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Polycarbonate Architecture

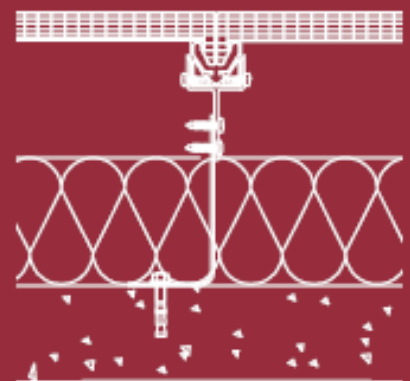
**Technical book**

# Poly-Pac

## arcoPlus<sup>®</sup> Absolut AR

***Opaque ventilated Rainscreen System***

626 VT



**arcoPlus<sup>®</sup>**



**dott.gallina**

## Introduction

This technical book has been developed by our Research & Development department, relying on both the CSTB Technical certification N°2/13-1551 and our internal technical expertise.

Our Research & Development department deals with two main responsibilities:

- To develop new innovative systems ;
- To bring its expertise to attend our customers and our technical and sales team in dealing with current complex projects.

Our R&D department has played a major role in providing the market with innovative polycarbonate systems solutions for over 10 years. For instance, its expertise led to such unprecedented polycarbonate applications as:

- 16 meters high ovoid towers in one single length (So Green shopping mall, Seclin, France)
- First CSTB certified solution in France for opaque ventilated rainscreen application with polycarbonate panels (CSTB Technical Certification N°2/13-1551)
- First ever implemented solution in France for 30 meters long stadium roofing (2x15 meters) with a slope lower than 5° ( MMA ARENA Stadium in Le Mans, France)

Our R&D team works in close connection with the various technical departments in CSTB, LNE and GINGER in order to finalise new systems and specific solutions to complex projects falling out from the Technical Certification perimeter.

Our research department know-how has been recognised by the French Ministry of Industry through Poly-Pac recent certification for CIR (Tax Credit for Innovation).

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## 1 – System definition

ArcoPlus® Absolut AR opaque ventilated rainscreen system is used to envelop the outer wall of new and existing buildings.

Absolut AR : opaque coextrusion to mask the imperfections behind the polycarbonate panels.

## 2 – Field of application for the system on concrete or masonry wall or timber frame wall.

ArcoPlus® Absolut AR opaque ventilated rainscreen system is applicable on new or existing, plan and vertical concrete and masonry walls, blind or with openings, located on floors or ground floor.

The implementation under face is also possible on plan and horizontal, new or existing masonry supports, inaccessible (above 3 m from the ground), and without nearby play area.

ArcoPlus® Absolut AR opaque ventilated rainscreen system can be used for any building type (industrial, air-conditioned offices, schools, hospitals, sport centres, housing, swimming pool, etc ...). This system can be installed with a maximum slope of 15°.

ArcoPlus® Absolut AR opaque ventilated rainscreen system do not contribute to the functions of loads transmission, bracing and shock resistance for security purpose (railing function). Those functions are dealt with by the supporting structure.

This system can be used on masonry walls or timber frame walls while respecting:

- For timber frame walls, Implementation condition of uses such as defined in ATEC report, ref 2/13-1551.
- **Absolut AR treatment will be required on the panels**
- The installed breather membrane will be UV protected.
- The breather membrane will be mechanically fixed so that the ends can not close the air gap in time (fixing with a flat, see page 19).

**Any application falling out from those criteria can be submitted to our technical department to be assessed within a specific analysis.**

## 3 –General principles of installation

To obtain a realization in the code of practice of the ArcoPlus® Absolut AR opaque ventilated rainscreen:

- The Cladding T brackets must be installed in quincunx along connectors 4243.
- The distance between centres of connectors 4243 must be 600 mm.
- A grid anti-rodent will have to be installed in foot of boarding.
- The distance between the ground and the lower part of the profile 4276 must be at least:  
50 mm for the hard grounds  
150 mm for the soft grounds
- In order to conduct the expansion of connectors ref. 4243, only one fixed point will be created by connector. The other fixings will be of slipping type, noted on our drawings by "moving point".
- At the low part of each panel, a fixed point must be created by fixing to profile ref. 4276 by two screws 4.8 X 38 mm provided with a slice Ø 18.
- The panels are delivered to lengths and the installation must take account of the expansion constraints and air circulation for the ventilation of the system.
- Being given the elasticity of the polycarbonate panels and their catch to the level of the connectors, those do not need to be cut during the splitting up of framework (connector ref. 4243)

- To carry out possible cuttings, it will be necessary to use a disc to be cut up fine or a saw with fine teeth (5 tooth/cm). Then to evacuate the possible chips inside the cells and to remake the sealing using perforated micro adhesive.
- The installation of the system must be done with advance: The whole of the connectors should not have to be installed first and then the panels. The system must be installed progressively in its totality.
- The film of protection of the panel must be withdraw as it is installed.

## 4 – Technical assistance

Technical assistance and distribution over France and UK are provided by Poly-Pac, ZA La Porte de Ker Lann, Bruz (France).

Poly-Pac analyses the solution best suited to the project and develops a detailed list of panels, profiles and accessories required for the installation.

Even though Poly-Pac does not install, the company can attend the beginning of the implementation and provide advices at customer request.

## 5 – Panels specifications

Panel	Width	Thickness
626	600-1	20

### Treatments and finishings

Panels	IR	Bi-colour	UV Tech
626	✓	✓	✓

IR : Infrared treatment (prevent from heat increase within the building)

UV Tech : Reinforced UV Protection – 15 years warranty.

Panels are available in various colours. Please refer to our Caleido range.

Due to extrusion process constraints, a visual difference in colour shade is admitted as long as it does not interfere with the mechanical characteristics of the polycarbonate components.

The treatment IR (infrared) can create some shade variations with the colour range.

## 6 – Thermal expansion

The linear expansion coefficient is 0,065mm/ml/°C.

Panels are freely expanding within the connectors and the top of opaque ventilated rainscreen system.

The delta of temperature to take into account will correspond to the difference between the installation temperature and the maximum admitted temperature 90° inside the panels

Exemple : Expansion calculation « E » for 1 panel 5 ml

Maxi temperature inside the panel : 90°C

External temperature during the installation : 20°C

$E = 0,065 \times 5 \text{ m} \times (90^\circ\text{C} - 20^\circ\text{C}) = + 22,8 \text{ mm}$

Exemple : Frontward« F » for a panel 5 ml

External temperature during the installation : 20°C

Mini external temperature in winter : - 20°C

$R = 0,065 \times 5 \text{ m} \times (20^\circ\text{C} - (-20^\circ\text{C})) = - 13 \text{ mm}$

## 7 – Shock resistance

Panel	External shock	Internal shock
626	Q4	O3

GINGER CEBTP report n°ORE6.B.0015 of 13/09/2011 following norm P08-302 of October 1990 and from CSTB 3534 book of December 2005.

## 8 – Fire resistance

Resistance fire of opaque ventilated rainscreen system in accordance to ITE 249 and the norm NF EN 16153 regulating systems with polycarbonate applicable from 01/01/2014

Panel	Fire classification	Combustible Mass (MJ/m²)
626	C,s3-d0	80

Fire classification Euro-Classe on the system following the norm EN 13501-1:2007.

Report : M121130 DE/1 & DE/2 of 26/03/12, M121130 DE/5 & DE/7 of 26/09/12 & N° M090743 of 13/12/11

## 9 – Storage

ArcoPlus® Absolut AR panels should be stored avoiding exposure to direct sunlight and rain. Should storage be outside, it should not be directly in contact with the ground (a ventilation space must be kept) and should be protected with a light coloured non-transparent tarpaulin. To avoid oxidation, untreated aluminium profiles should be unpacked straight away after unloading to avoid any contact with potential residual humidity within the package, and stored in a dry environment. In any case, untreated aluminium profiles should not be kept in contact of each others in a humid environment.

Do not store more than two pallets on top of each other.

In case of heavy wind, use straps.

## 10 – Resistance to chemical agents

ArcoPlus® Absolut AR panels have good resistance to most chemicals with which it is likely to come into contact during normal use.

Chemical agents	Resistance
Diluted acids	Good
Concentrated acids	Average to good
Alkali	Low to average
Organic solvents – alcohol	Good
Chlorinated hydrocarbons	Low
Aromatic hydrocarbons	Low
Aliphatic polycarbons	Low
Lubricating oils	Good
Detergents	Good

Preliminary tests are recommended in case of intense or specific exposure. Use of solvent must be avoided.

## 11 – Maintenance

ArcoPlus® Absolut AR panels should be frequently cleaned with mild soapy water (neutral detergent) and thoroughly rinsed with clear water. Do not use warm water.

Do not use organic solvents, abrasive or alkaline products.

## 12 – Replacement of a damaged panel

1. Remove the 1169 gasket being located in foot of the cladding.
2. Unclip the low AL clip for profile while swileling it towards the interior of the boarding.
3. To remove the screws 4.8 x 38 below of panels.
4. Using a portable grinder with a diamond disc, cut the damaged panel carefully, alongside the connector.  
A guide could be used in order to protect the other panels against any damage.  
Then unclip the weakened panel.  
Starting from the bottom, install the replacement panel.
5. Put the screws 4.8 x 38 on the below of panels.
6. Put back in place the AL clips.
7. Push the 1169 gasket.

### 13 - Maximum load charts for the installation on concrete of masonry wall or timber frame wall

Reference	Maximum distance between fixed point	Maximum load N/m <sup>2</sup>	
ArcoPlus® 626 with AL connector 4243	1350 mm	Positive pressure	1440
		Négative pressure	1630

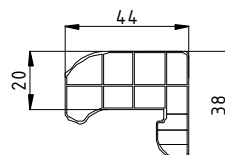
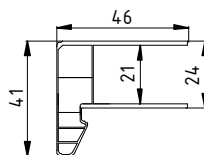
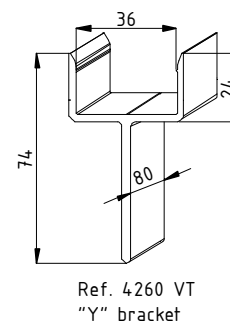
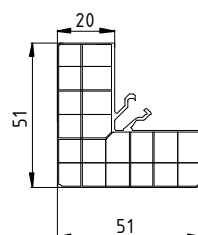
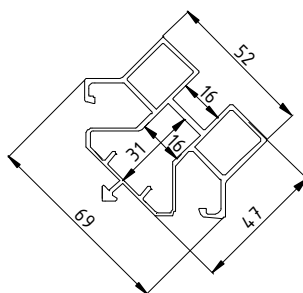
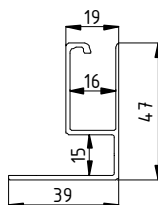
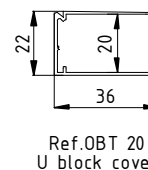
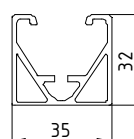
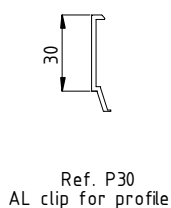
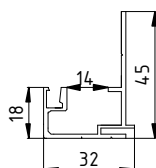
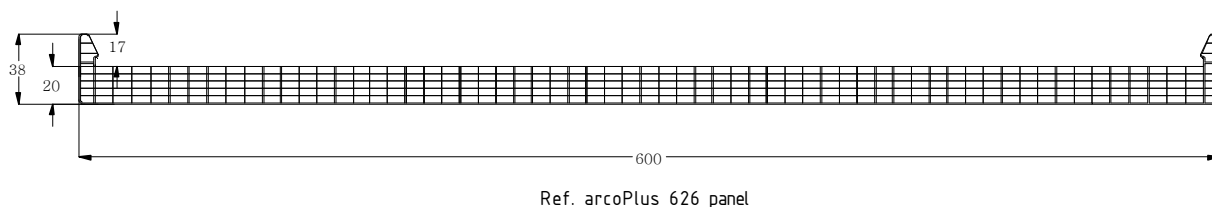
### 14 - For installation on concrete, masonry wall or timber frame wall:

"Useful width" in mm of IN/out air for 40 mm air gap - Translucent AR or Opaque panels

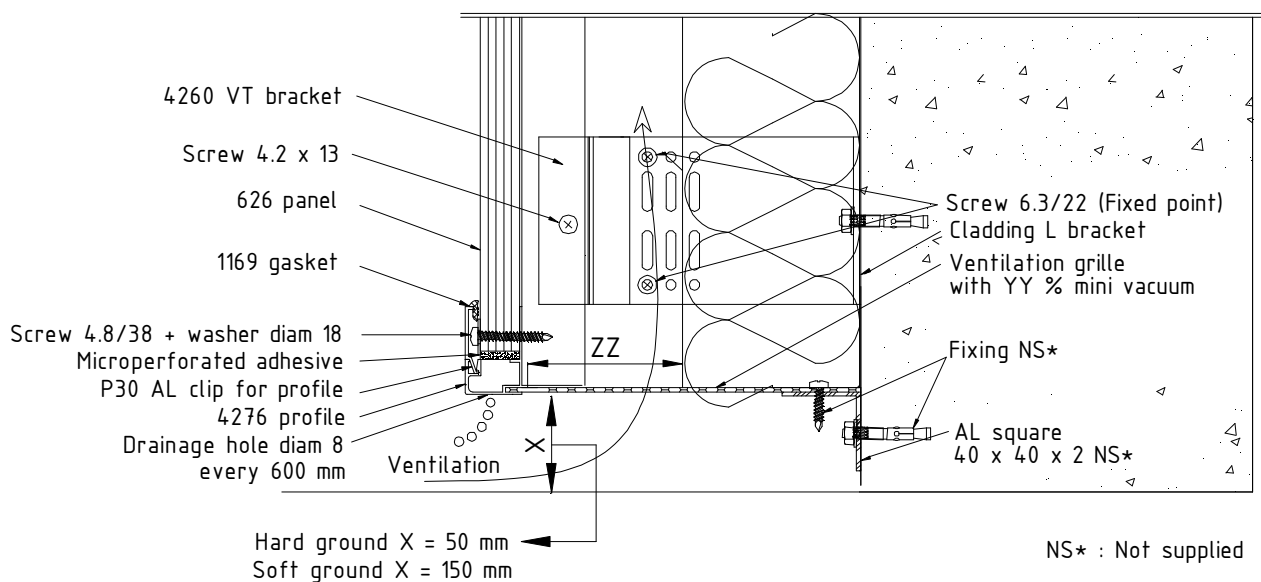
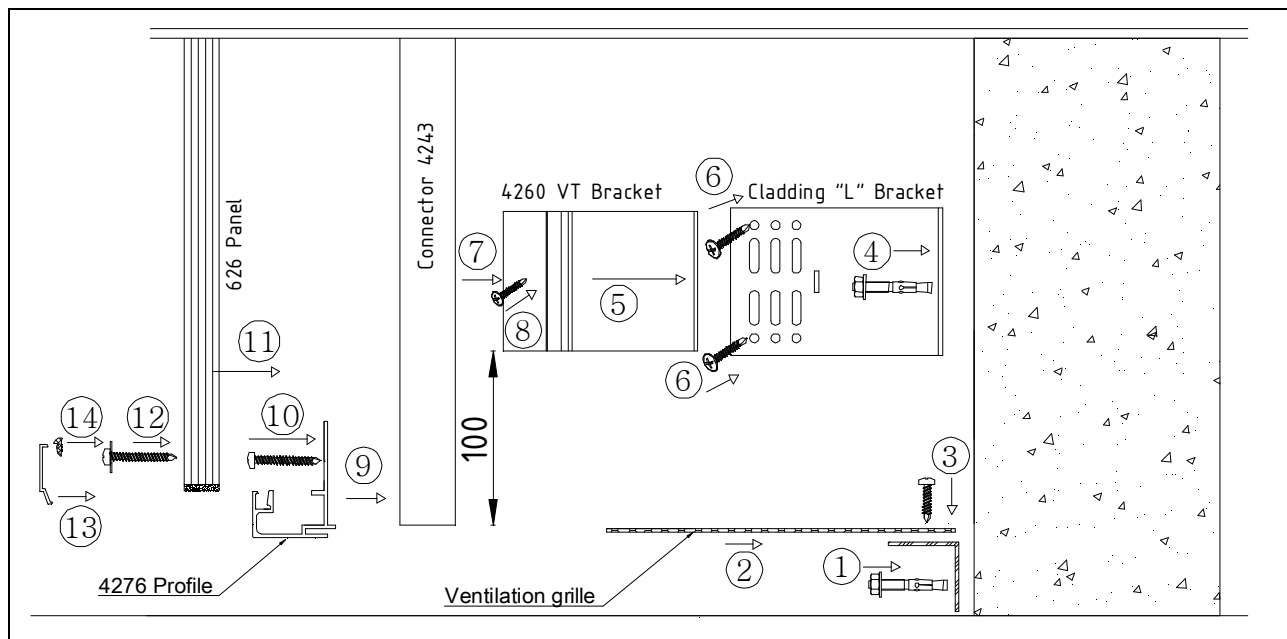
			SOLAR FLOW (W/M²)			
		Heigth of cladding	0 - 250	251 - 500	501 - 750	751 - 1000
Location	NORTH	0 to 3 m	2	2	2	2
		3.01 to 6 m	2	2	2	2
		6.01 to 9 m	2	2	2	2
		9.01 to 12 m	2	2	2	3
		12.01 to 16 m	2	2	2	3
	WEST	0 to 3 m	2	2	2	3
		3.01 to 6 m	2	2	2	3
		6.01 to 9 m	2	2	2	4
		9.01 to 12 m	2	2	3	*
		12.01 to 16 m	2	2	4	*
	SOUTH	0 to 3 m	2	2	2	3
		3.01 to 6 m	2	2	2	3
		6.01 to 9 m	2	2	2	4
		9.01 to 12 m	2	2	3	*
		12.01 to 16 m	2	2	4	*
	EAST	0 to 3 m	2	2	2	3
		3.01 to 6 m	2	2	2	3
		6.01 to 9 m	2	2	2	4
		9.01 to 12 m	2	2	3	*
		12.01 to 16 m	2	2	4	*

\* An individual specific study must be realized by the office R&D of the company Poly-Pac

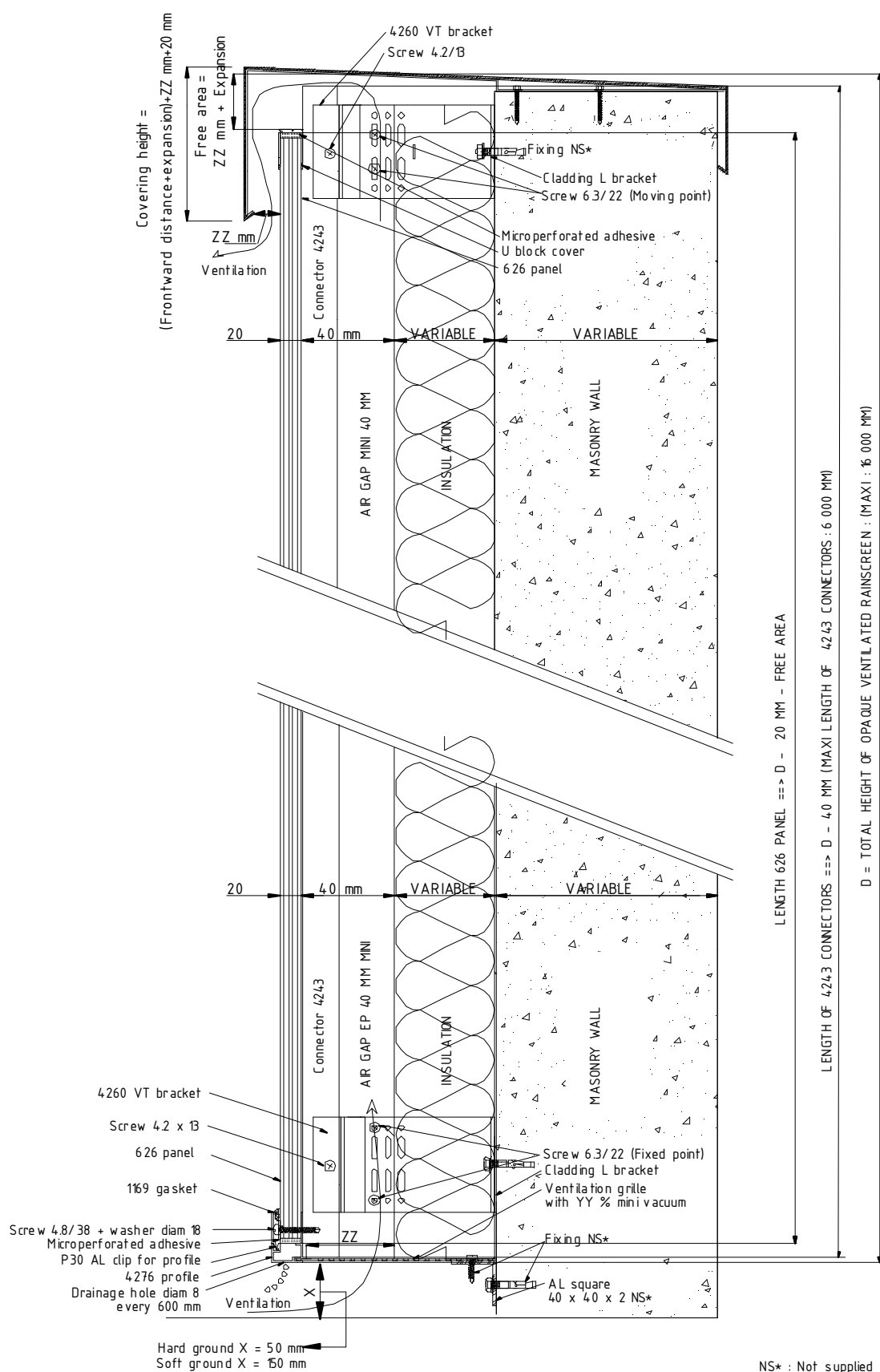
## arcoPlus® Panels , Connectors, Profiles and Accessories



## Principle of installation on low part

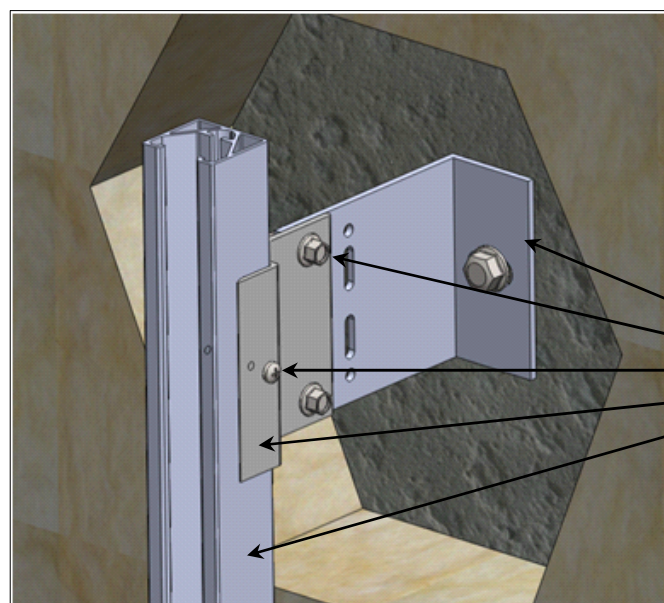
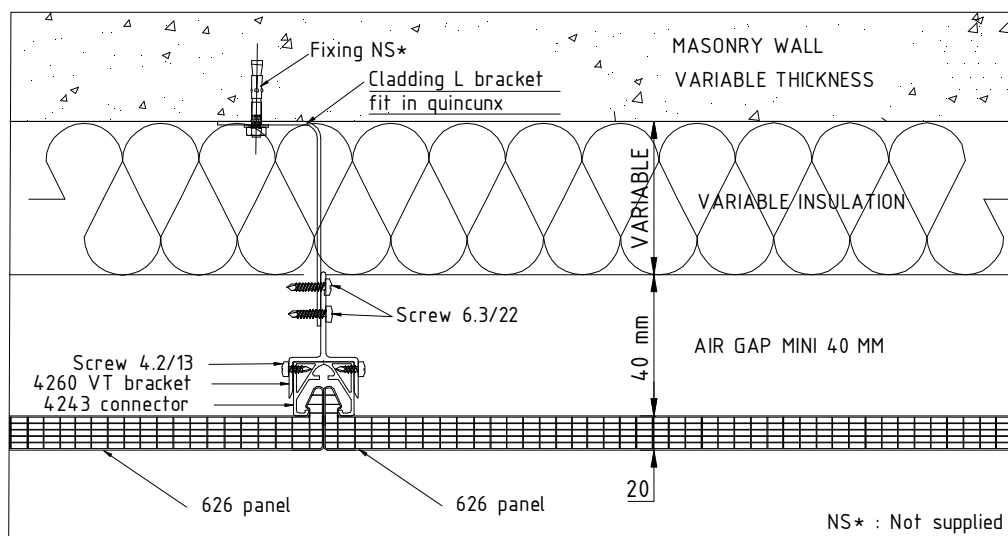


## Principle - Vertical section -

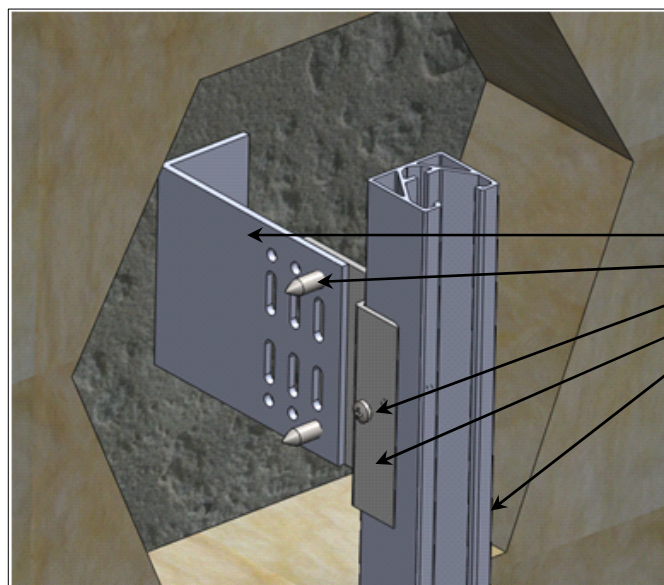




## Fitting of Connectors ref. 4243



Cladding L bracket NS\*  
Screw 6.3 x 22 NS\*  
Screw 4.2 x 13  
Bracket ref. 4260 VT  
Connector ref. 4243

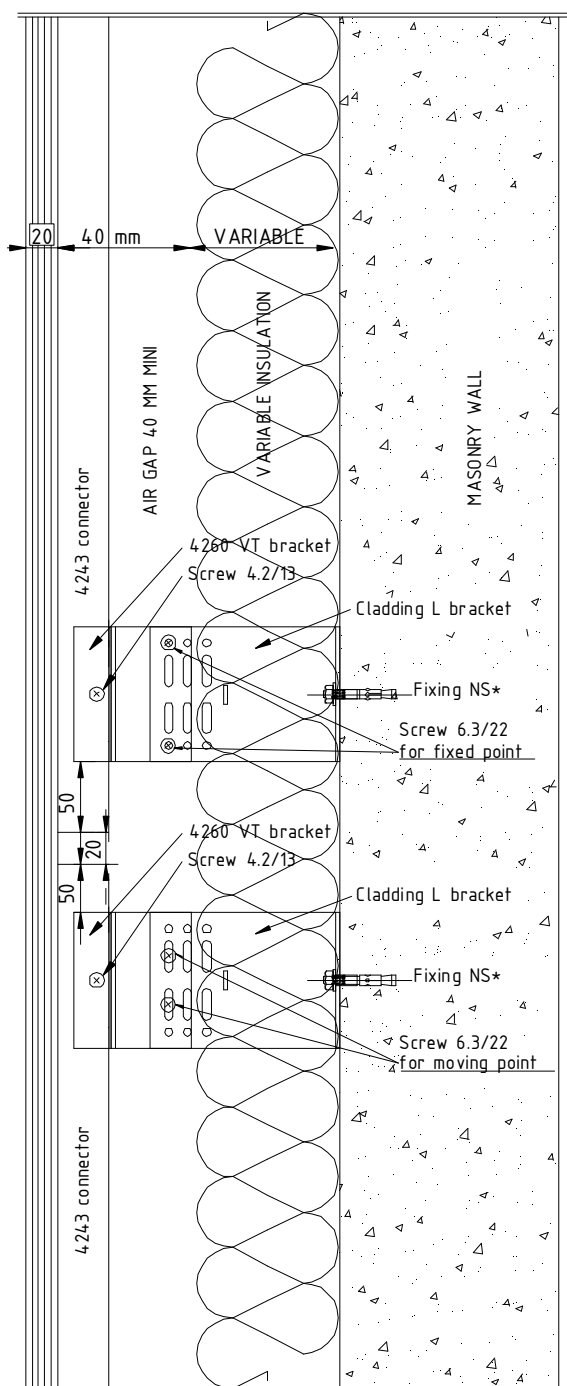


Cladding L bracket NS\*  
Screw 6.3 x 22 HL\*  
Screw 4.2 x 13  
Bracket ref. 4260 VT  
Connector ref. 4243

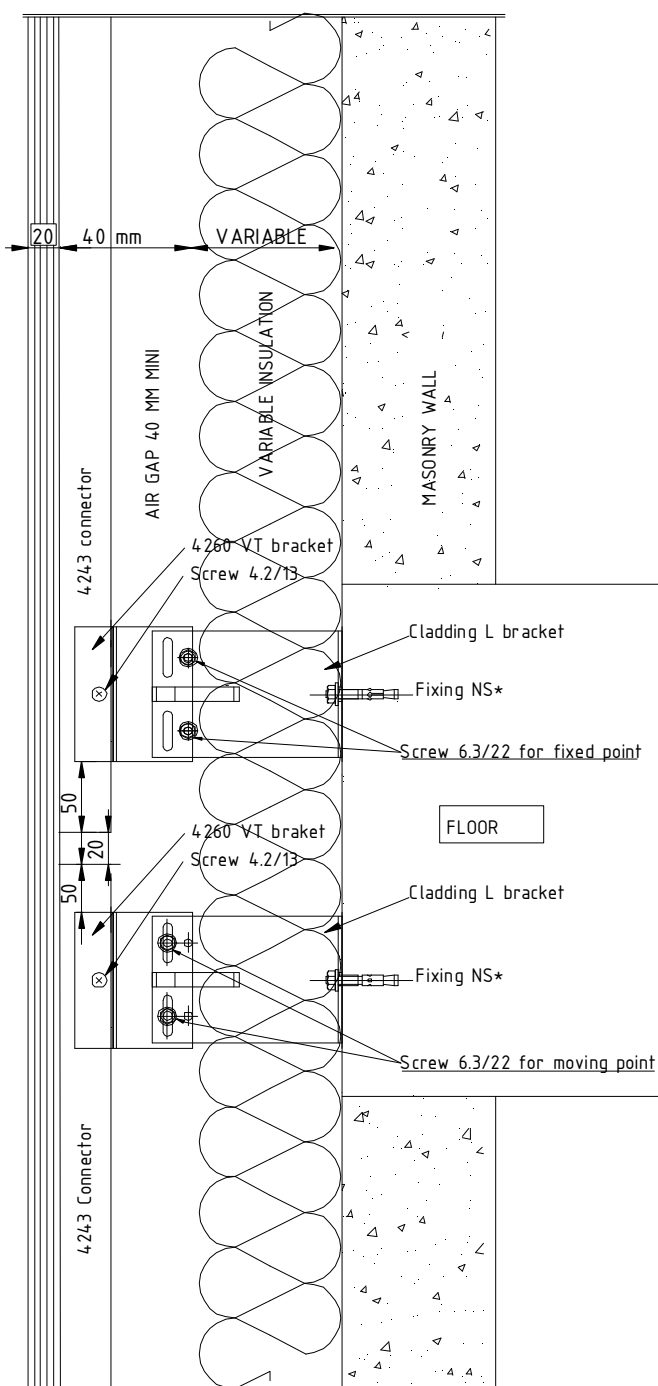
NS\* : Not Supplied

## Principle of splitting up of Connectors ref. 4243

### On masonry wall

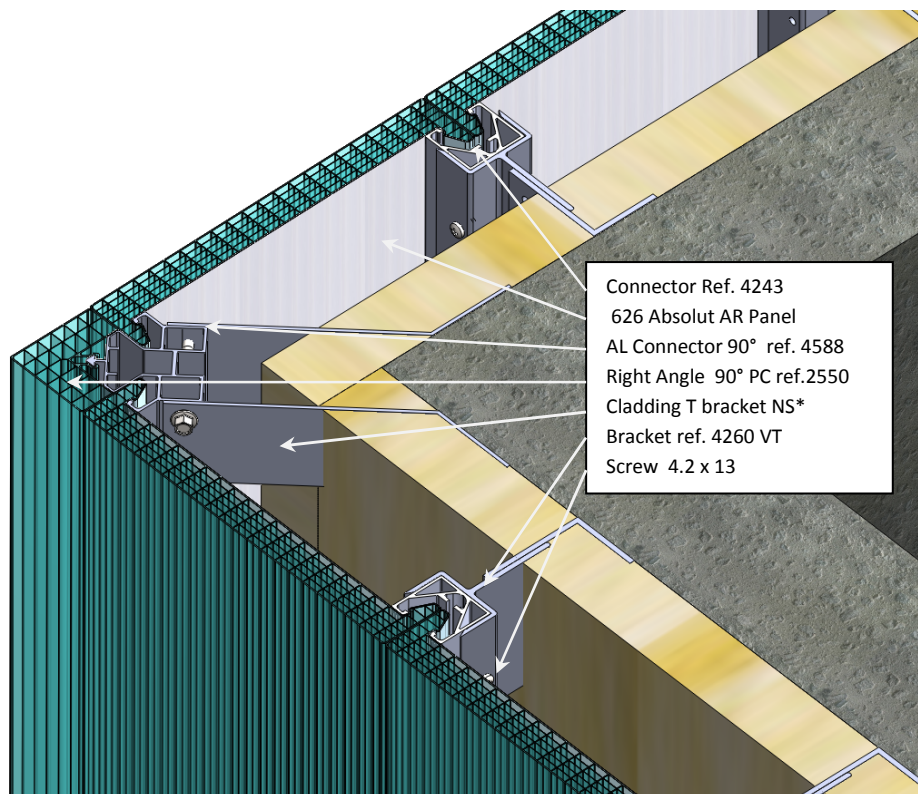
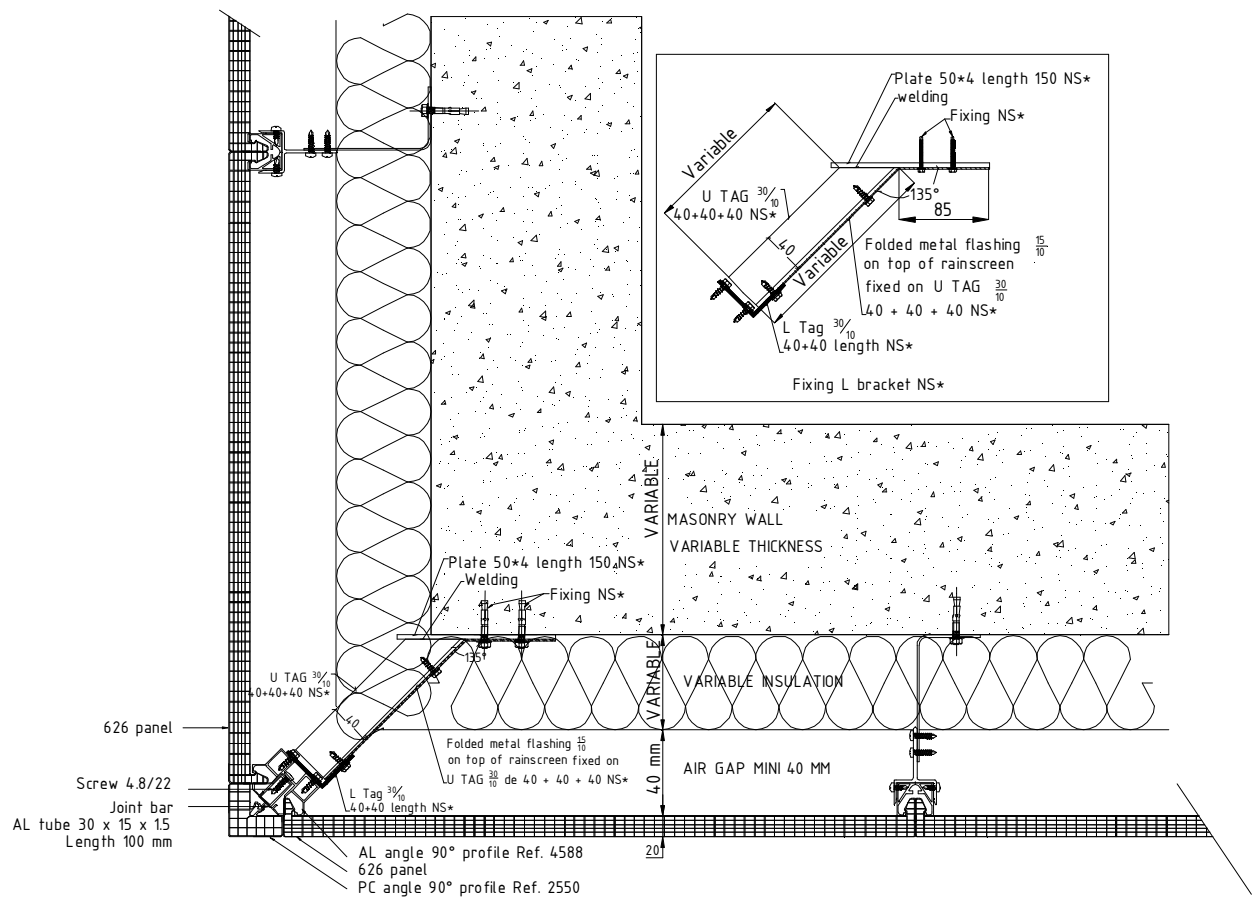


### On slab



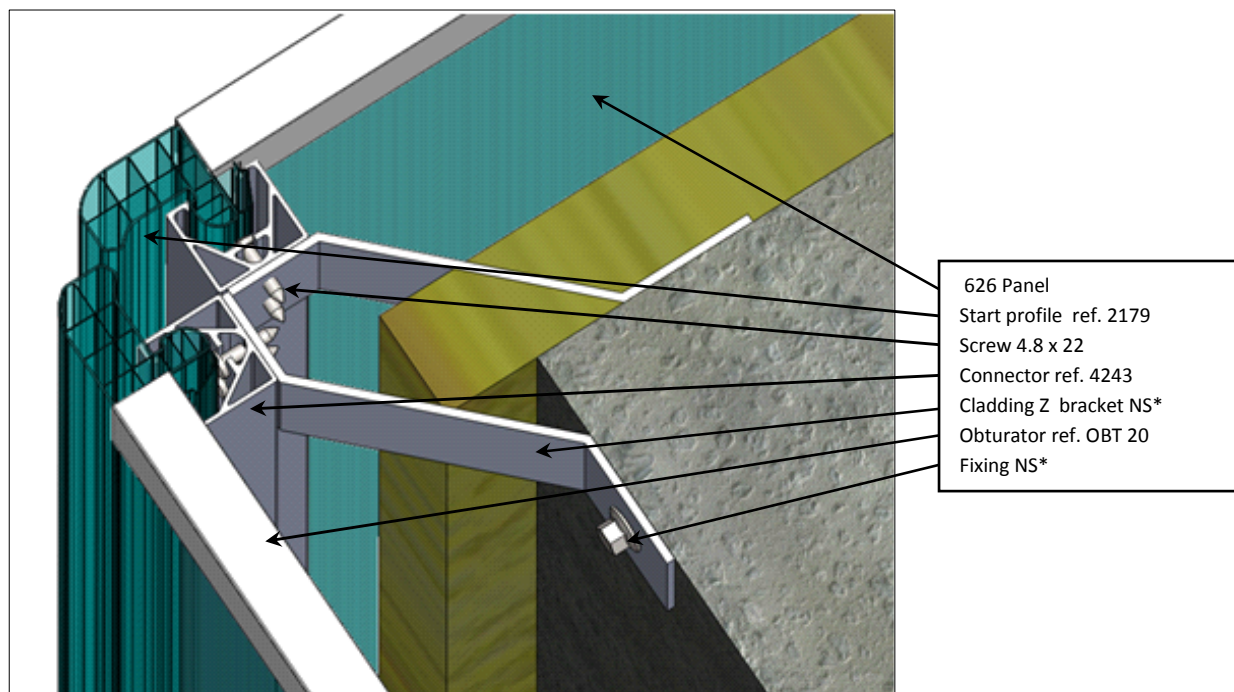
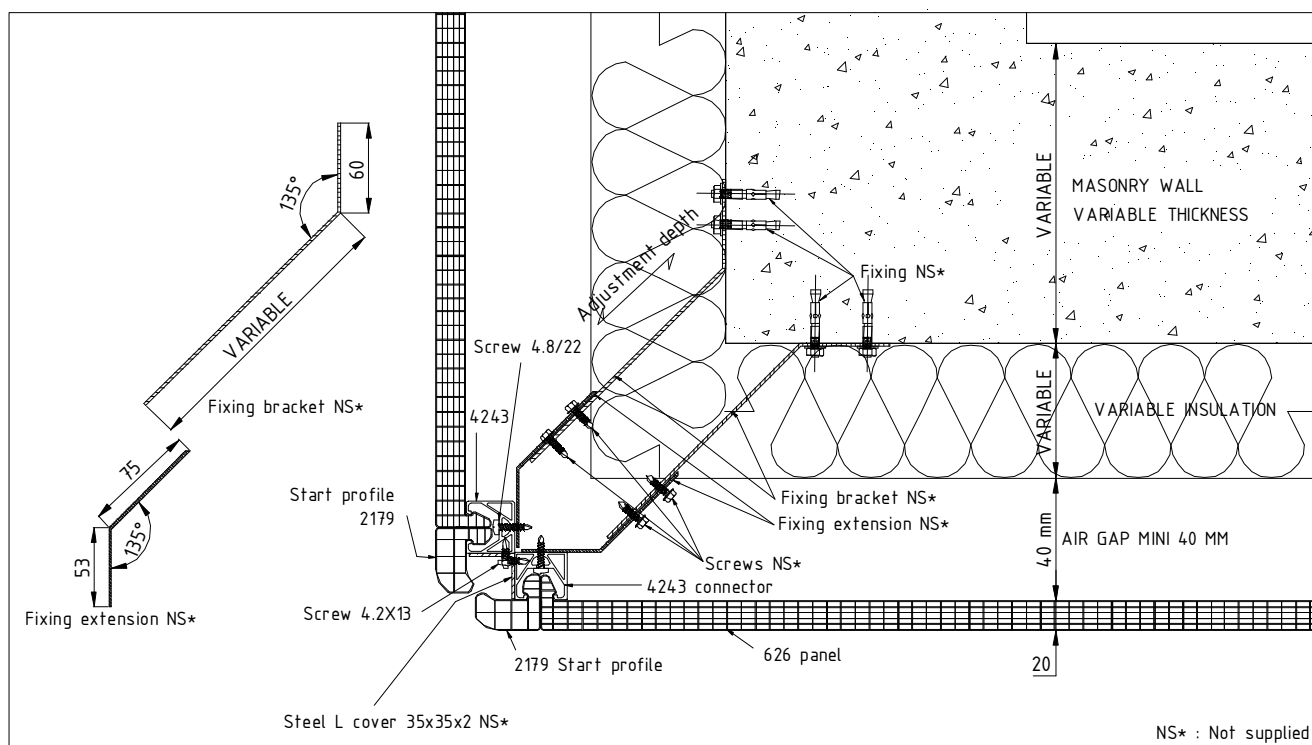
NS\* : Not supplied

### Principle of salient angle 90°



NS \* : Not Supplied

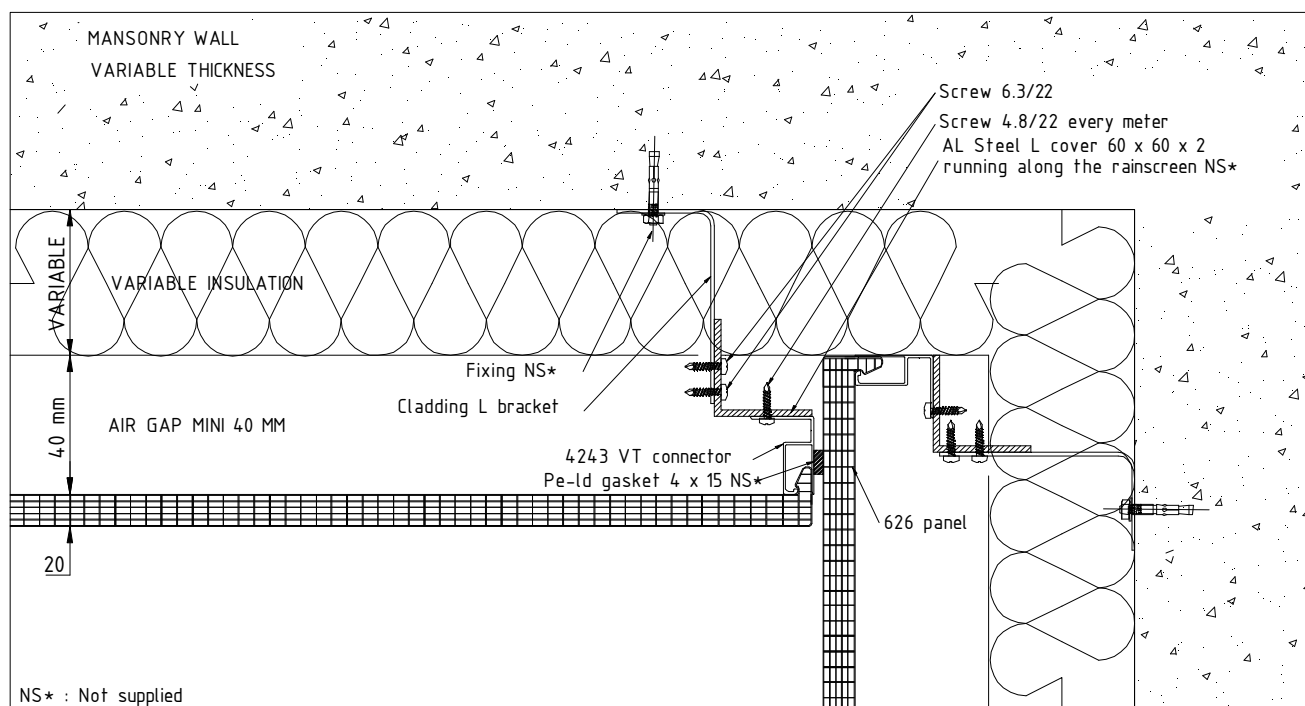
## Principle of round salient angle with start Profiles ref. 2179



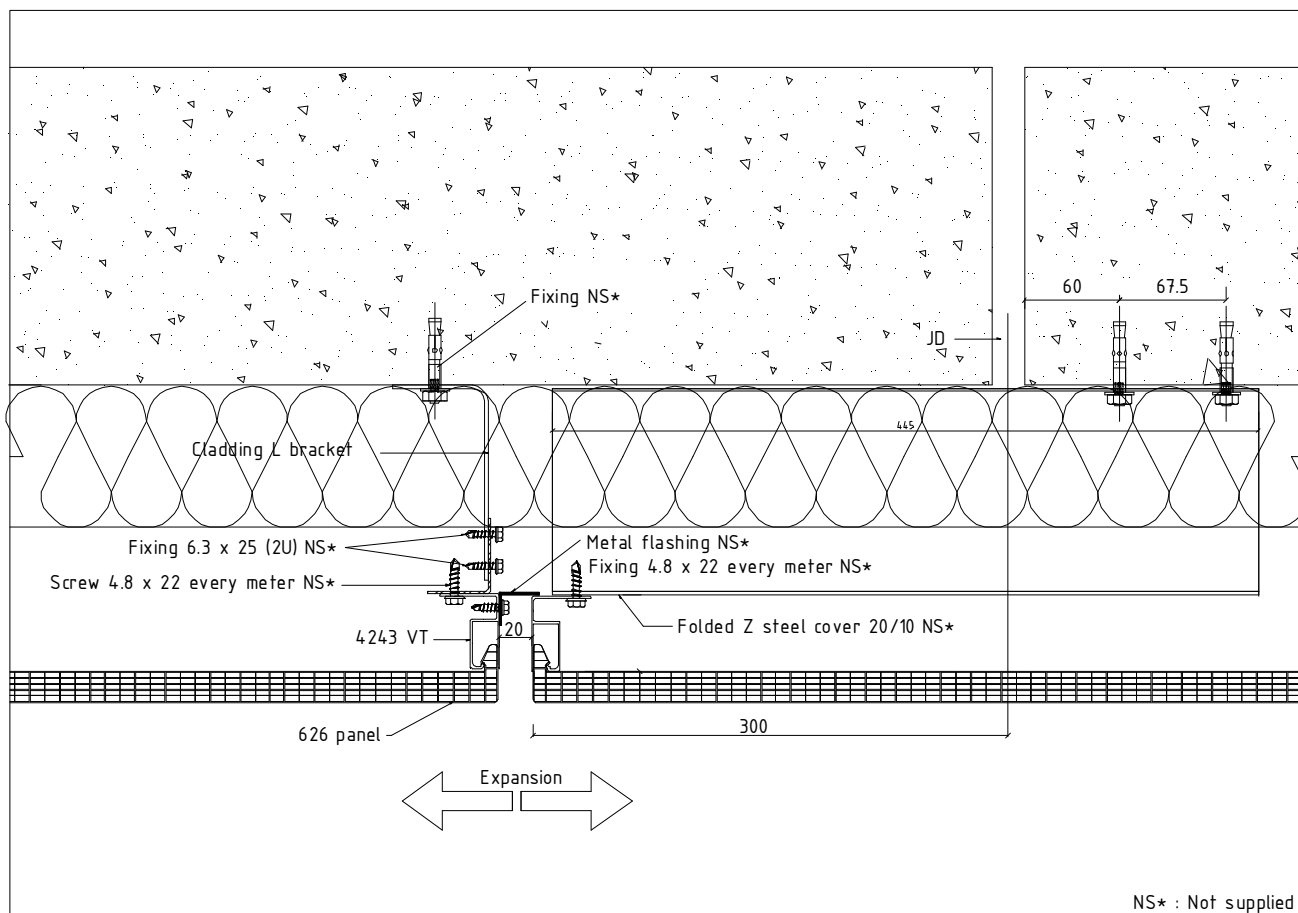
NS\* : Not Supplied



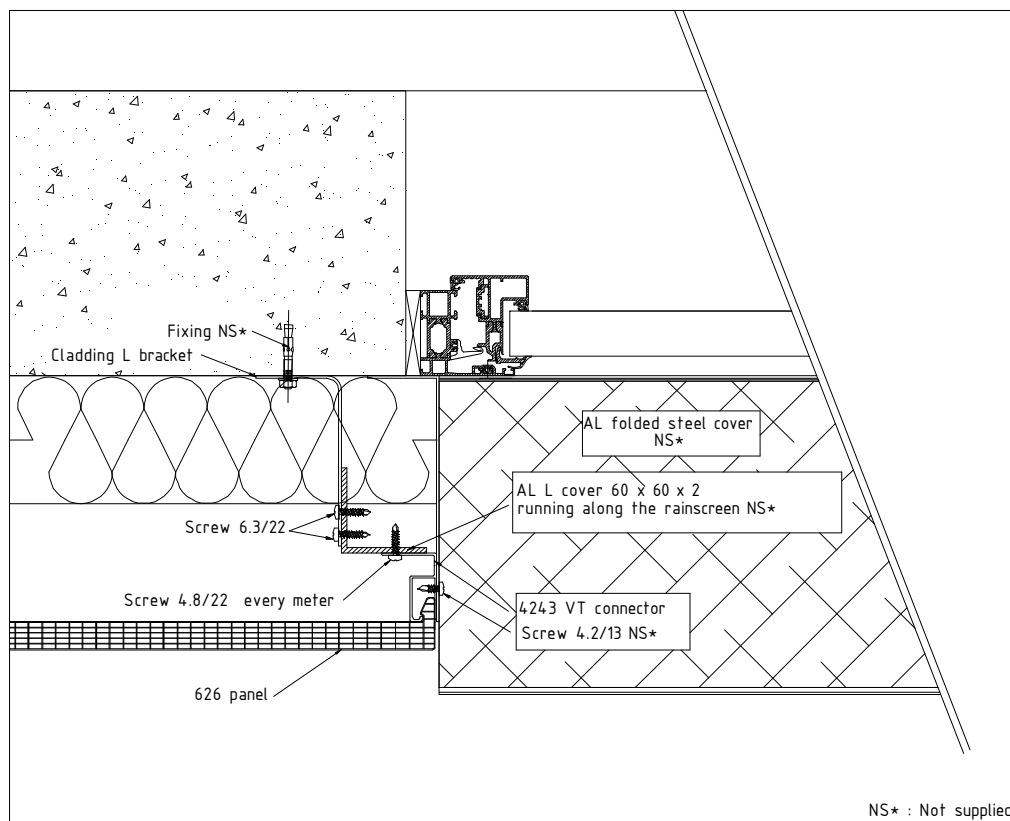
## Principle of incoming angle



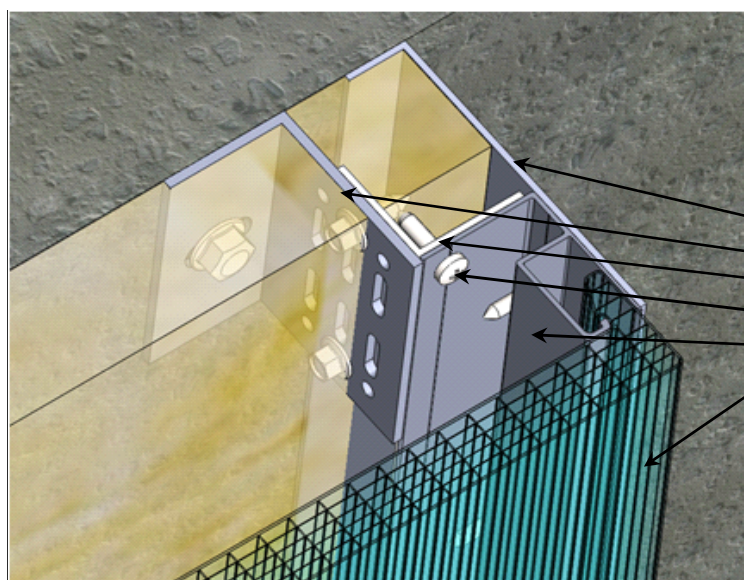
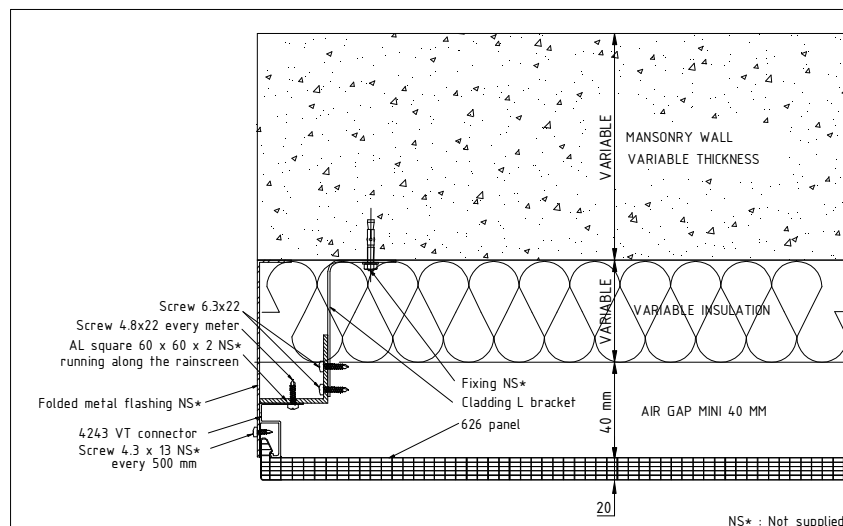
## Expansion joint



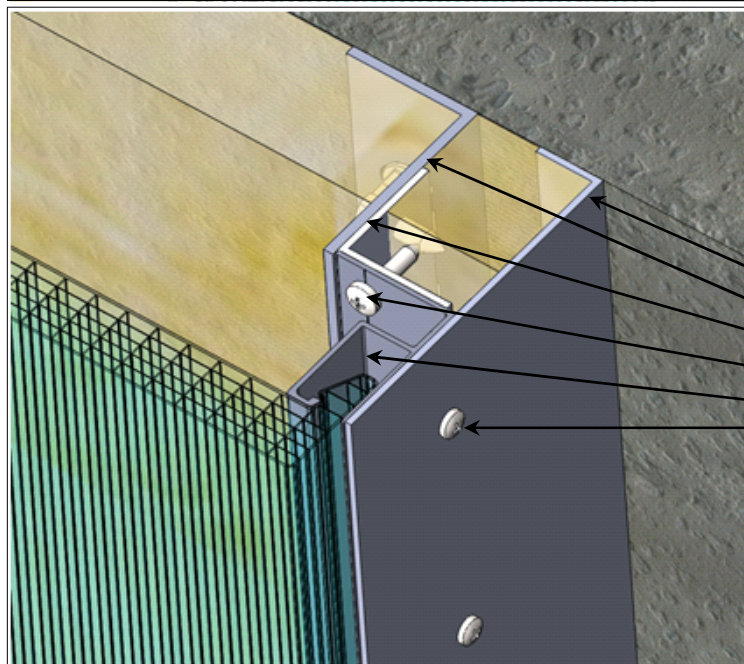
## Principle of bay covering on the left/right side



## Principle covering on side



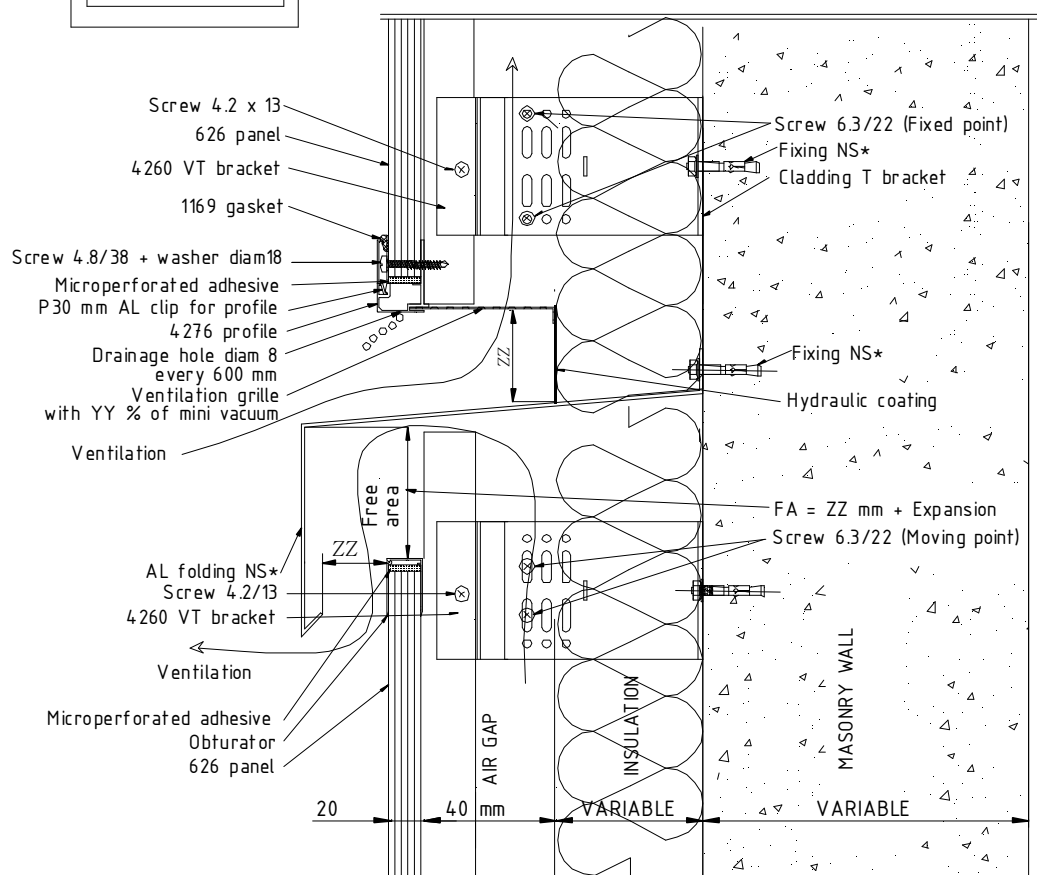
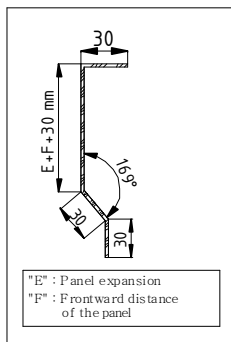
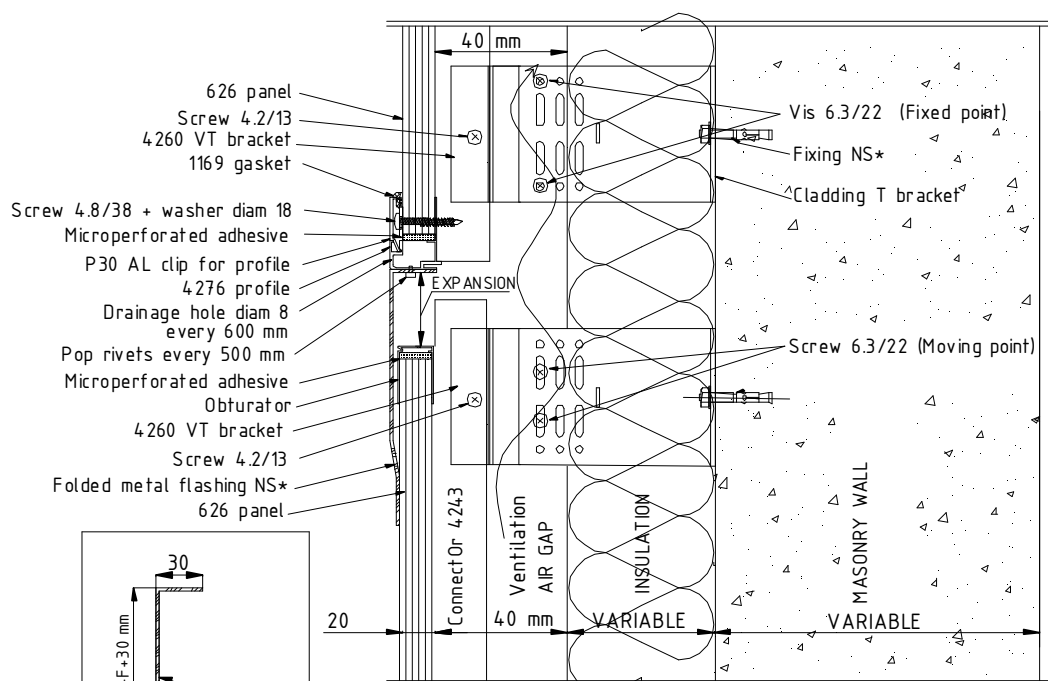
- Folded steel cover NS\*
- Cladding T bracket NS\*
- Running steel L cover NS\*
- Screw 4.2 x 22 every meter NS\*
- 1/2 Connector ref. 4243 VT
- arcoPlus 626 Panel



- Folded steel cover NS\*
- Cladding T bracket NS\*
- Running steel L cover NS\*
- Screw 4.2 x 22 every meter NS\*
- 1/2 Connector ref. 4243 VT
- Screw 4.2 x 13 NS\* every 500

NS \* : Not Supplied

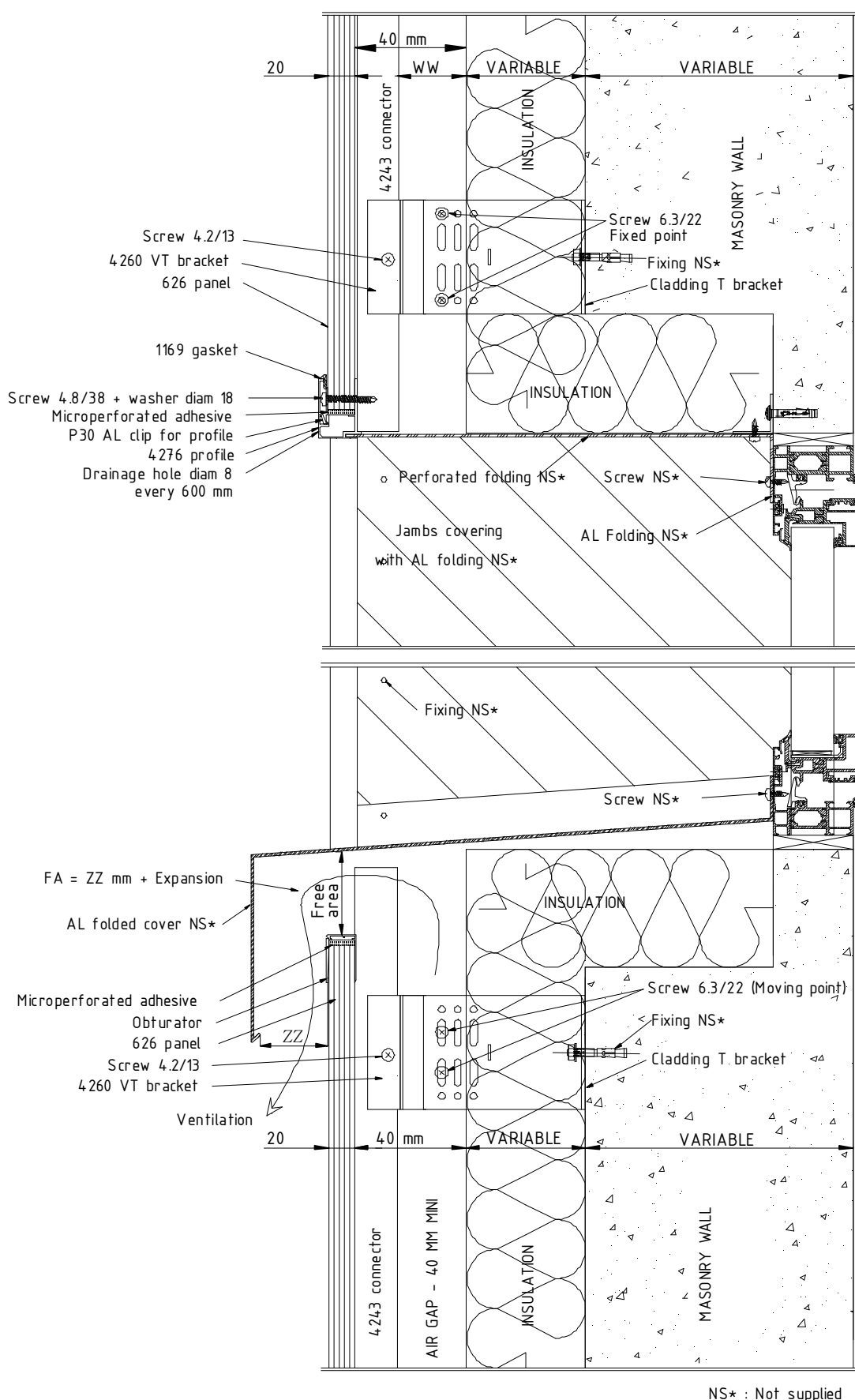
## Principle of junction between 2 panels



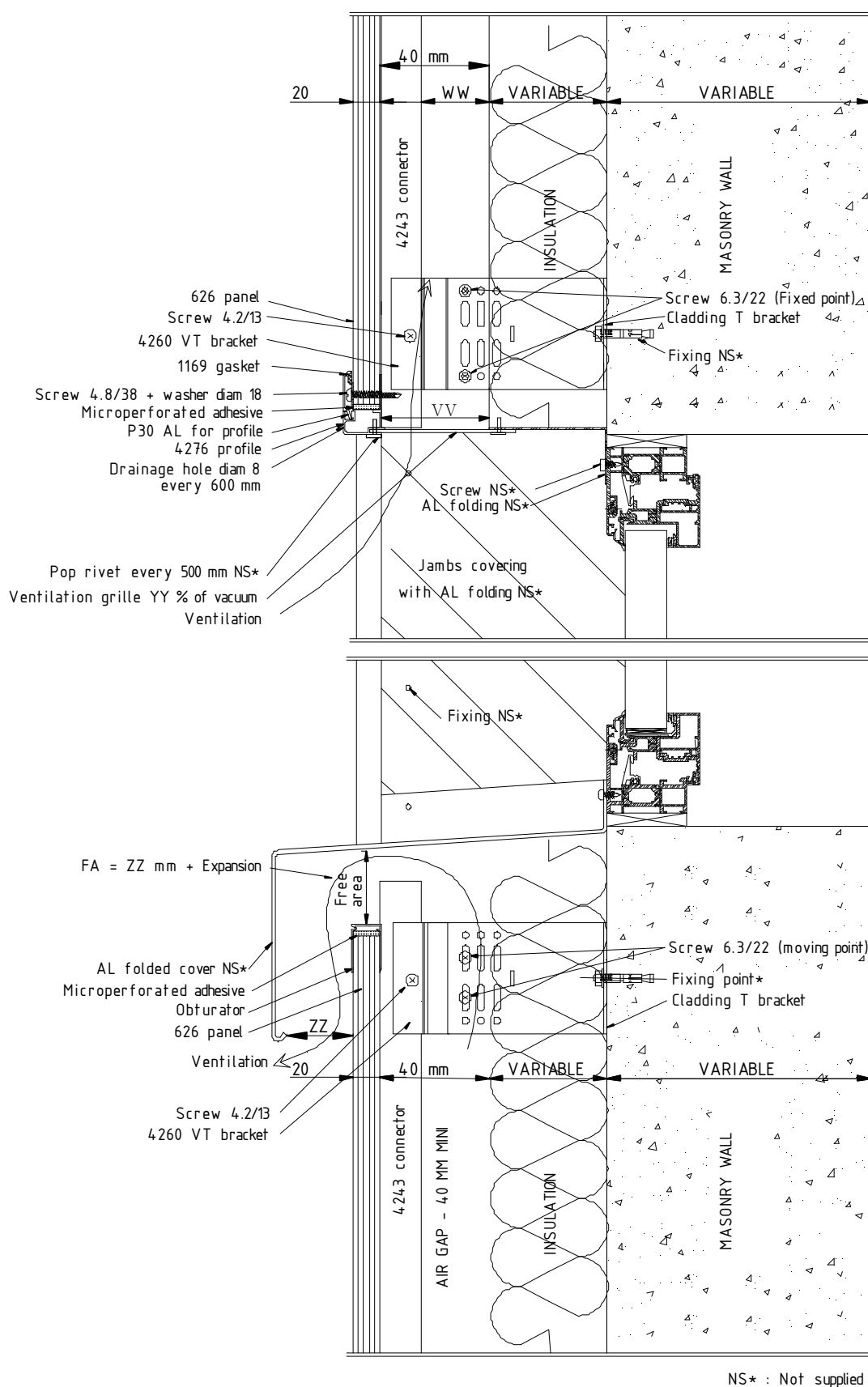
NS\* : Not supplied



## Principle of bay covering



## Principe of bay covering



## Vertical section : Installation

