

## Ventilated façade

**1 General**

These application instructions are specifically intended for the fastening of the TONALITY cladding tiles as façade cladding on aluminium fixing profiles fixed to a supporting structure. A number of basic principles are given that must be adhered to. For variations or additional advice one can always contact EURO PANELS OVERSEAS N.V..

**2 Cladding material**

The following EURO PANELS OVERSEAS N.V. products are treated in this document

**CLADDING TILES**

	TILE THICKNESS (mm)
• TONALITY – CLASSIC	26

**FIXING PROFILES (SYSTEM CONSTRUCTION)**

	PROFILE DEPTH (mm)	SYSTEM DEPTH (mm)
• ADS: ADAPTIVE PROFILE SYSTEM	17 – 27 – 37	46 – 56 – 66
• BAS: BASE CLINCH PROFILE SYSTEM	0	
• CLS: CLASSIC PROFILE SYSTEM	27	56

For product data and the details of the processing of the various cladding tiles and fixing profiles, reference is made to the product information sheets and the general instructions for use, available from EURO PANELS OVERSEAS N.V..

**3 Area of application**

These instructions apply for buildings up to a certain height and subjected to a maximum actual wind load (according to DIN 1055-4:1986-08).

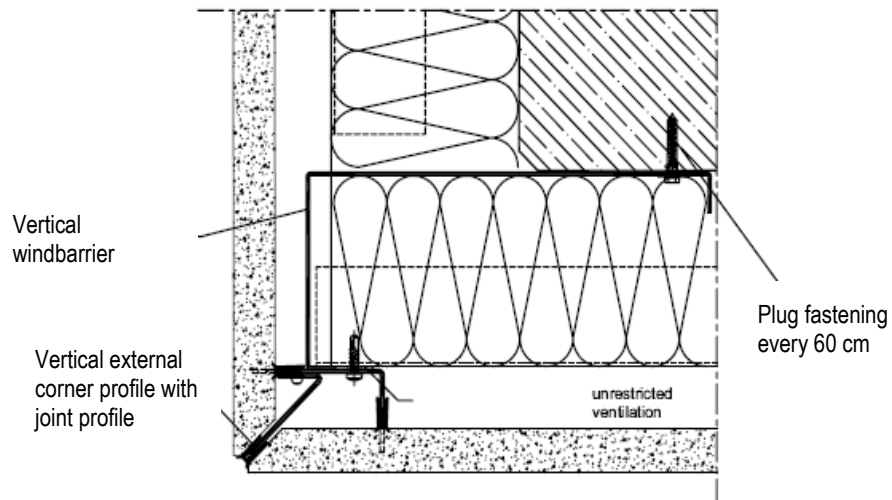
Building Height H (m)	0 < H ≤ 8		8 < H ≤ 20		20 < H ≤ 100		H > 100	
Location/Area	Surface	Edge	Surface	Edge	Surface	Edge	Surface	Edge
Wind suction load (N/m <sup>2</sup> )	350	1000	560	1600	770	2200	910	2600
Wind pressure load (N/m <sup>2</sup> )	500	500	800	800	1100	1100	1300	1300

The width of the edge area amounts to at least 1 m from the corner of the building and must be further determined on the basis of prevailing national standards and conditions. If variations of the aforementioned load limits occur (e.g. due to certain location or form factors, etc.), the design must be determined by building services engineers.

In case of increased wind section loads at the edge area of the building, a vertical wind barrier is mounted along the vertical building edges over the total height.

The wind barrier must be manufactured of aluminium of minimum 1.6 mm thickness or of another metal according to DIN 18516-1, under observance of the protection against corrosion.

The profiles of the wind barrier are anchored respectively mounted on the wall at distances of 60 cm from each other. In case of arrangement of several profiles of the wind barrier one above the other, the gap at the vertical joint of the profiles is at least 5 mm, if profiles of maximum 2.8 m length are used.

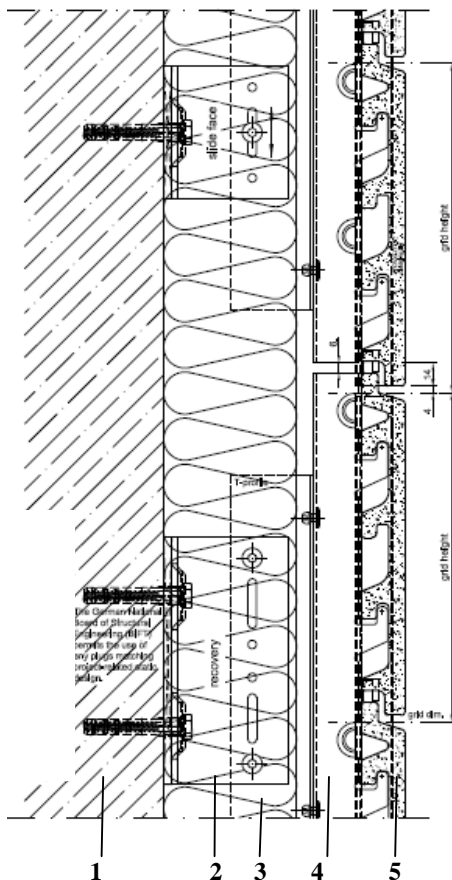


In case of using a wind barrier, it is necessary to use a vertical external corner profile with a joint profile.

Use of aluminium supporting structures is reserved for aggressive environments, where the aluminium of the supporting structure can be corroded, such as for example in coastal locations (minimum one kilometre from the coastline).

**GENERAL SYSTEM COMPOSITION**

In the figure below, a general composition of the TONALITY system with the different components is given:



1. Back construction (massive or wooden frame constructions)
2. Supporting structure (brackets)
3. Supporting structure (aluminium or wooden / horizontal or vertical)
4. Aluminium fixing profiles (CLS/ADS/BAS)
5. Cladding tiles

#### 4 Supporting structure

The TONALITY fixing profiles and cladding tiles are installed on a vertical or horizontal supporting structure. The supporting structure is fixed at a certain distance (depending on the required insulation thickness and air cavity) on the back construction.

The supporting structure must be able to resist the wind forces exerted on the building and the load of its own weight.

- maximum bending (deflection/deformation) under the influence of strain :  $\leq L/150$
- safety factor calculation of strength : 3
- maximum unevenness supporting structure :  $\leq L/1000$
  
- Maximum distance between supporting profiles in case of vertical supporting structure : 1.20 m
- Maximum distance between supporting profiles in case of horizontal supporting structure : 1.20 m

For the supporting structure, it is possible to use aluminium supporting profiles or wooden supporting laths. It is possible to mount the supporting structure horizontally or vertically, except for the BAS fixing profiles. The BAS fixing profiles may only be mounted on a vertical supporting structure.

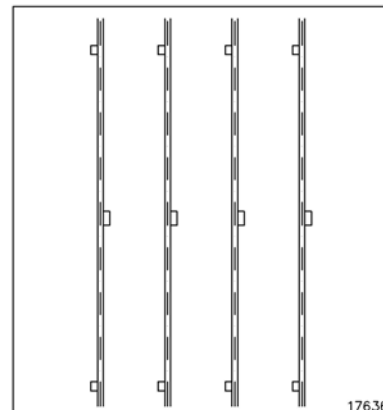
The fastening of TONALITY cladding tiles must always take place with a ventilated cavity. The necessary openings are provided on the bottom side, top side and in the details to allow sufficient ventilation.

Badly ventilated systems could result in physical problems for the construction.

- Ventilation openings above/below :  $\geq 10$  mm
- Minimum cavity width : 30 mm

In the case of using brackets for a massive back construction, the distance between the brackets is determined by the load exerted (as a result of the wind load and force of gravity) and the strength properties of the supporting structure (in case of aluminium, to be indicated by the supplier of the supporting structure).

To obtain a stable vertical supporting structure, the brackets can alternately be fitted left and right of the supporting profiles.



In case of vertical supporting structure, the length of the supporting profile must correspond to the length of the TONALITY – vertical fixing profile.

Mineral wool with a water-repellent black protective coating is recommended for insulation. The insulation is fixed with synthetic insulation fasteners in case of massive back constructions. The insulation is fastened according to the instructions of the producer of the insulation, e.g. with five insulation fasteners per square metre.

If the supporting structure is fixed with brackets, the insulation is fastened after the fitting of the brackets and before the fitting of the supporting structure. A slit is cut in the insulation at the bracket.

It is preferable to isolate the bracket from the supporting wall by using a piece of hard insulation material.

**A. ALUMINIUM SUPPORTING PROFILES**

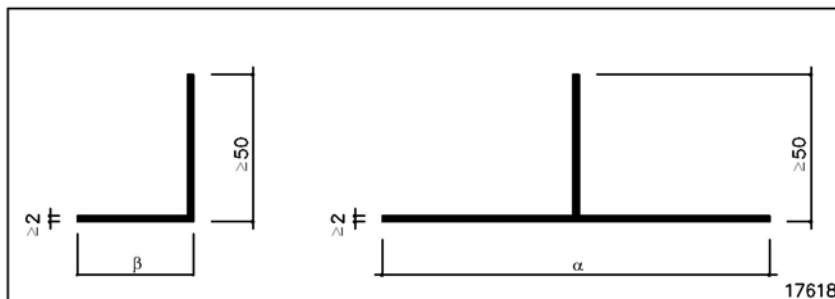
The design and dimensions of the supporting structure in relation to the load fall under the guarantee conditions of the supplier of the supporting structure. This document only explains a number of general principles.

Aluminium profiles are to be aligned with aluminium wall brackets.

It is preferable to isolate the bracket from the supporting wall by using a piece of hard insulation material.

There are different types of aluminium profiles depending on the supplier of the supporting structure. In this document the aluminium profiles are diagrammatically represented as follows.

- T-profile: Vertical supporting structure
- L-profile: Horizontal supporting structure



- minimum width T-profile ( $\alpha$ ) : 70 mm
- minimum width L-profile ( $\beta$ ) : 30 mm

Depending on type of aluminium alloy and the spans (to be indicated by the supplier of the aluminium supporting structure) the aluminium profiles must be sufficiently thick to withstand occurring loads (as a result of the wind load and force of gravity). The aluminium supporting structure must also be sufficiently thick to allow the sufficiently strong fastening of the fastening accessories.

- Minimum thickness aluminium supporting profile : 2 mm

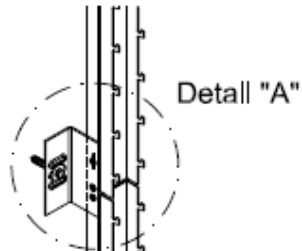
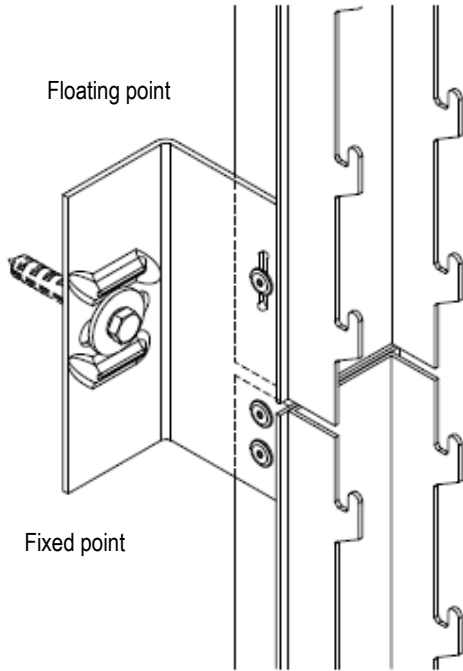
For the use of aluminium supporting profiles, it is necessary to take into consideration the respective linear expansion of the supporting structure:

- width of joint between aluminium supporting profiles : 20 mm
- maximum length horizontal aluminium supporting profiles : 3.0 m
- maximum length vertical aluminium supporting profiles : 2.8 m

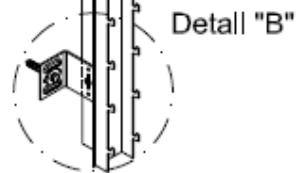
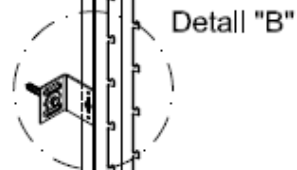
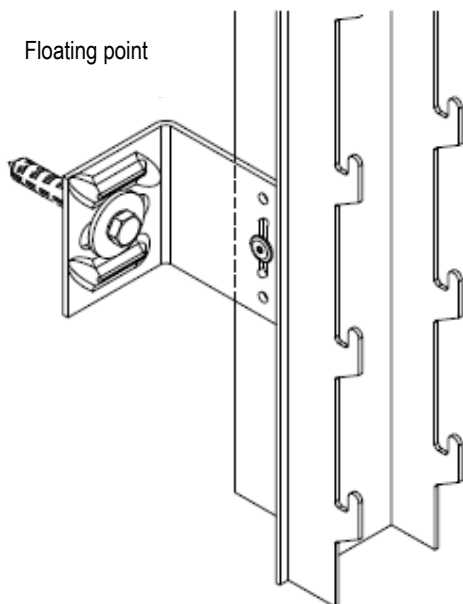
In view of the high thermal coefficient of expansion of aluminium, the aluminium supporting profiles must be fixed in such a way that free movement is possible. The system for fixing the brackets to the supporting profile must accommodate the expansion of the aluminium structure. This is achieved by fixing the supporting profiles with fixed fastening point (F: fixed point) and free fastening points (G: floating point). The distance between the brackets must be calculated in function of the expected load.

The free fastening points must be strong enough to withstand the wind loads. The fixed fastening point must be able to withstand both the wind loads and the dead weight of the façade cladding system.

## Detail "A"



## Detail "B"



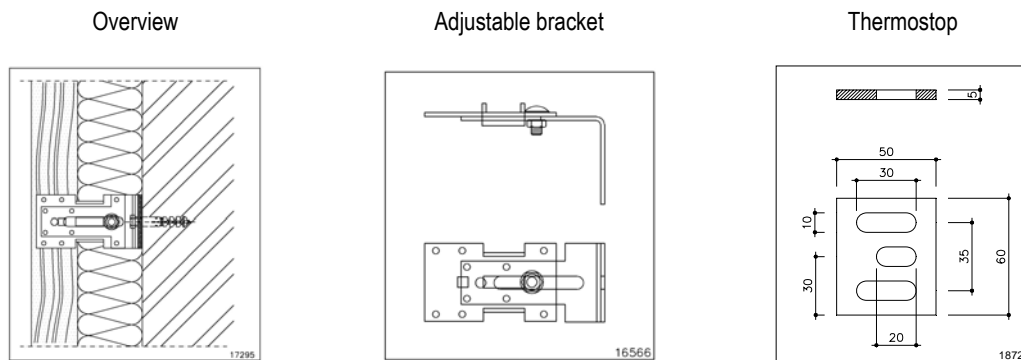
**B. WOODEN SUPPORTING LATHS**

*Wooden supporting structure is only possible with the BAS system construction.*

The quality of the wood must suffice with regard to that described in the prevailing standards for this area of application. The wood must also be protected against being affected by fungi, etc. in accordance with the prevailing standard and must also be sufficiently stable so that alignment is retained. A small expansion joint is left between the wooden supporting laths.

- minimum characteristic bending strength of wood : 18 N/mm<sup>2</sup>
- minimum average modulus of elasticity : 9000 N/mm<sup>2</sup>
- joint between supporting laths : ≥ 5mm

With uneven back constructions, the supporting structure can be fixed using adjustable brackets. The supporting laths are to be fixed to the adjustable bracket by means of four stainless steel wood screws per bracket. The distance between the brackets must be calculated in function of the expected load.



It is preferable to isolate the bracket from the supporting wall by using a piece of hard insulation material.

The supporting lath is sufficiently thick to enable the good fix of the brackets, and the adjustable bracket has the following properties.

- minimum thickness supporting lath : 50 mm
- bracket material : at least Sendzimir galvanised steel

For wooden frame constructions or sufficiently smooth back constructions, the supporting laths are fixed to the wooden cross laths by two stainless steel wood screws per crossing point.

- Minimum thickness of cross lath : 30 mm
- Minimum width of cross lath : 60 mm

The wooden supporting laths must be sufficiently wide for the correct fitting of the aluminium fixing profiles.

- Minimum width of supporting lath : 70 mm

The vertical supporting laths must be sufficiently thick to resist occurring forces and to enable the correct application of the fixing profiles.

5 System profiles

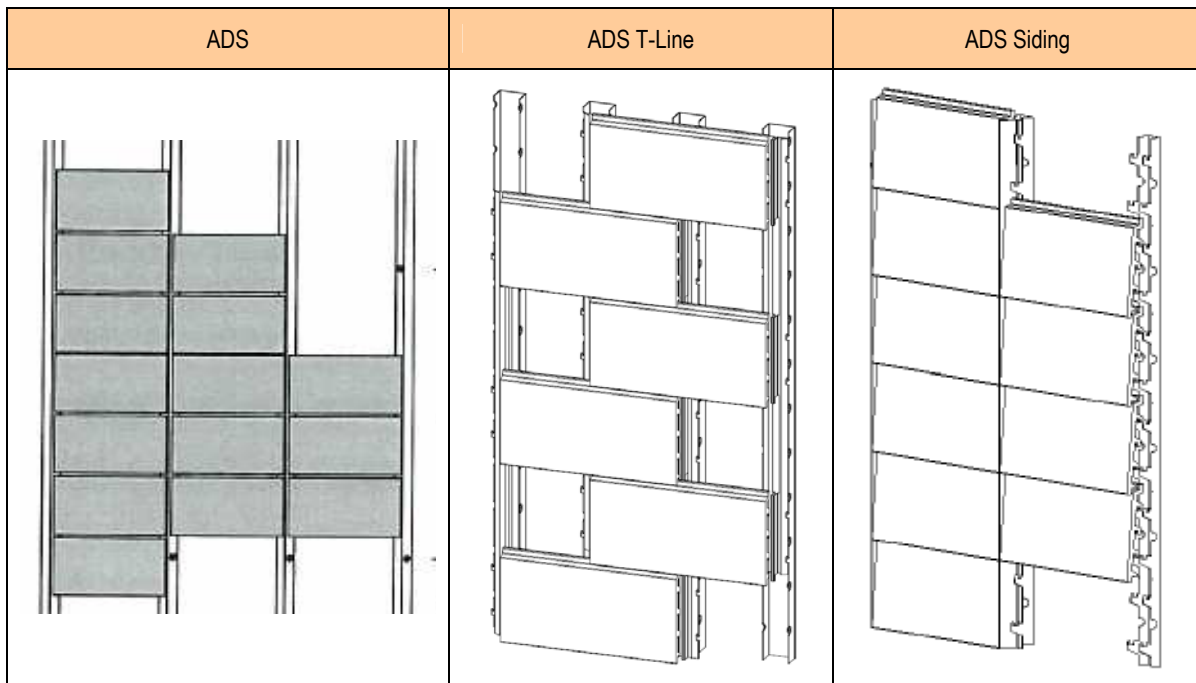
A. TYPES OF SYSTEM PROFILES

For fixing the tiles, three different fixing profiles are available.

- ADS: Adaptive Profile System
- BAS: Base Clinch Profile System
- CLS: Classic Profile System

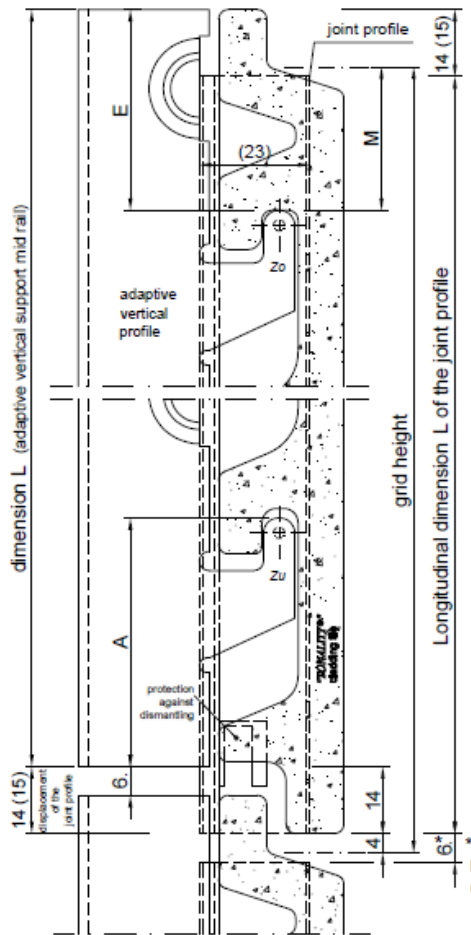
In the ADS range, three different types of completion are possible:

- ADS
- ADS T-Line
- ADS Siding



ADS: Adaptive Profile System

The ADS system can be fixed on vertical or horizontal supporting structures.

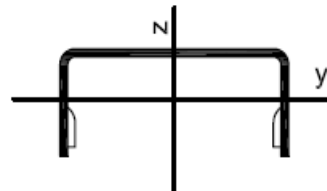


Tile	Number of grids	L	A	B	C	E	M
150	18	2694	45	75	75	24	12
175	16	2794	45	100	75	24	12
200	14	2794	52	100	100	42	30
225	12	2694	45	150	75	24	12
250	11	2744	52	150	100	42	30
300	9	2694	102	150	150	42	30
400	7	2794	102	200	200	92	80
500	5	2494	102	300	200	92	80
600	4	2394	152	300	300	142	130

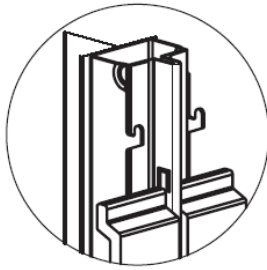
Zo: Tile fixing top  
Zu: Tile fixing bottom

ADS system construction is available in 3 different profile depths

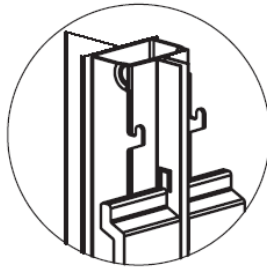
Profile depth	17 mm	27 mm	37 mm
Cross-sectional area	1,72 cm <sup>2</sup>	2,12 cm <sup>2</sup>	2,52 cm <sup>2</sup>
Moment of inertia	$I_y = 0,28 \text{ cm}^4$ $I_z = 7,97 \text{ cm}^4$	$I_y = 1,22 \text{ cm}^4$ $I_z = 11,34 \text{ cm}^4$	$I_y = 3,13 \text{ cm}^4$ $I_z = 14,71 \text{ cm}^4$
Section modulus	$W_{y0} = 0,24 \text{ cm}^3$ $W_{yu} = 0,86 \text{ cm}^3$ $W_{yz} = 2,66 \text{ cm}^3$	$W_{y0} = 0,66 \text{ cm}^3$ $W_{yu} = 1,90 \text{ cm}^3$ $W_{yz} = 3,78 \text{ cm}^3$	$W_{y0} = 1,26 \text{ cm}^3$ $W_{yu} = 3,08 \text{ cm}^3$ $W_{yz} = 4,90 \text{ cm}^3$



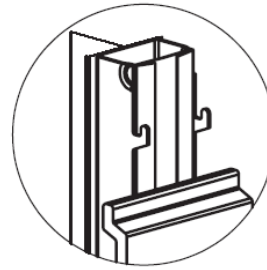
Different types of joint profiles (open, closed, standard width, tight, deep or levelled with front of tile) are available.



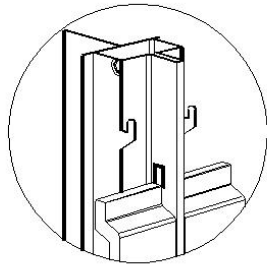
ADS with deep closed joint profile



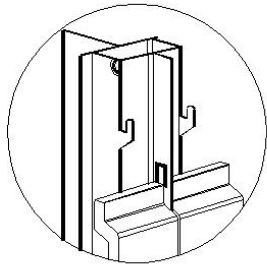
ADS with open joint profile



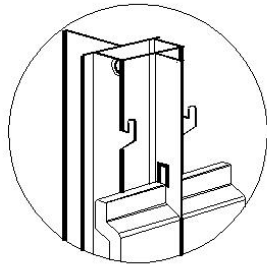
ADS with end profile



ADS with closed joint profile levelled with front of tile



ADS with deep narrow joint profile



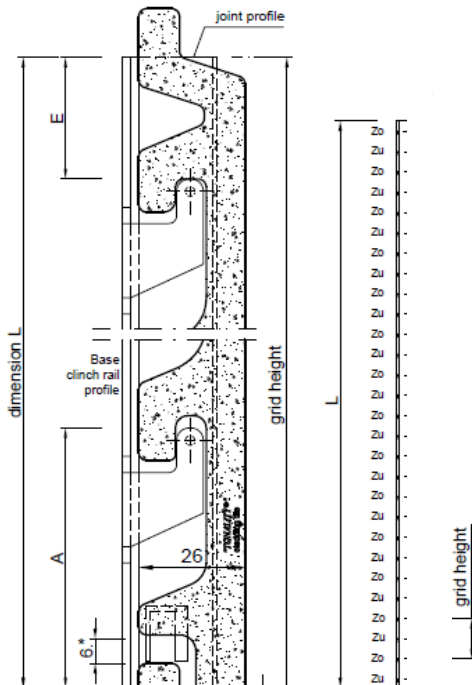
ADS with narrow joint profile levelled with front of tile

The ADS joint profiles have protection against dismantling.



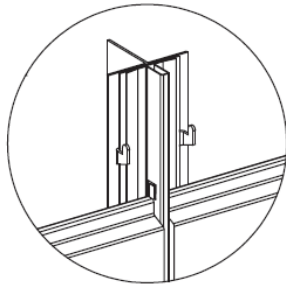
**BAS: Base Clinch rail System**

The BAS system can only be fixed on vertical supporting structures.



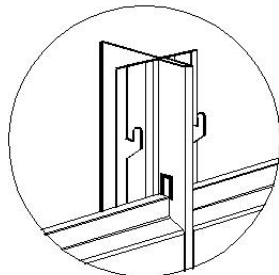
Tile	Number of grids	L	A	B	C	E
150	18	2694	57	75	75	75
175	16	2794	57	100	75	100
200	14	2794	64	100	100	100
225	12	2694	57	150	75	150
250	11	2744	64	150	100	150
300	9	2694	114	150	150	150
400	7	2794	114	200	200	80
500	5	2494	114	300	200	80
600	4	2394	164	300	300	130

Zo: Tile fixing top  
Zu: Tile fixing bottom

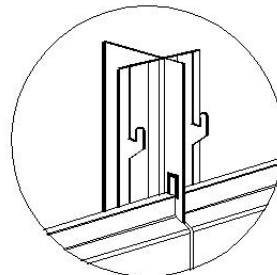


BAS fixing profile with deep closed joint profile

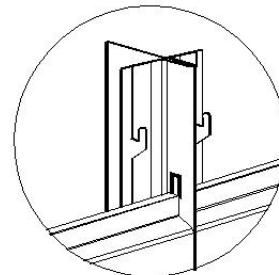
Profile depth	0 mm
Moment of inertia	$I_y = 7,4 \text{ cm}^4$ $I_z = 5,72 \text{ cm}^4$



BAS fixing profile with closed joint profile leveled with front of tile



BAS fixing profile with deep narrow joint profile



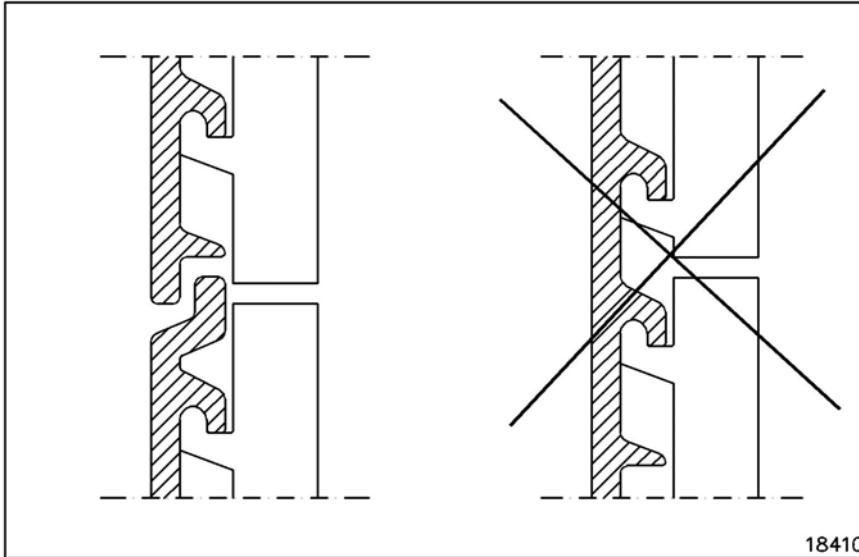
BAS fixing profile with narrow joint profile leveled with front of tile

The BAS joint profiles have protection against dismantling.



**B. MOUNTING OF FIXING PROFILES (SYSTEM CONSTRUCTION)**

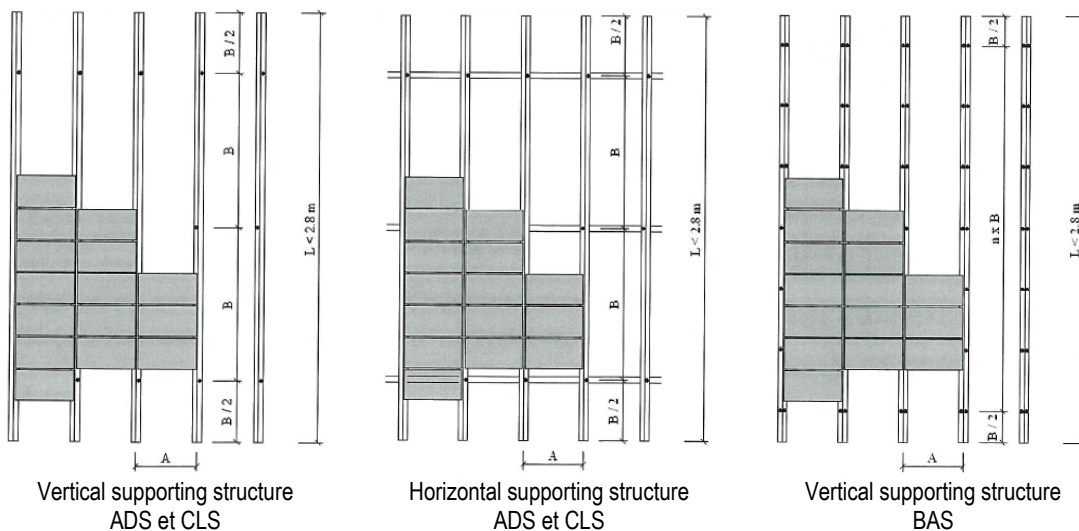
In case of installation of several vertical profiles one above the other, the joints between two cladding tiles must always be at the same height of the supporting and fixing structure. The fixing structure must be screwed or riveted on the supporting structure.



For the BAS-profiles you have to mount the fixing profiles on both sides of the fixing profile. The distance between the fixing points depend on the height of the tiles.

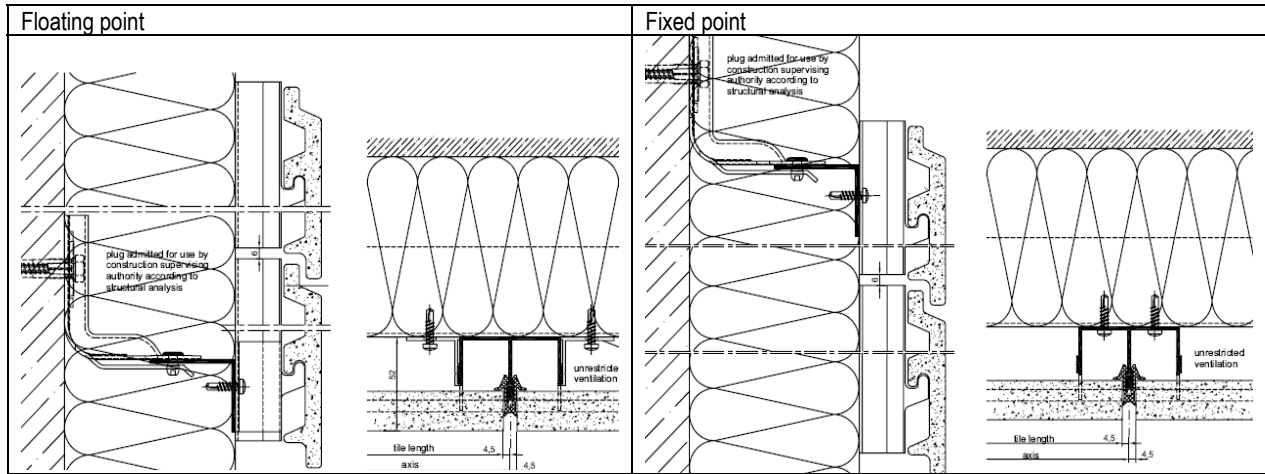
- Maximum distance between the fixing points for the profiles type BAS :  $\leq 2 \times$  height of the tile

For the ADS and CLS fixing profiles you mount the profiles with alternating fixing points. You must perform the static calculations to calculate the distance between two fixing points to mount the fixing profiles on the supporting structure.



- A : tile length
- B : distance between two fixing holes
- B/2 : maximum distance from the border of the profile

When mounting the ADS and CLS profiles on a horizontal supporting structure, you must fix the profiles in such a way that free movement is possible in view of thermal expansion. The fixing profile must be fixed with one fixed fastening point (fixed point) and free fastening points (floating point). A bar shaped L- profile is used for the floating points.



**C. MAXIMUM BEARING DISTANCE BETWEEN PROFILES**

The maximal bearing distances of the cladding tiles depends on the maximum wind loads. As a general rule the following maximum distances between the profiles must be respected.

Table: admissible bearing distances in case of admissible wind suction force of 0.86 kN/tile

Wind charge (kN/m <sup>2</sup> )	0,5	0,8	1,0	1,5	2,0	2,5	3,0
Adm. bearing dist. (m)							
Tile height 150 mm	11,47	7,64	5,73	3,82	2,87	2,29	1,91
Tile height 175 mm	9,83	6,55	4,91	3,28	2,46	1,97	1,64
Tile height 200 mm	8,60	5,73	4,30	2,87	2,15	1,72	1,43
Tile height 225 mm	7,64	5,10	3,82	2,55	1,91	1,53	1,27
Tile height 250 mm	6,88	4,59	3,44	2,29	1,72	1,38	1,15
Tile height 300 mm	5,73	3,82	2,87	1,91	1,43	1,15	0,96

**D. JOINT FINISHING**

The vertical gap between the cladding tiles must be backed with the joint profiles joints as protection against driving rain and as constructive stabilisation of the position of the cladding tiles.

**ADS: Adaptive Profile System**

In order to fasten the aluminium joint profile, it is clamped into the vertical fixing profile. As a rule, it is secured against falling off through insertion of the tiles. At the same time, the tiles are pushed to the vertical profile by the joint profile in order to avoid the generation of noise of the tiles in case of load from wind pressure.

**BAS: Base Clinch Rail Profile**

The joint profile is already fixed onto the fixing profile with a high-strength connection between the extruded fixing profile and the joint profile. Each basic clinch rail profile must be mechanically fastened onto a vertical supporting profile of aluminium.

**CLS: Classic Profile System**

In order to fasten the neoprene joint profile, it is clamped on the vertical profile. As a rule, it is secured against falling off through insertion of the tiles. At the same time, the tiles are pushed to the vertical profile by the joint profile in order to avoid the generation of noise of the tiles in case of load from wind pressure.

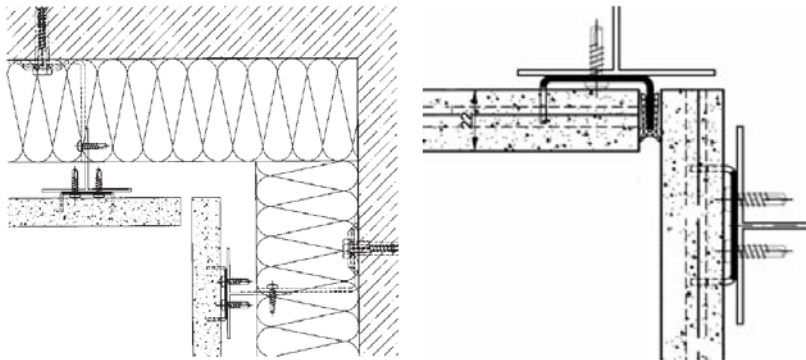
**External corners**

For the finishing of external corners, you can use cladding tiles with left and right miter joints optional in combination with an aluminium joint profile with or without neoprene sealing gasket or an aluminium corner profile.

Aluminium joint profile 45°	Neoprene sealing gasket	Aluminium corner profile

**Internal corners**

In case of internal corners, an open joint of 9 mm between the cladding tiles or a closing-off profile with neoprene sealing gasket can be applied.



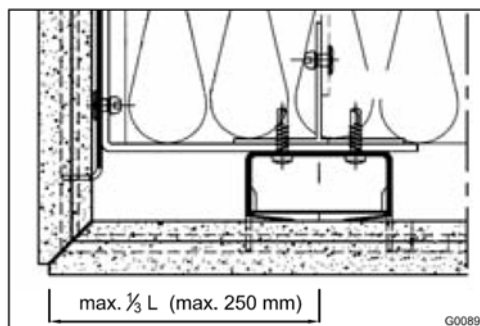
**6 Fixing of tiles**

In general, all tiles must be installed free of constraint forces between the vertical fixing profiles.

Attention must be paid to the fact that the tile can easily be inserted into the system bearing. The tile should show a distance to the joint profile of 1 mm to the left as well as to the right. This does, however, presuppose that the installation of the vertical fixing profiles has been executed carefully and accurately.

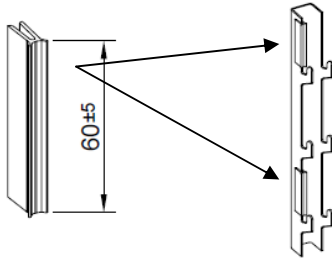
<ul style="list-style-type: none"> <li>Distance between tile and fixing profile: 1 mm</li> <li>Vertical open or closed joint between 2 tiles                             <ul style="list-style-type: none"> <li>With normal joint profile: 8 mm</li> <li>With narrow joint profile: 2 mm</li> </ul> </li> <li>Tile length = center to center distance – joint width.</li> </ul>	
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The maximum overhang of a tile is maximum 1/3 of the tile length but should not exceed 250 mm.



Neoprene safety movement gasket

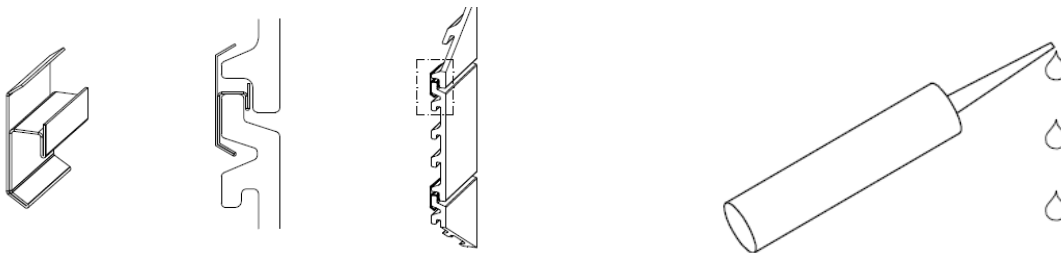
To prevent horizontal displacement of the tiles with edged system construction (corner fixing profile for external corners and end lugs).



Accessorie for small tile segments

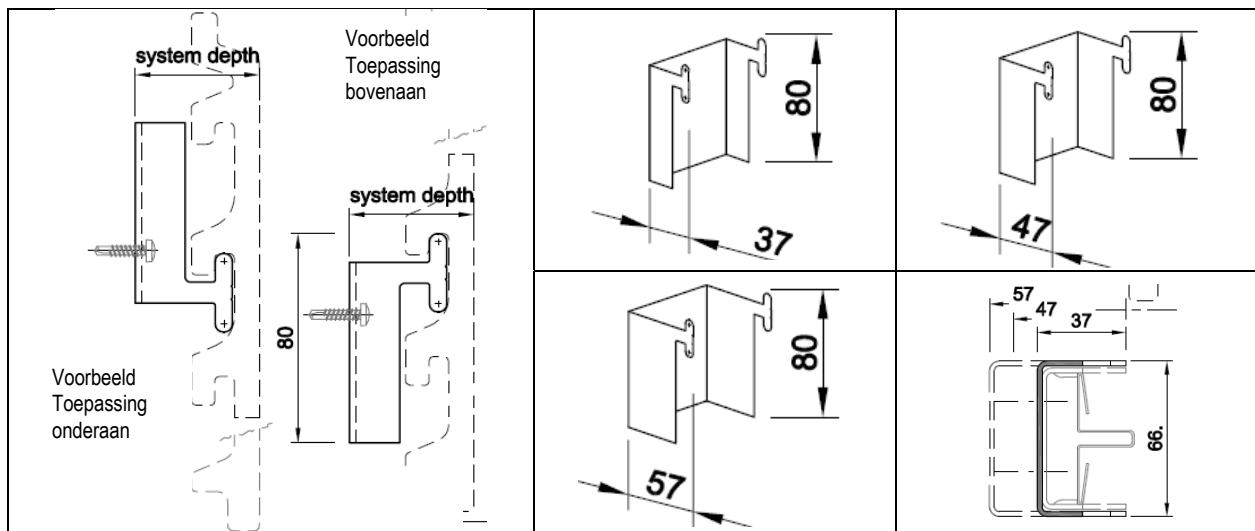
For the fastening of small tile segments, you can use a gamble clamp in combination with the glue for these gamble clamps. These gambling clamps must only be used when the tile is mounted with one side on a fixing profile.

- Maximum distance between two gamble clamps : 300 mm



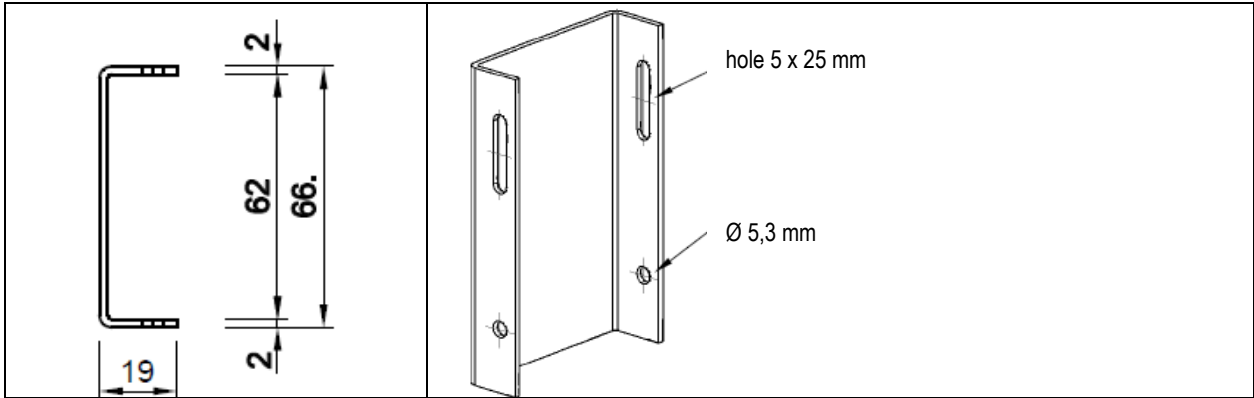
Adapter profile for the ADS and CLS fixing profile

To fix horizontally cut tiles (tile height smaller than 150 mm) which can't be fixed on the standard hooks of the fixing profile, an adapter profile is used. For each system depth a different adapter profile is available. The adapter profile is slid over the ADS fixing profile.



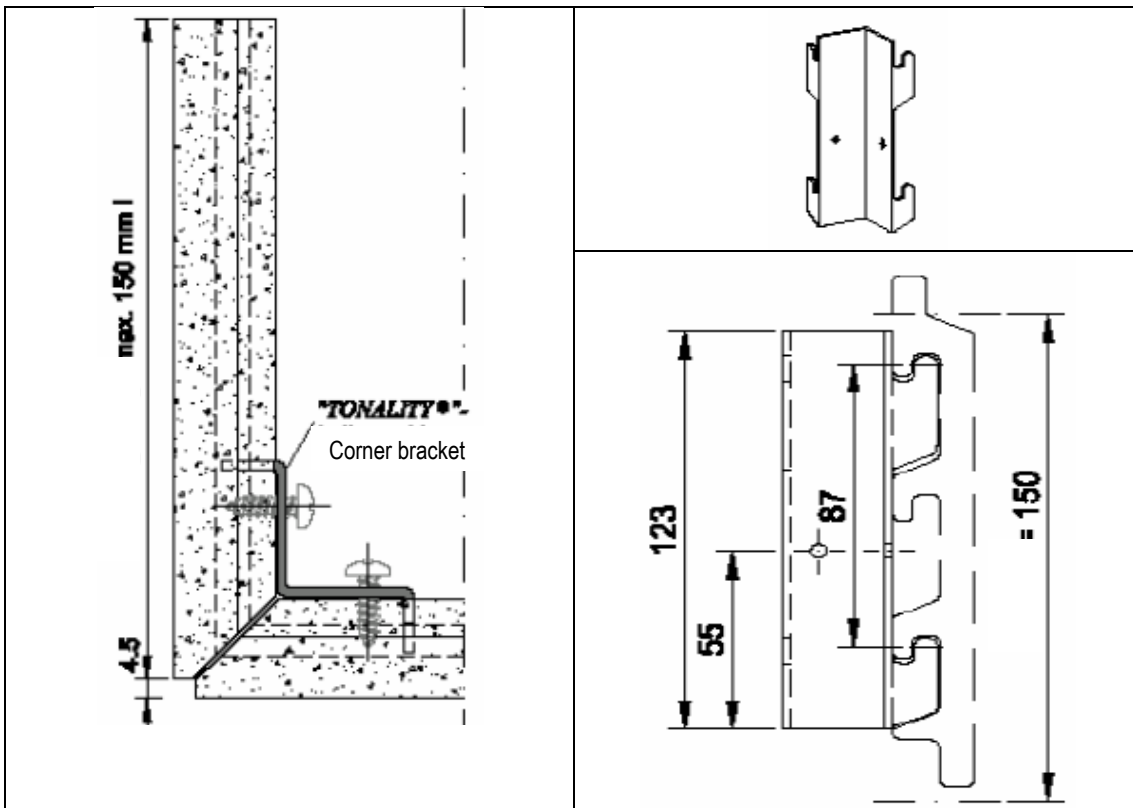
Connection profile for the ADS and CLS fixing profile.

To connect 2 fixing profiles a connection profile is available. This connection profile fits the 3 system depths.



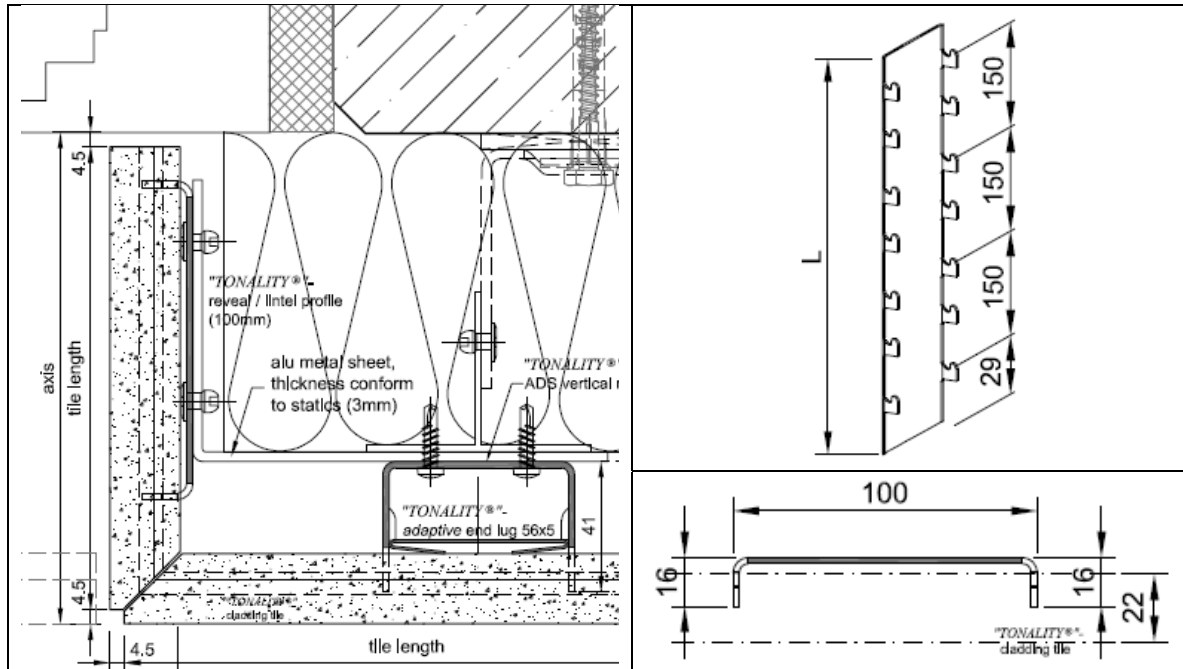
Corner brackets

For tiles with height 150 mm corner brackets are available to easily fix window returns. The maximum length of the return is 150 mm.



Window return profile – reveal profile

The reveal profile (width 100 mm) can be used to finish window reveals larger than 150 mm without using a primary supporting structure. This profile is fixed to the nearest supporting profile with large L-shaped brackets.



**7 Installing procedure**

- Determine the distance of the façade to the carcass of the building taking into account the thickness of the insulation and the unrestricted ventilation (see DIN 18516). The established distance is important for your order of the supporting structure.
- Plan the tile lengths in agreement with the architect / building owner methodically. In this context, it will be necessary to verify details, connections, etc., by presentation of drawings.
- Perform the site measuring and determine the type of tiles, profiles, wall brackets, etc

Combination of tiles and fixing profiles:				Possible for:		
Profile length	Number of tiles	Tile height (mm)	with max. tile length of (mm)	ADS	BAS	CLS
2694 mm	18	150	900 mm	X	X	X
2794 mm	16	175	900 mm	X	X	X
2794 mm	14	200	1600 mm	X	X	X
2694 mm	12	225	1600 mm	X	X	X
2744 mm	11	250	1600 mm	X	X	X
2694 mm	9	300	1600 mm	X	X	X
2794 mm	7	400	1600 mm	X	X	X
2494 mm	5	500	1600 mm	X	X	X
2394 mm	4	600	1600 mm	X	X	X

- Perform static calculations for load-bearing profiles and anchorings and if necessary, have these calculations reviewed.
- Installing has to be done according to the guidelines of the manufacturer and the technical approval.

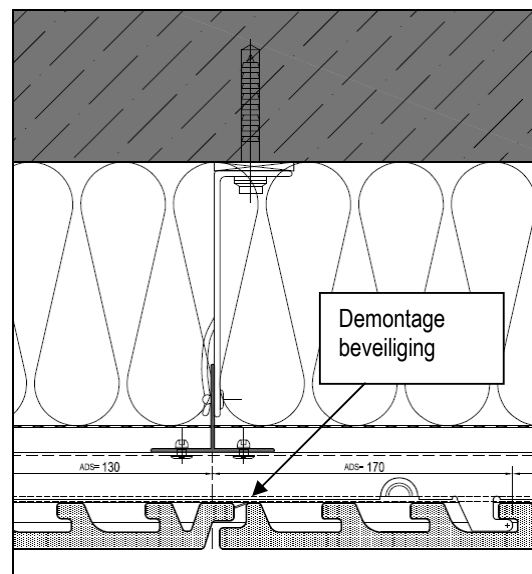
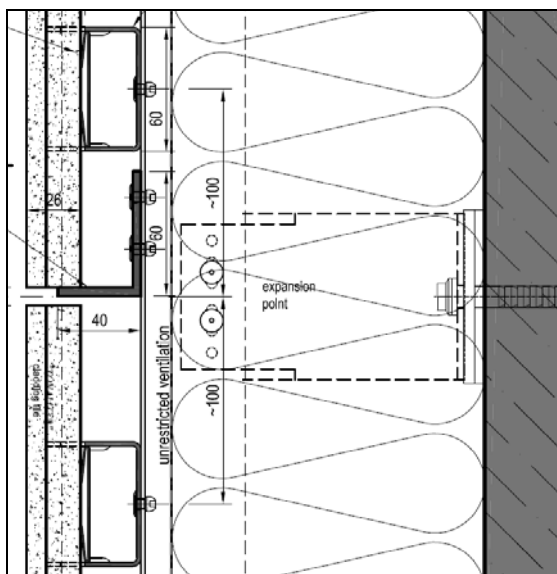
## 8 Expansion joints

The expansion joints in the building must also be included in the cladding. The profiles of the supporting structure must be interrupted at the expansion joints. Expansion joints may not be damaged during the installation of the façade.

## 9 Special applications

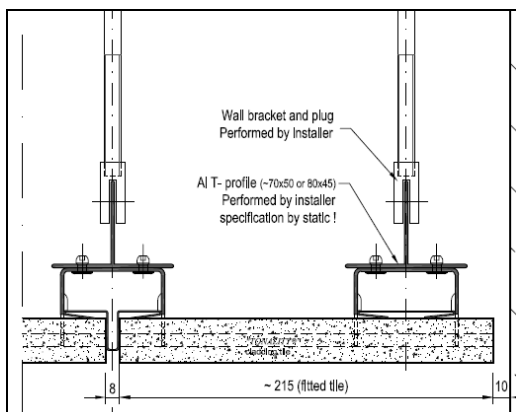
### A VERTICAL APPLICATION OF CLADDING TILES

The tiles are fixed on horizontally mounted ADS system profiles with end lug (= end profile, see page 9). The ADS system profiles are fixed on a vertical supporting structure. Each row of vertical tiles is supported by a supplementary L-shaped profile. This L-shaped profile is also fixed on the vertical supporting structure. The dimensions of the L-shaped profile are determined by the weight of the supported tiles and are to be calculated by the supplier of the vertical supporting structure. Necessary arrangements have to be taken to keep the tiles in place.



### B APPLICATION ON OUTSIDE CEILING

The tiles are fixed on ADS system profiles. The ADS system profiles are mounted on a suspended supporting structure. The dimensions and shape of the suspension system are determined by the load occurring (wind load, force of gravity, etc.) and are to be calculated by the supplier of the supporting structure. Necessary arrangements have to be taken to keep the tiles in place. (e.g. use of dismantling security in the joint profiles).



## 10 Responsibility of the installer

Our details pertaining to execution do not constitute but recommendations. Profiles, supporting construction, etc., must be determined in accordance with the static calculation for the individual building project taking into account the altitude of the building and the load due to wind pressure. Documents must be examined and approved by a structural engineer prior to the execution of the order. All measurements (dimensions, trimming) and details must be determined by the installer. The responsibility for their correctness shall rest with him. The conditions stipulated by the Technical Approval must, however, be observed in any case. If required, please refer to EURO PANELS OVERSEAS N.V. in order to receive a copy of the abovementioned Technical Approval.

The supporting structure is to be ordered by the installer with third parties on his own authority. The necessary planning as well as the required static calculation must be performed by the installer beforehand and if necessary, presented to all those in authority in order to be clarified and approved.

## 11 Health and safety aspects

During the mechanical machining of panels, dust can be released which can irritate the airways and eyes. Apart from this, the inhalation of fine (respirable size) quartz containing dust, particularly when in high concentrations or over prolonged periods of time can lead to lung disease and an increased risk of lung cancer. Depending on the working conditions, adequate machinery with dust extraction and/or ventilation should be foreseen. For more ample information, please check the Safety Data Sheet according to 91/155/EEC.

## 12 More information

Information about the various cladding panels can be found in the EURO PANELS OVERSEAS N.V. product information sheets. They can be found on the website or can be obtained on demand by phone. Information about external suppliers can also be downloaded from the website.

These application instructions replace any previous editions. EURO PANELS OVERSEAS N.V. reserves the right to amend these instructions without prior notice. Readers should always satisfy themselves that they are referring to the most recent version of this document. No part of this text can be changed without permission of EURO PANELS OVERSEAS N.V..

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