Thermal transmittance (W/m ² K)* Qbiss One Power S		0.50	0.41	0.34	0.31	0.28	0.24	0.21	0.18
Fire resistance class Qbiss One Power S**		/	EI 30	EI 90	EI 120	EI 120	EI 120	EI 120	EI 120
Core combustibility [EN 13501-1]	non-combustible mineral wool core, Class A1								
R _w Sound reduction (dB) [EN 10140-3]	30 [-1,3]								
Water permeability - Resistance to driving rain under pulsating pressure [EN 14509]	Class A (1200 Pa)								
Modular width (mm)	1000 [available from 600 to 1200]								
Length (mm)	530 - 6500								

* Data based on typical MW core. For specific project data refer to Technical CE specification data and contact Trimo Technical Support. Calculated according to EN 14509 standard without consideration of longitudinal joint losses.

** Admissible distances between the supports of the assembly of the façade system are calculated for each individual building by Trimo Technical Support.

Values of the table may differ because of different legislation in individual countries.

1.5.2 Shape of elements and corner finishes

Fig. 1.7: Example, BOTH SIDES, L-D

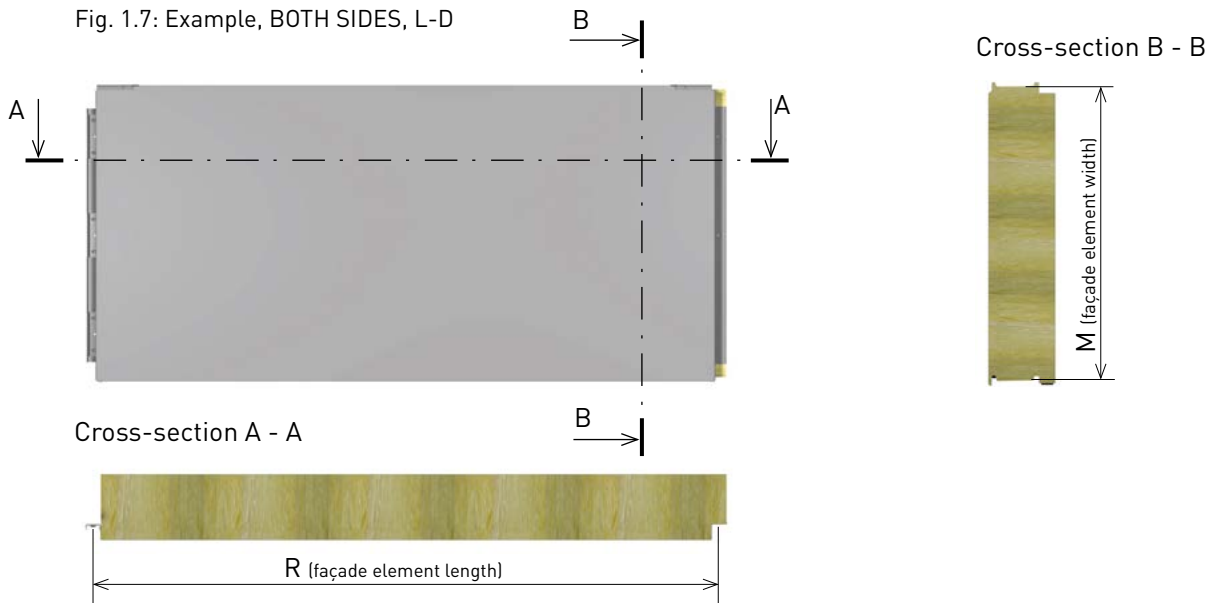
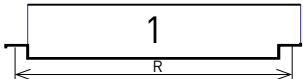
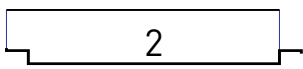
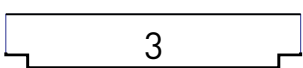
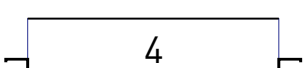
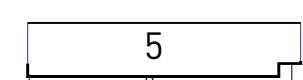
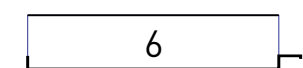
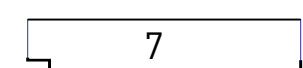
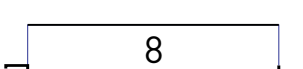
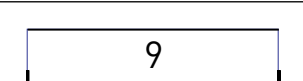
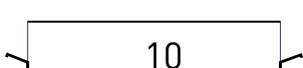
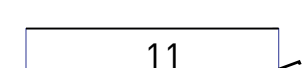
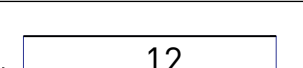


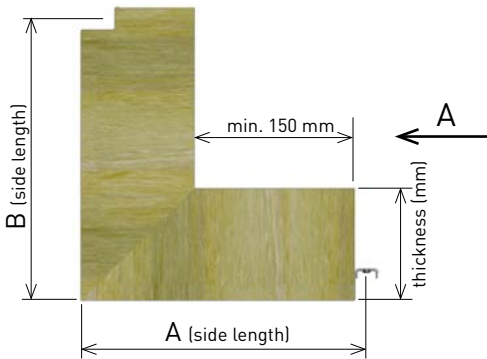
Table 1.3: Different types of finishing

ELEMENT TYPE	SHAPE OF THE ELEMENT	DIRECTION OF INSTALLATION	INSTALLATION METHOD
	BOTH-SIDED	L-D	HORIZONTAL HORIZONTAL - BRICK VERTICAL
	BOTH-SIDED	D-L	HORIZONTAL HORIZONTAL - BRICK
	BOTH-SIDED	INITIAL	HORIZONTAL HORIZONTAL - BRICK VERTICAL
	BOTH-SIDED	FINAL	HORIZONTAL HORIZONTAL - BRICK
	RIGHT	INITIAL	HORIZONTAL HORIZONTAL - BRICK VERTICAL
	RIGHT	FINAL	HORIZONTAL HORIZONTAL - BRICK
	LEFT	INITIAL	HORIZONTAL HORIZONTAL - BRICK VERTICAL
	LEFT	FINAL	HORIZONTAL HORIZONTAL - BRICK VERTICAL
	NONE	INITIAL FINAL L-D D-L	HORIZONTAL HORIZONTAL - BRICK VERTICAL
	BOTH-SIDED	L-D D-L	HORIZONTAL façade RADIUS MUST BE GIVEN
	RIGHT	L-D D-L	HORIZONTAL façade RADIUS MUST BE GIVEN
	LEFT	L-D D-L	HORIZONTAL façade RADIUS MUST BE GIVEN

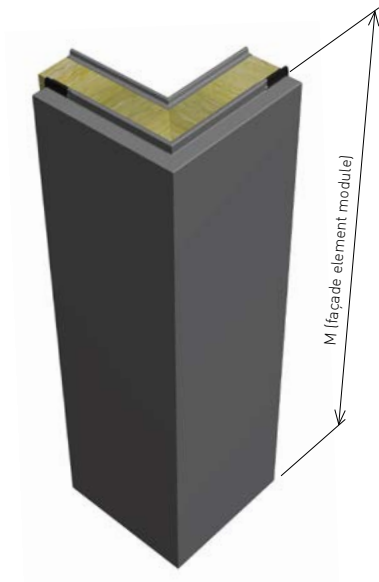
Types of corner elements

Horizontal corner elements

Fig. 1.8: L shape



Isometric view



View A



Fig. 1.9: The principle for designating the sides of corner elements - shown is a top-down view of four corners of a building with side designations

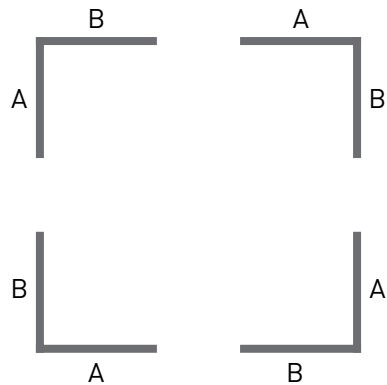
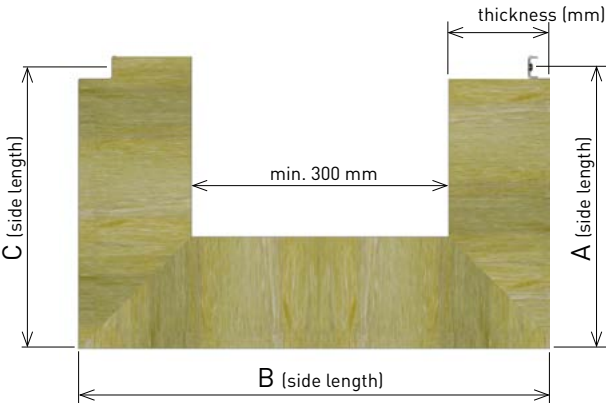


Fig. 1.10: U shape



NOTE:

The direction of installation and the element type do not affect the designation of legs (A, B, C) of the corner element. The scheme for designating the legs is shown in Figure 1.15.

Vertical corner elements

Fig. 1.11: A cross-section of the vertical corner element

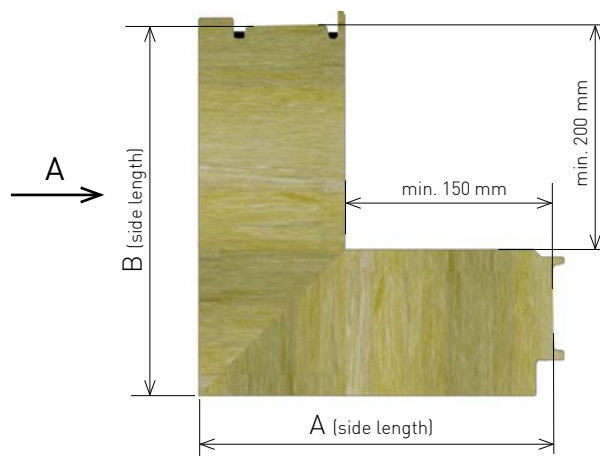
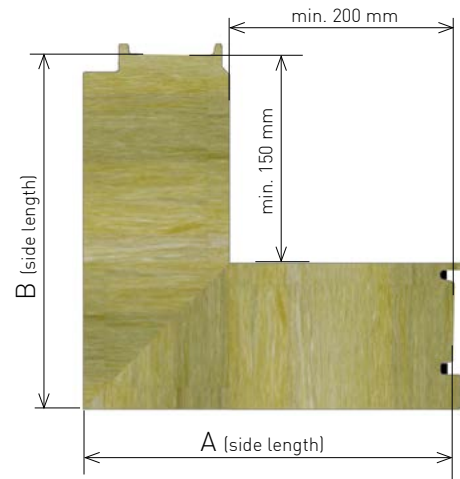
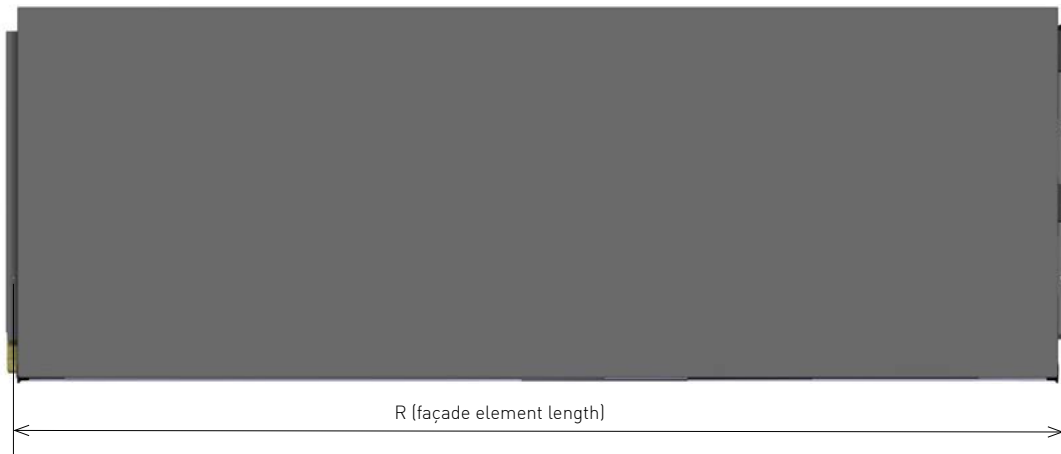


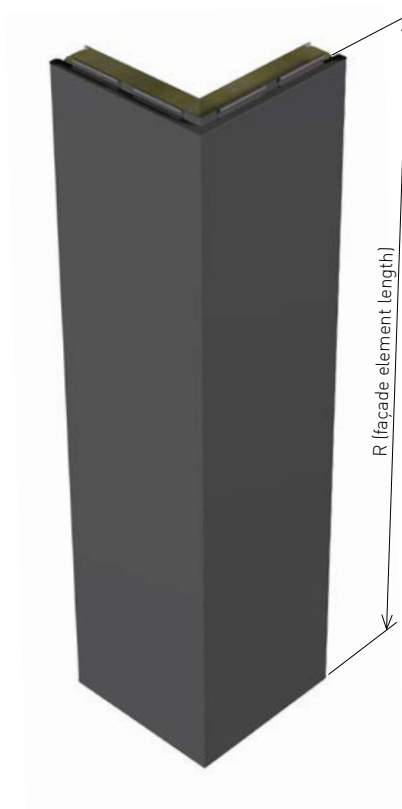
Fig. 1.12: A cross-section of the vertical corner element



View A



Isometric view



1.6. System Characteristics, Requirements and Limitations

The chapter contains a summary of the modular Qbiss One F façade system with its requirements and limitations.

CHARACTERISTICS

Components of the modular façade system

- Modular façade elements
- Fixing and sealing material
- Standard metal sheet flashings
- Joint interface connection detail for windows and doors
- Corner elements
- Sub-structure (optional)
- Windows and doors (optional)

Installation Methods

- Horizontal installation
- Vertical Installation

Standardised assembly direction of Qbiss One F façade elements is from the LEFT to the RIGHT.

Fixing material

- Self-tapping screws (stainless A2)
- Self-drilling screws (stainless A2)

Horizontal Qbiss One F Corner Façade Elements - L & U shape

- L shape: - **Restrictions on the length of the corner elements sides:**

$$A_{\max} (B_{\max}) = 2500 \text{ mm}$$

$$(A+B)_{\min} = 530 \text{ mm}$$

$$(A+B)_{\max} = 2000 \text{ mm if } A \text{ or } B > 600 \text{ mm}$$

- Min length of the sides: $A_{\min} = B_{\min} = (150 \text{ mm} + \text{thickness})$; $A + B = \min 530 \text{ mm}$
- Angles available **from 60° to 175°**
- U shape: - Max external dimensions (side x middle x side): 1000 x 1500 x 1000 mm
- Min internal dimensions (side x middle x side): 150 x 300 x 150 mm

Vertical Qbiss One F Corner Façade Elements - L shape

- L shape:
 - $A_{\min} = (200 \text{ mm} + \text{thickness})$
 - $B_{\min} = (150 \text{ mm} + \text{thickness})$
 - $(A+B) = \min 600 \text{ mm}$
 - Modular width: 600 - 1200 mm
 - Element length: 530 - 6500 mm
 - Angles available: **from 80° to 180°**

Metal Sheet corner elements

- Available in different versions for horizontal and vertical assembly of Qbiss One F façade elements
- With continued corner flashings (rounded or sharp edges)
- Rounded-edge version available only with continued corner sheet metal flashing

Aluminium Windows, Doors, and other Openings

Aluminium serves as functional frame for spaces and openings such as:

- Windows or glass doors
- Light strips

We can supply individual frames up to 6.5 m long. We can make longer frames by joining individual frames, connected by a transversal joint.

Light strips without windows (for closing façade elements) can be installed by using one of the following options:

1. as frames (max. 6.5 m long) that are connected by a transversal joint, or
2. a continuous strip with expansion bonds at a minimum of 6.5 m, with an extension element.

Installing recessed windows/doors is possible by two methods:

1. with frames (up to 4 m long), connected by a transversal joint.
2. as an endless strip with an expansion joint at a minimum of 4 m, with an extension element.

Design possibilities

- Façade elements of the façade can be in different colour combinations.
- Standard colour of deep joints (longitudinal and transversal) is the same as colour of façade elements.
Subject to prior order available also in different colours.

REQUIREMENTS

1. Ordering data, necessary for production

1. Static calculation (Building location and relevant data, geometry, and type of the building)

2. Specification of the façade system:

- Thickness of the façade elements
- Number of pieces
- Type of the façade elements (BOTH-SIDED, LEFT, RIGHT, NONE)
- Raster length R (distance between screws or, termination at single sided elements, respectively)
- Module - M (module width)
- Number of transversal joints
- Number of EPDM cubic seals for sealing of joints in cut-outs
- Number of drip flashings
- Colour of transversal and longitudinal decorative plates (if different from the colour of the façade element)
- Radius of the façade (in case of segmented assembly) measured on external sheet (fig. 1.16)

3. Assembly data:

- Assembly direction (LEFT to RIGHT, RIGHT to LEFT)
- Assembly type (HORIZONTAL, HORIZONTAL BY SHIFTING, VERTICAL)

2. Preparation of structure or sub-structure

Preparation of a suitable structure or sub-structure in accordance with the provisions of these instructions is required to ensure quality, tightness, and durability of the façade system. The levelling structure system (Trimo Quick-Assembling sub-structure) must be used in cases when the structure fails to meet the above-mentioned requirements.

A geodetic snapshot of the building (concrete or brick wall) or structure (steel, concrete, wood) is required to determine suitability of the structure.

LIMITATIONS

Segmented Assembly:

Apparent radius of segmented façade system:

- Minimal transversal radius: 10 m
- Minimal longitudinal radius: 60 m
- Check suitability of the desired façade elements length and thickness related building radius.

Production of the Qbiss façade elements on the construction site/object is not possible. In case of additional requirements, elements must be ordered in Trimo and delivered subsequently.

Inclined assembly:

- admissible façade inclination inside building: 10°
- admissible external façade inclination: without limitations, if inclination is not limited by static calculation
- admissible inclination of the façade elements with regard to zero height (floor) 15°

2.0 Design Procedure

2.1 Selecting the thickness

According to recommendations in 1.5.1 and technical requirements of the façade surface, the thickness of Qbiss One F façade element is determined. The thickness of the Qbiss One F façade element has direct influence on its load-bearing capacity, heat insulation properties, fire resistance and thermal stability of the façade.

2.2 Permissible distances between supports and attaching Qbiss One F façade elements

For façade elements, static proof of stability according to EN 14509 or other national regulations may be required. A control calculation for actual installation conditions and loads is required.

NOTE:

Table of allowed distances cannot be used as static stability evidence. Stated values are calculated based on the most unfavourable combination of load and idealized assembly conditions and not on actual conditions. Trimo (Technical Support Department) can perform your individual static calculation.

2.2.1 Wind load determination

The key factor for determining acceptable installation distances and the dimensions for fixing are wind loads, determined according to EN 1991-1-4:2005 or other national standards (DIN 1055-4, NEN6702, SniiP...), if required.

According to the European standard used by the majority of EU countries (also applies to similar national standard), a static load calculation must be performed for the actual project. Performance of such calculations requires the following input data:

1. Building Location and Data Linked to Location

- location and address,
- altitude,
- wind zone or basic wind speed,
- Category of the surrounding location (categories 0, I, II, III, IV)
- Micro-location (building situated at very demanding locations, such as coastlines, hill-tops, ...)

2. Geometry and Type of the Building

- Building shape and dimensions (height, length, width, distribution; Warning: Attics!)
- Type of building (open / partially open / closed building, ceilings, projecting roofs...)
- Size of Qbiss One F façade elements
- Building purpose

Without the abovementioned data, wind loads cannot be determined, while using approximate values based on experience may lead to significant deviations and cause severe difficulties later when determining building façade static stability.

2.2.1.1 Edge Zones and their Effect on Façade Elements and Fixing Conditions

Wind effects can be divided into the following categories, based on the direction:

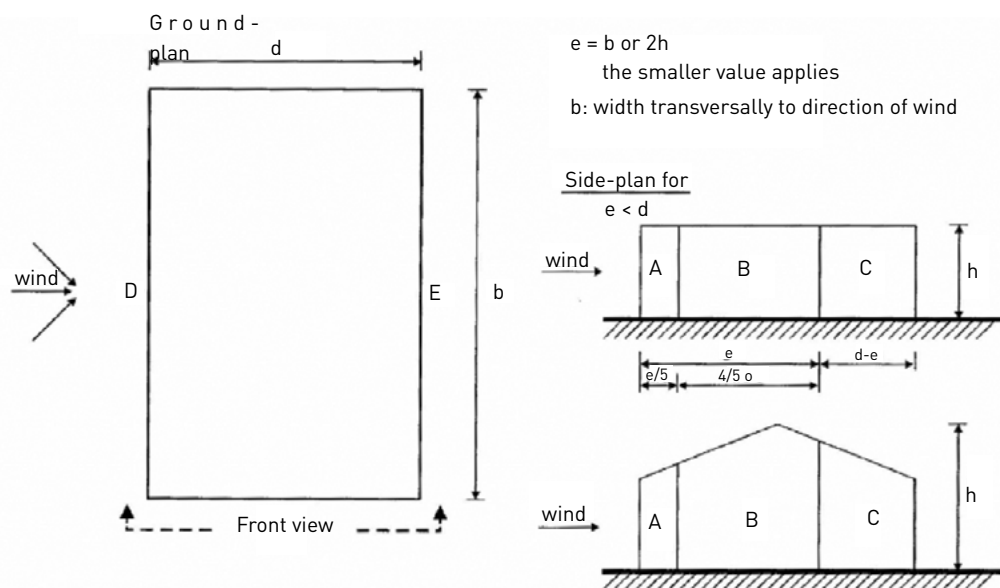
1. wind force in the building direction (+) - wind pressure
2. Effect of wind directed away from the building (-) - wind suction

Wind suction, caused by whirling of wind on the edge zones (building edges), is particularly problematic. Suction load in these zones is greater than pressure load; it has a significant effect on façade elements and, therefore, directly determines the fixing conditions. Basic edge zones for simple buildings ($e < d$) are outlined in Figure 2.1. Table 2.1 gives the design coefficients for wind effects. A detailed overview of the edge zones defining procedure is described in Chapter 7.2.2. of EN 1991-1-Standard.

If data on wind pressure load exists, $w_{e,d}$, wind loads in the edge area A can be calculated using the below formula:

$$w_{e,A} = -1.75 * w_{e,d}$$

Fig. 2.1: Determining edge zones on a simple rectangular building with proportions $e < d$



According to EN 1991-1-4 Standard in Chapter 7.2.2.

Table 2.1: Recommended outdoor pressure coefficient values for perpendicular walls of rectangular buildings

Area	A		B		C		D		E	
h/d	$C_{pe,10}$	$C_{pe,1}$	$C_{pe,10}$	$C_{pe,1}$	$C_{pe,10}$	$C_{pe,1}$	$C_{pe,10}$	$C_{pe,1}$	$C_{pe,10}$	$C_{pe,1}$
5	- 1,2	- 1,4	- 0,8	- 1,1	- 0,5		+ 0,8	+ 1,0	- 0,7	
1	- 1,2	- 1,4	- 0,8	- 1,1	- 0,5		+ 0,8	+ 1,0	- 0,5	
< 0,25	- 1,2	- 1,4	- 0,8	- 1,1	- 0,5		+ 0,7	+ 1,0	- 0,3	

2.3 Installation Directions

The installation is initiated using a Qbiss One F corner element at the extreme axis of the building (Figure 2.5), however, the neighbouring Qbiss One F façade element can be installed if the corner elements have not yet arrived.

The project usually contains the installation direction for each façade (building side). If the installation direction is not prescribed, **the standard installation direction is from the LEFT to the RIGHT**.

Fig. 2.3: Installation direction from the LEFT to the RIGHT

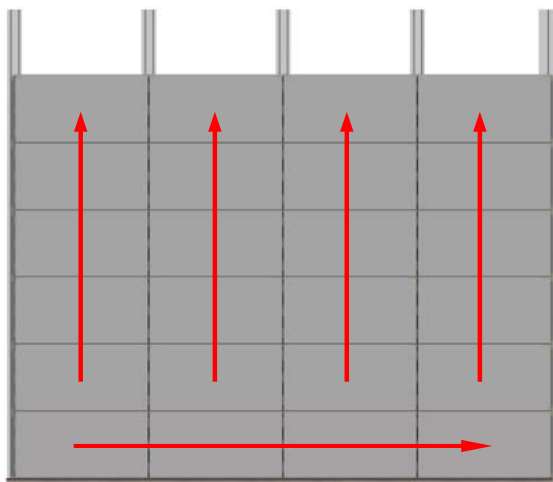
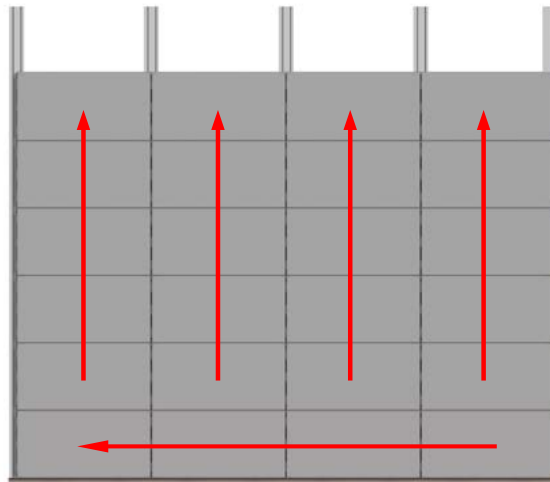


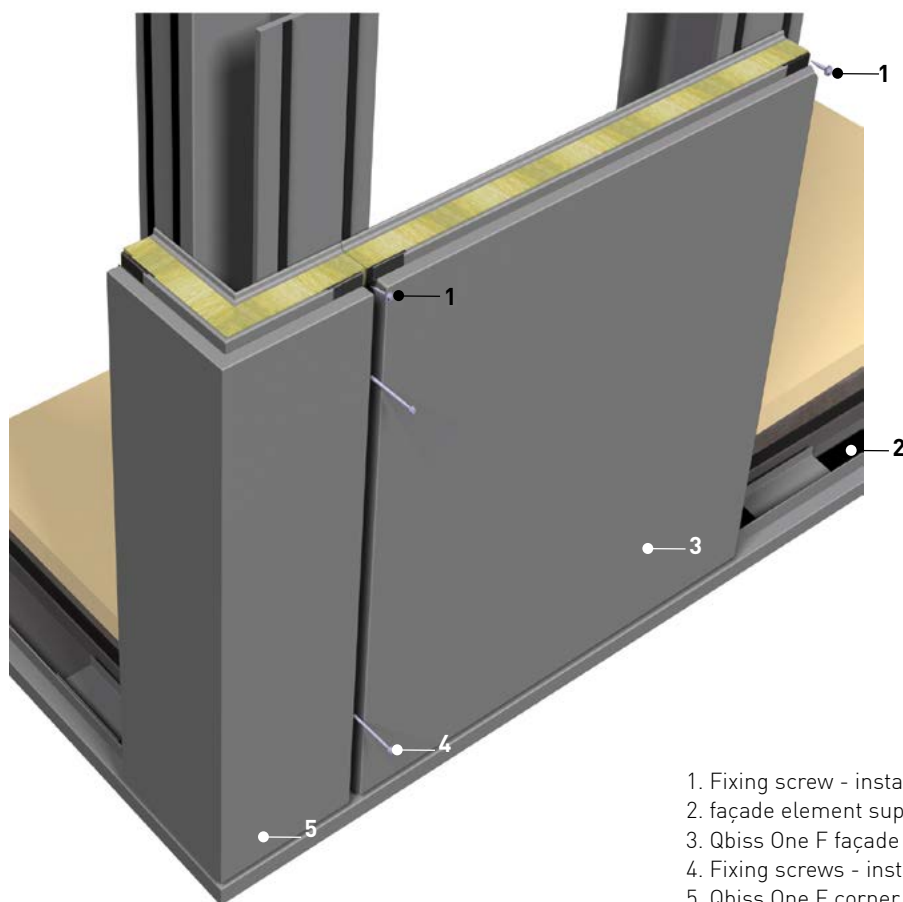
Fig. 2.4: Installation direction from the RIGHT to the LEFT



Installation recommendations

Regardless of installation direction, the first row on the main beam should be constructed of at least three Qbiss One F façade elements before continuing with vertical installation.

Fig. 2.5: Attachment of Qbiss One F façade element to the main beam



1. Fixing screw - installation through internal sheet metal
2. façade element support
3. Qbiss One F façade element (L-R installation)
4. Fixing screws - installation through attachment profiles
5. Qbiss One F corner element (initial)

2.4 Structure and substructure types and selecting the fixing method

Classic steel substructure (Figure 2.6a) is suitable for installation of Qbiss One F façade elements, when it is within the tolerances (Section 3.1). If the substructure does not meet the tolerances, an adjustable substructure must be used (Figure 2.6b).

The installation method is selected depending on the structure type:

- Qbiss One F façade elements are attached:

1. directly to the steel structure (if the structure meets the tolerances) or
2. if the structure does not meet acceptable tolerances, an adjustable substructure must be used.

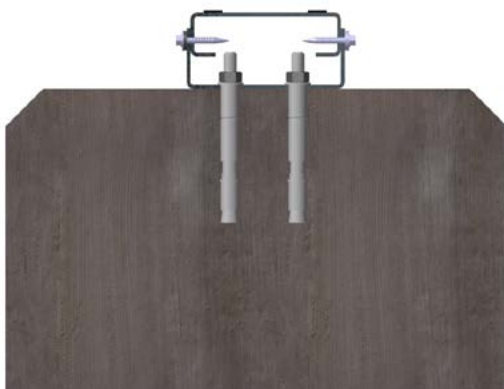
-For concrete structures, the adjustable substructure method is used

Fig. 2.6: Steel structure and steel structure with adjustable substructure

a) steel



Fig. 2.7: Concrete structure with the adjustable substructure variant



NOTE:

- The minimal required contact surface for the Qbiss One F modular façade system is given in the static calculation for the project. If there is no such calculation, the width (b_{min}) is used for minimal contact surface, which is 80 mm per façade element edge.
- If the substructure does not meet the tolerances, an adjustable substructure must be used.

2.5 Screws and fixing

The Qbiss One F façade elements are attached to the façade structure or substructure with screws through internal and external sheet metal. The Qbiss One F façade element already has boreholes in attachment areas. The required number of screws is defined using the static calculation in the project. See "2.2 Permissible distances between supports and attaching Qbiss One F façade elements".

Qbiss One F façade elements are fixed through internal and external sheet metal. For attachment through external sheet metal, screws WITHOUT washers are used.

Fixing through internal sheet metal is performed using a screw for fixing thin metal sheets:

Table 2.3: Screw type for fixing through internal sheet metal and drill diameter

thickness of the element (mm)	self-tapping screw (A2)	Self-drilling screws (A2)
valid for all thicknesses	6.3 x 25	5.5 x 32/5.5 x 38

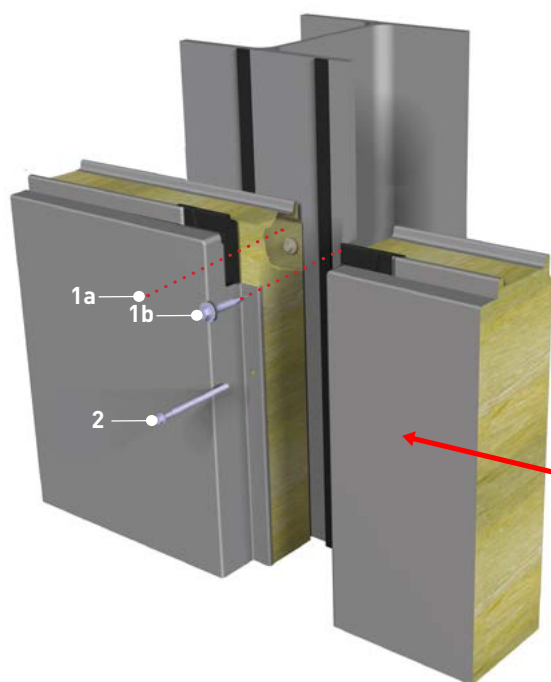
Fixing through internal sheet metal:

1a: for Qbiss One F façade elements with a thickness of up to 100 mm, ONE screw should be used

1b: for Qbiss One F façade elements with a thickness of more than 100 mm, TWO screws should be used

thickness of the substructure for screw diameter of 6.3 mm	nominal drill diameter [mm]
2.0 - 3.0 (type A)	5,00
3,0 - 3,9	5,05
4,0 - 4,9	5,35
5,0 - 5,9	5,65
6,0 - 10,0	5,80
> 10,0	5,85

Fig. 2.8: Illustration of fixing through external and internal sheet metal



1a and 1b. Fixing through internal sheet metal
2. Fixing through external sheet metal

In order to attach the Qbiss One F façade elements, self-tapping screws are provided as standard. Table 2.4 lists minimal required lengths

Table 2.4: Minimal required lengths of SELF-TAPPING screws for Qbiss One F façade elements for thickness of subconstruction (max. 10 mm)

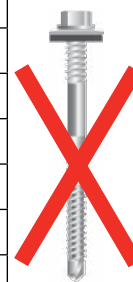
element thickness (mm)	self-tapping screw (A2) WITHOUT washer	self-tapping screw (A2) WITH washer	drill length
	fixing in the transversal joint (screw length in mm)	fixing through façade element Qbiss One F (screw length in mm)	minimal length in mm
80	75	100	100
100	90	127	120
120	115	152	140
133	127 (150)	152	155
150	152 (178)	178	170
172	178 (200)	200	200
200	200 (215)	265	220
240	245 (230)	265	260



Qbiss One F façade elements can also be fixed using self-drilling screws. Table 2.5 lists minimal required lengths

Table 2.5: Minimal required lengths of self-drilling screws

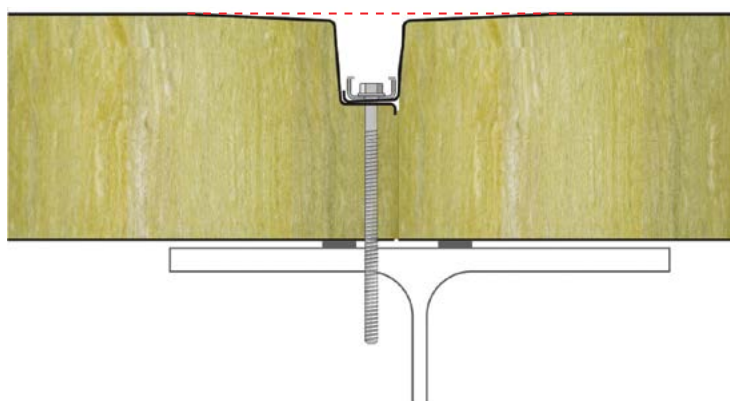
element thickness (mm)	Self-drilling screws (A2) WITHOUT washer		Self-drilling screws (A2) WITH washer	
	fixing in the transversal joint (screw length in mm)		fixing through the Qbiss One F façade element (screw length in mm)	
	thickness of the substructure Up to 5 mm	substructure thickness between 4 and 14 mm	thickness of the substructure up to 5 mm	thickness of the substructure between 4 and 14 mm
80	93	93	113	118
100	113	113	133	147
120	113	113	163	168
133	163	163	163	168
150	163	163	193	193
172	193	193	193	218
200	193	193	236	243
240	236 [245]	236 [245]	280	280



NOTE:

In case self-tapping screws are used, the hole must be drilled beforehand, and then the element must be screwed in. Any burrs and filings must be removed after the Qbiss One F façade elements are screwed in, in order to avoid corrosion on the surface.

Fig. 2.9: Consequences of reusing the screws



NOTE:

The screws must not be reused, as local deformations of the external surface of Qbiss One F façade elements can occur.

2.6 Attachment to STEEL structure

Qbiss One F façade elements are fixed to the steel façade structure using screws via integrated attachment profiles. The solution described allows for quick and aesthetically pleasing attachment of Qbiss One F façade elements without visible screws on the outside of the façade.

Classic steel structure (Figure 2.10) is suitable for installation of Qbiss One F façade elements, when it is within the tolerances (Section 3.1). If the substructure does not meet the tolerances, an adjustable substructure must be used (Figure 2.10.b).

Fig. 2.10.a: Basic structure

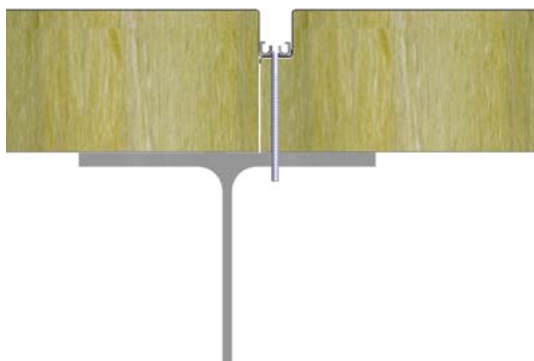
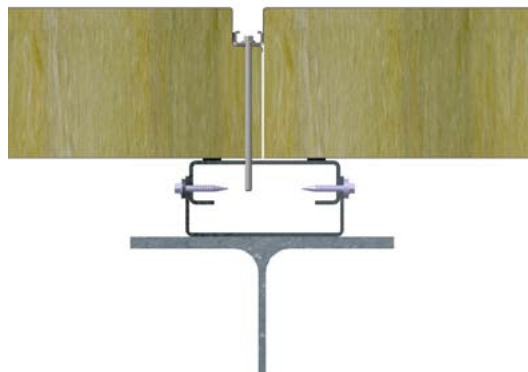


Figure 2.10.b: Adjustable structure



NOTE:

- In order to check the level of the substructure, a geodetic snapshot is recommended (permissible structure tolerances - Section 3.1)
- If the substructure does not meet the tolerances, an adjustable substructure must be used.
- The contact profile must be aligned with the support for the finishing of the Qbiss One F façade element on the main beam.

2.7 Attachment to CONCRETE structure

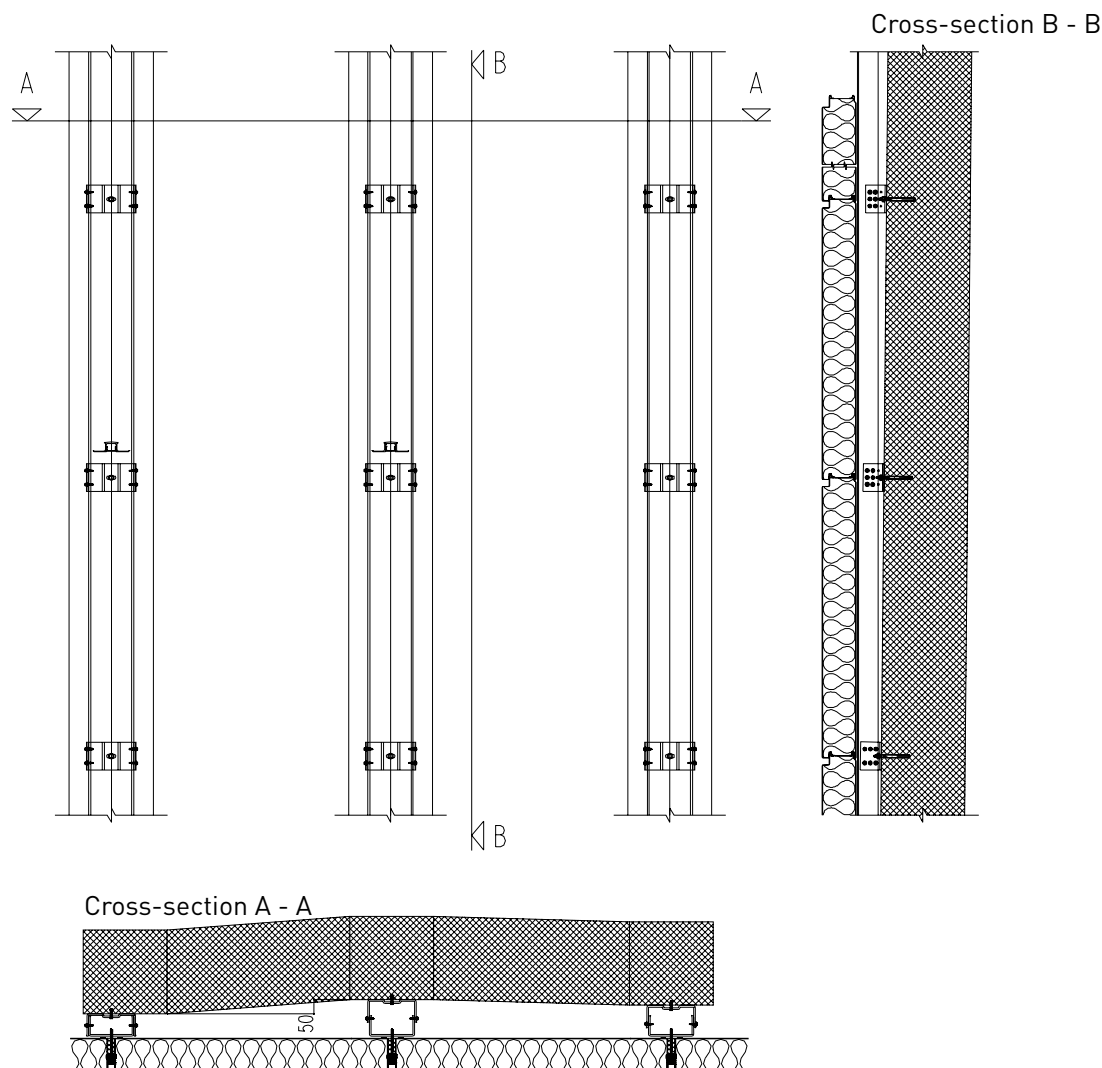
2.7.1 Fixing to concrete using a LEVELLING SUBSTRUCTURE



1. Load-bearing profiles - the wide profiles are attached to the structure using certified anchoring screws.
2. To such prepared line of profiles, the contact profile is attached using self-drilling screws, with which the level surface is defined/achieved in order to install Qbiss One F façade profiles.

The substructure can be adjusted by ± 25 mm (Figure 2.12).

Fig. 2.12: Installing the horizontal façade with levelling substructure to concrete

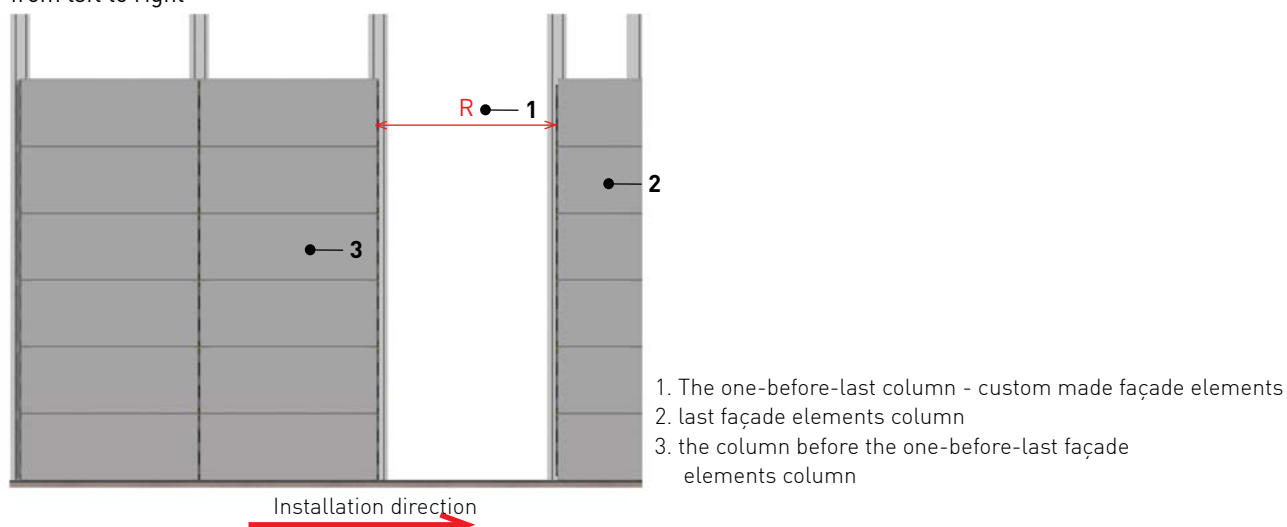


2.8 Manufacturing Qbiss One F façade elements in custom dimensions at installation

Usually, Qbiss One F façade elements are manufactured and shipped for the whole building.

If large deviations are anticipated in the building dimensions or the façade lengths, custom elements are defined in the design phase. These façade elements are manufactured at a later date. It is recommended that the one-before-last column of façade elements is manufactured subsequently (Figure 2.13). Corner elements can also be manufactured later on.

Fig. 2.13: Subsequent manufacturing and installation of the one-before-last column in case of installation from left to right



During the design phase, it must be determined which Qbiss One F façade elements will be custom made.

3.0 Installation instructions

3.1 Installation and control of the basic structure or substructure

Before installing, the actual status of the building must be checked, as well as the layout of the substructure according to the project raster.

In order to insure the quality of installation of the façade system, a geodetic snapshot of the structures to which the Qbiss One F façade system will be installed is required.

1. Support for the finishing of the Qbiss One F façade element must be horizontally level. Otherwise, the vertical joints will not be of the same width.

The permissible deviations of alignment of the base load-bearing finishing must meet two conditions (A and B):

A. Permissible deviation for the complete length of individual Qbiss One F façade elements is $\pm 0,5$ mm.

B. Permissible deviation of alignment of the complete building façade is ± 2 mm.

Figure 3.1a



2. The permissible substructure tolerances apply between vertical axes

$\Delta 1 = \pm 2$ mm - permissible deviation of the vertical substructure in the ground plan from the building axis.

$\Delta 2 = \pm 2$ mm - permissible deviation from the distance between two adjacent vertical lines in ground plan.

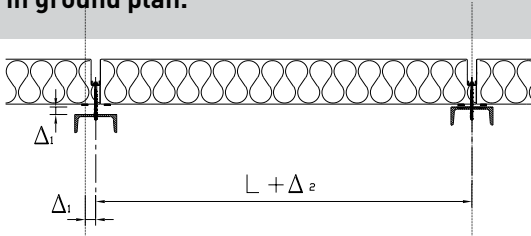


Figure 3.1 b

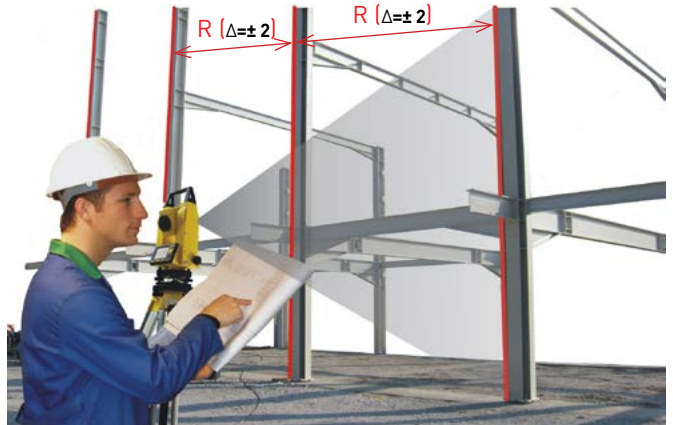


3. If the substructure is already installed, the distances between the substructure at vertical supports must still be measured.

Permissible deviations for distances of vertical lines between each other is ± 2 mm, however, errors must not be added up.

The transversal joint of the Qbiss One F façade system allows for tolerances of deviations of the façade structure or the substructure of $\pm 2 - 1$ mm.

Figure 3.1 c



4. Vertical alignment of the structure in a corner must be done with a tolerance of 1 mm per 1 m of height.

3.2 Preparation for installation

The contractor is responsible for handling Qbiss One elements according to the directions contained in the technical and assembly documents.

Checking façade elements before installation

When opening a package, the condition of its contents needs to be checked. The elements must be clean, dry and undamaged and without signs of water penetration in the insulation and between the façade elements.

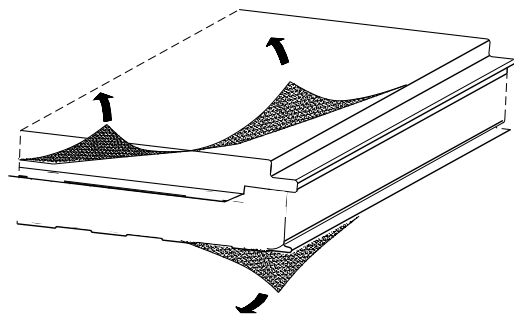
Removing the protective foil

The Qbiss One F façade elements have a protective foil on top and bottom to protect the lacquered surfaces from eventual scratches during transport, handling and installation.

Immediately before installing the Qbiss One F façade element on the installation site, you must

1. Remove the protective foil completely from the inside.
2. Partially remove the protective foil at the attachment site, on both longitudinal joints, under the trims etc. (Figure 3.2).
3. EACH DAY after installed the plastic foil must be COMPLETELY REMOVED from the Qbiss One B façade element.

Fig. 3.2: Removing the protective foil



NOTE:

- If Qbiss One F façade elements are stored for a longer period of time, the foil should be removed within three months since the takeover at the building site.
- If the Qbiss One F façade elements are to be stored in the open, they should be protected against the sun; otherwise the complete removal of foil is no longer possible.
- During assembly, the foil must be removed from all joints of the Qbiss One F façade element.
- EACH DAY after installed the plastic foil must be COMPLETELY REMOVED from the Qbiss One F façade element.
- If adhesive remains on the surface it needs to be wiped off promptly with the detergent and cloth.

Protecting the insulation from water penetration

NOTE!

Façade elements MUST be protected from water and other liquids seeping into the insulation during unloading right through to the end of the installation!

Open packages and/or installed façade elements must be covered with protective sheeting every day during the installation process.

Materials that provide suitable protection include protective tarpaulins or sheets of PVC, EPDM or similar material.

Tarpaulins or sheeting:

- must not affixed using adhesives or adhesive tapes as these can react with façade elements and cause permanent damage.
- must not damage the façade elements in any way.

Cutting of elements

Cutting or trimming of Qbiss One F façade elements can be performed when making openings (e.g. windows, doors, ventilation or electricity openings etc.). In these cases, only metal shears and saws that do not heat the metal at the cutting site may be used (Figure 3.3). Circular saw use is recommended.

Fig. 3.3: Cutting of elements is only permitted when using scissors or saws

Recommended use



Prohibited use



NOTE:

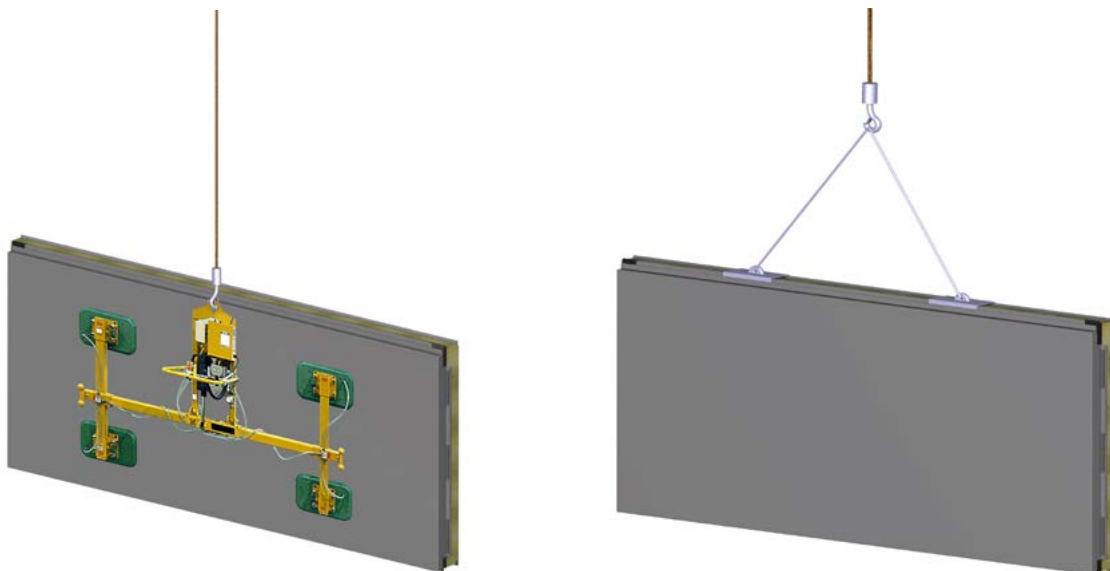
- Do not mark the panels with sharp objects, as this may damage the protective colour coating.
- Use of cutting tools and welding damage the corrosion protection.
- Metal particles occurring due to cutting and drilling **MUST** be removed from the surface of façade and installation elements at the end of the working day at the latest (metal particles and filings cause corrosion when subjected to moisture).

Handling and lifting of the façade element

In order to handle and lift the elements, vacuum grippers or special mechanical grippers attached to the longitudinal joint of the Qbiss One F façade elements are recommended (Figure 3.4).

1. Vacuum gripper that is attached using vacuum to the external surface of the Qbiss One F façade elements.
2. Horizontal grippers attached to the tongue of the longitudinal joint of Qbiss One F façade elements (Figure 3.5)

Fig. 3.5: Grippers for horizontal installation



For work with one lift, two grippers are required, available on prior order or upon delivery of Qbiss One F façade elements (see Figure 3.5). The instructions for using the grippers are included.

Table 3.1: Gripper markings according to façade element thickness

Facade element thickness [mm]	Gripper marking	Gripper weight [kg]
80	PHQ - 80	2.0
100	PHQ - 100	2.3
120	PHQ - 120	2.5
133	PHQ - 133	2.8
150	PHQ - 150	3.0
172	PHQ - 172	3.2
200	PHQ - 200	3.5
240	PHQ - 240	3.8

NOTE:
Handle carefully!



3.3. Installation recommendations

3.3.1. Adjusting the transversal joint to inaccurate structure or substructure distances

In the installation phase, deviations of support distances are compensated for with the joint width. The nominal width of the vertical joint is 25 mm. The permissible deviation is +2 mm -1 mm (Figure 3.6).

Fig. 3.6: Permissible tolerances of the vertical joint

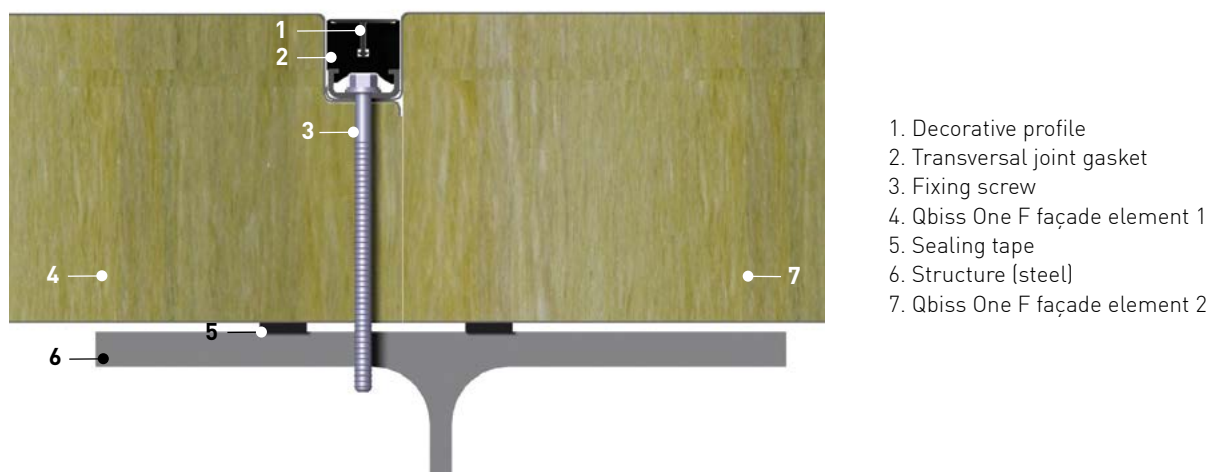


3.3.2 Form of the transversal (attachment) joint

Joint form can be seen in Figure 3.7. In the joint, a dedicated EPDM gasket for the transversal joint is installed, as well as an aluminium decorative profile. The loads are transferred from the Qbiss One F façade elements through the built-in profile, which is attached to the load-bearing structure of the building with screws.

If the substructure does not meet the tolerances (Section 2.4), an adjustable substructure must be used (Figure 2.6 or 2.7).

Figure 3.7: Transversal joint shape

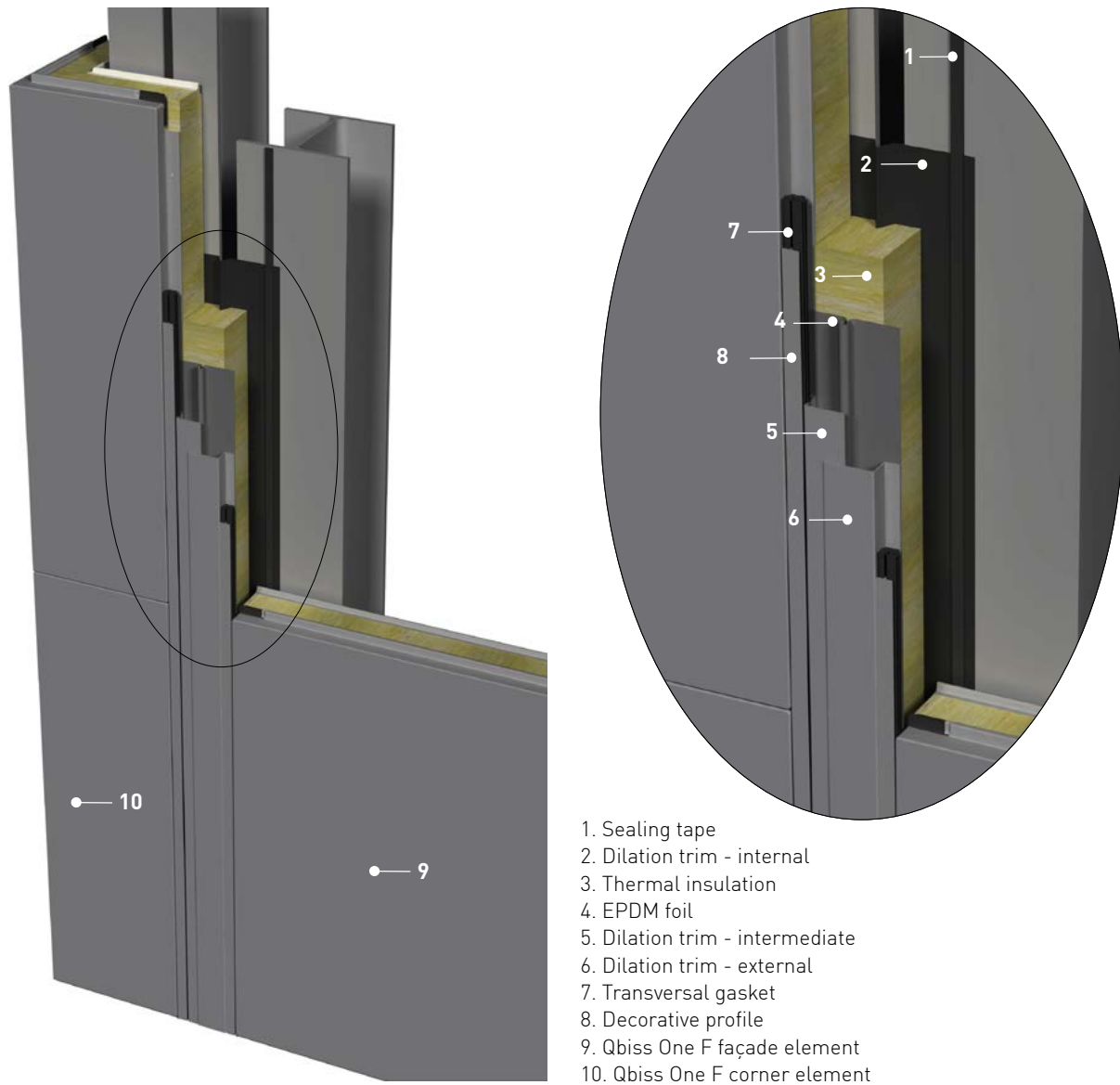


3.3.3. Dilation

Dilation is performed using a dilation detail, which is used for:

1. compensation of expansion/shrinking of long façades and buildings for façades exceeding 50 m. The dilation detail should be installed per every 50 m of building façade length. This way, "breathing" can be compensated along the longitudinal axis of the façade.
2. compensation due to tolerances in installing façade in the corner

Figure 3.8: Example of installing a dilation detail to compensate tolerances for installing corner façades



3.3.4. Forming details according to installation instructions

Some details and their execution are described further on in the technical document. Standard details are shown in the catalogue.

4.0 Sealing

4.1 Sealing of longitudinal joint

All Qbiss One F façade elements are equipped with a sealing profile in the longitudinal joint groove which meets construction requirements of the building according to the project requirements.

CORRECT ORIENTATION must be ensured, in order to allow for water to be drained (Figure 4.1) (the tongue on the longitudinal joint must always point upwards) and TIGHT FITTING of neighbouring Qbiss One F façade elements at the longitudinal joint (Figure 4.2) - fitting must be airtight!

Figure 4.1: CORRECT ORIENTATION of elements

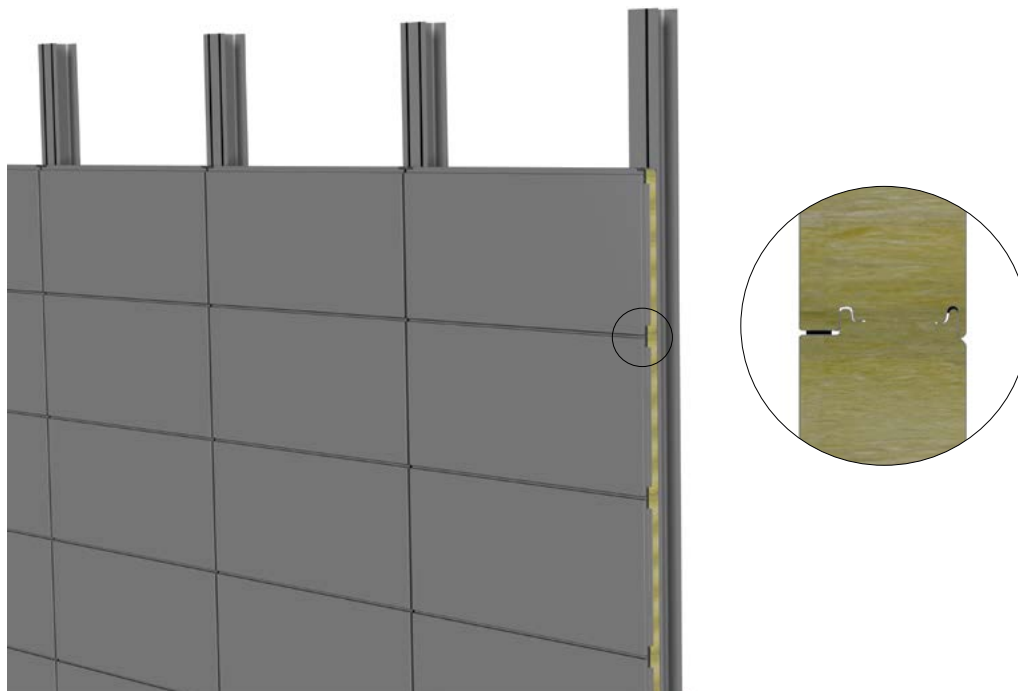


Figure 4.2: CORRECT sealing in both longitudinal joints

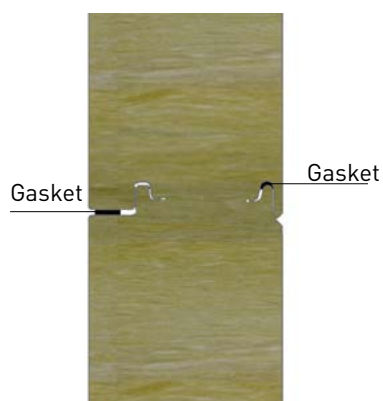
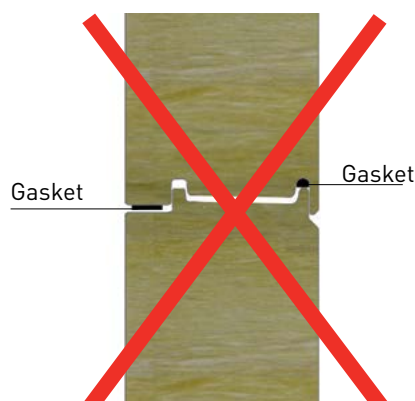
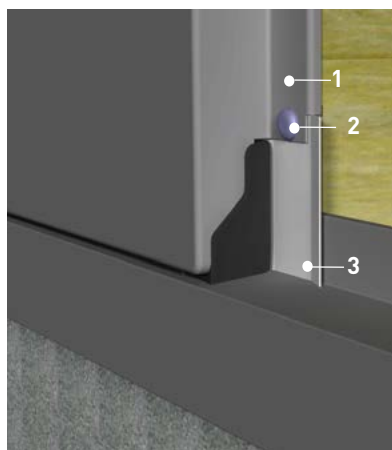


Figure 4.3: INCORRECT sealing in both longitudinal joints



4.2 Sealing of the transversal joint at the main beam attachment

Figure 4.4: Installation of drainage EPDM drip flashing



Sealing at the end of the transversal joint is performed using a drip flashing which is attached to the sheet metal of the transversal joint and supported by the main beam.

It is intended to prevent the entry of rain water and to drain any water from the transversal joint which serves as a drainage channel.

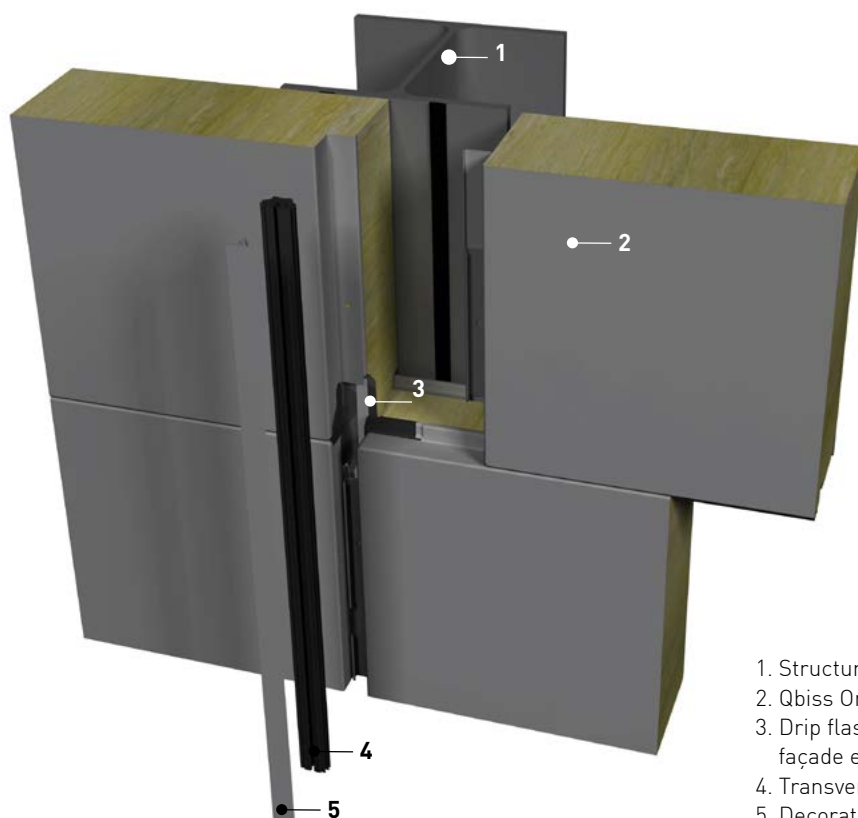
- 1. Transversal joint
- 2. Rivet
- 3. Drip flashing

NOTE:

The drainage drip flashing is **ALWAYS** installed before installing the neighbouring element and installing the gasket of the transversal joint.

4.3 Sealing the transversal joint of the façade system

Figure 4.5: Composition and sealing of the transversal joint



- 1. Structure (steel)
- 2. Qbiss One F façade elements
- 3. Drip flashing for the joint of 4 Qbiss One F façade elements
- 4. Transversal gasket
- 5. Decorative profile

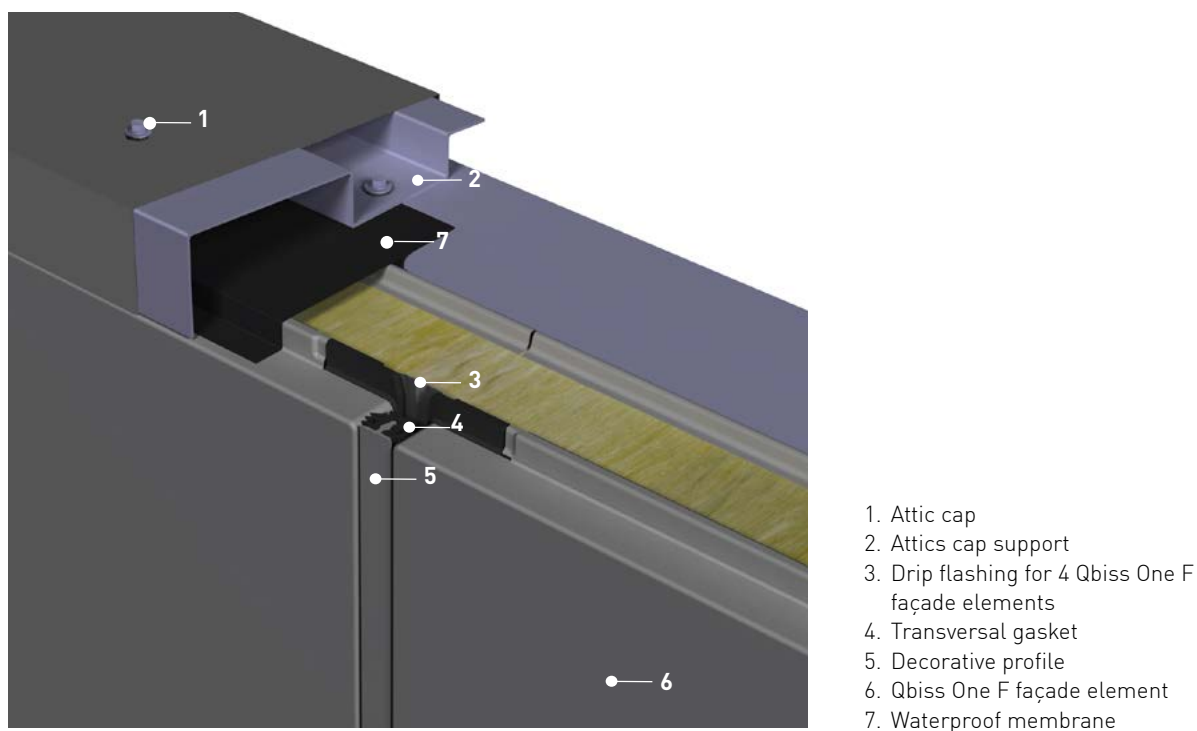
NOTE:

The transversal joint must be sealed in order to prevent rain or increased humidity from entering the joint and the inside of Qbiss One F façade elements.

4.4 Sealing in the building attic

In the attic, the sealing is performed by finishing all the elements in a transversal joints where the drip flashing for a joint of 4 elements is cut to the level of a longitudinal joint. The attic finish is done using an attic cap.

Figure 4.6: Sealing in the building attic

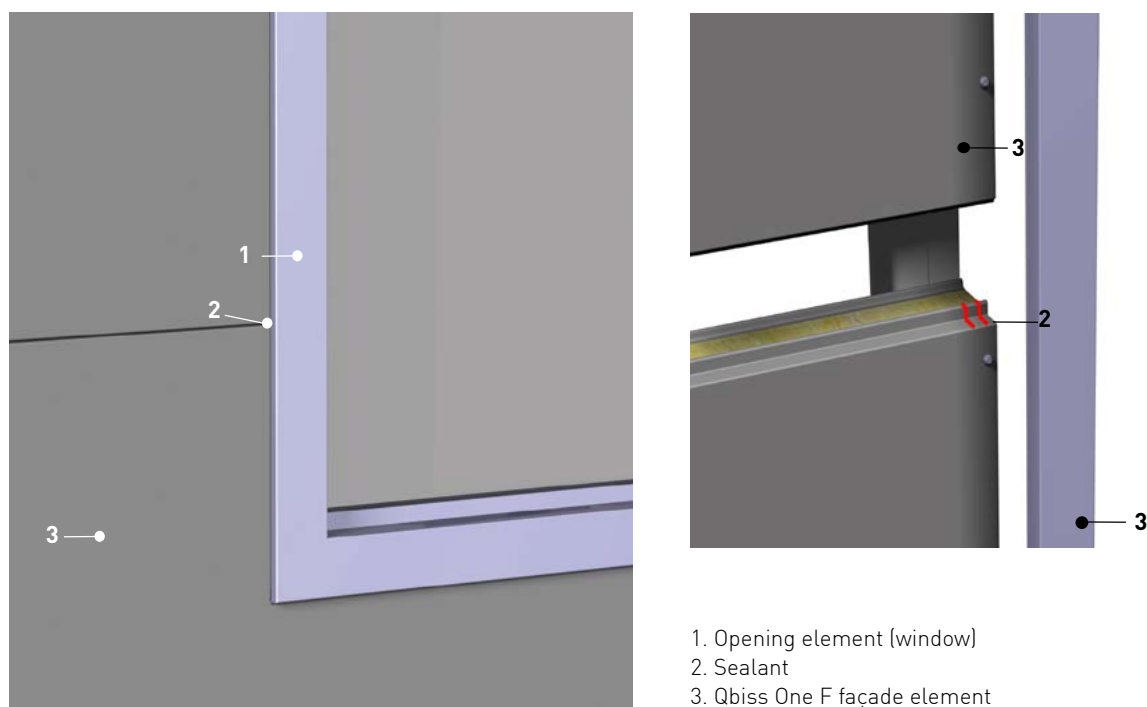


4.5 Sealing between element joints and openings

Openings include window, door, infrastructure openings etc.

The joints are usually sealed with window, door and other elements which have integrated sealing profiles. In individual areas, these areas must be sealed using additional sealants.

Figure 4.7: Sealing at the site of a longitudinal joint and opening

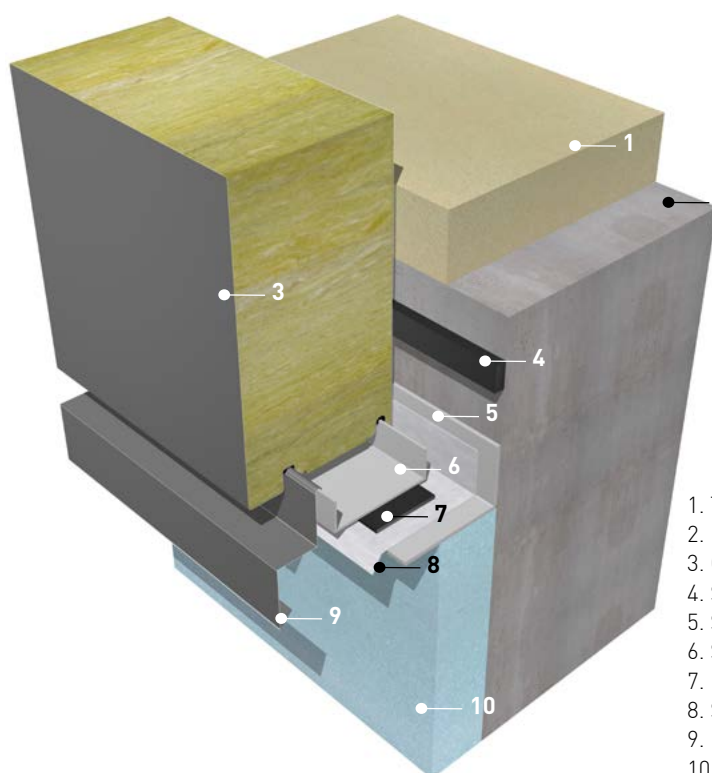


Sealing of other openings in the area of the transversal and longitudinal joint is performed in the same way.

5.0 Execution of certain details

5.1 Attachment to main beam

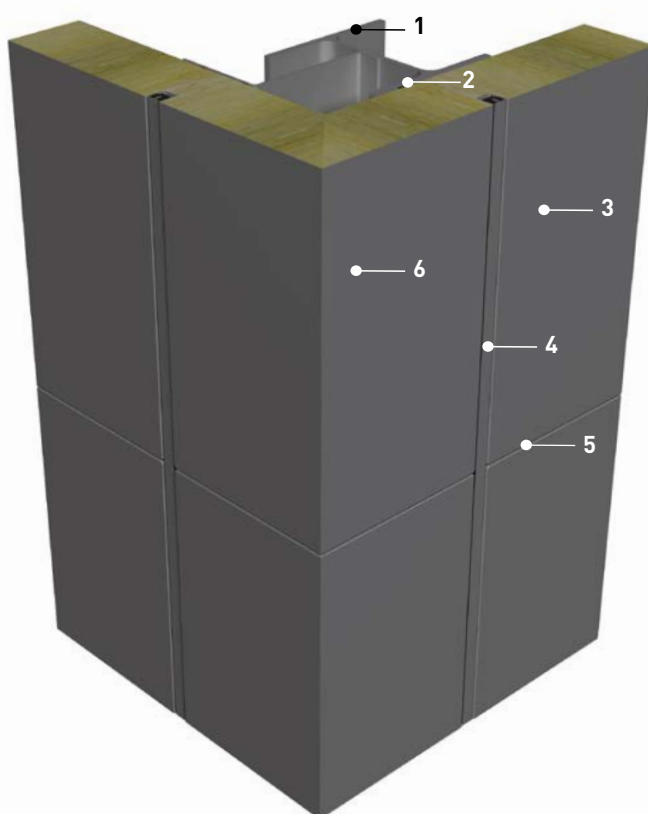
Figure 5.1: Attachment to main beam



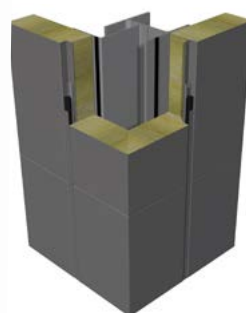
1. Thermal insulation of the floor (not included in the detail)
2. Main beam (not included in the detail)
3. Qbiss One F façade element
4. Sealing tape
5. Support for the finish of Qbiss One F façade element
6. Support for the Qbiss One F façade element
7. EPD sealing tape
8. Secondary drip flashing of the Qbiss One F façade element
9. Drip flashing of the Qbiss One F façade element
10. Perimeter coating (not included in the detail)

5.2 External corner finish

Figure 5.2: Acute angle corner



1. Structure (steel)
2. Sealing tape
3. Qbiss One F façade element
4. Transversal joint (transversal gasket + decorative profile)
5. Longitudinal joint
6. Corner Qbiss One F façade element



FT corner Qbiss One F façade element

5.3 External corner finish with a continuous corner element from sheet metal

Figure 5.3: Rounded corner

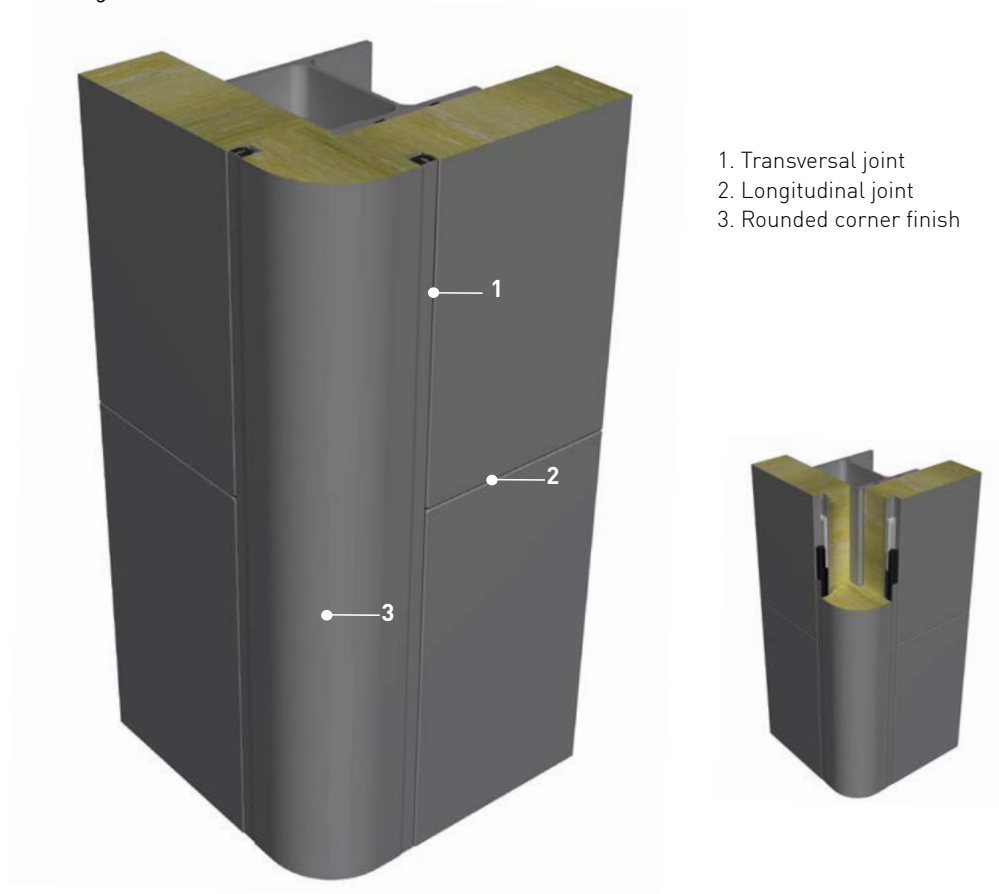
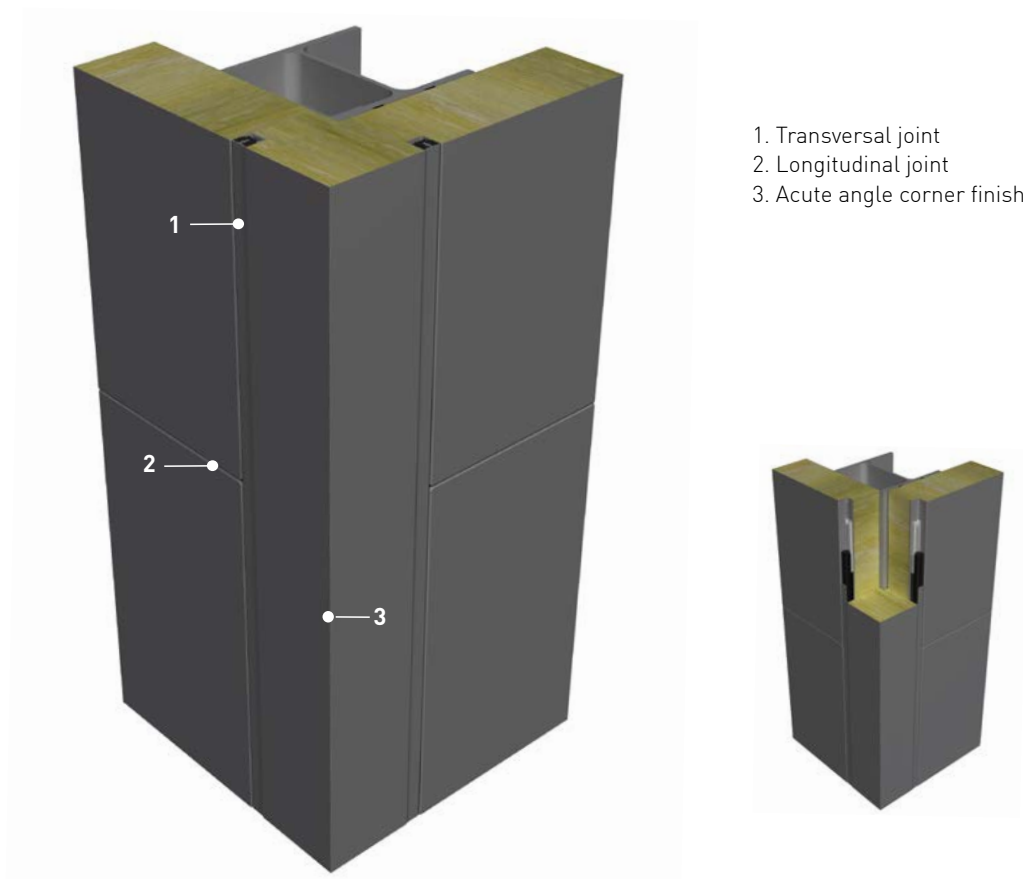
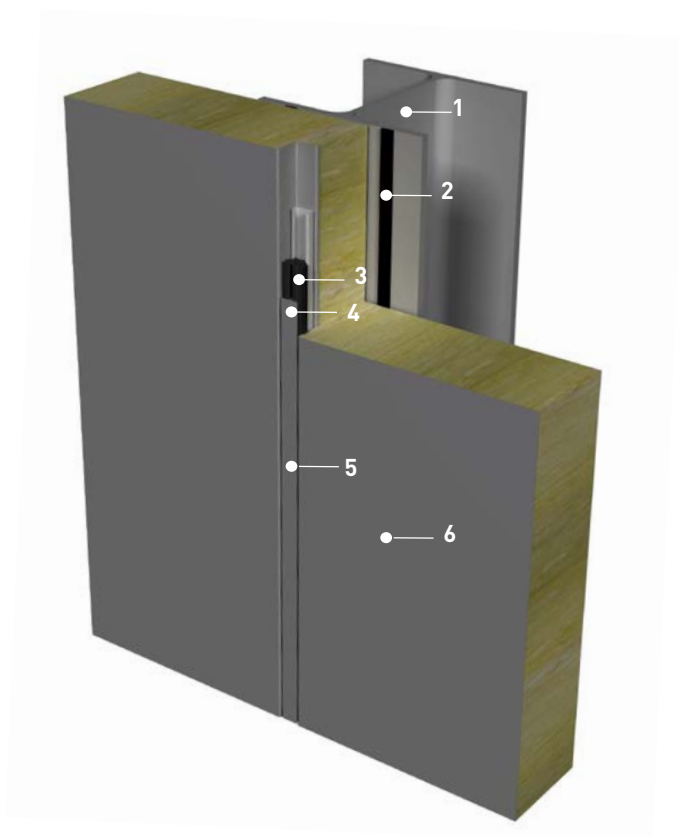


Figure 5.4: Acute angle corner



5.4 Attachment to steel structure

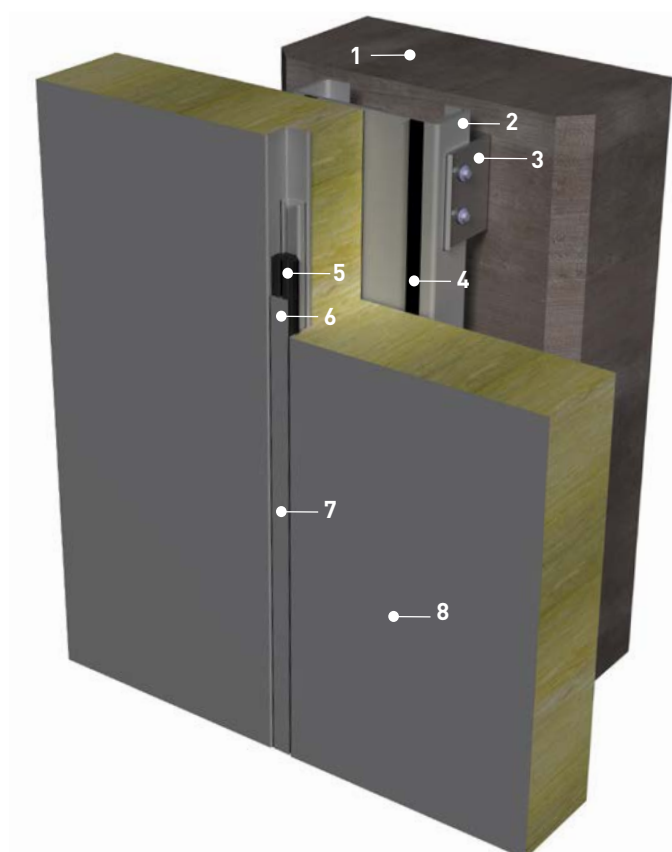
Figure 5.5: Attachment to steel structure



1. Structure (steel)
2. Sealing tape
3. Transversal gasket
4. Decorative profile
5. Transversal joint
6. Qbiss One F façade element

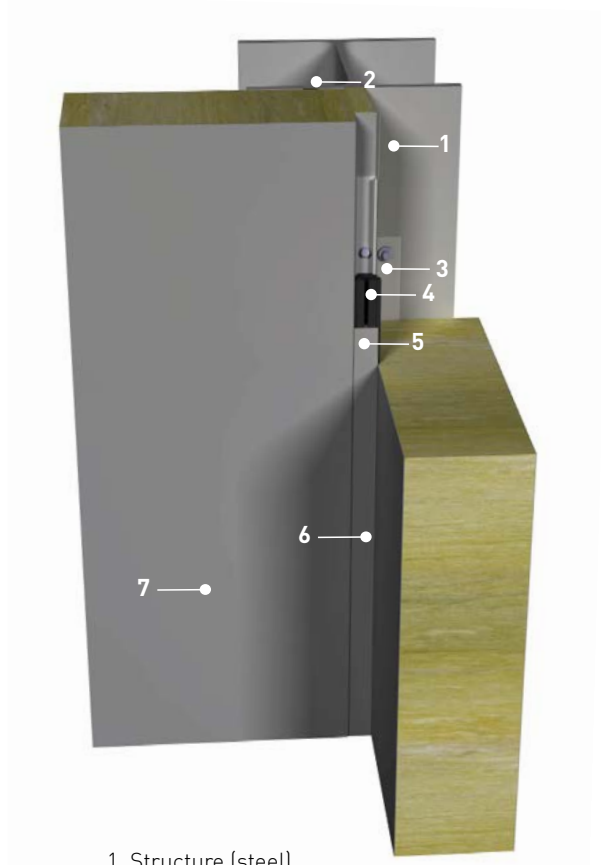
5.5 Attachment to concrete structure

Figure 5.6: Attachment to concrete structure

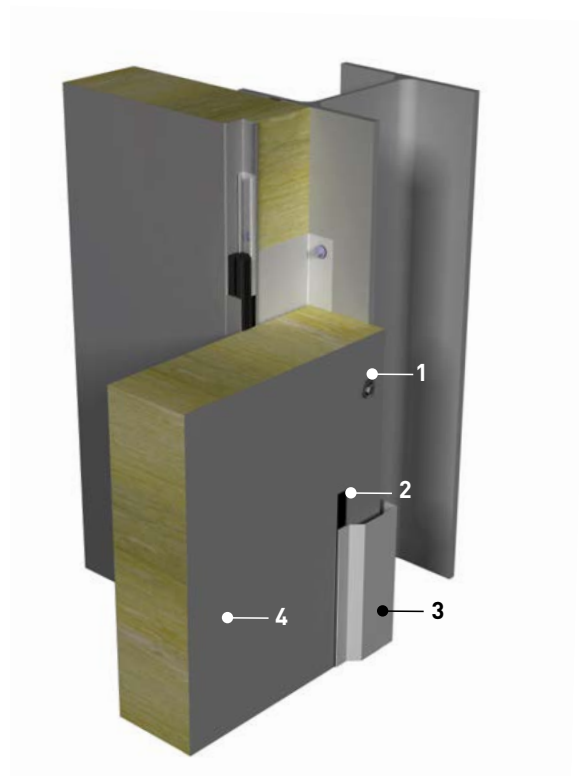


1. Structure (steel)
2. Substructure (contact profile)
3. Substructure (load-bearing profile)
4. Sealing tape
5. Transversal joint
6. Decorative profile
7. Transversal joint
8. Qbiss One F façade element

5.6 Internal corner finish of an element



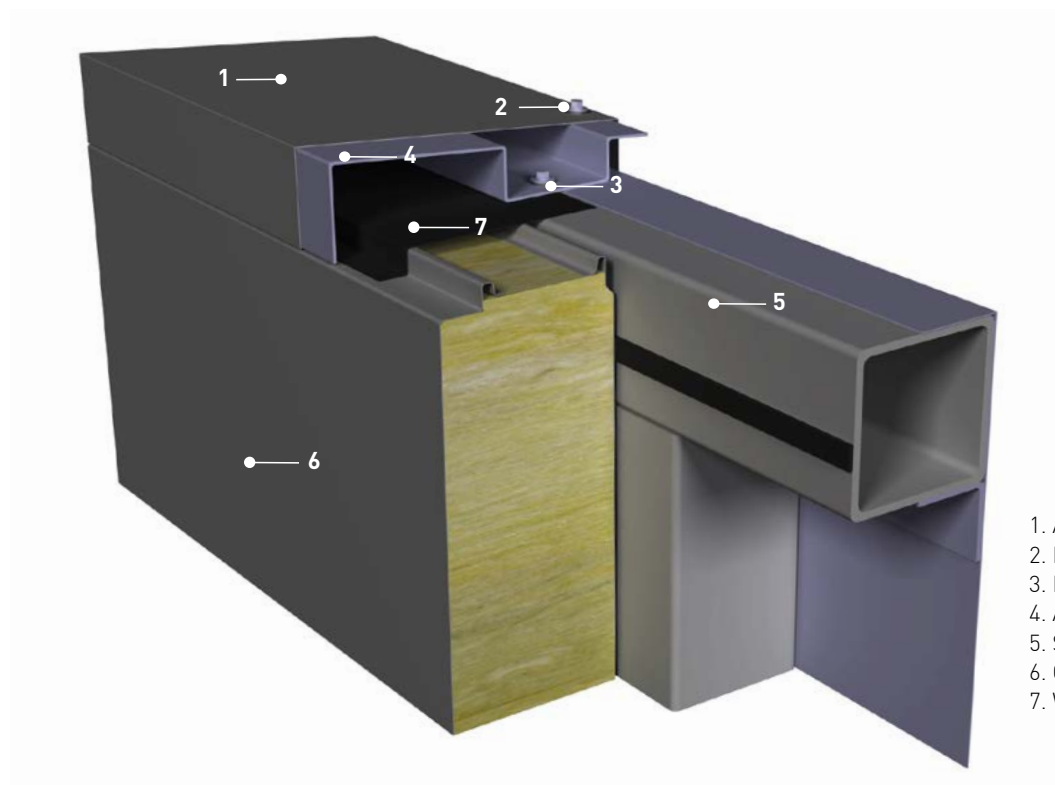
1. Structure (steel)
2. Sealing tape
3. Corner piece
4. Transversal gasket
5. Decorative profile
6. Transversal joint
7. Qbiss One F façade element



1. Fixing screw
2. Sealing tape
3. Corner trim
4. Qbiss One F façade element

5.7 Attic with substructure

Figure 5.8: Attic with substructure



1. Attic cap
2. Fixing screw
3. Fixing screw
4. Attic cap support
5. Substructure (steel)
6. Qbiss One F façade element
7. Waterproof membrane

6.0 Windows, Window and Door Frames and other Openings

For the Qbiss One F modular façade system, elegant and high-quality solutions for door and windows openings as well as other openings area available. They are constructed from aluminium profiles with integrated thermal separation, ensuring thermal stability and comfort in the internal spaces. Using these, details can be finished quickly, simply and with a high degree of repeatability. Unlike classical trims, the aluminium profiles are prefabricated on the manufacturing line. They can be delivered to the site assembled or disassembled. The speed and quality of installation is thereby markedly improved.

The modular construction system allows execution of the following types using combinations of installing frames and glazing.

WINDOW OPENINGS

Types of installation (possible combinations of installations: A, B, C, D, E, F):

TYPE 1 - installation that fits element dimensions

TYPE 1.4 - into the joint

TYPE 2 - installation outside element dimensions

TYPE 2.1 - with covered edges

TYPE 2.2 - with covered edges and a joint

TYPE 2.3 - At Top Joint with Covered Side Edges

TYPE 2.4 - At Bottom Joint with Covered Side Edges

Combinations for installing windows and glazing:

- A - aluminium frame (false frame)
- B - Aluminium frame + fixed glazing
- C - Aluminium frame + glazing that can be opened
- D - Aluminium frame + deepening
- E - Aluminium frame + deepening + window with fixed glazing
- F - Aluminium frame + deepening + windows that can be opened

DOORS AND OTHER OPENINGS

Types of installation (possible combinations of installations A, B):

TYPE 1 - installation that fits element dimensions

TYPE 1.4 visible joint

TYPE 2 installation outside element dimensions

TYPE 2.1 With covered edges

TYPE 2.2 With covered edges and a joint

TYPE 2.3 At top joint with covered side edges

TYPE 2.4 At bottom joint with covered side edges

Combinations for installing door frames and other openings:

- A - aluminium frame (false frame)
- B - Aluminium frame + deepening

Types of installations for doors and openings are the same as for windows - see Section 6.1.

Figure 6.1: TYPE 1 - installation of frames that fit element dimensions

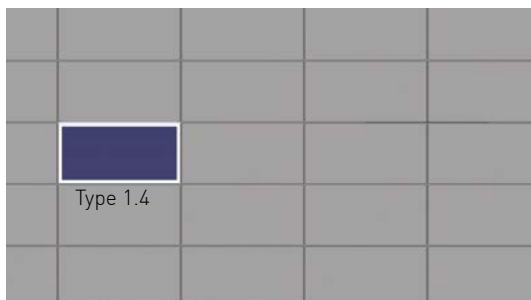
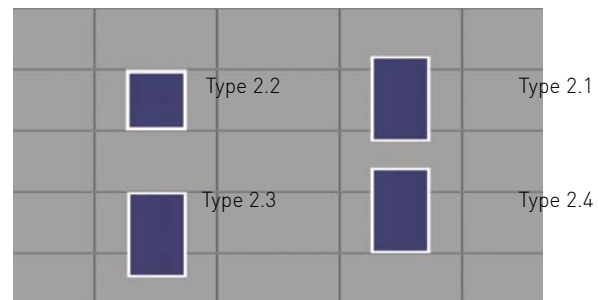


Figure 6.2: TYPE 2 - installation of frames outside element dimensions



NOTE:

Using a static calculation, the load-bearing substructure at the point of installation of the window frame must be determined.

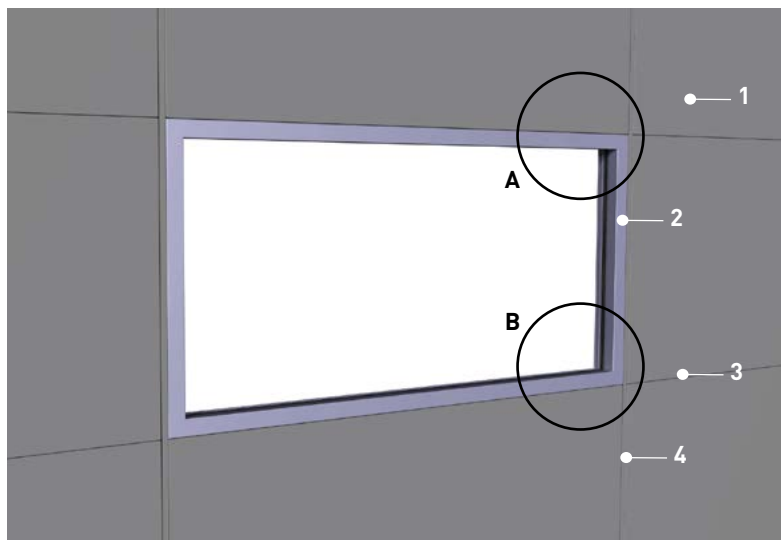
6.1 Window and other Openings

Type 1.1 In the joint - the window fits the width and length of the façade element

Combination: A - aluminium frame (blind frame)

ALSO POSSIBLE IN DEEPENED VERSION

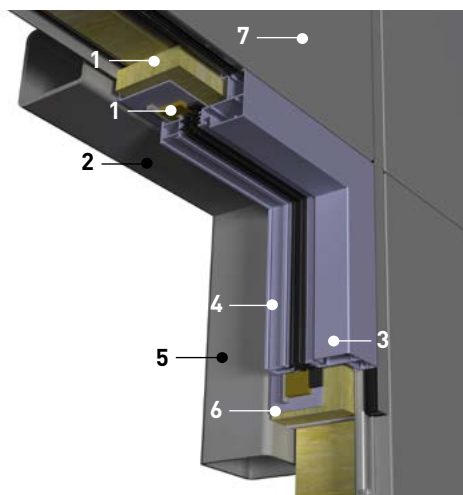
Figure 6.3: Window frame in the joint, flush with the surface of Qbiss One F façade elements



MANDATORY
simultaneous assembly of
the window and the façade
elements

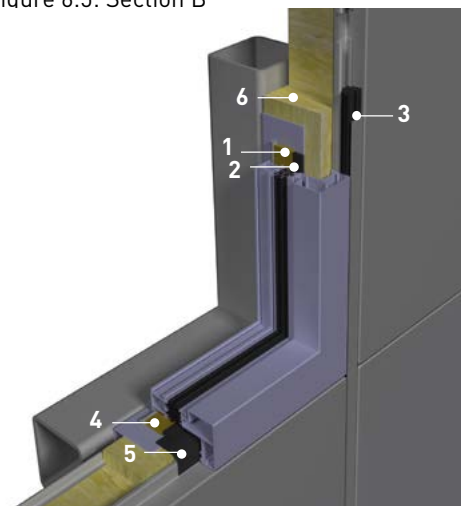
1. Qbiss One F façade element
2. Window frame - fixed glazing
3. Longitudinal joint
4. Transversal joint

Figure 6.4: Section A



1. Thermal insulation
2. Sub-structure with supporting profile
3. Window frame
4. Window frame attachment
5. Structure (steel)
6. Load-bearing profile of the window opening
7. Qbiss One F façade element

Figure 6.5: Section B



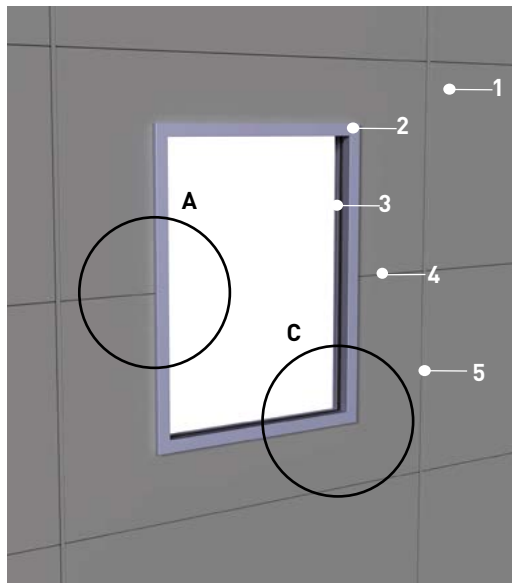
1. Insulation foam
2. Sealing tape
3. Transversal joint (transversal gasket + decorative profile)
4. Round PE gasket
5. Waterproof membrane
6. Thermal insulation

Type 2.1 With covered edges - the window is LARGER/SMALLER than the width of Qbiss One F façade element

Combination: A - aluminium frame (blind frame)

ALSO POSSIBLE IN DEEPENED VERSION

Figure 6.6: The window frame above the surface of Qbiss One F façade elements



1. Qbiss One F façade element
2. Window frame
3. Substructure (steel)
4. Longitudinal joint
5. Transversal joint

Figure 6.7: Section A

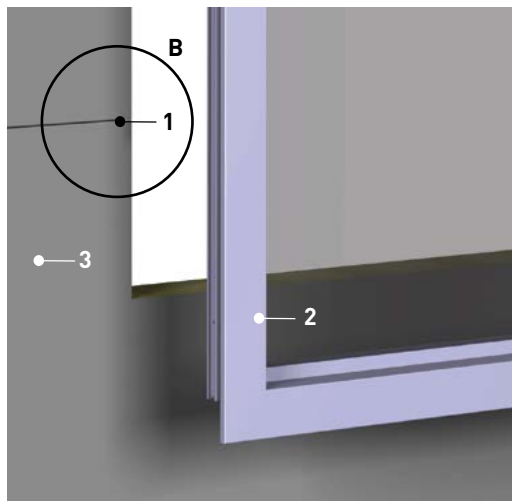
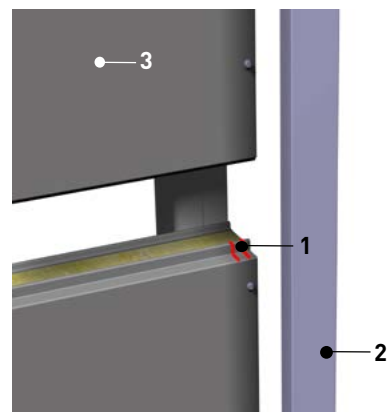
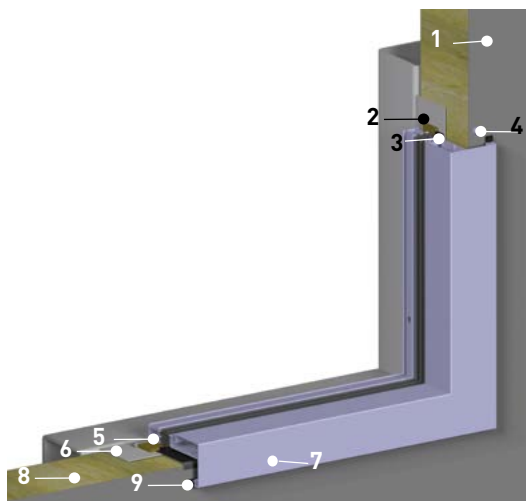


Figure 6.8: Section B



1. Sealant
2. Window frame
3. Qbiss One F façade element

Figure 6.9 Section C

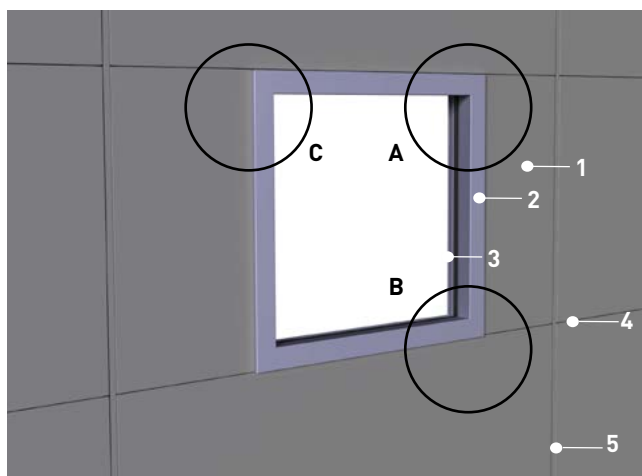


1. Qbiss One F façade element
2. Round PE gasket
3. Sealing tape
4. Fixing screw
5. Insulation foam
6. Load-bearing profile of the window opening
7. Waterproof membrane
8. Thermal insulation
9. Gasket

Combination: A - aluminium frame (blind frame)

ALSO POSSIBLE IN DEEPENED VERSION

Figure 6.10: Window frame, installed at top and bottom joint; side edges above

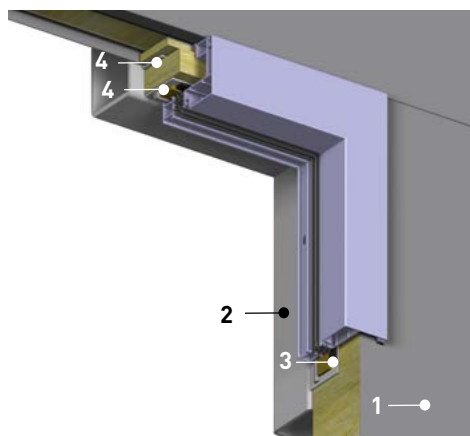


MANDATORY
simultaneous assembly
of the window and the
façade elements



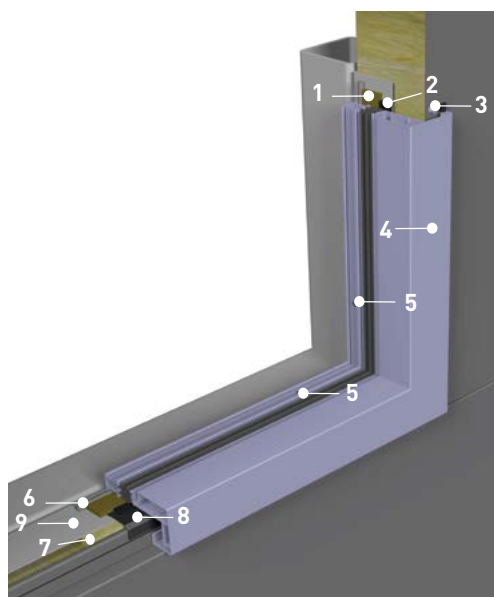
1. Qbiss One F façade element
2. Window frame
3. Substructure (steel)
4. Longitudinal joint
5. Transversal joint

Figure 6.11: Section A



1. Qbiss One F façade element
2. Sub-structure with supporting profile
3. Sealing tape
4. Thermal insulation

Figure 6.12: Section B



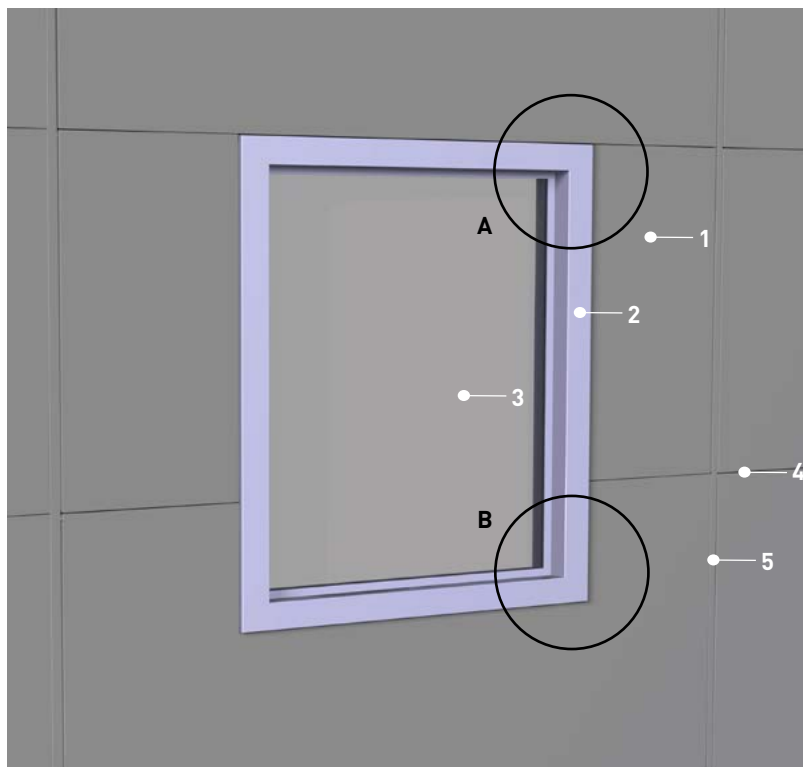
1. Insulation foam
2. Sealing tape
3. Fixing screw
4. Window frame
5. Window frame attachment
6. Round PE gasket
7. Thermal insulation
8. Waterproof membrane
9. Load-bearing profile of the window opening

Type 2.3 - At Top Joint with Covered Side Edges

Combination: B - Aluminium frame + fixed glazing

ALSO POSSIBLE IN DEEPENED VERSION

Figure 6.13: Window frame, installed at top joint; side edges above

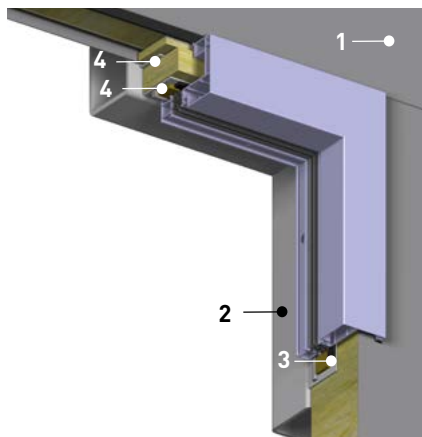


MANDATORY
simultaneous assembly
of the window and the
façade elements



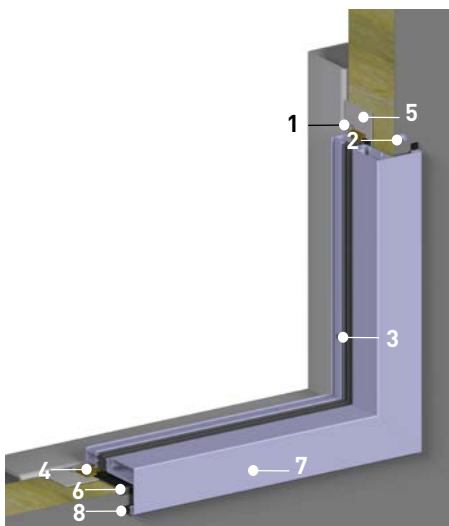
- 1. Qbiss One F façade element
- 2. Window frame - fixed glazing
- 3. Window-pane
- 4. Longitudinal joint
- 5. Transversal joint

Figure 6.14: Section A



- 1. Qbiss One F façade element
- 2. Sub-structure with supporting profile
- 3. Sealing tape
- 4. Thermal insulation

Figure 6.15: Section B



- 1. Round PE gasket
- 2. Fixing screw
- 3. Fixing of the window frame
- 4. Insulation foam
- 5. Support frame
- 6. Waterproof membrane
- 7. Window frame
- 8. Gasket

Type 2.4 Type 2.4 - At Lower Joint with Covered Side Edges

Combination: B - Aluminium frame + fixed glazing

ALSO POSSIBLE IN DEEPENED VERSION

Figure 6.16: Window frame, installed at lower joint; side edges above

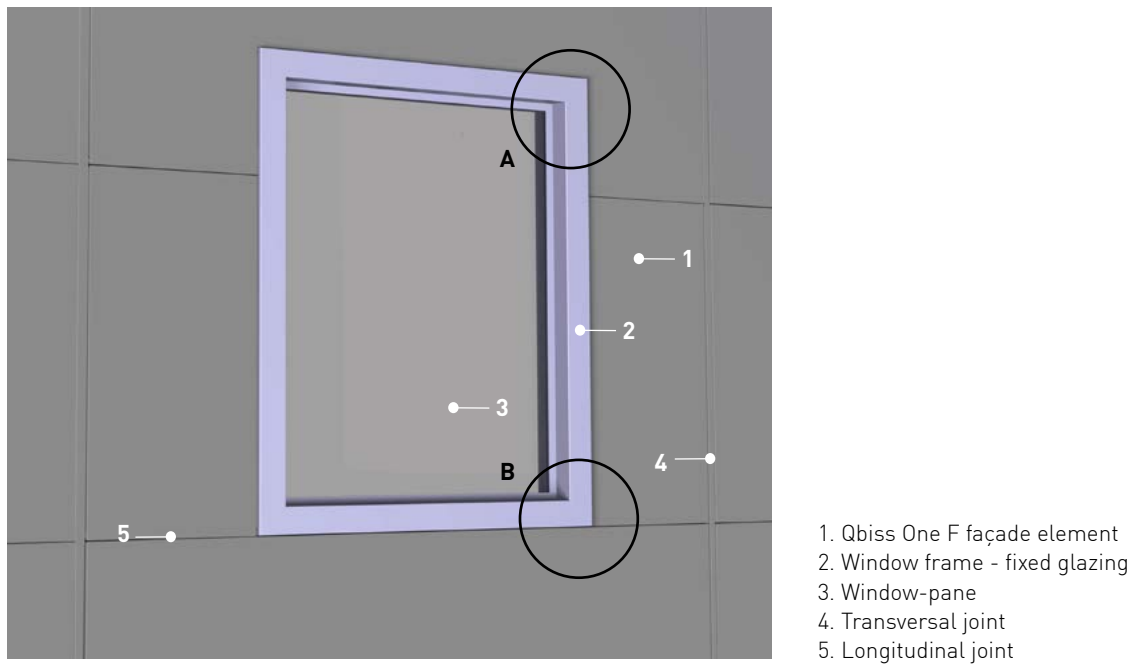


Figure 6.17: Section A

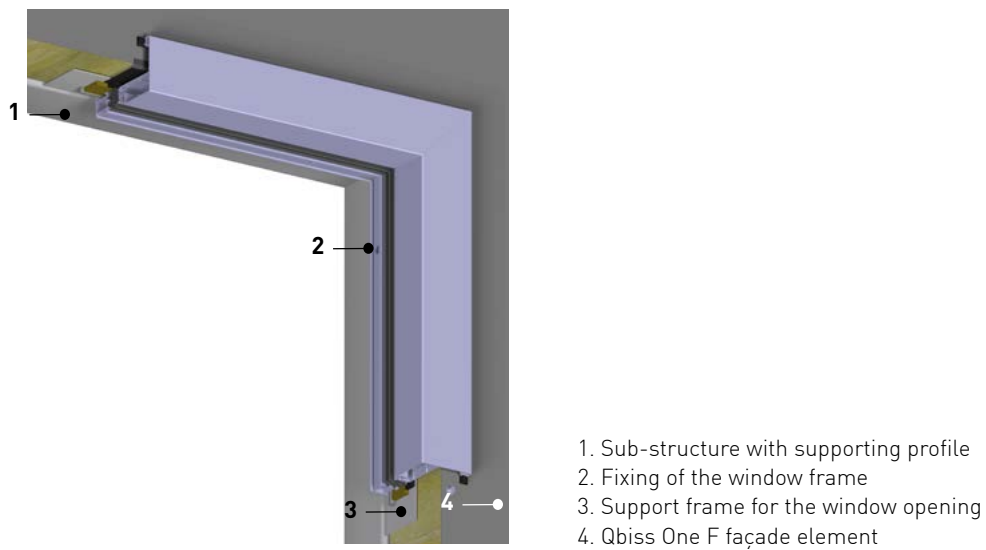
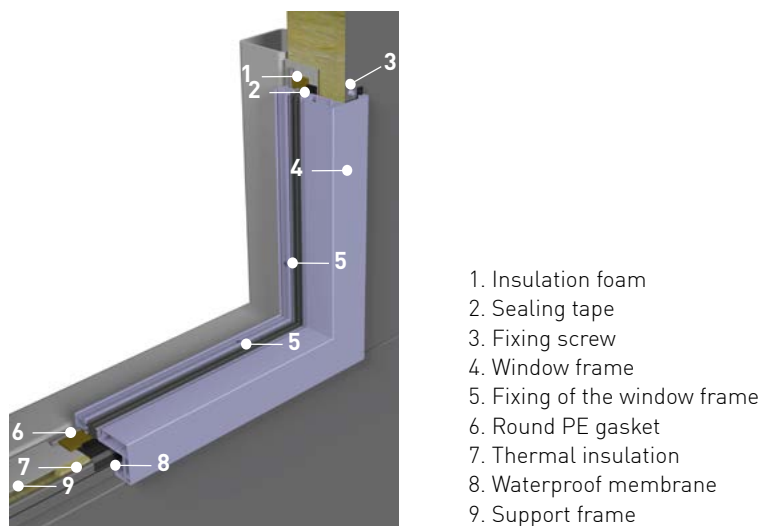


Figure 6.18: Section B



7.0 Packing, Transport and Storing

7.1 Packing

Qbiss One F façade elements are packed in standard packaging of heights between 200 and 1320 mm. They are usually stacked in 100 mm high polystyrene pads.

The varnished surface of the Qbiss One F façade elements is protected with self-adhesive protective foil that must be removed from each individual element prior to its assembly. Every package is protected with protective cardboard elements and wrapped in stretchable, waterproof, packaging foil.

Possible types of packaging:

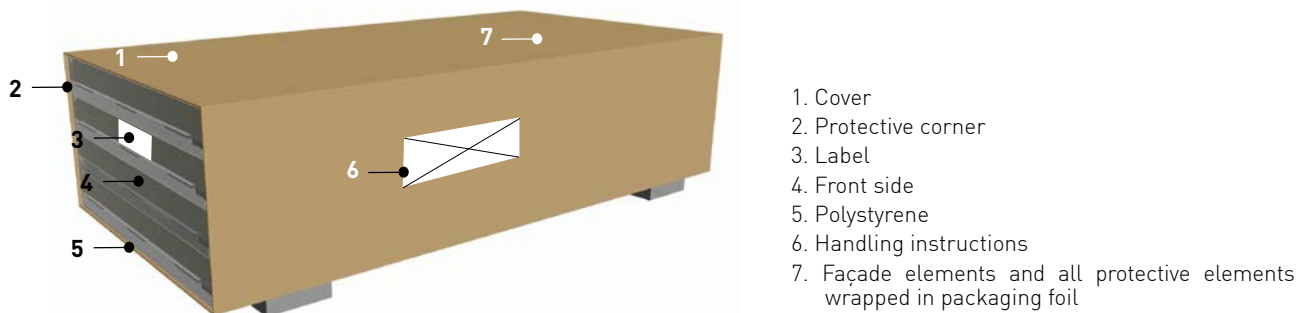
- truck transport (standard package),
- wagon transport (additionally strengthened) *
- container transport (packaging for overseas transport) *

* Type of packaging is specifically defined for each individual project

Table 7.1: Maximal package dimensions (including packaging)

package dimensions	net	packaging addition	gross
maximal width (mm)	1220	20	1240
maximal height (mm)	1200	120	1320
maximal length (mm)	6525	100	6600
maximal weight (kg)	2000		

Fig. 7.1: Side view of a stack prepared for transport by truck



7.2 Transport

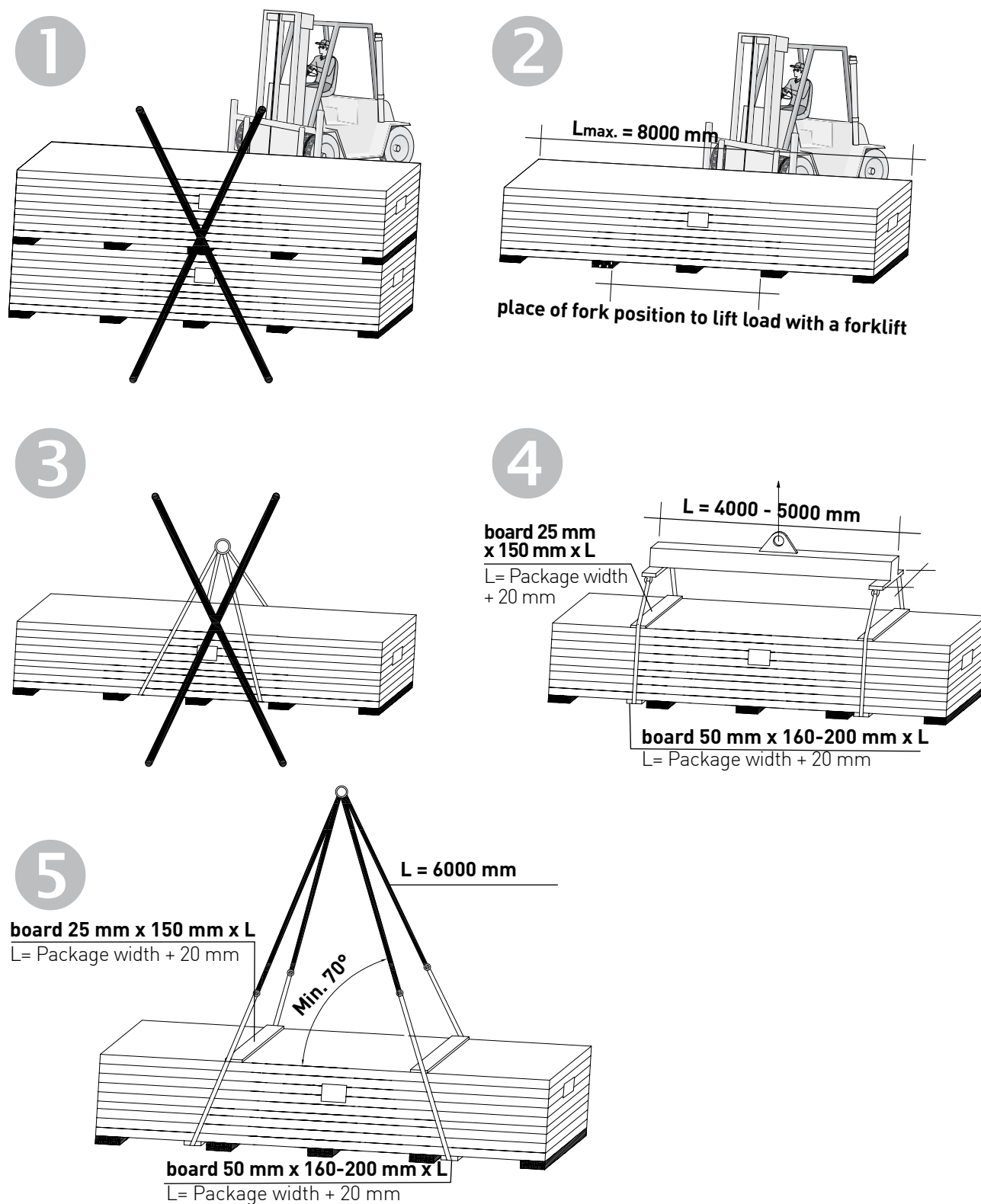
Qbiss One F façade elements can be transported from the factory to the construction site either by road or railway transport. The load-bearing textile bands with under-lying wooden battens must be used to attach the cargo to the means of transport.

7.2.1. Handling with fork-lift and lifting device (Unloading)

Unloading and transfer by a forklift truck is permitted only if individual packages are up to 8 m long (Fig. 2)!

When unloading by the lifting device the use of lifting bands of appropriate load-bearing capacity and load carriers in a length of 4 to 5 m (Fig. 4), or 4-ridge lifting element in a length of 6 m (Fig. 5) are to be used! Suitable planks are to be placed under bands lined up with the edge of the package. Distance boards should be placed on the top (Fig. 4 and 5).

Fig. 7.2: Unloading procedure



During unloading, the truck cover must be fully open. Cover supports must be removed in such a manner that enables safe manipulation of packages and prevents Qbiss One F façade elements from damage during lifting of the truck.

NOTE:

- Lifting more than one package at a time is not allowed.
- To prevent unnecessary damage, consistently follow the handling instructions attached to every package.
- The recipient is liable to report all visual damages to the carrier upon reception of packages at the construction site.

7.2.2. Fastening Packages for Transport

Fastening Packages for Truck Transport

The packages must be fastened to the truck with textile bands at maximal distance 2.5 m or less (depending on package length). The use of steel wire rope is not allowed. While fastening the bands it is necessary to control the contact of the under-lying wood battens with the upper Qbiss One façade element in the package, to protect possible deformation of the upper façade element's sheet metal. During transport, the driver should occasionally check the stability of the cargo and to re-tighten the bands if Necessary.

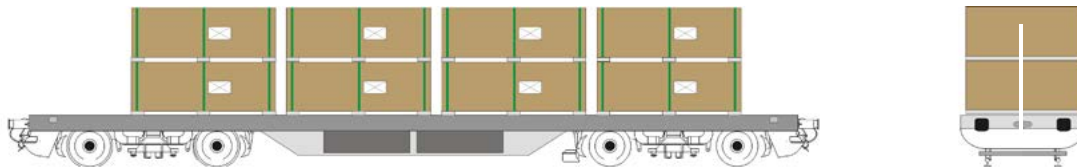
Fig. 7.3: Loading the packages on truck



Fastening Packages for Wagon Transport

The packages must be fastened together and to the transport wagon. The packages must be fastened together with steel bands at a maximum distance of 2.5 m, or at least twice for each package. Smaller packages must be bundled together and protected against possible movements. The packages must be fastened to the wagon with textile bands. The use of steel wire rope is not allowed. It is necessary to exclude possibility of upper façade element deformation.

Fig. 7.4: Loading the packages on wagon



NOTE:

To prevent unnecessary damage during unloading, consistently follow the handling instructions, attached to every package.

The crane, mobile crane or fork-lift may be used for handling packages. Moving or pushing of packages with forks of a fork-lift is strictly forbidden. The use of steel wire ropes is not allowed during handling by crane. The packages priate load-bearing bands. The centre of gravity must always be between forks or load-bearing bands.

IT IS STRICTLY FORBIDDEN TO LIFT MORE THAN ONE PACKAGE AT A TIME!

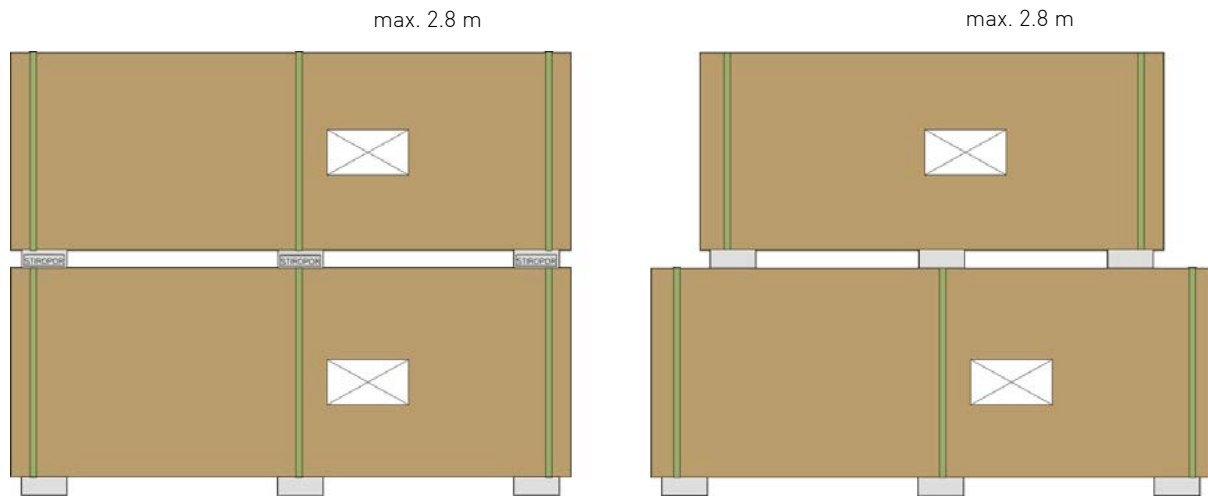
7.3 Storing

The following provisions must be considered when storing Qbiss One B façade elements:

- It is highly recommended Qbiss One B façade elements be stored in their original packaging in closed, covered, dry premises - they should not be exposed to the sun and other weather impacts.
- Packages are to be stored on a straight, stable, dry and clean supporting surface. Any damage to the protective foil should be repaired.
- The packages should be stocked on flat solid surfaces to prevent immersion, leaning, and falling of separate packages, especially in winter periods, when the package's protective foil is covered with ice.
- If storing outdoors, ensure that packages are drained and dry before being fully covered with a tarpaulin. The maximum height of stacking is 2.8 m.

The protective foil needs to be removed from both sides of the panel within three months since the delivery at the building site. The protective foil has to be completely removed from the panel or facade every day after the completed assembly to thereby prevent a negative effect of gathered water/condensation under the foil. If adhesive remains on the surface it needs to be wiped off promptly with the detergent and cloth.

Fig. 7.5: Stacking of packages



8.0 Maintenance of Buildings

8.1 Annual service inspection of the façade

According to best practices, at least once a year, a service inspection of the façade and the whole building must be performed. The purpose of this is to fix any defects and increase the life span of the façade. The annual inspection includes:

- Clearing of all dirt and debris accumulated on the façade and washing if necessary.
- façade damage must be dealt with immediately when it occurs or when it is spotted. The damaged areas should be locally cleaned with a fine abrasive. This is followed by de-dusting and degreasing (rubbing alcohol, isopropyl alcohol). Then, the primer varnish should be applied with a brush (air-drying coat using epoxy binding materials and Zn pigments). In the end, the final protection is applied with a brush (air-drying coating with a polyurethane or acrylic binding material).

8.2 General advice

- Do not use aggressive cleaning agents in order to prevent damage of the corrosion protection.
- Do not use a grinder near Qbiss One F façade elements, as hot particles damage the colour.
- Should questions arise regarding maintenance of the building or the need to fix damage or faults, consult Trimo Service department.

9.0 Warranty

Trimo's façade elements guarantee - see Trimo guarantee terms and conditions.

**TRIMO D.O.O.**

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