

www.poly-pac



Polycarbonate Architecture

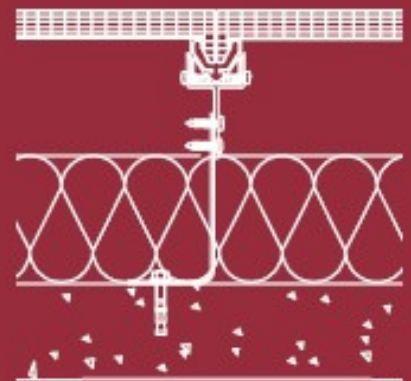
Technical book

Poly Pac

arcoPlus® Absolut AR

Opaque ventilated Rainscreen System

626 VT



arcoPlus®



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).

Contents

Description	Page
System definition	3
Field of application for the system	3
General principles of installation	3
Technical assistance	3
Panels specifications	3
Thermal expansion	3
Shock resistance	4
Fire resistance	4
Storage	4
Resistance to chemical agents	4
Maintenance	4
Replacement of a damaged panel	4
Maximum load chart for the installation on concrete or masonry wall or timber frame wall	5
Minimum ventilation sections for installation on concrete, masonry wall or timber frame wall:	5
Installation on concrete or masonry wall: Diagrams, cross-sections and 3D drawings	6

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 floors.

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 cannot 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 centers 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 withdrawn 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	Bicolor	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°C inside the panels

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

Maxi temperature inside the panel: 90°C

External temperature during the installation: 20°C

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

Example: 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/m ²)
626	B, s3-d0	95

Fire classification Euro-Classe on the system following the norm EN 13501-1+A1:2013.

Report : P183169 DE/3 of 19/03/2019

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
Organics 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 swivelling 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 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

Deflection at 1/50th of the span							
Nb	Maximum load daN/m ²	Maximum distance between fixed points (m) *					
		1.5*	1.8*	2.0*	2.5*	2.6*	2.8*
2 supports	Positive pressure	180	157	157	88	-	-
	Negative pressure	160	163	163	117	-	-
3 supports	Positive pressure	180	180	180	180	117	117
	Negative pressure	163	153	153	121	113	113

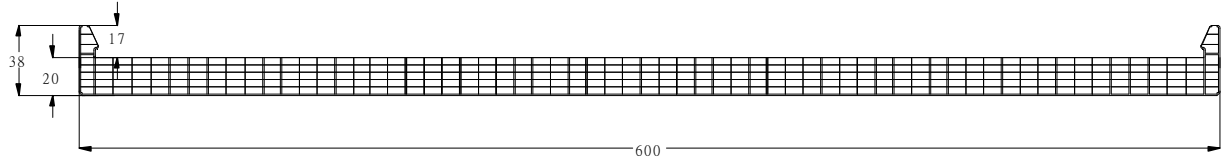
Deflection at 1/100th of the span							
Nb	Maximum load daN/m ²	Maximum distance between fixed points (m)					
		1.5	1.8	2.0	2.5	2.6	2.8
2 supports	Positive pressure	180	68	68	-	-	-
	Negative pressure	160	163	163	-	-	-
3 supports	Positive pressure	180	180	180	180	55	55
	Negative pressure	163	153	153	80	80	59

14 - Minimum ventilation sections for installation on concrete, masonry wall or timber frame wall:

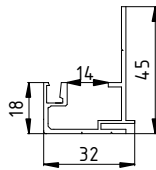
Polycarbonate panel solar factor "SF"	Minimum ventilation sections at the top and bottom of the system		
	200 cm ² /m	300 cm ² /m	400 cm ² /m
51 % < SF ≤ 58 %	7.8 m	14.4 m	16 m
45 % < SF ≤ 51 %	8.4 m	14.4 m	16 m
0 % < SF ≤ 45 %	9.6 m	16 m	16 m

Values of this table are used for the west, south and east façades. For north facade, the maximum length of polycarbonate panel is 16 m with a minimum ventilation sections at the top and bottom of 200 cm²/m. For example, with a 14 m long panel that has a solar factor of 50 %, the minimum ventilation width at the top and bottom is 300 cm²/m, i.e. 3 cm or 30 mm. These values must take in account the ventilation grille. With a 50 % perforated ventilation grille at the bottom, the ventilation width becomes 30/0.5 = 60 mm.

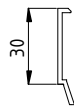
arcoPlus[®] Panels, Connectors, Profiles and Accessories



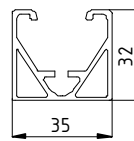
Ref. arcoPlus 626 panel



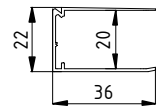
Ref. 4276



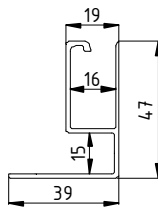
Ref. P30
AL clip for profile



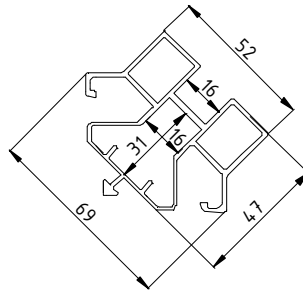
Ref. 4243
Connector



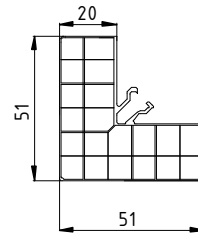
Ref. OBT 20
U block cover



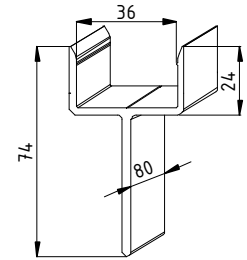
Ref. 4243 VT



Ref. 4588
Angle 90° profile



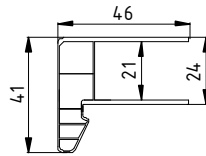
Ref. 2550
PC Angle 90° profile



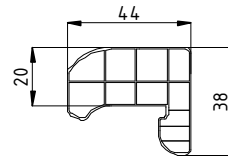
Ref. 4260 VT
"Y" bracket



Ref. 1169
Rubber gasket



Ref. 2180
End profile

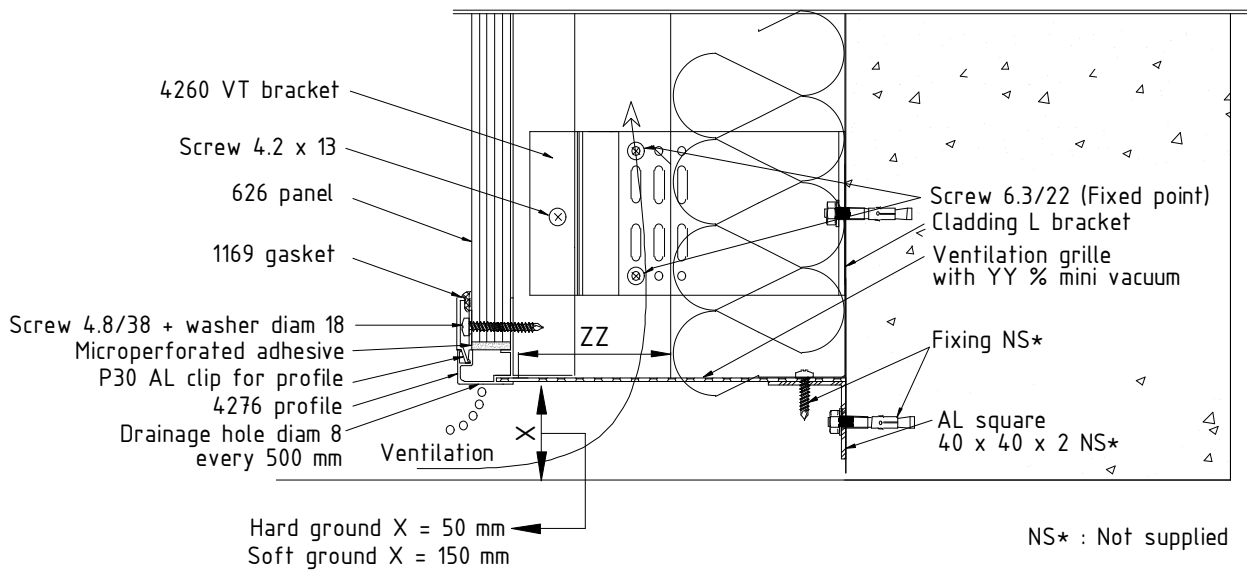
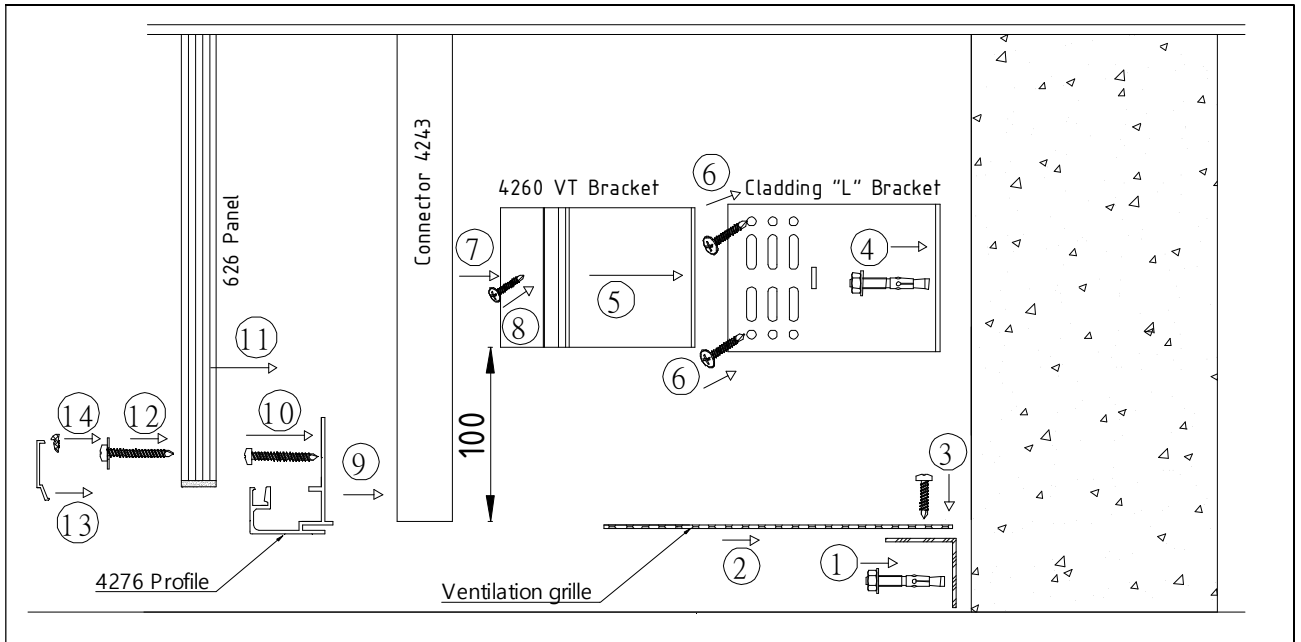


Ref. 2179
Start profile

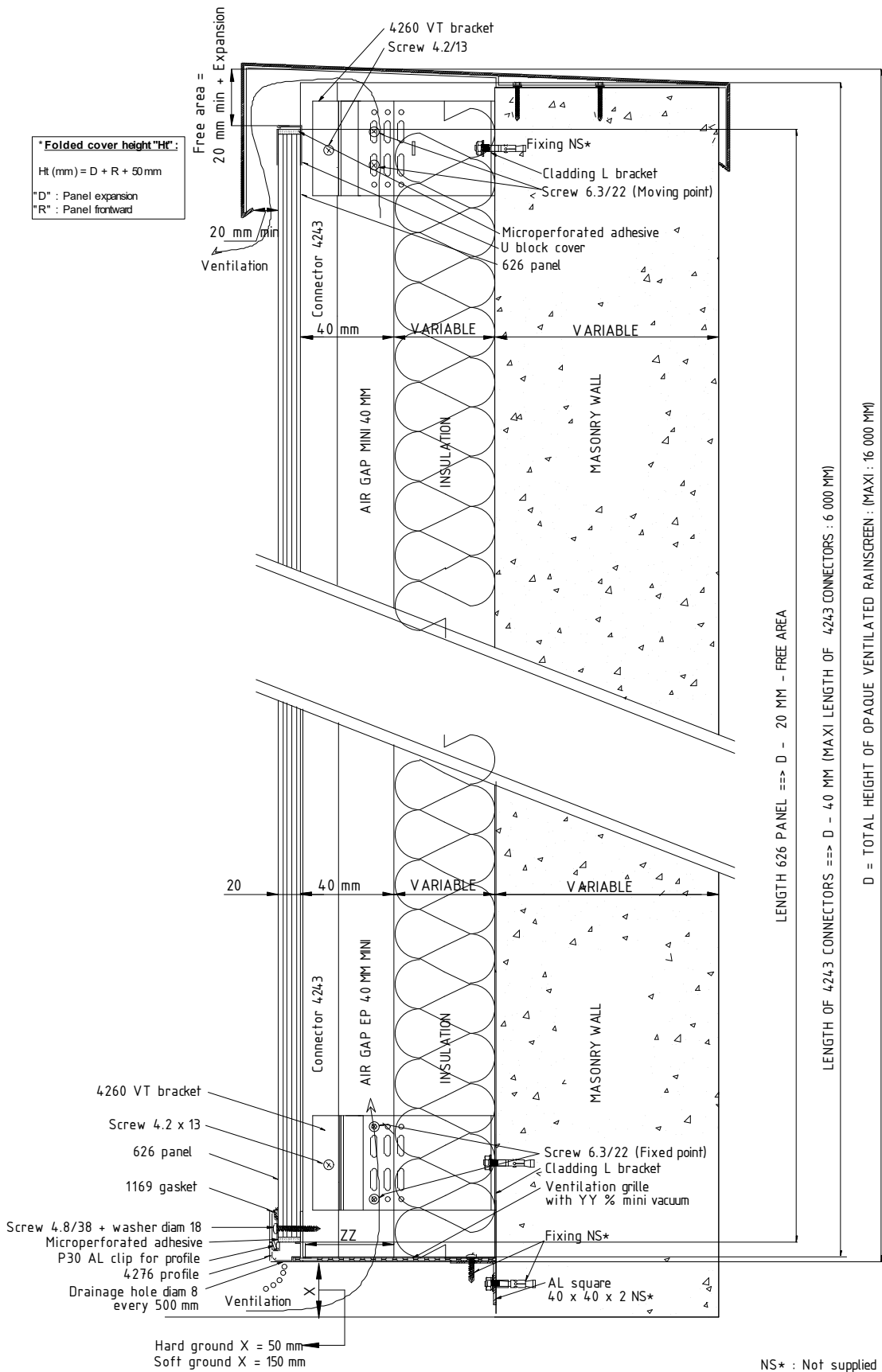


Ref. 4083
Micro-perforated adhesive

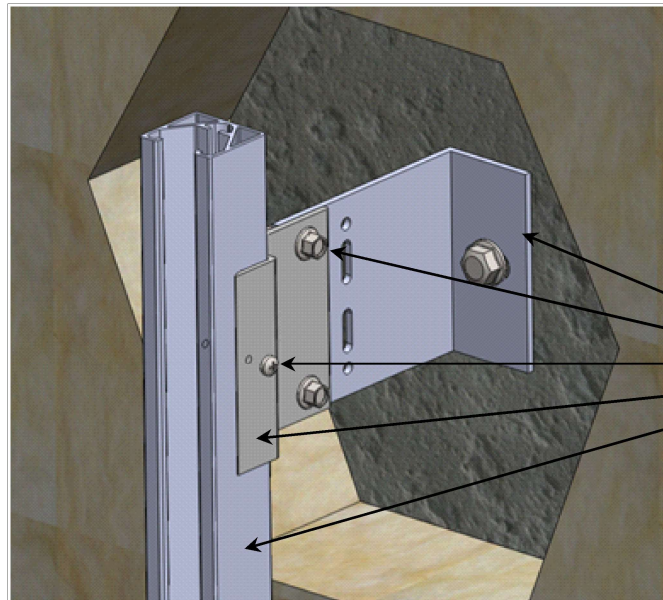
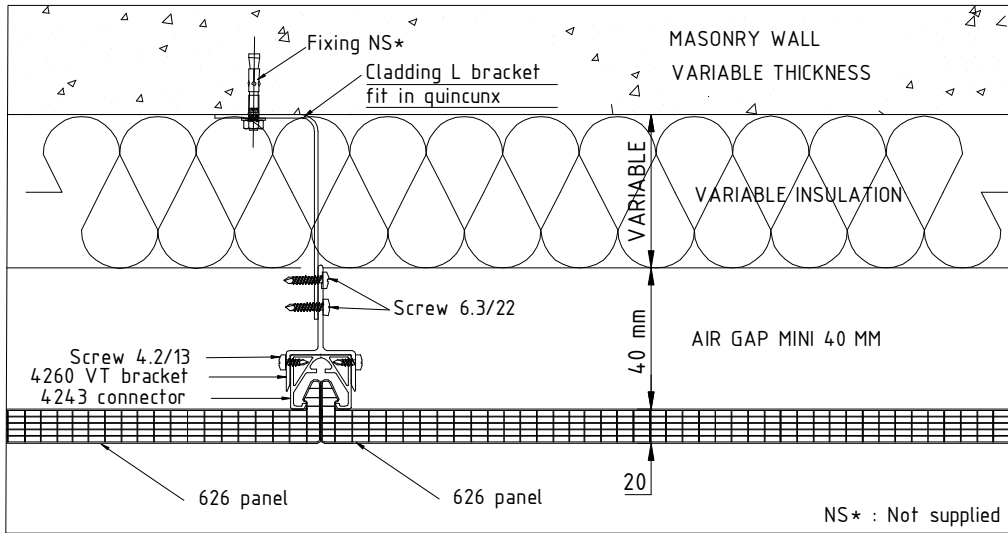
Principle of installation on low part



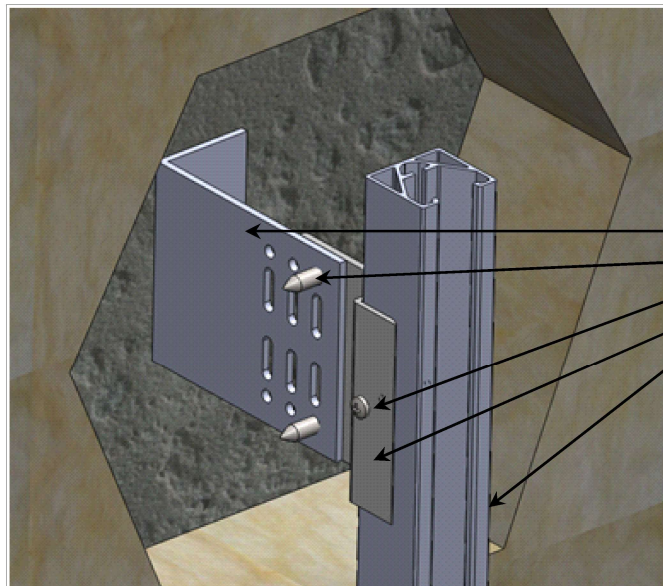
Principle - Vertical section -



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

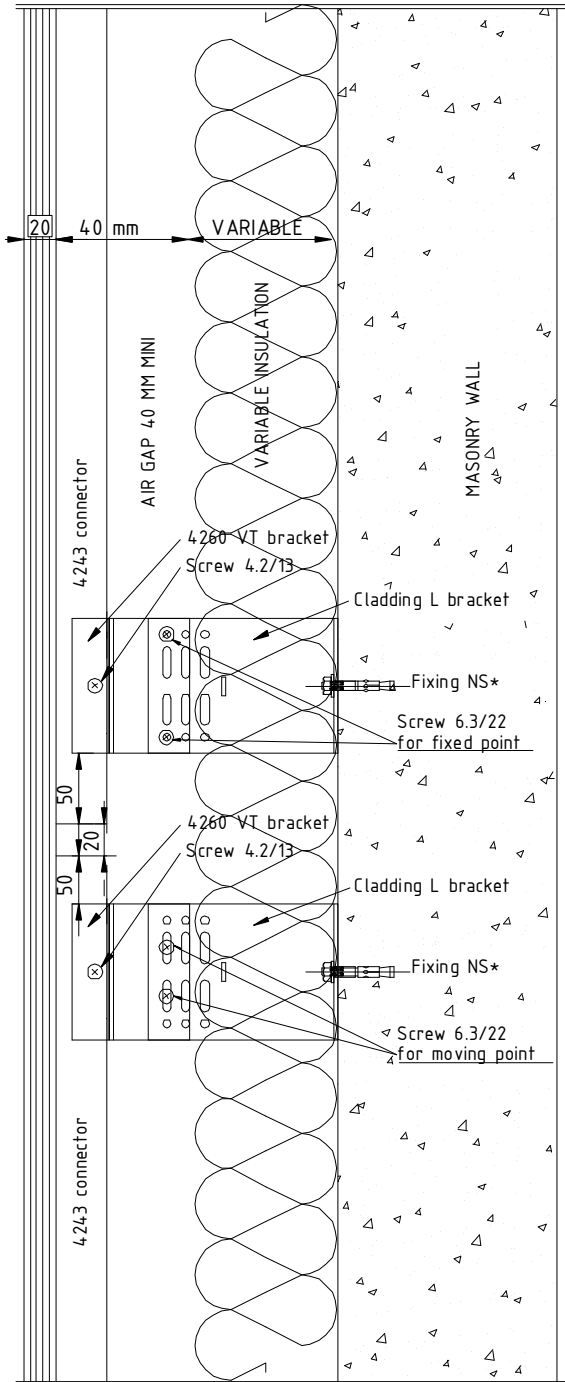


- Cladding L bracket NS*
- Screw 6.3 x 22 HL*
- Screw 4.2 x 13
- Bracket ref. 4260 VT
- Connector ref. 4243

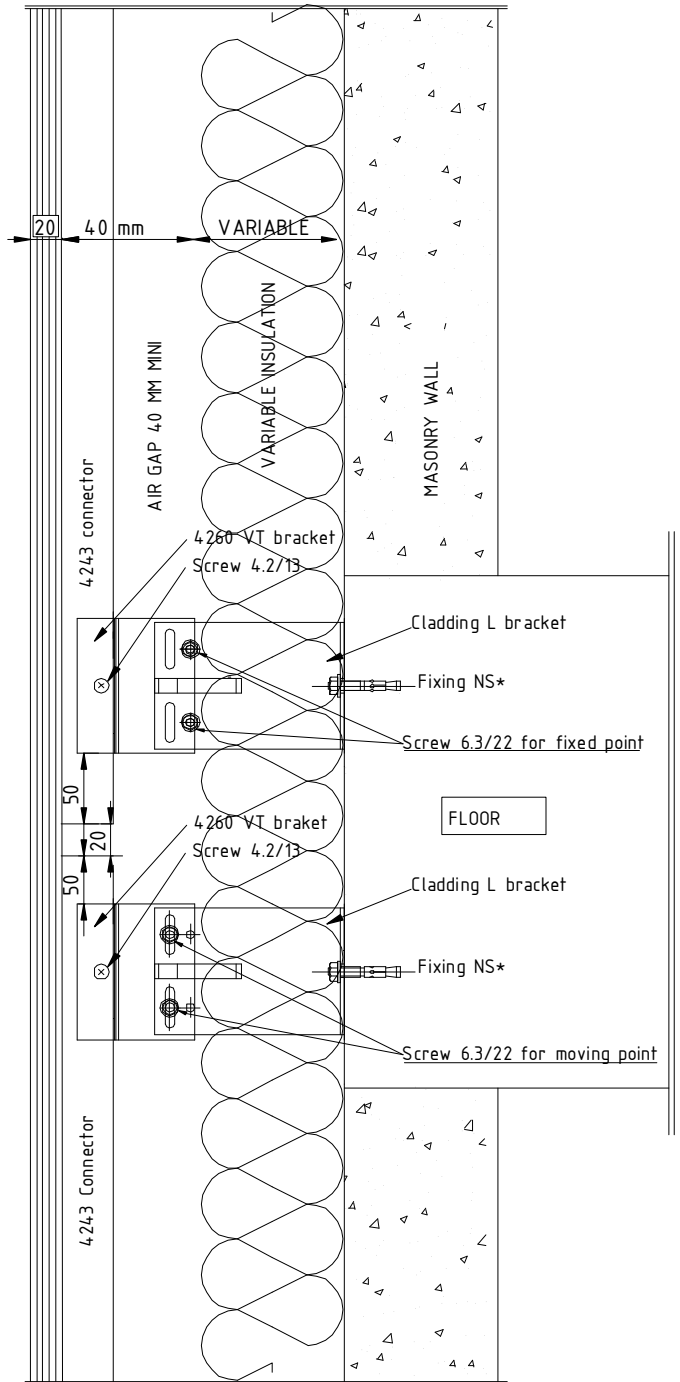
NS* : Not Supplied

Principle of splitting up of Connectors ref. 4243

On masonry wall

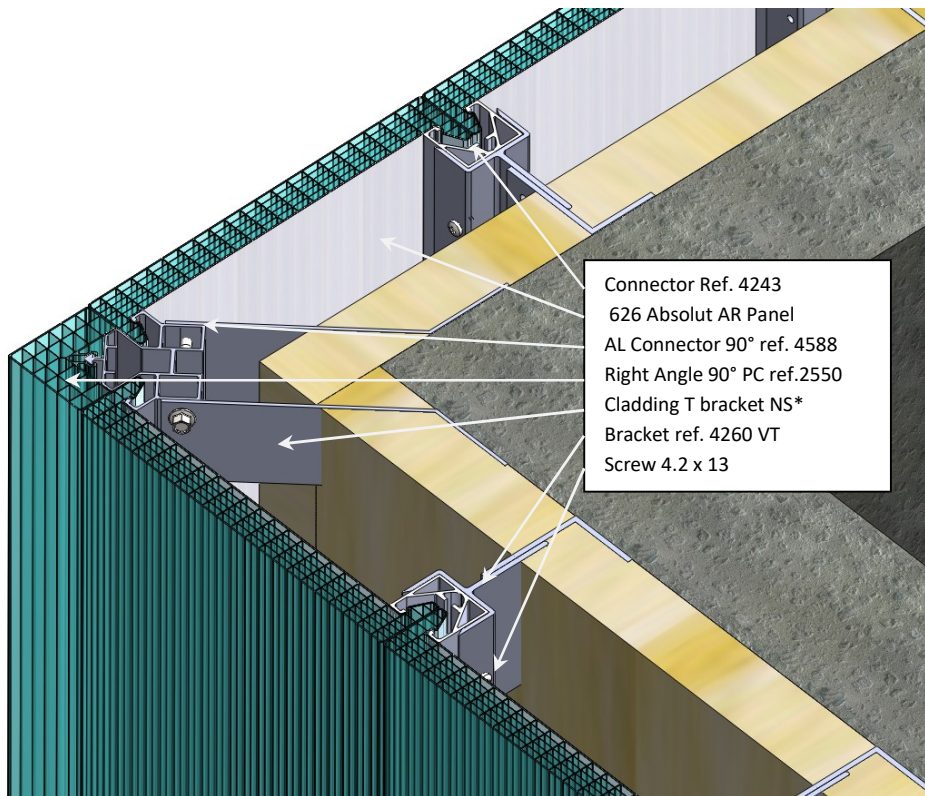
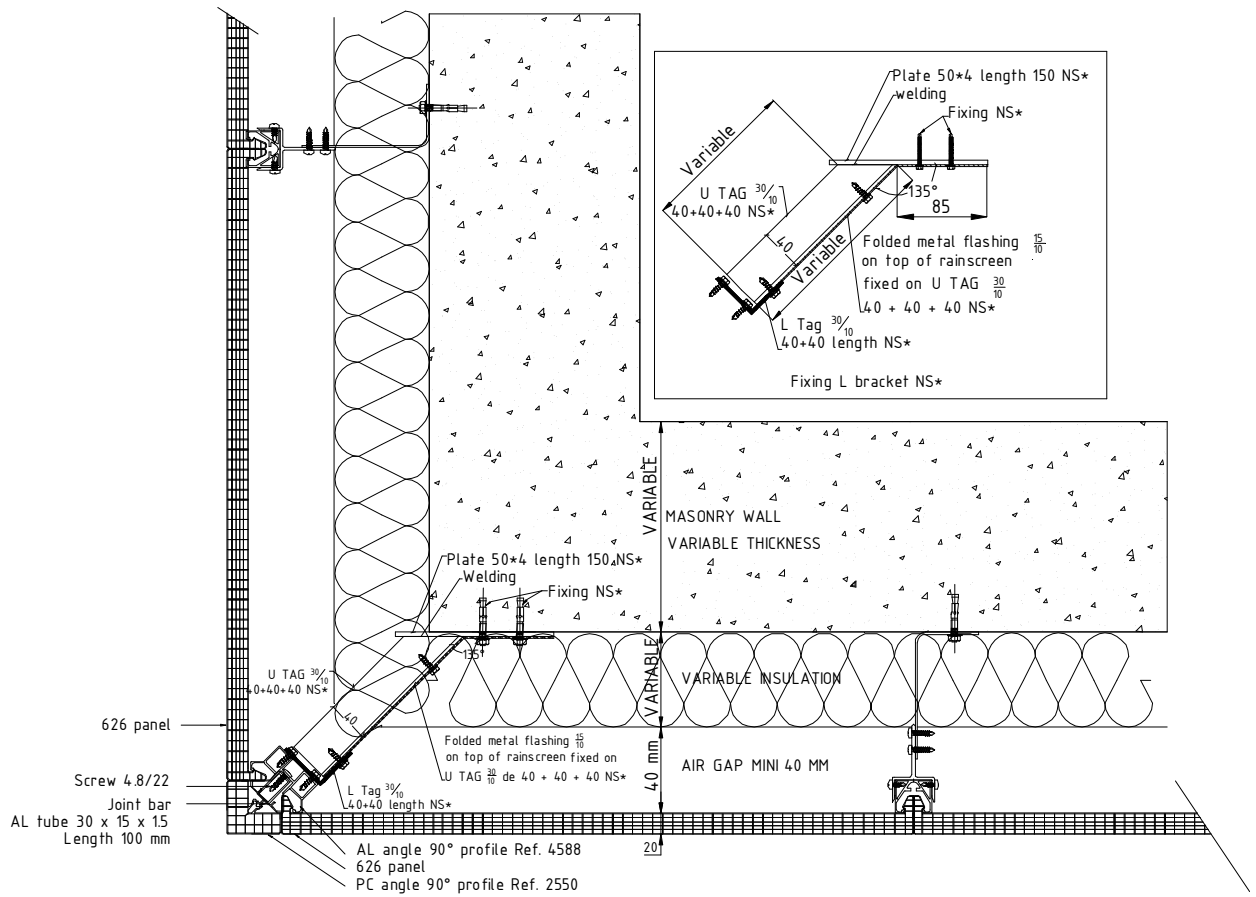


On slab



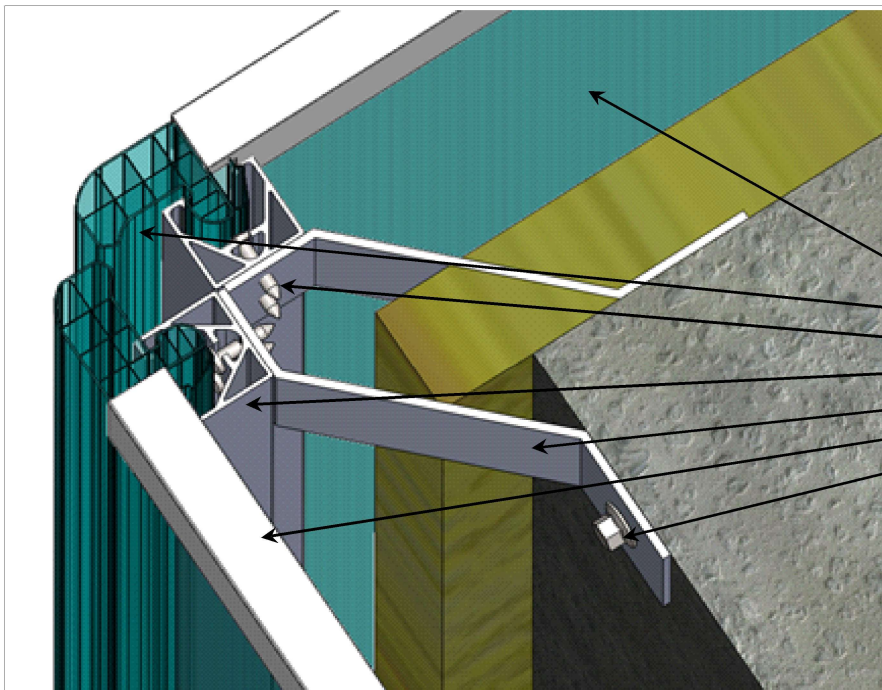
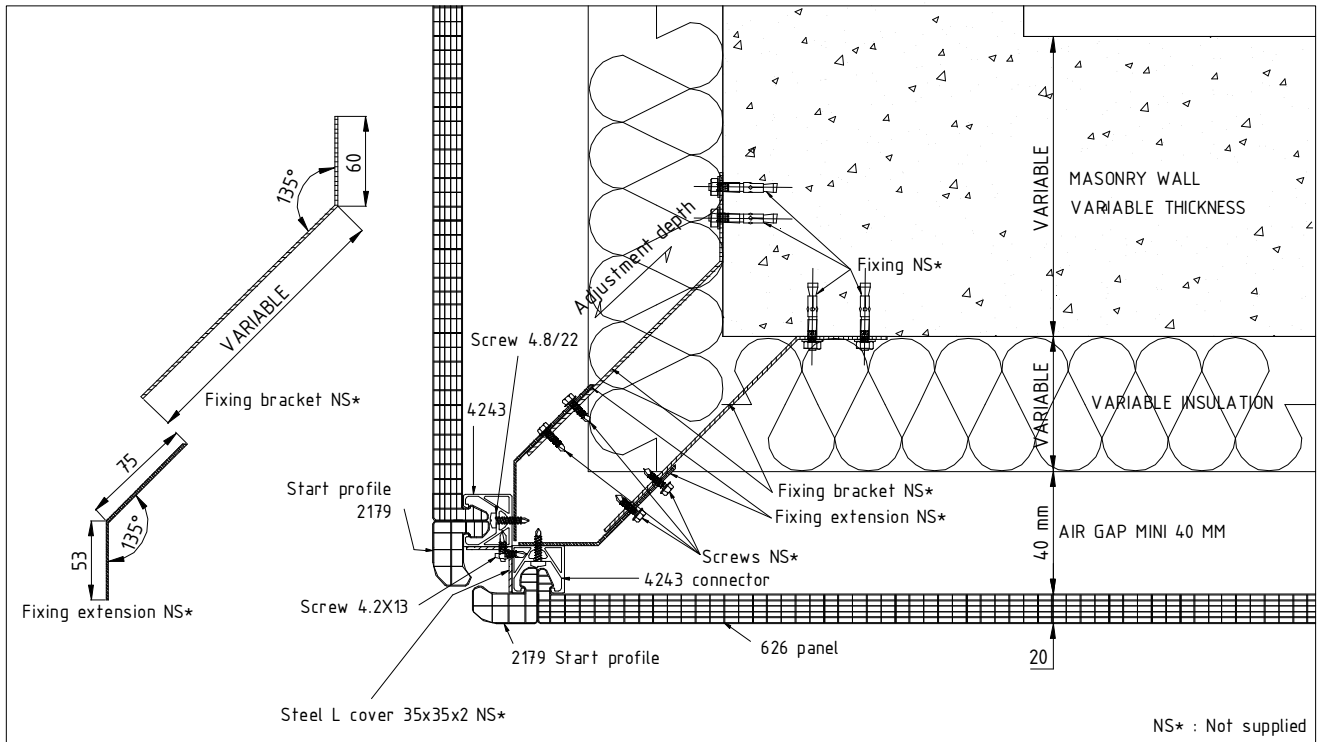
NS* : Not supplied

Principle of salient angle 90°



NS *: Not Supplied

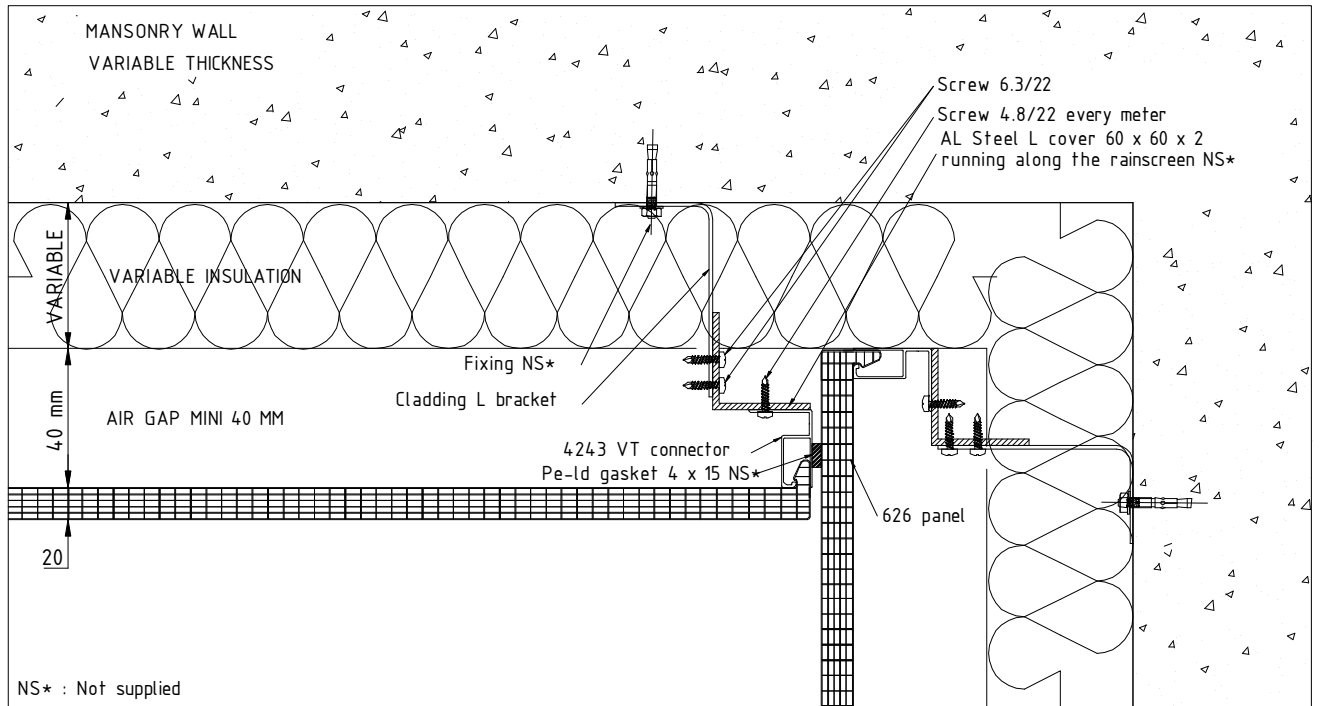
Principle of round salient angle with start Profiles ref. 2179



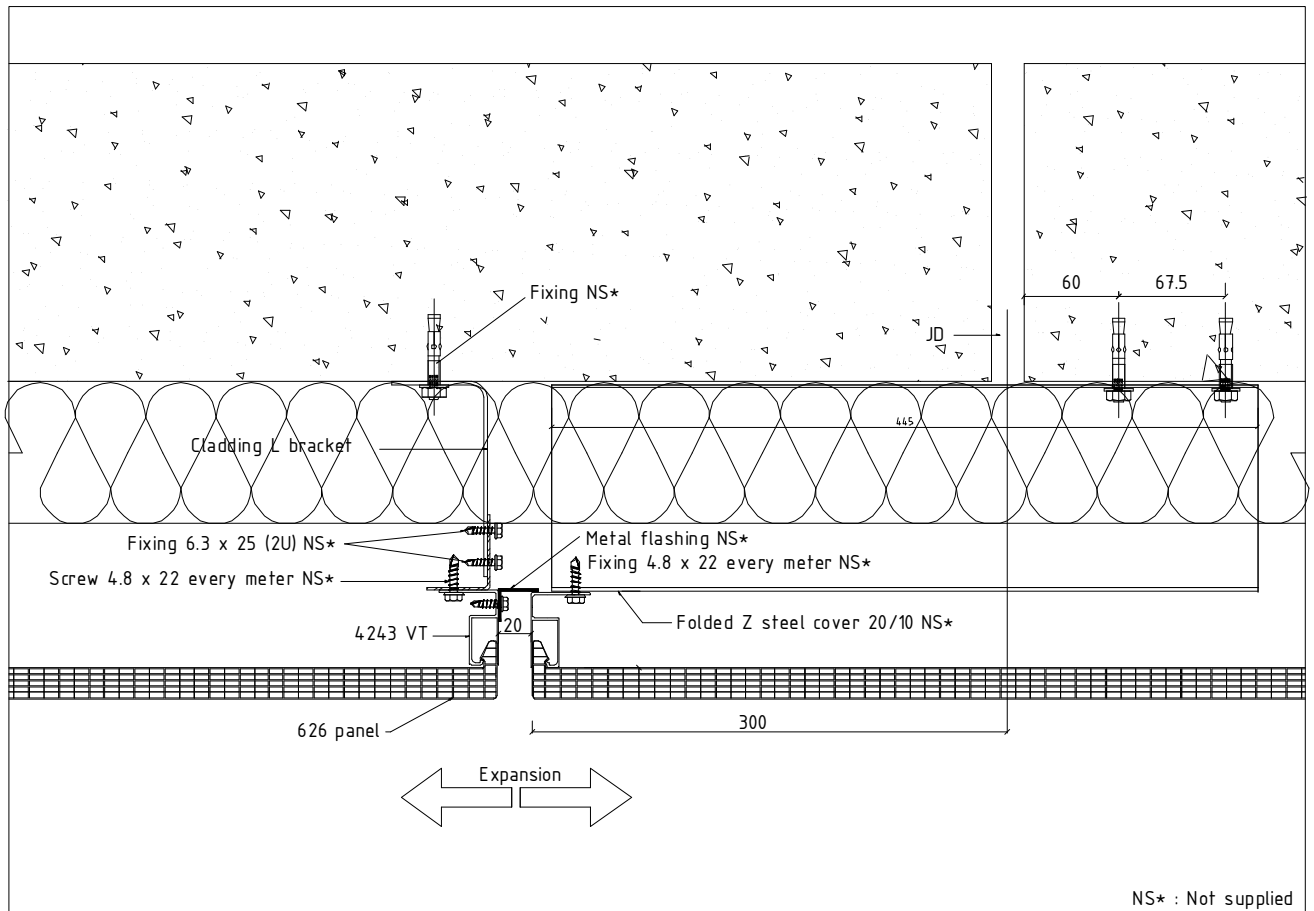
- 626 Panel
- Start profile ref. 2179
- Screw 4.8 x 22
- Connector ref. 4243
- Cladding Z bracket NS*
- Obturator ref. OBT 20
- Fixing NS*

NS* : Not Supplied

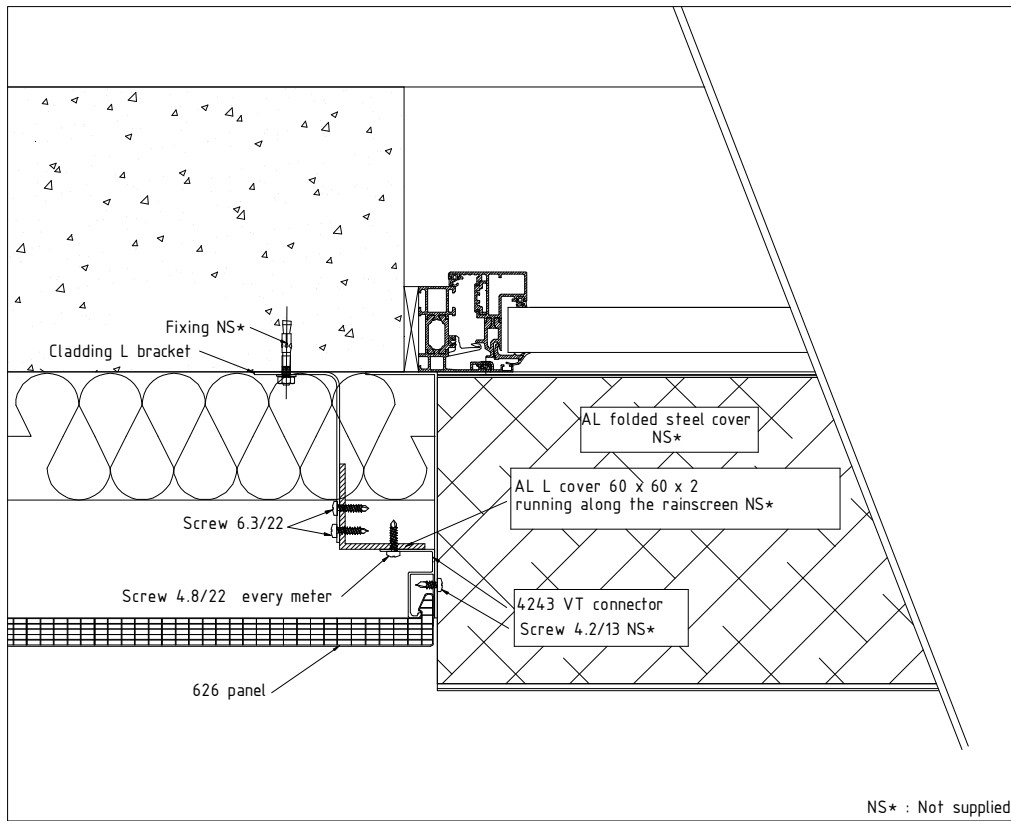
Principle of incoming angle



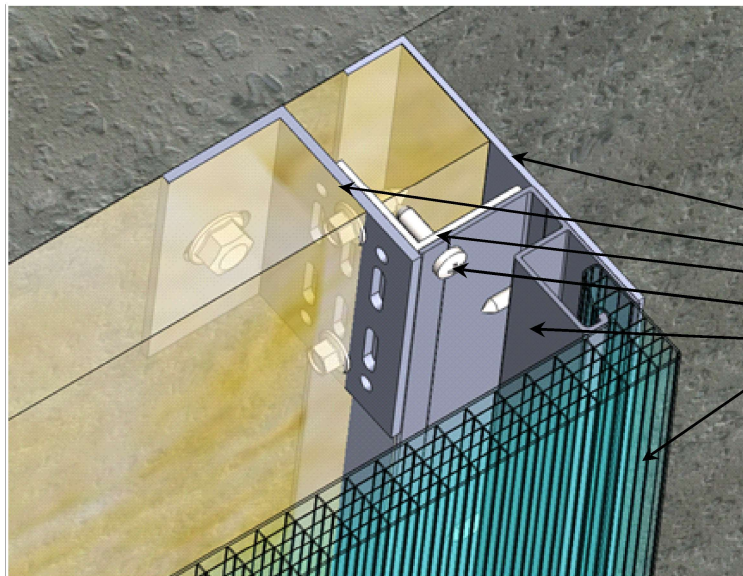
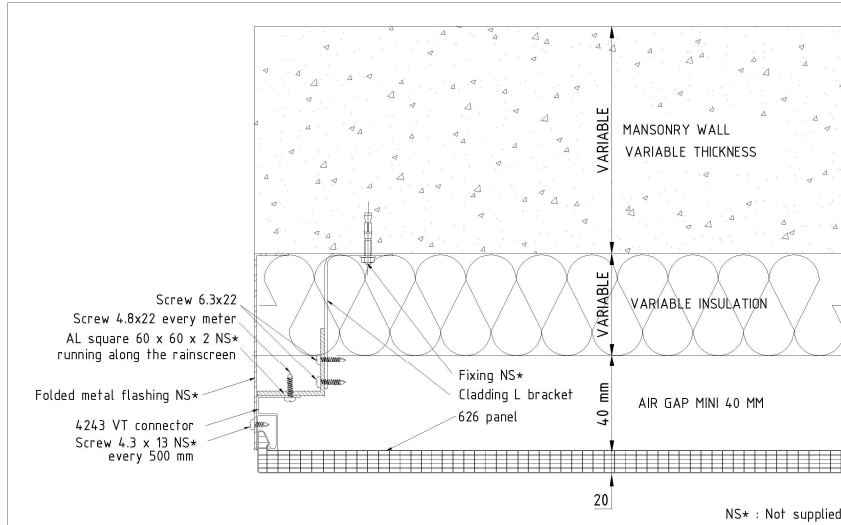
Expansion joint



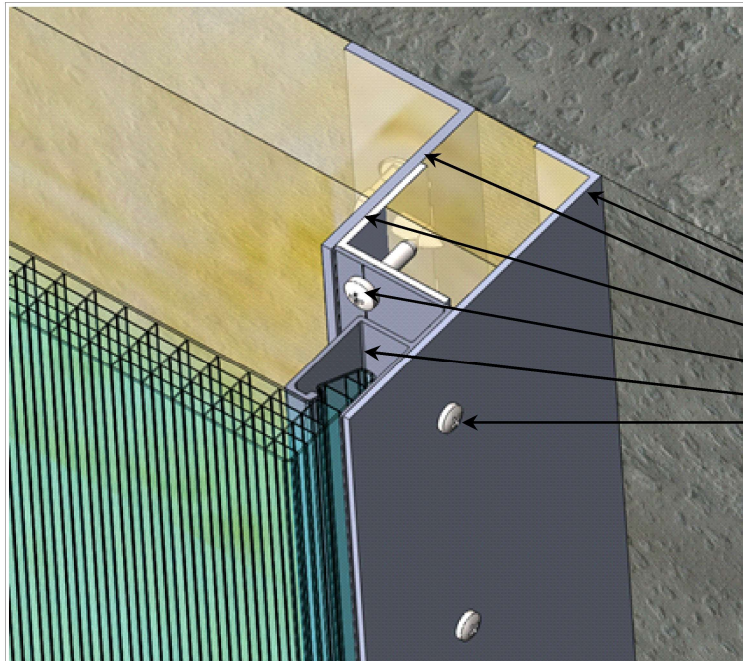
Principle of bay covering on the left/right side



Principle covering on side



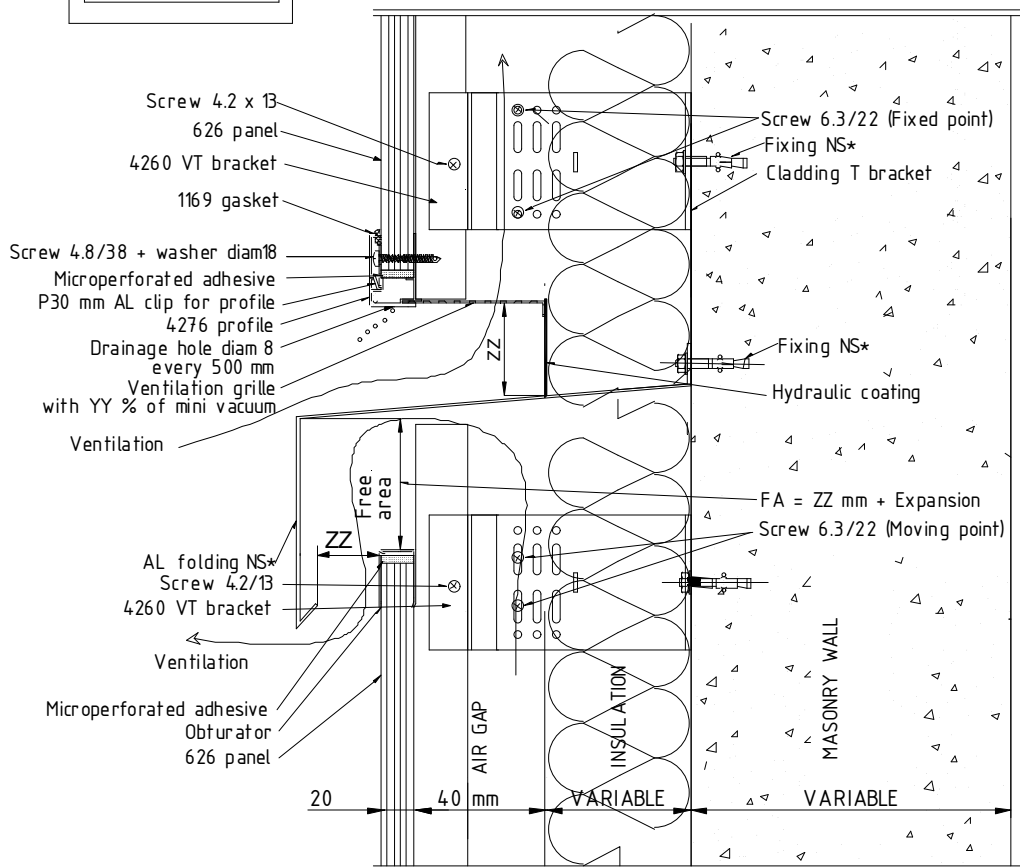
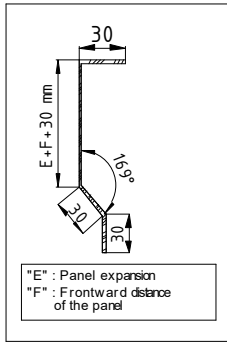
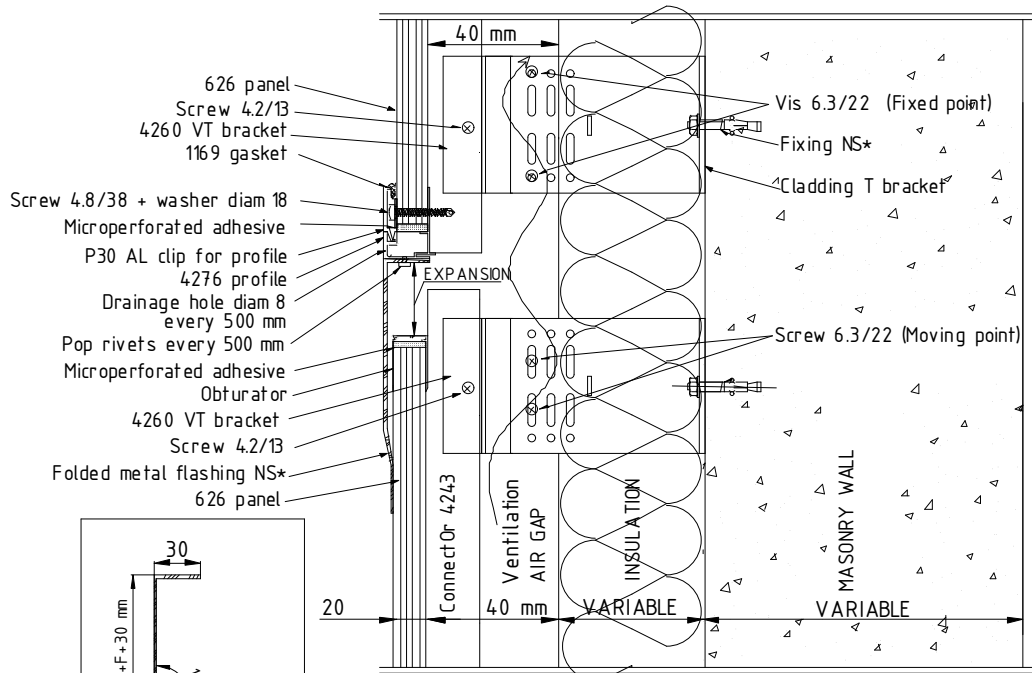
- Folded steel cover NS*
- Cladding T bracket NS*
- Running steel L cover NS*
- Screw 4.2 x 22 every meter NS*
- 1/2 Connector ref. 4243 VT
- arcoPlus 626 Panel



- 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

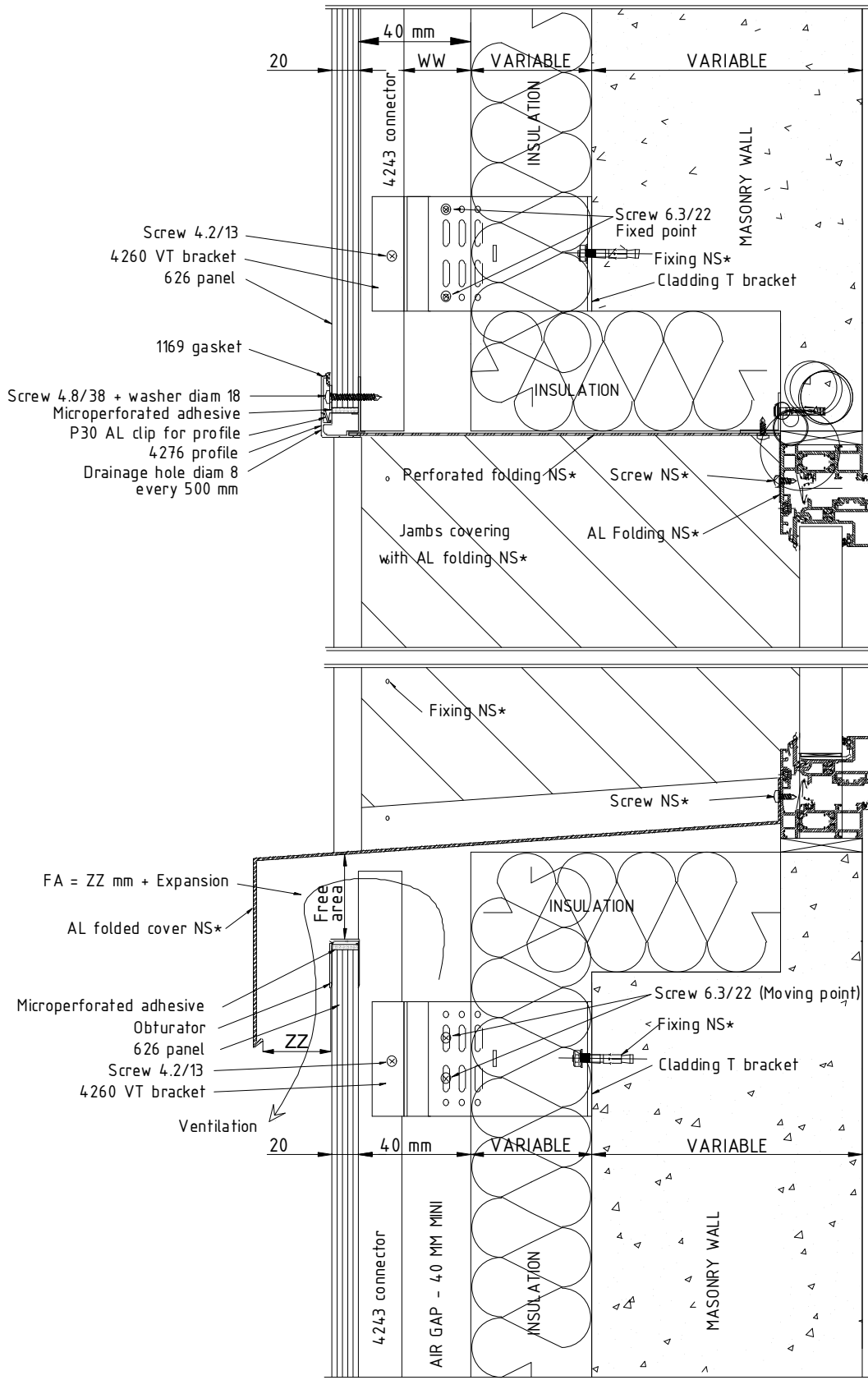
NS * : Not Supplied

Principle of junction between 2 panels



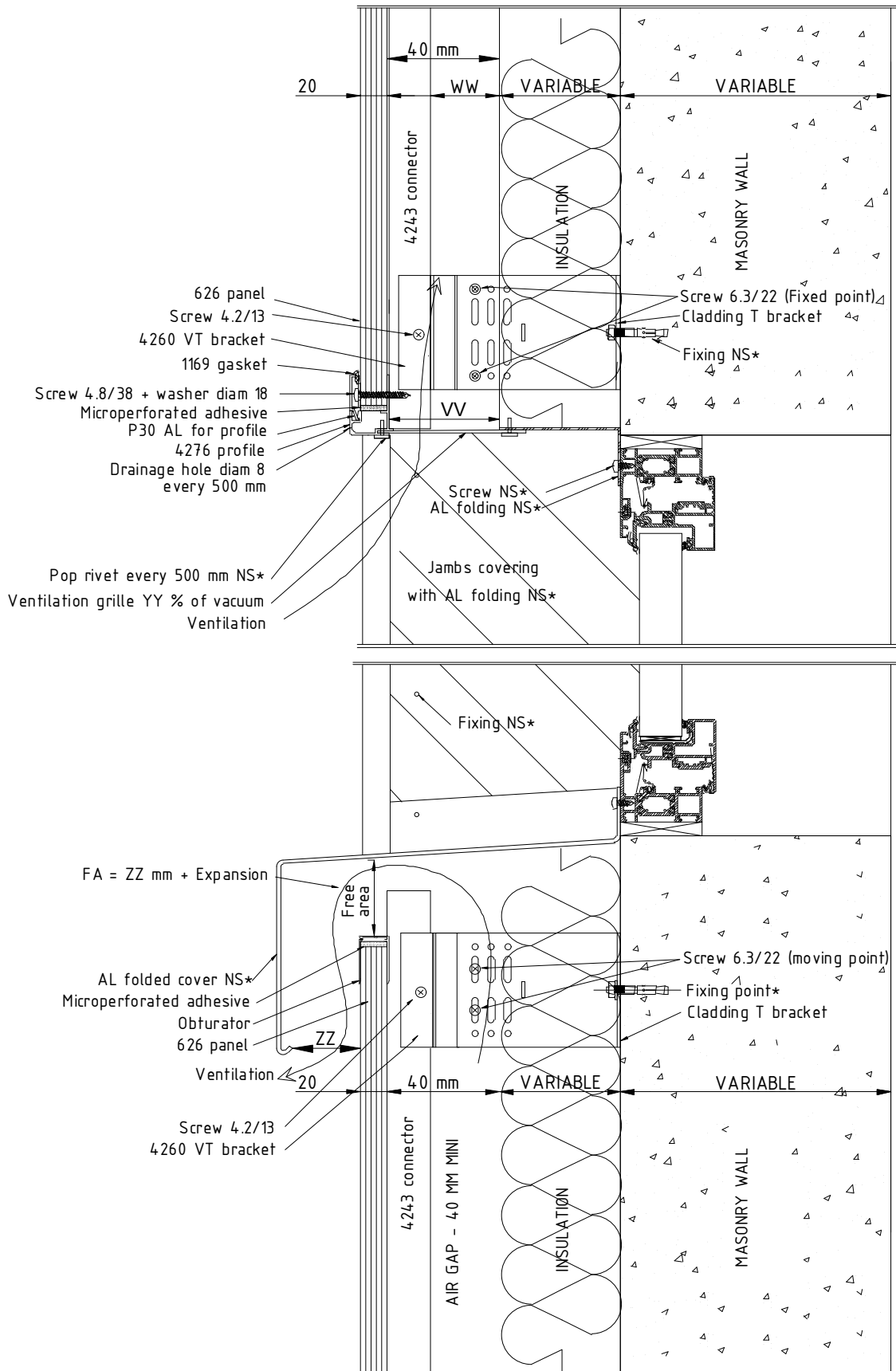
NS* : Not supplied

Principle of bay covering



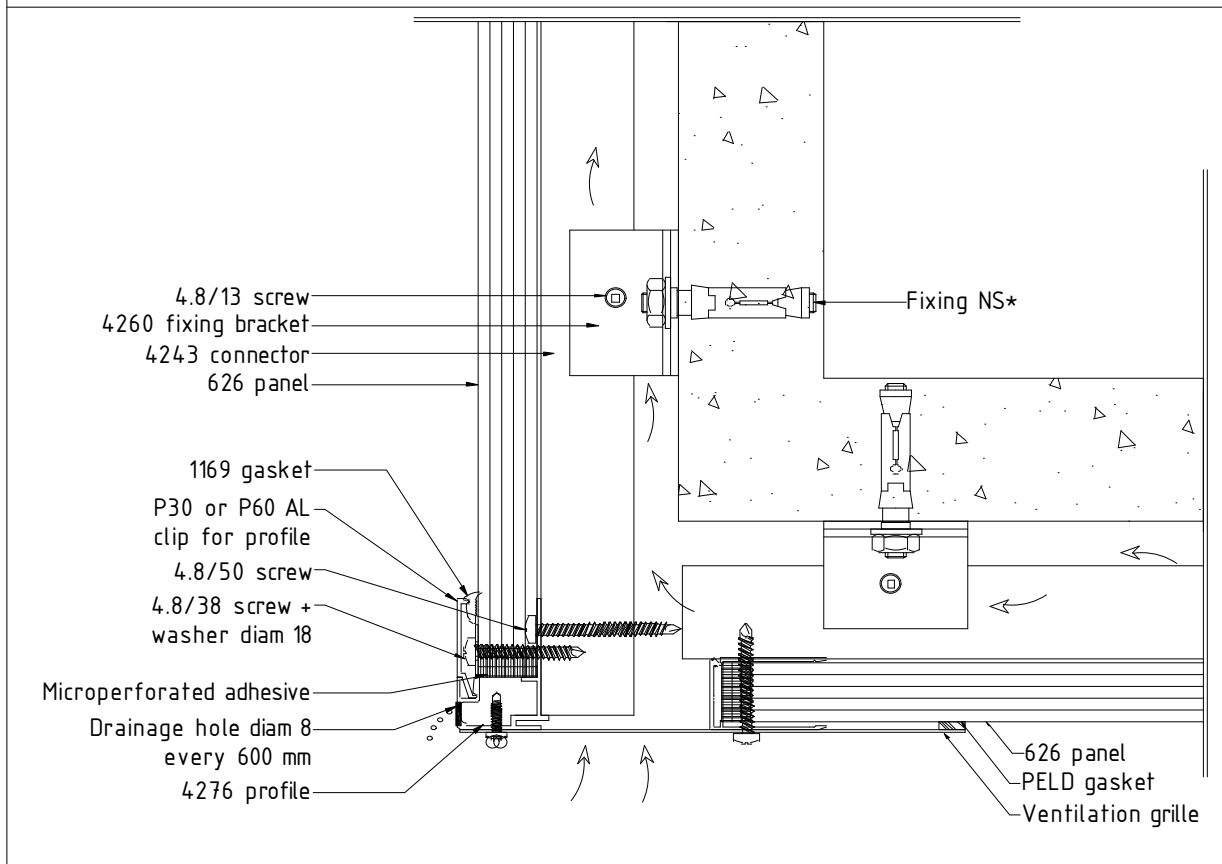
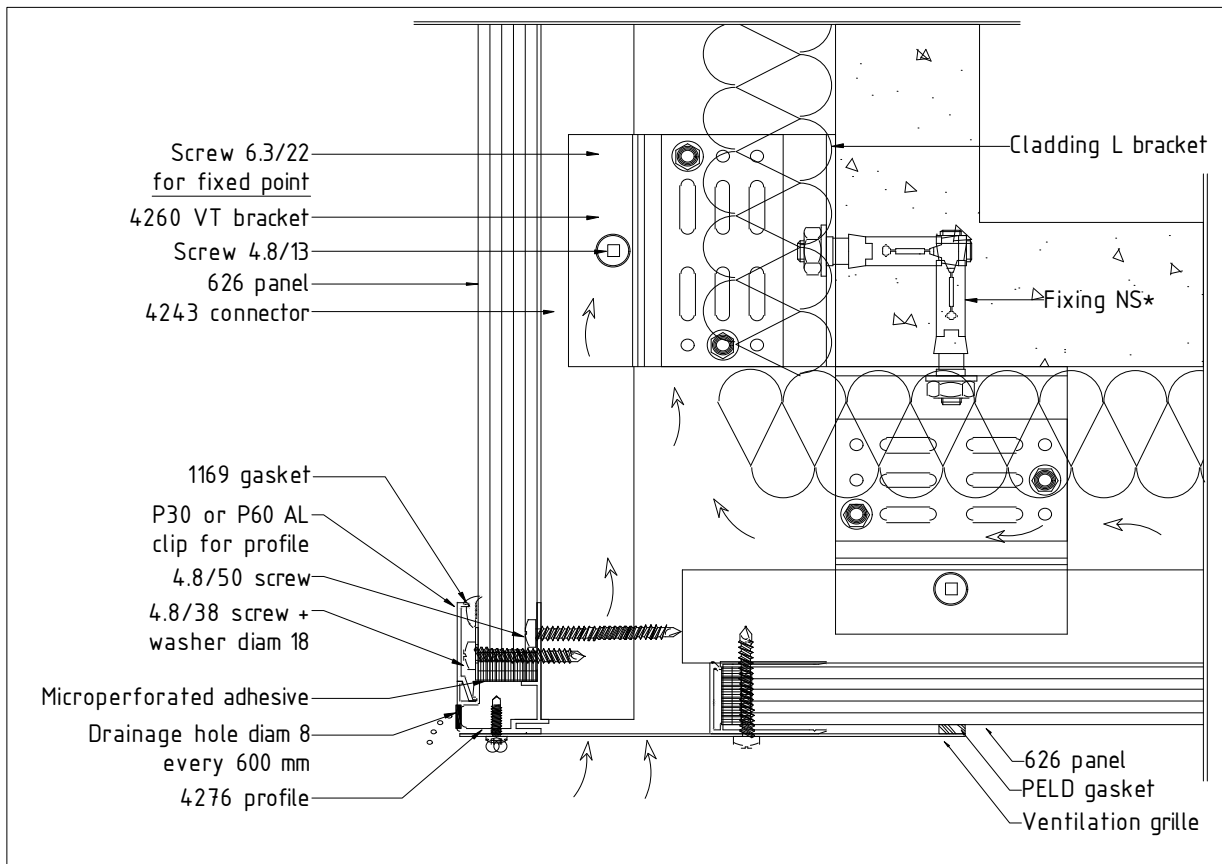
NS* : Not supplied

Principe of bay covering



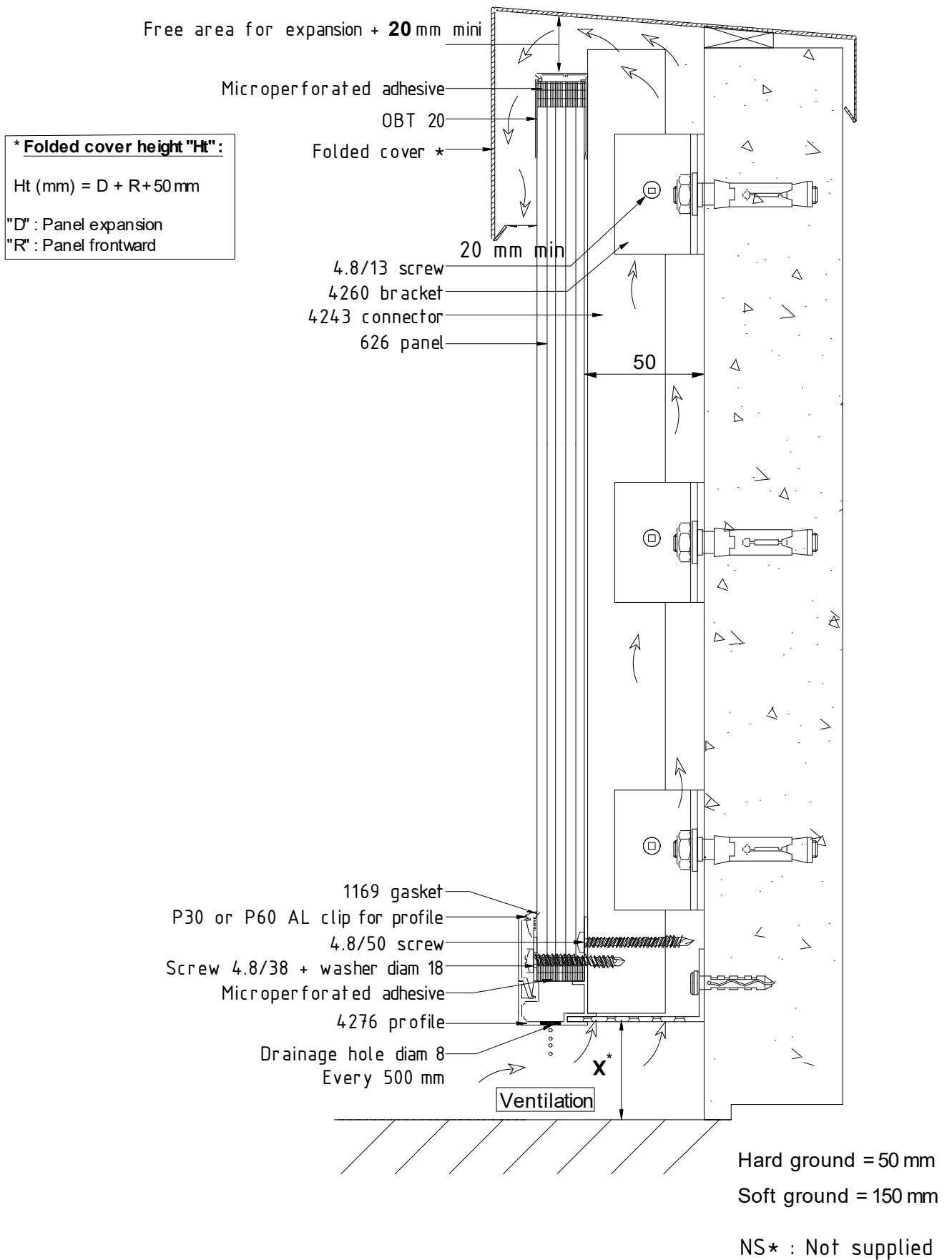
NS* : Not supplied

Ventilated rainscreen on the underside

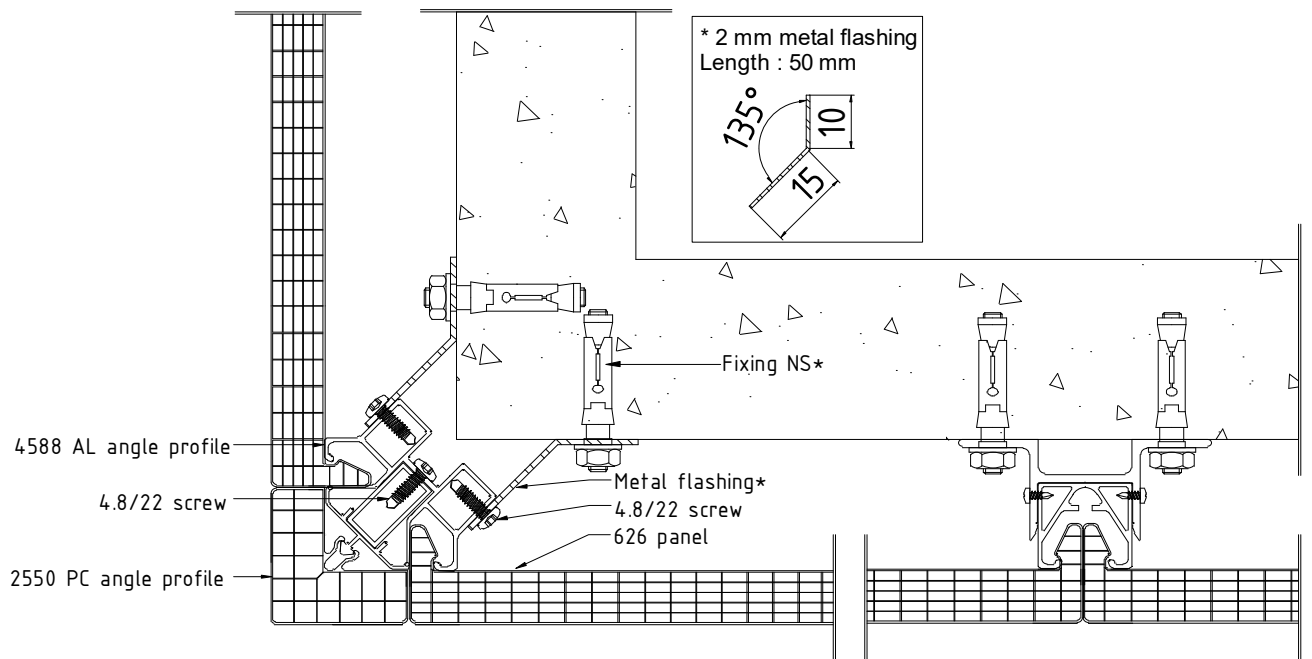


NS* : Not supplied

Vertical section without insulation



Principle of salient angle 90° without insulation



NS* : Not supplied