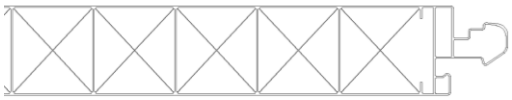
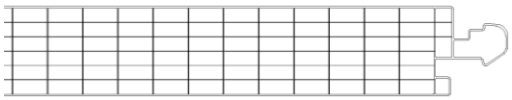

arcoPlus® 344x

arcoPlus® 347 547-549

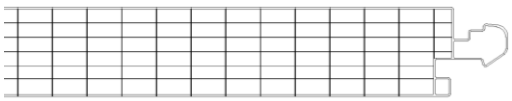
# Technical book



344X



347



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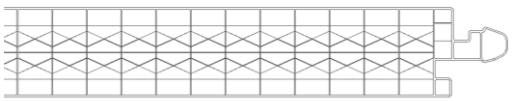


549

GALLINA USA
Polycarbonate systems and sheets

# *Introduction*

This technical book has been developed by our Technical Sales Department, relying on 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:

- Prada Foundation in Milano.
- Gorky Park Museum in Moscow.
- Multipurpose hall in Cluji.
- “Il Centro” Mall in Arese.
- Protoshop Lamborghini in Sant’Agata Bolognese.
- “Centro Sicilia” Mall in Catania.

Our Technical Sales Department 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.

# *Index*

## 1 – System definition

ArcoPlus® Interlocking systems 344X-347-547-549 have 40mm thickness. They can be used without any restriction of width or height to create lighting glazing for applications such as cladding or roof "saw tooth". They are made of cellular polycarbonate panels, anti-UV co-extruded on one side (or two sides upon request) and they are assembled vertically by interlocking of longitudinal ribs.

Those systems can be used for any building type (industrial, air-conditioned offices, schools, hospitals, sport centres, housing, swimming pool, etc …), would they be heated or not, however not refrigerated. They can be installed with a maximum slope of 15°, including for "saw tooth" application, and they can also be installed in any humidity level (high or low) environments (ie: swimming pools).

ArcoPlus® systems do not contribute to the functions of loads transmission, bracing and shock resistance for security purpose (railing function). Those functions are performed by the supporting structure.

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

## 2 – Thermal expansion

The linear expansion coefficient is 0,065mm/ml/°C. The precise expansion of a panel can be calculated with the following expression: **$\Delta L = \alpha \times L \times \Delta T°$**

ΔL: Thermal expansion;
α= 0.065 mm/m°C;
L= panel's lenght;
ΔT°= estimated temperature in Celsius degrees.

While installing the panels, it is essential to check on the polycarbonate panels covering section (R in mm) of the aluminium profile according to the following chart:

| T° C Installation | Panel length in meter | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| (L) | 1 | 3 | 5 | 7 | 8 | 10 | 12 | 14 | 16 |
| 0°c | 20 mm | 23 mm | 25 mm | 27 mm | 29 mm | 30 mm | 31 mm | 33 mm | 37 mm |
| 15°c | 22 mm | 26 mm | 31 mm | 35 mm | 39 mm | 41 mm | 44 mm | 47 mm | 53 mm |
| 30°c | 23 mm | 30 mm | 36 mm | 42 mm | 48 mm | 53 mm | 56 mm | 60 mm | 70 mm |

Panels are freely expanding towards the top within the connectors and the top lateral profiles.

## 3 – Technical Assistance

Technical assistance and distribution in Italy and abroad is realized by dottor Gallina srl, based in La Loggia (TO). The company analyse the solution best suited to the project and develop a detailed list of panels, profiles and accessories required for the installation.

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

## 4 – Panels specifications/treatments

| | 344X | 347 | 547 | 549 |
|---|---|---|---|---|
| Width (mm) | 333±3 | 333±3 | 500±3 | 500±3 |
| Thickness (mm) | 40±0.3 | 40±0.3 | 40±0.3 | 40±0.3 |
| AR | X | √ | √ | √ |
| IR | X | √ | √ | √ |
| Bi-coloured | X | √ | √ | √ |
| UV Tech | √ | √ | √ | √ |
| UV Matt | √ | √ | √ | √ |
| AG | √ | √ | √ | √ |

AR : Anti-glare treatment (visual comfort, prevent from neon effect)
IR : Infrared treatment (prevent from heat increase within the building)
UV Tech : Reinforced UV Protection – 15 years warranty.
UV Matt: Matt finishing treatment (prevent from surface glares, better distribution of the light)
AG: Anti-graffiti and anti-scratch treatment.

Panels are available in various colours, included in 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. Some treatments like AR (anti-glare) and IR (infrared) can create some shade variations with colour range.

## 5 – Thermal specifications

| | 344X | 347 | 547 | 549 |
|---|---|---|---|---|
| Uc (W/m².K) | 1.70 | 1.10 | 1.10 | 1.00 |
| ψi (W/m.K) | n.d. | n.d. | n.d. | n.d. |
| χk (W/k) | 0.005 | 0.005 | 0.005 | 0.005 |

Uc : Thermal coefficient in the core part of the panel (in between connectors)
ψi et χk : Thermal coefficient alongside the connectors.

## 6 – Acoustic insulation values

| | 344X | 347 | 547 | 549 |
|---|---|---|---|---|
| Internal | 18 dB(A) | n.d. | n.d. | 1.00 |
| External | 16 dB(A) | n.d. | n.d. | n.d. |
| Rw (C,Ctr) | 19 (-1,-4) dB | 21 (-1,-4) dB | 21 (-1,-4) dB | 21 (-1,-4) dB |

Acoustic test according to regulation ISO 140-4 e UNI ISO 10140

## 7 – Optical characteristics

| | 344X | | 347 | | 547 | | 549 | |
|---|---|---|---|---|---|---|---|---|
| Colour | Crystal | Opal | Crystal | Opal | Crystal | Opal | Crystal | Opal |
| Light Transmission (LT) in % | 72 | 49 | 54 | 31 | 54 | 31 | 50 | 28 |
| Solar factor (SF) in % | 77 | 60 | 58 | 46 | 58 | 46 | 57 | 46 |

Light transmission (LT): Different pigments are used to obtain different light transmission values. The values indicated in the tables are based on calculations performed at specialist laboratories.
Solar factor (SF): Incoming solar radiation is reflected, partially absorbed, and transmitted to the inside. The solar factor indicated in the table is the ratio, expressed as a percentage, between the total energy transmitted to the inside and the total solar radiation.

## 8 – Fire reaction according to EN 13501-1

| | 344X | 347 | 547 | 549 |
|---|---|---|---|---|
| Fire classification | B,s1-d0 | B,s1-d0 | B,s1-d0 | B,s1-d0 |

## 9 – Resistance to chemical agents

The polycarbonate has good resistance to most chemicals with which it is likely to come into contact during normal use. Specific tests are recommended for applications where the material is likely to come into contact with aggressive chemicals. It is essential to verify their compatibility prior to use. Below some examples:

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

## 10 - Storage

ArcoPlus® systems 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.

## 11 - Maintenance

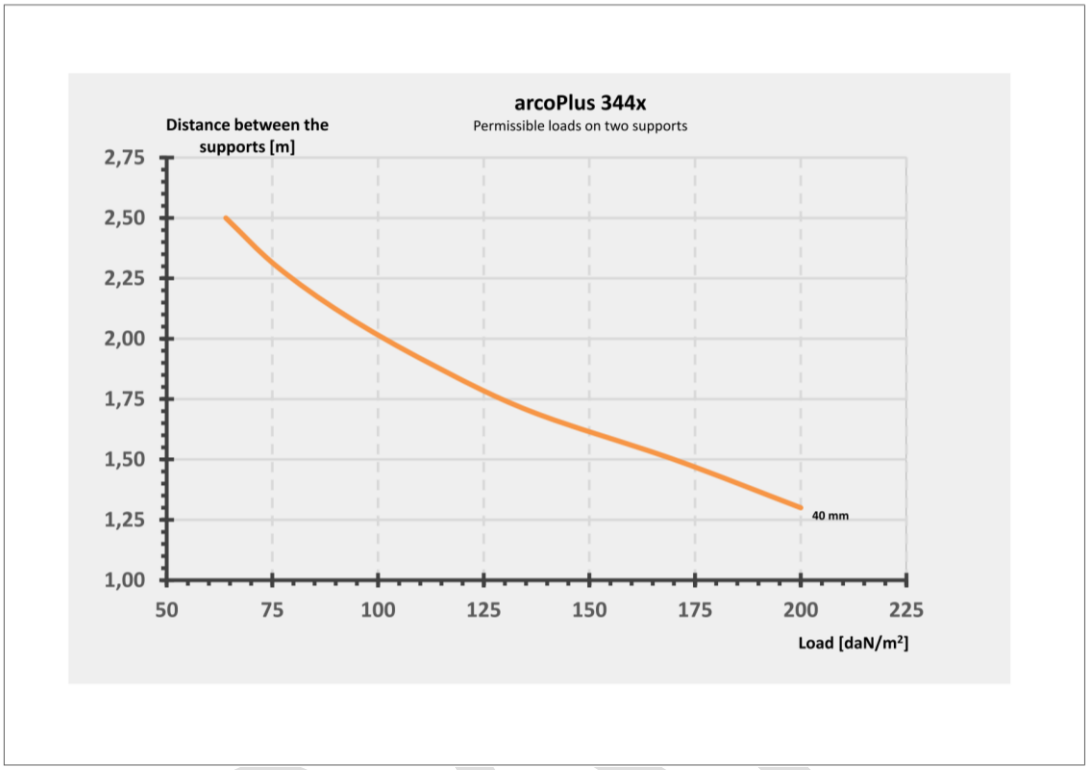
ArcoPlus® panels should be frequently cleaned with mild soapy water (neutral detergent) and thoroughly rinsed with clear water. Do not use warm water. Do not use organic solvents, abrasive or alkaline products.

## 12 – How to replace a damaged panel (with thermally broken profiles cod. 4597 e 4598 or with frontal opening profiles cod. 4140)

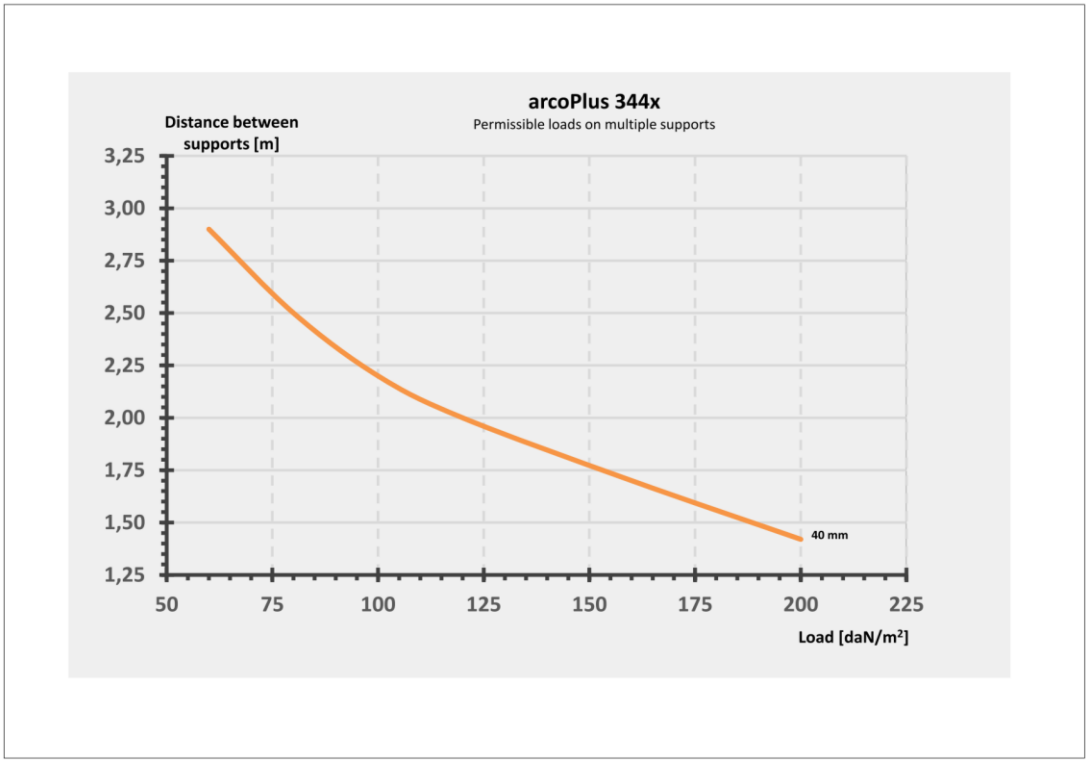
1. Remove the EPDM gasket 1169/b on top and low part of the cladding.
2. Remove the profile frontale edge turning it towards the inside.
3. Cut the damaged panel with a diamond cutting disc and remove the different parts.
4. Remove the panel on the right side, pushing it on the left and then pulling it down.
5. Create a ”V-shape” with this panel and the new one. Then, insert them in the upper profile and press on the side joints to click the panels with the ones on the sides. Pull them down to put them in place.
6. Put back in place the AL drip edge, on the top and low part of the cladding.
7. Re-insert the EPDM gasket 1169/b between the gasket and the panels.

## 13 – Permissible loads

### *344X – Permissible loads on two supports.*

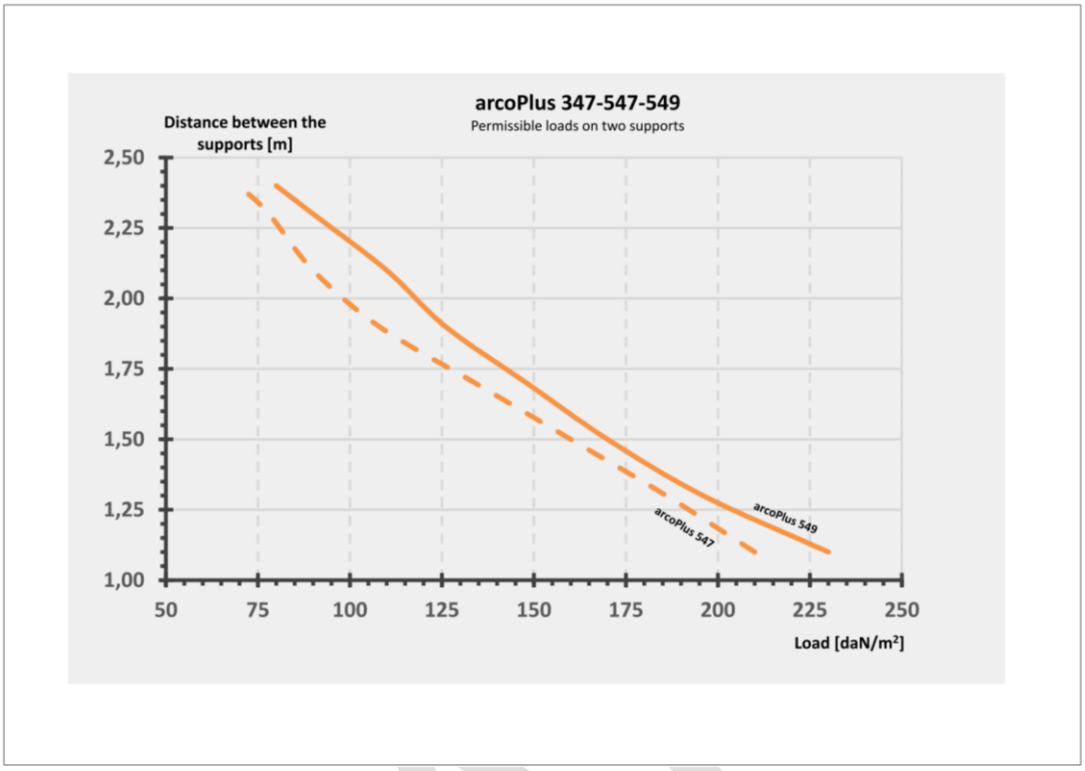



### *344X – Permissible loads on multiple supports.*

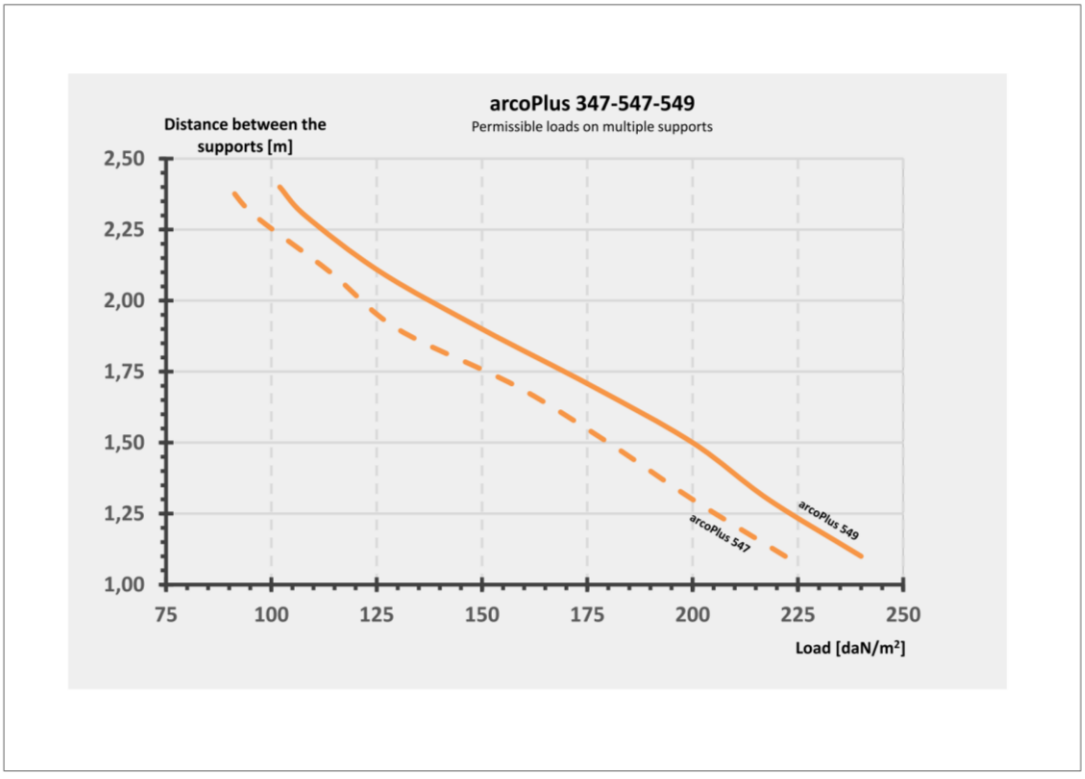



*The permissible load for a specific distance between the supports can be calculated by interpolation between the x-axis value and the y-axis value.*

### *347-547-549 – Permissible loads on two supports.*

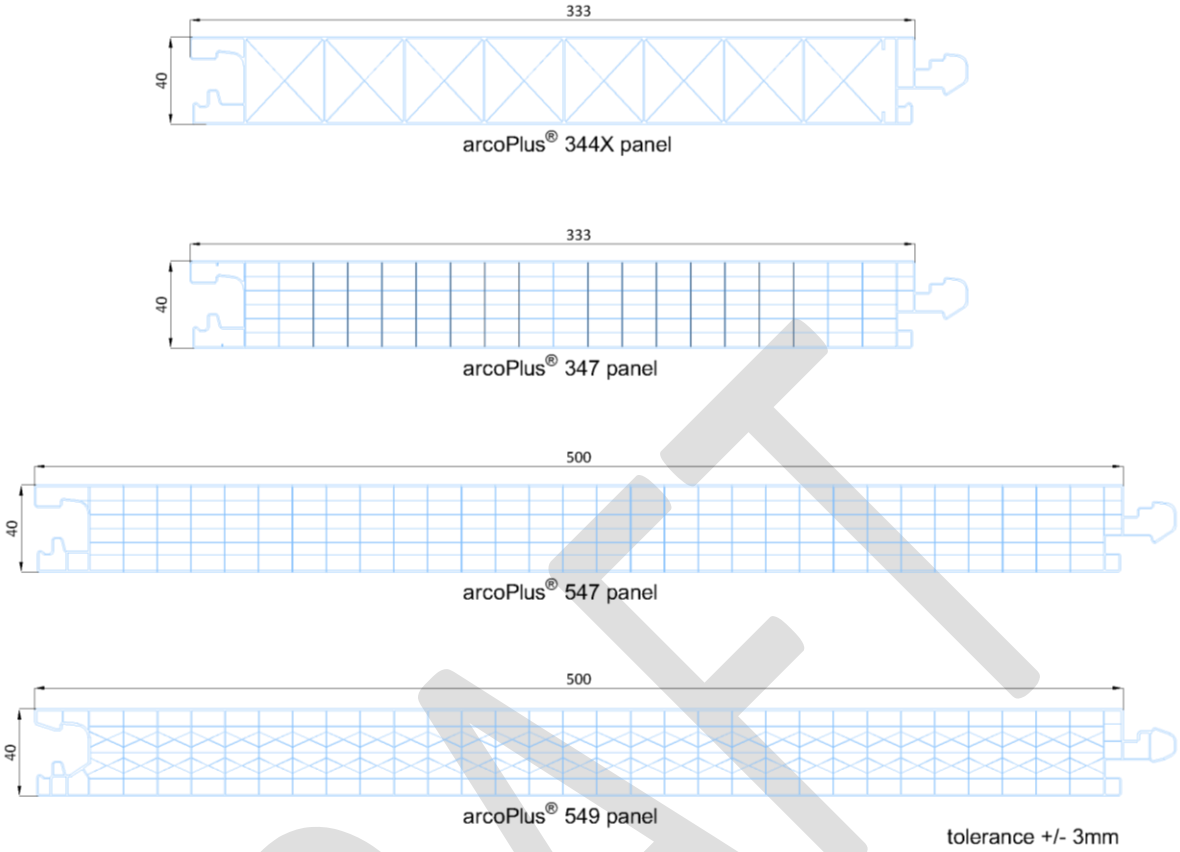


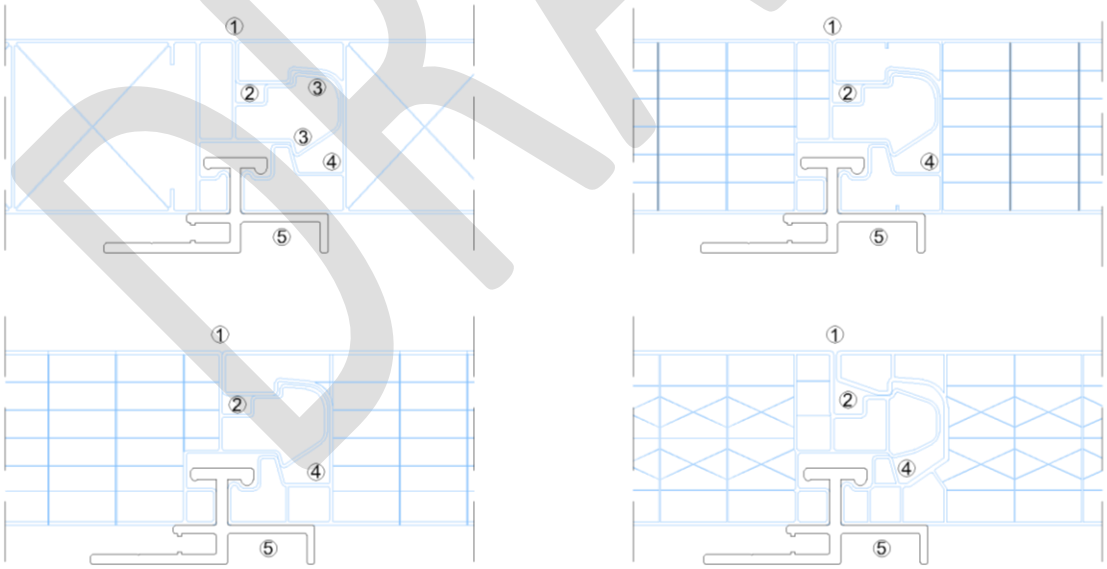

### *347-547-549 – Permissible loads on multiple supports.*




*The permissible load for a specific distance between the supports can be calculated by interpolation between the x-axis value and the y-axis value.*

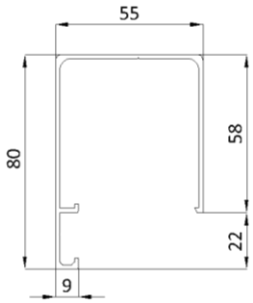
# Joint detail - arcoPlus 344X – 347 – 547 – 549



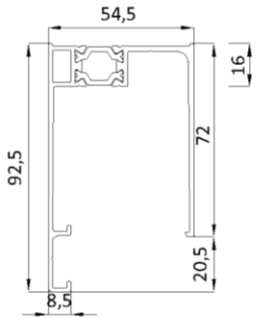




1 - Bring External UV protected faces into line
2 - Low pressure channel
3 - Adjacent panel assembly
4 - Important drainage channel
5 - Fixing bracket maintaining the 2 interlocking faces

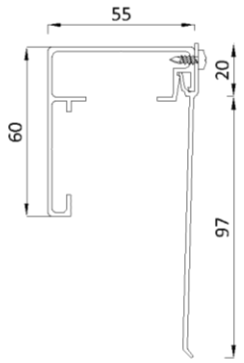
# AL profile and accessories



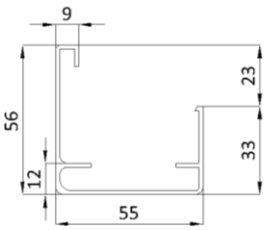

Upper/side AL profile
cod.4045



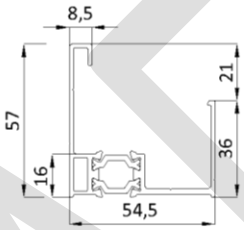

Upper/side AL TB profile
cod.4585



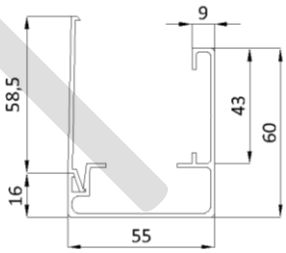

Top flap h= 100mm
cod.4275 (+ profile 4140)



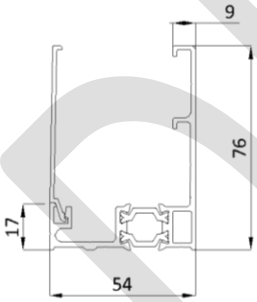

Base AL profile
cod.4047



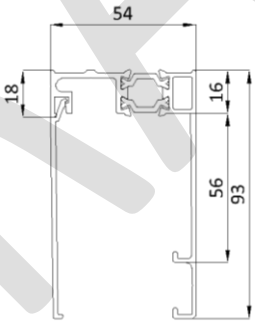

Base AL TB profile
cod.4587



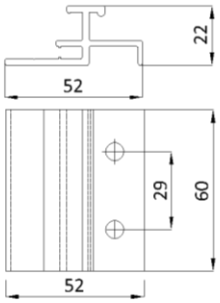

Base/upper/side AL
profile with frontal
opening cod.4140



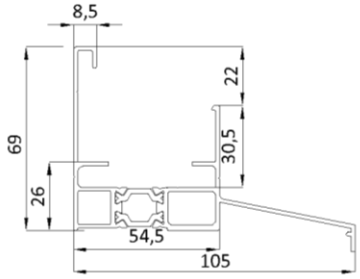

Base AL TB profile
cod.4597+4742



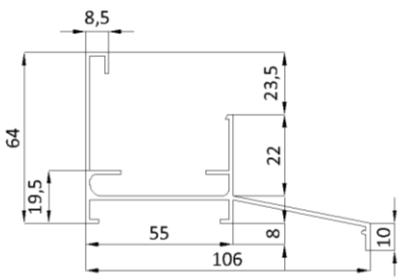

Upper/side AL TB profile
cod.4598+4743



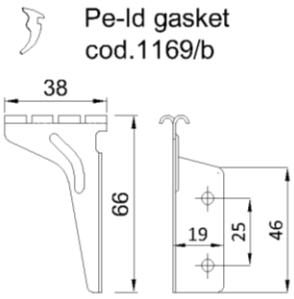

AL bracket
cod. 4050




Base AL TB profile
with eave cod.4590

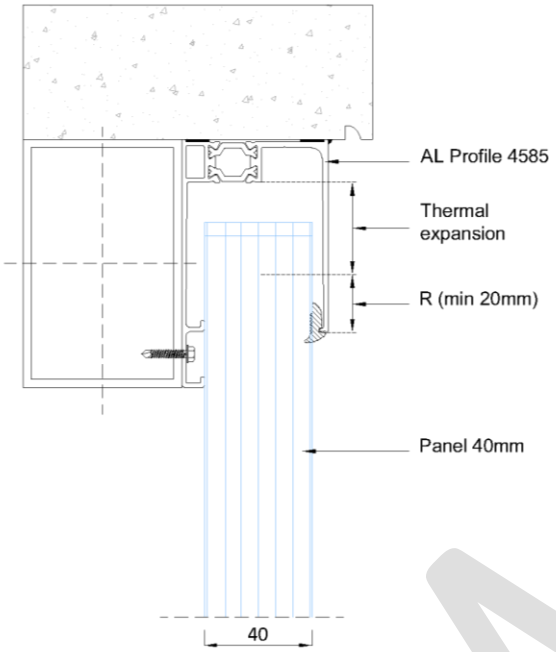


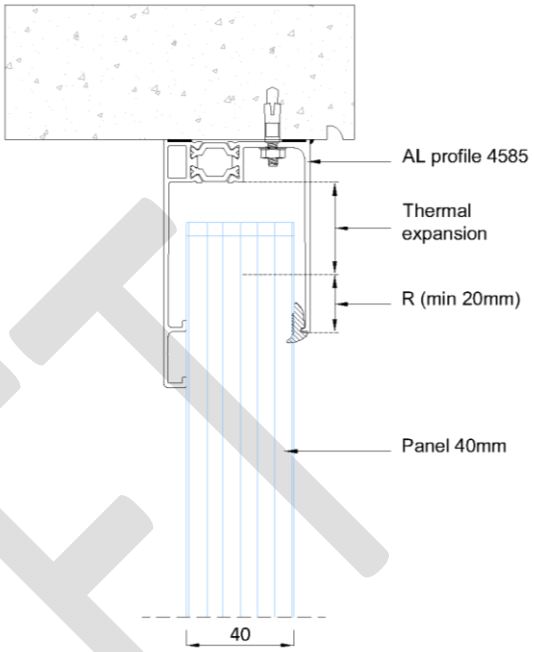

Base AL profile
with eave cod.4046

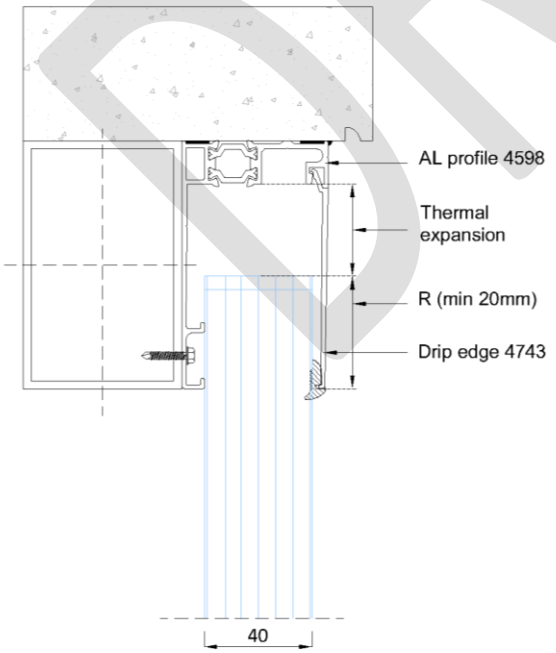


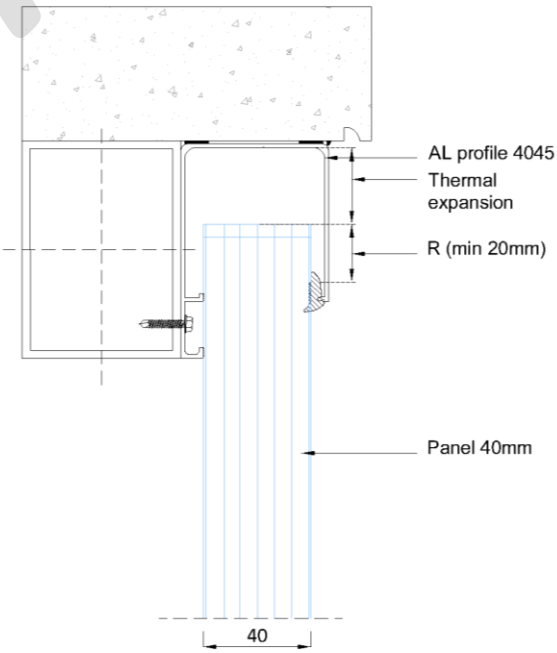

Inox barcket cod.4052

# Installation: upper profile detail

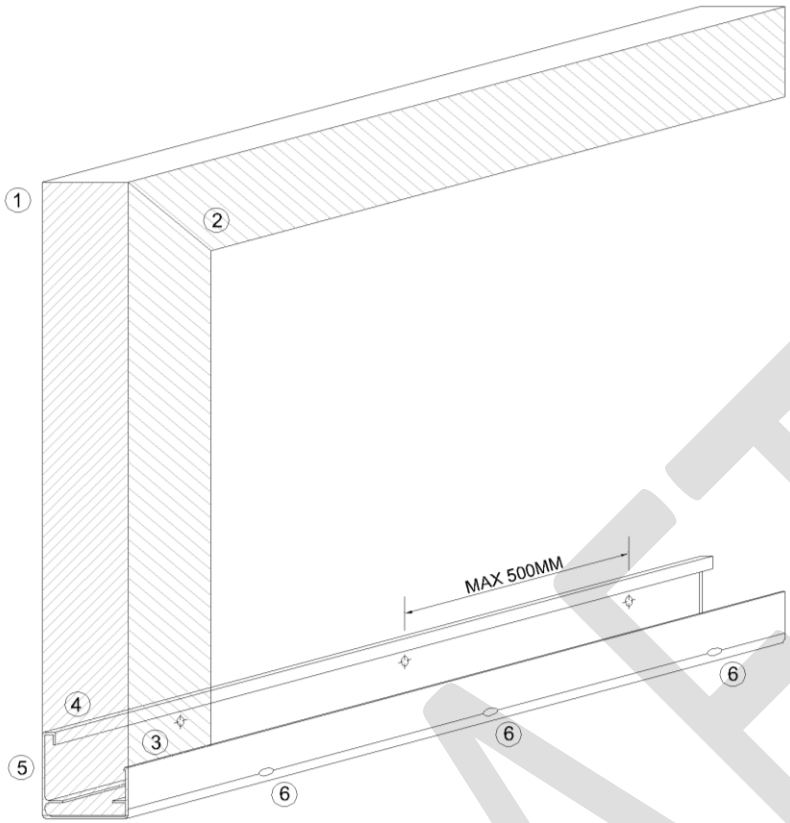


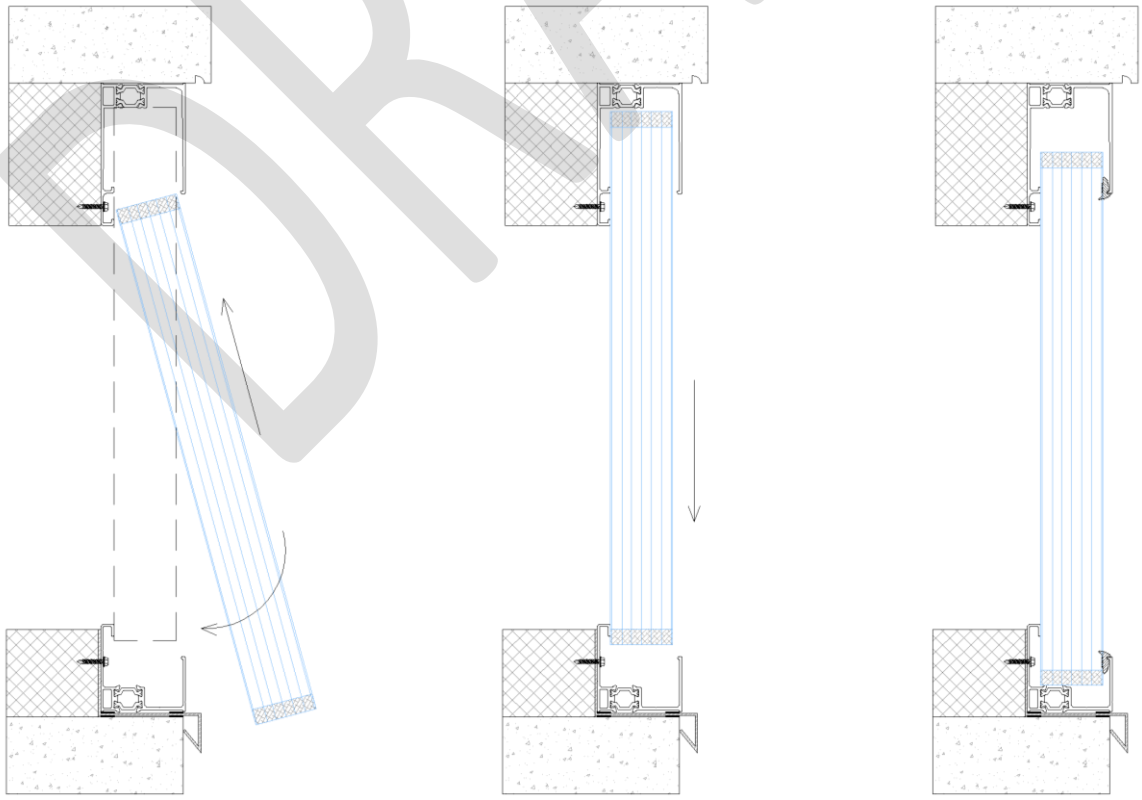
# Installation: finishing of the AL profiles



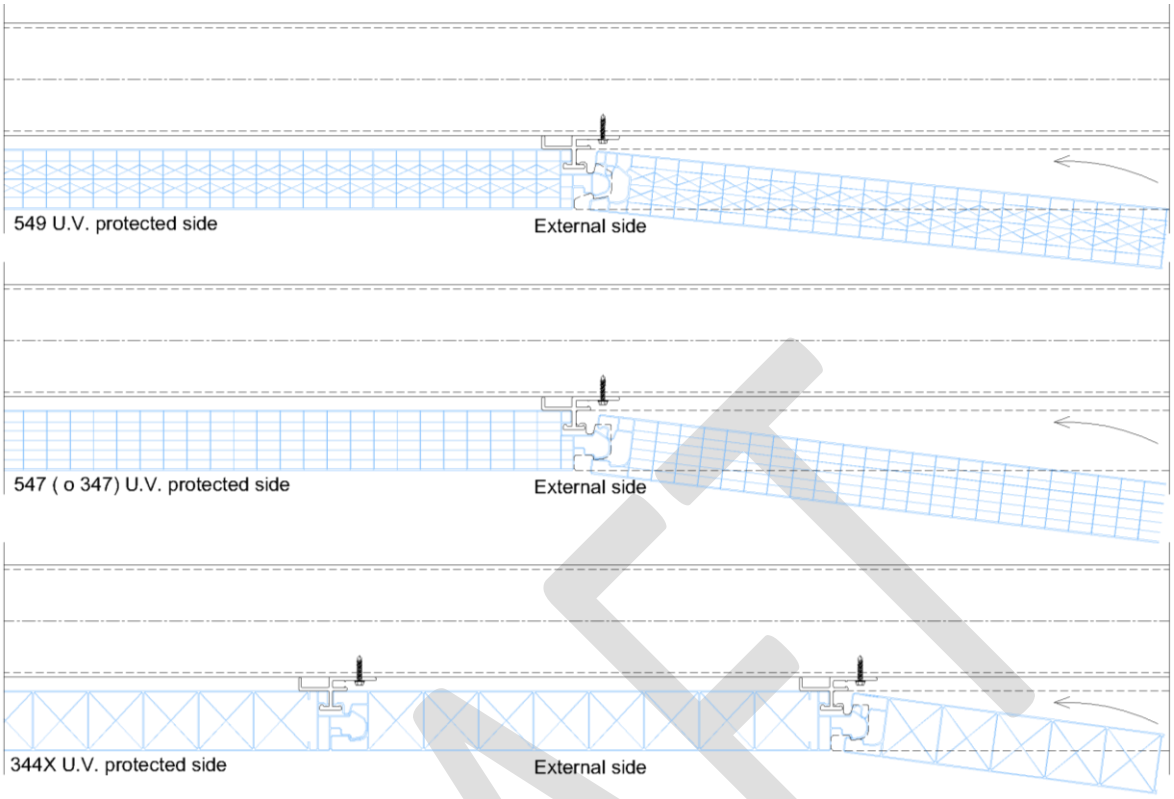

Upper part:
1 - Cut to 45° the upper and side profiles cod. 4045
2 - Seal the mitre cut with an elastomer

Base part:
3 - Shape the lateral profile front border as much as the length of the low profile front face
4 - Shape the back border following the same principle
5 - Seal the profile mitre cuts and junctions with an elastomer mastic
6 - Check the drainage of the low profile ( hole diam. 8 mm below or on the frontal part every 333 mm)

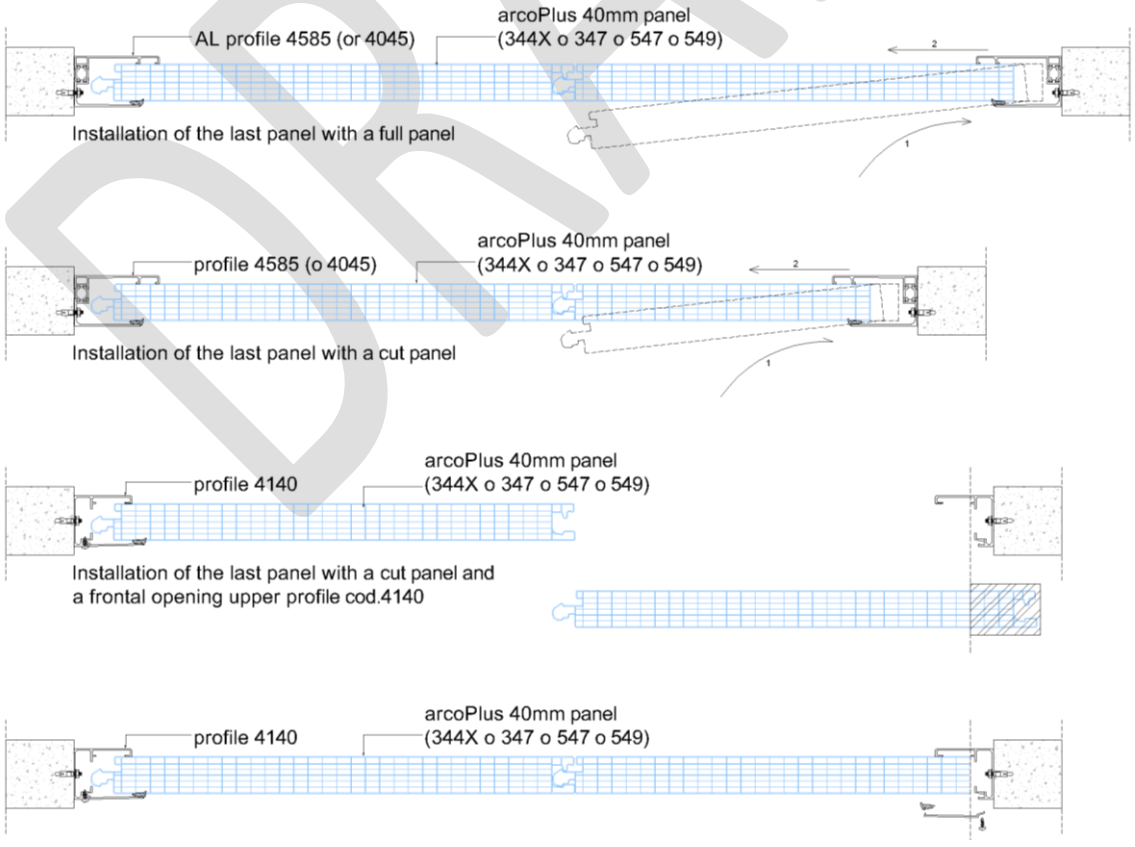
# Installation of the panels



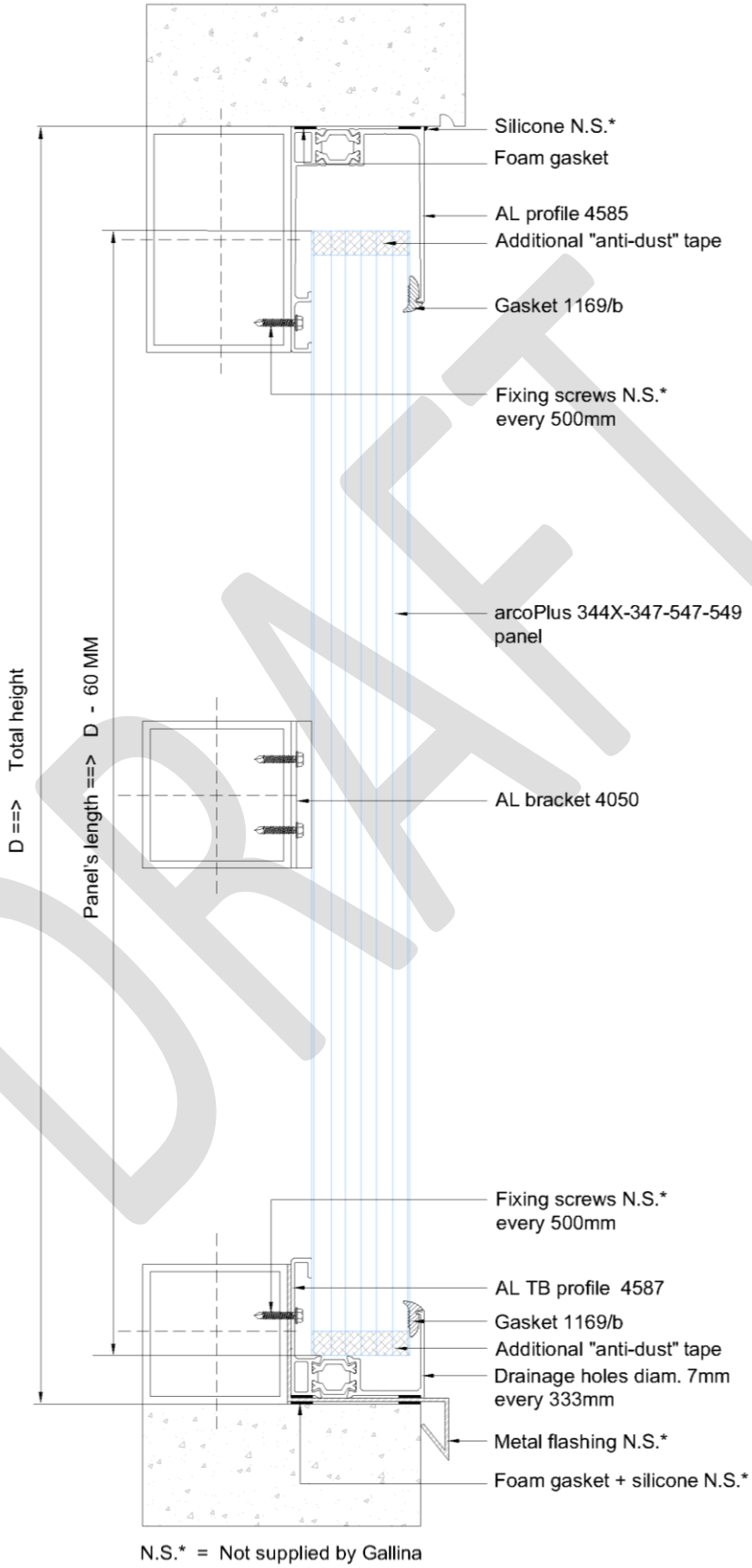
## Installation of the AL brackets cod. 4050




## Installation of the last panel

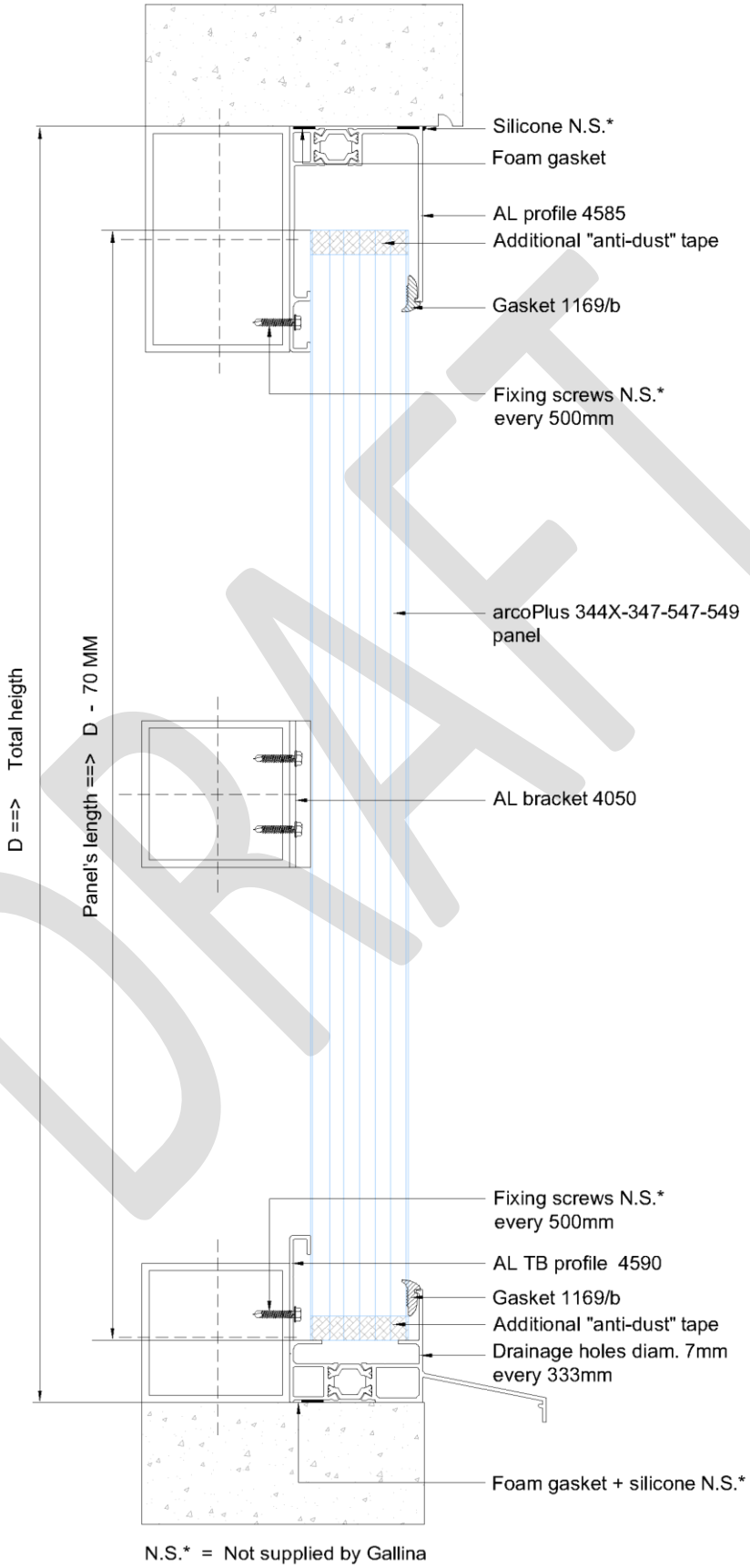


## Vertical installation: fitting between two supports with thermally broken profiles cod. 4587 e 4585



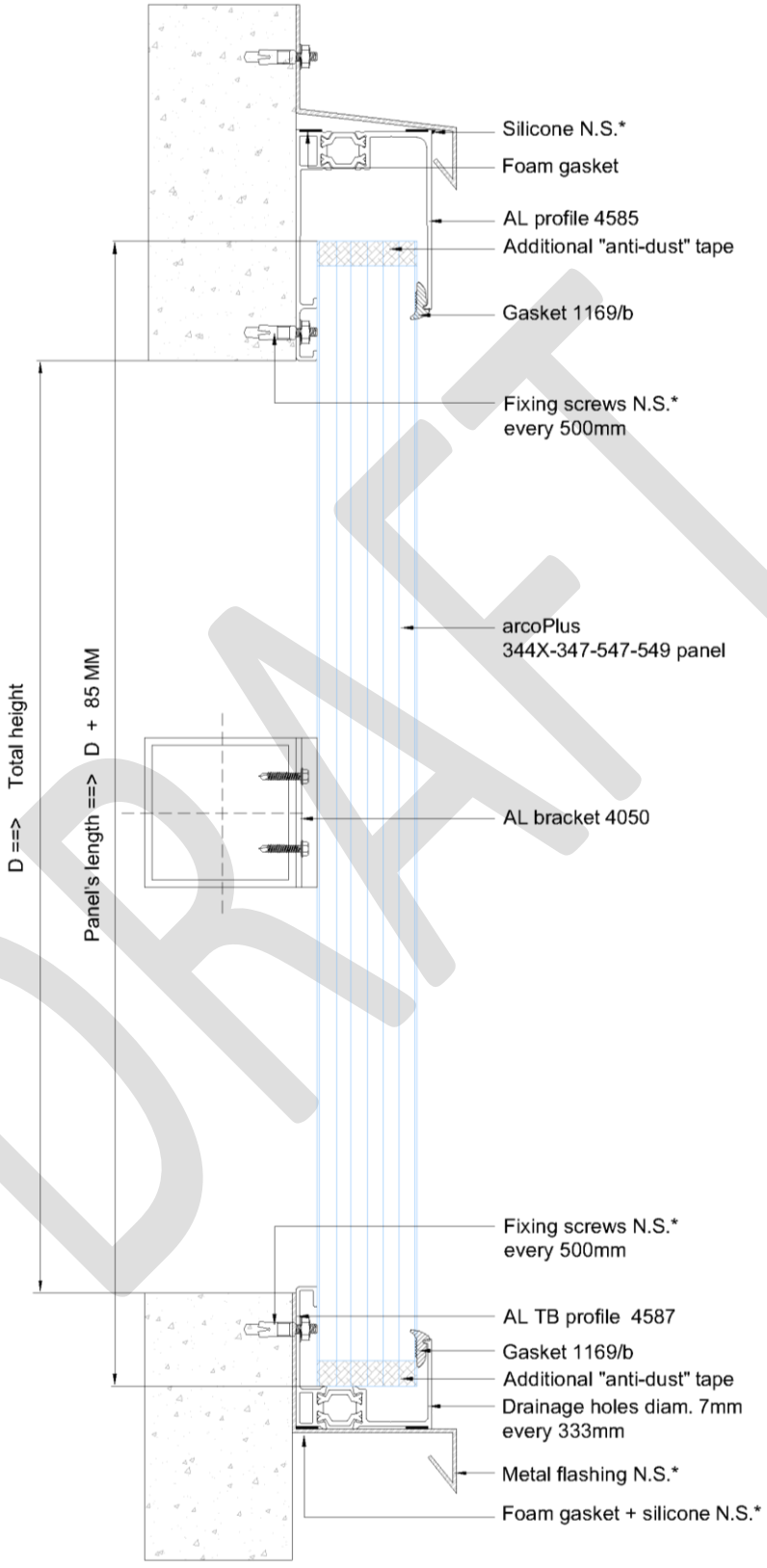

N.S.* = Not supplied by Gallina

## Vertical installation: fitting between two supports with thermally broken profiles cod. 4590 e 4585



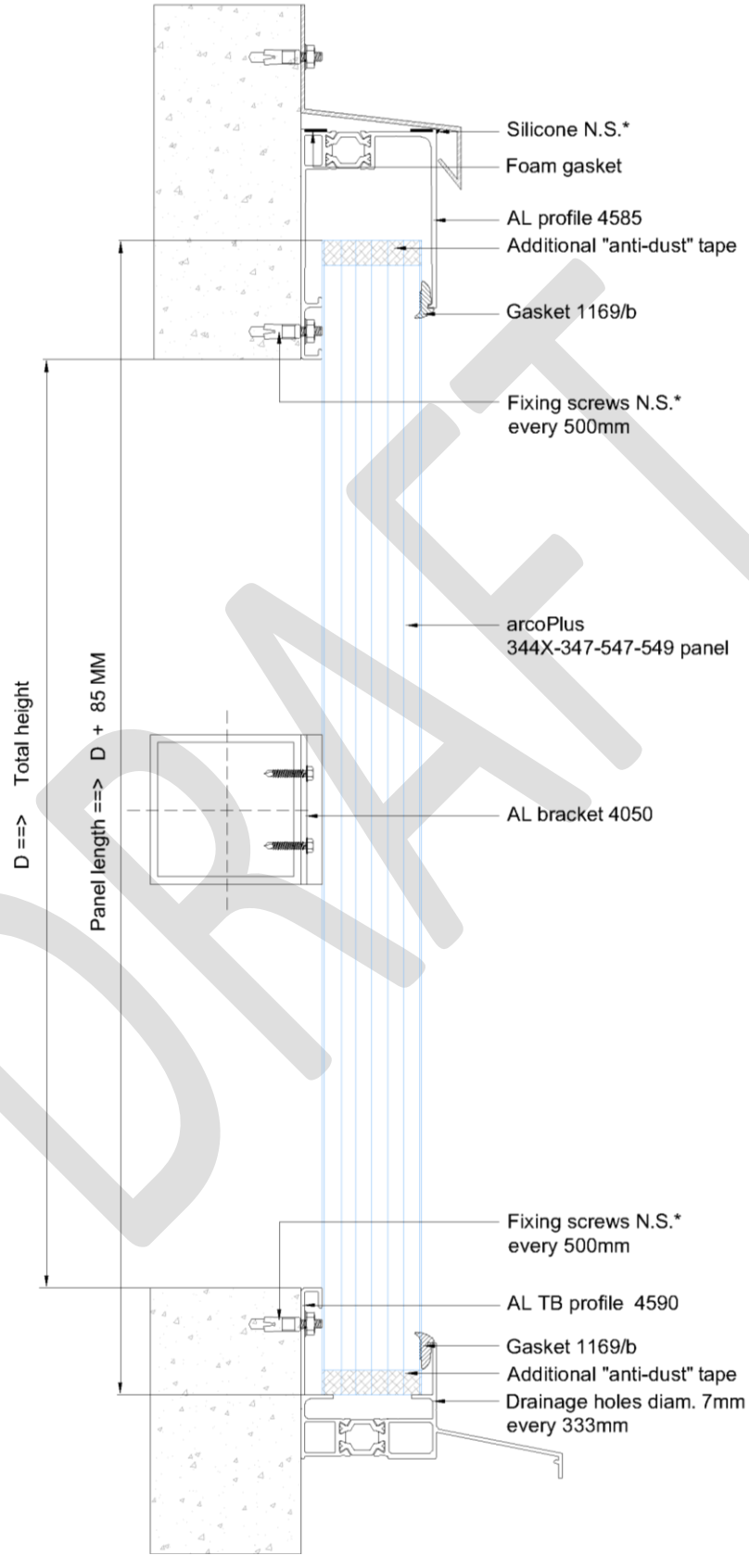

N.S.* = Not supplied by Gallina

## Vertical installation: front of the building installation with thermally broken profiles cod. 4587 e 4585



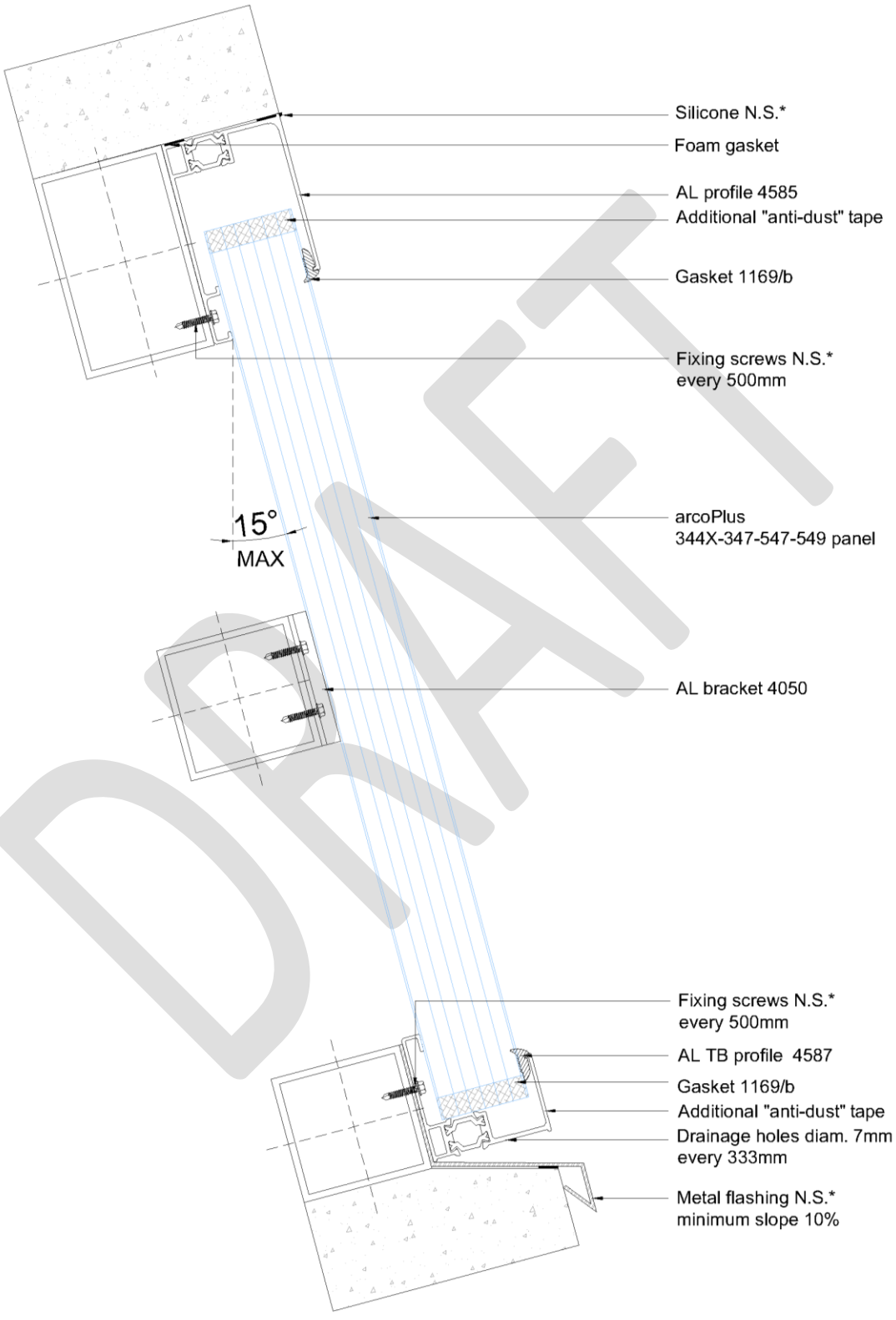

N.S.* = Not supplied by Gallina

## Vertical installation: front of the building installation with thermally broken profiles cod. 4590 e 4585



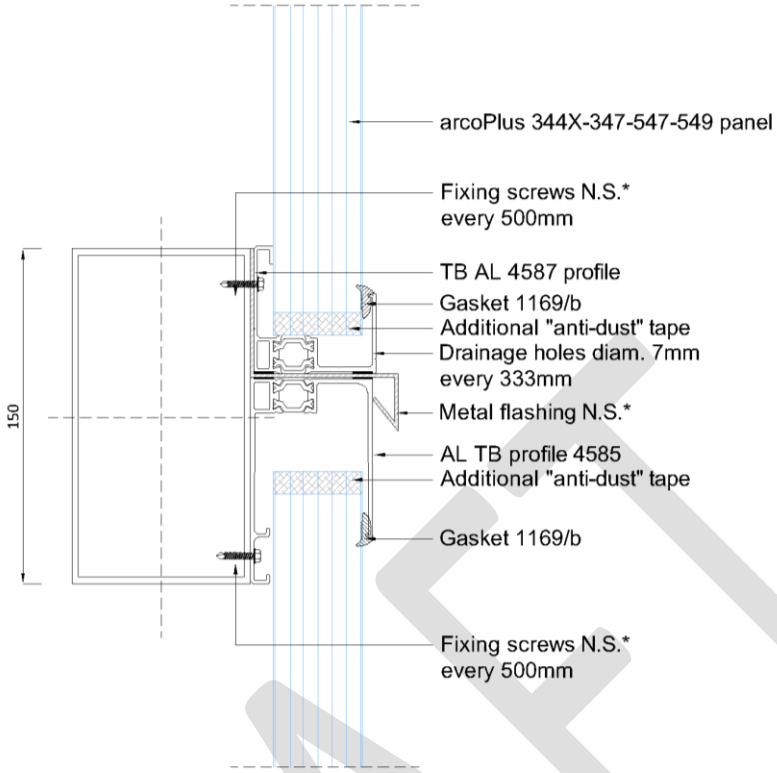

N.S.* = Not supplied by Gallina

## Inclined installation: fitting between two supports with thermally broken profiles cod. 4587 e 4585

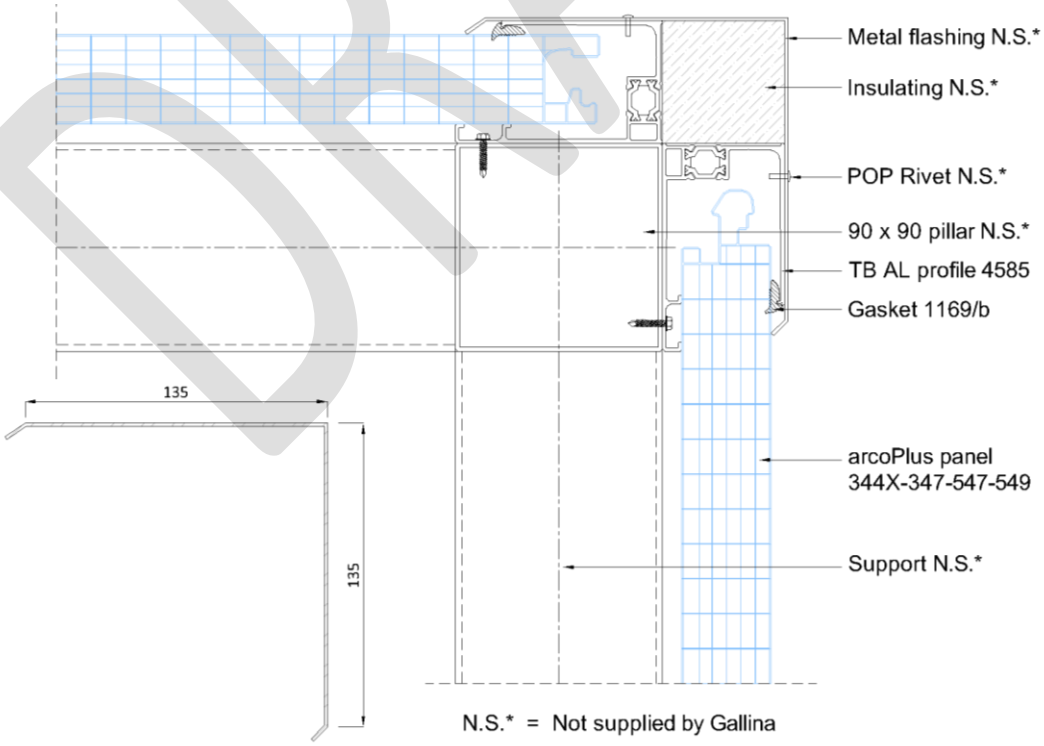



N.S.* = Not supplied by Gallina

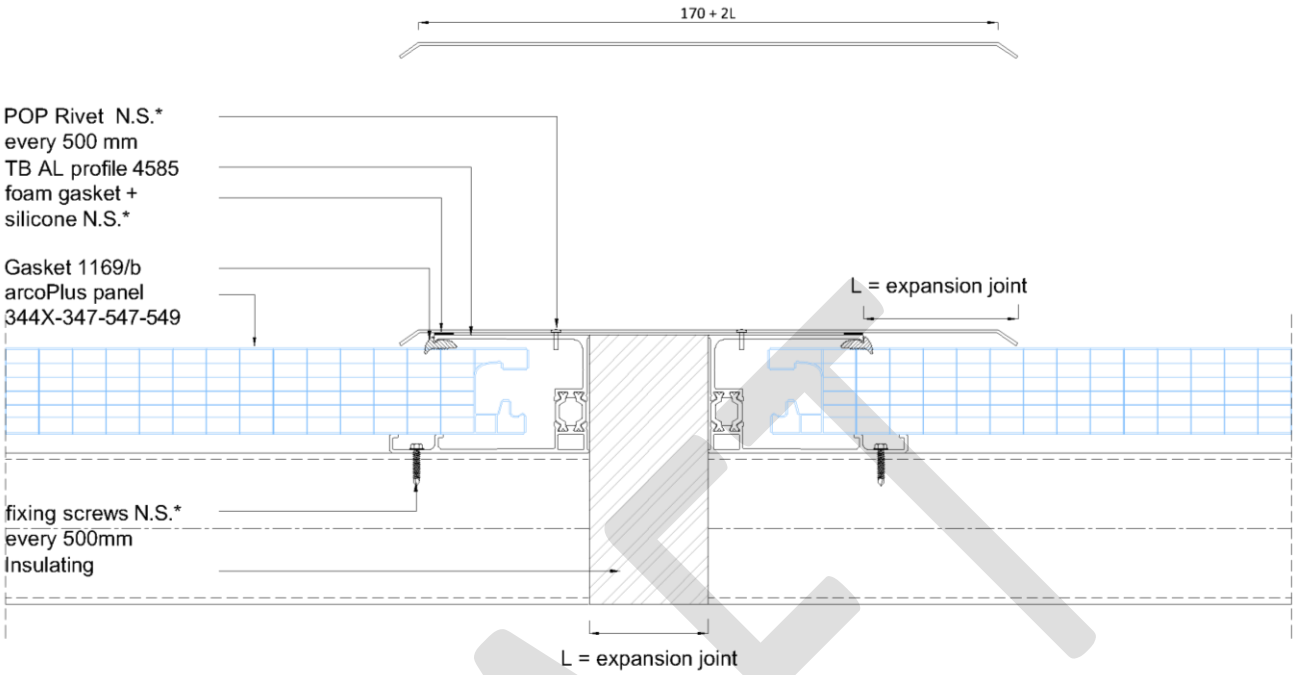
## Junction of superposed cladding with TB profiles cod. 4587 e 4585



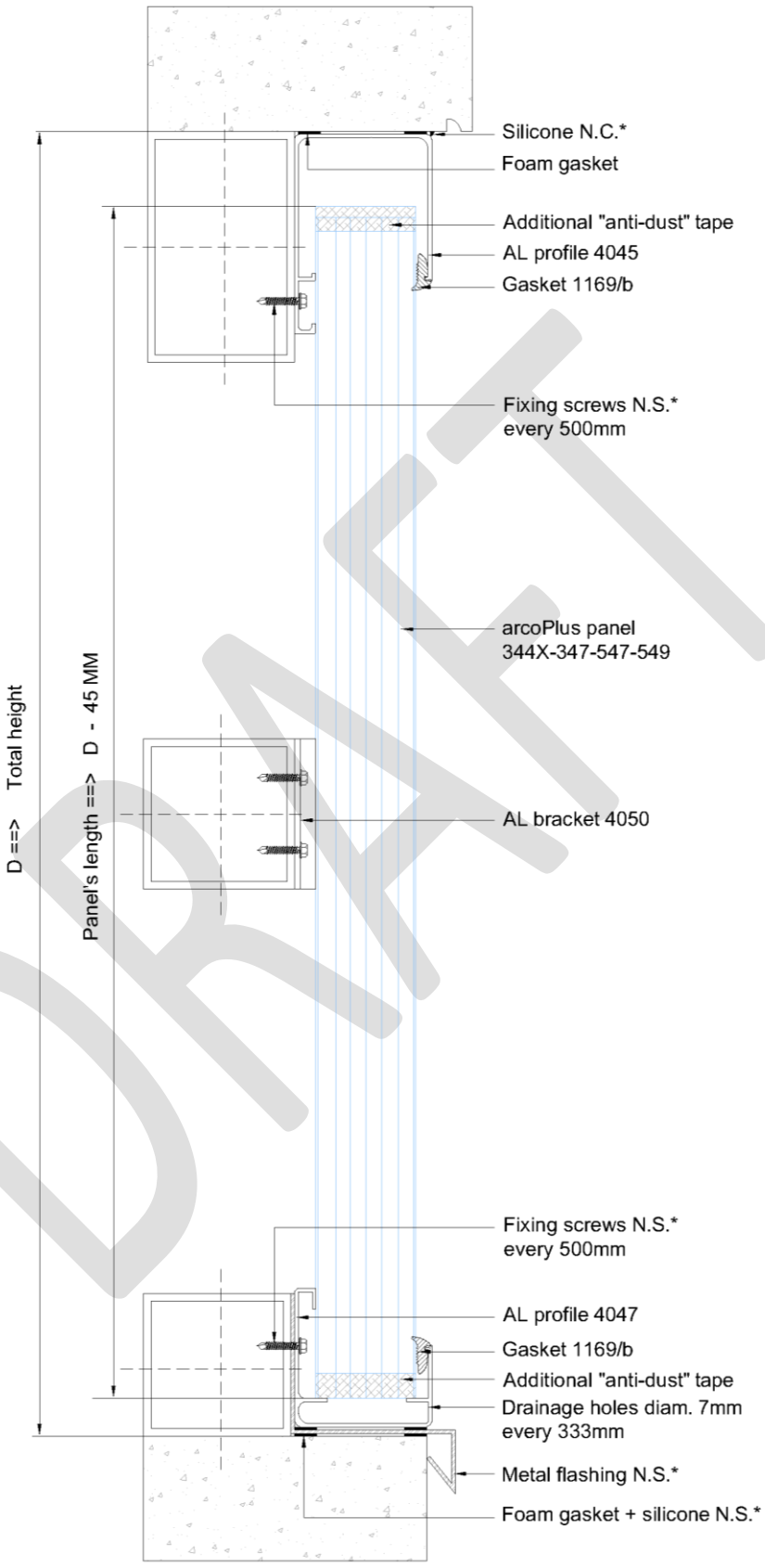

## Detail of the angle with TB profiles cod. 4585



# Expansion joint's detail with TB profile cod. 4585

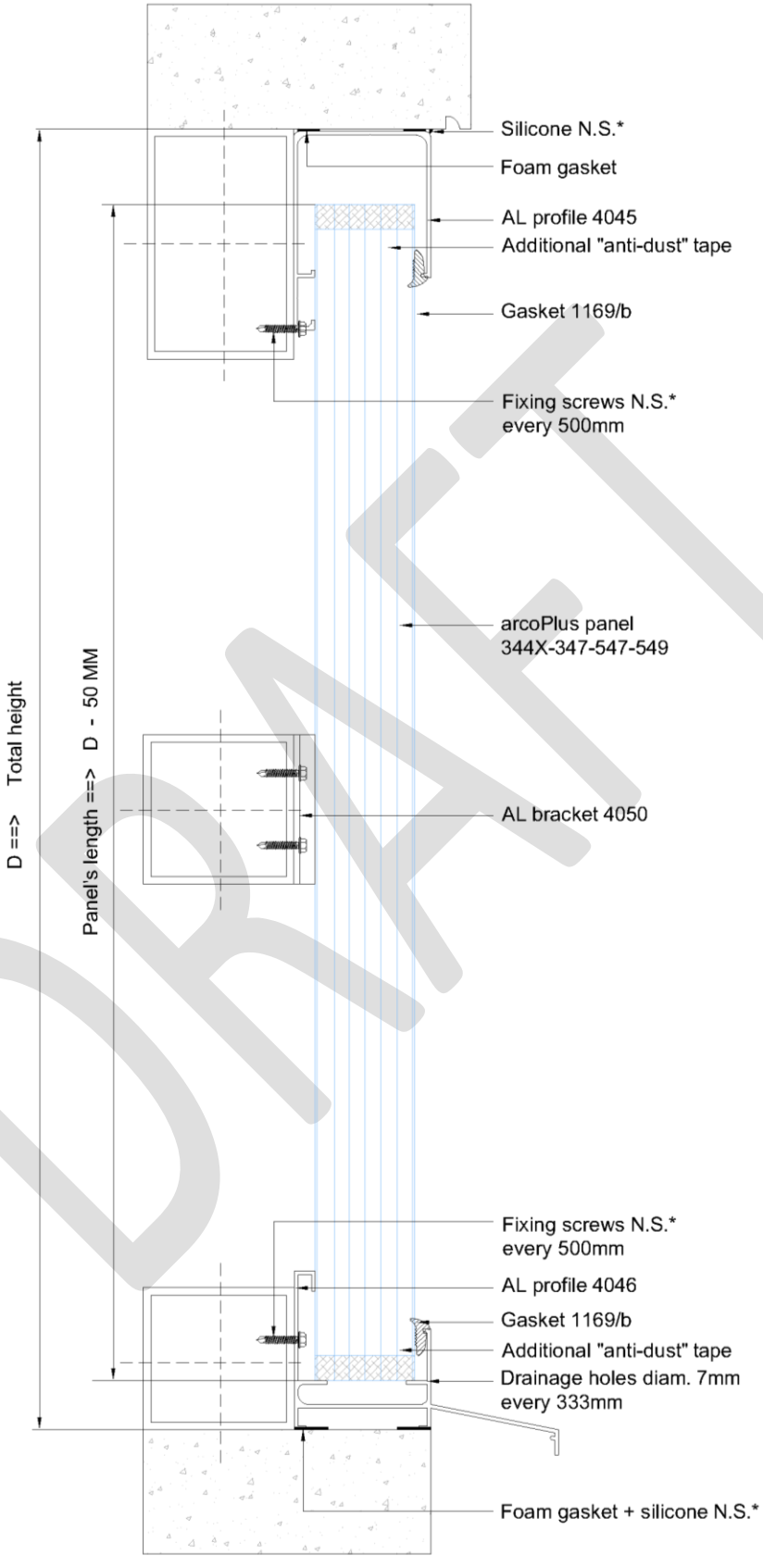


## Vertical installation: fitting between two supports with profiles cod. 4047 e 4045



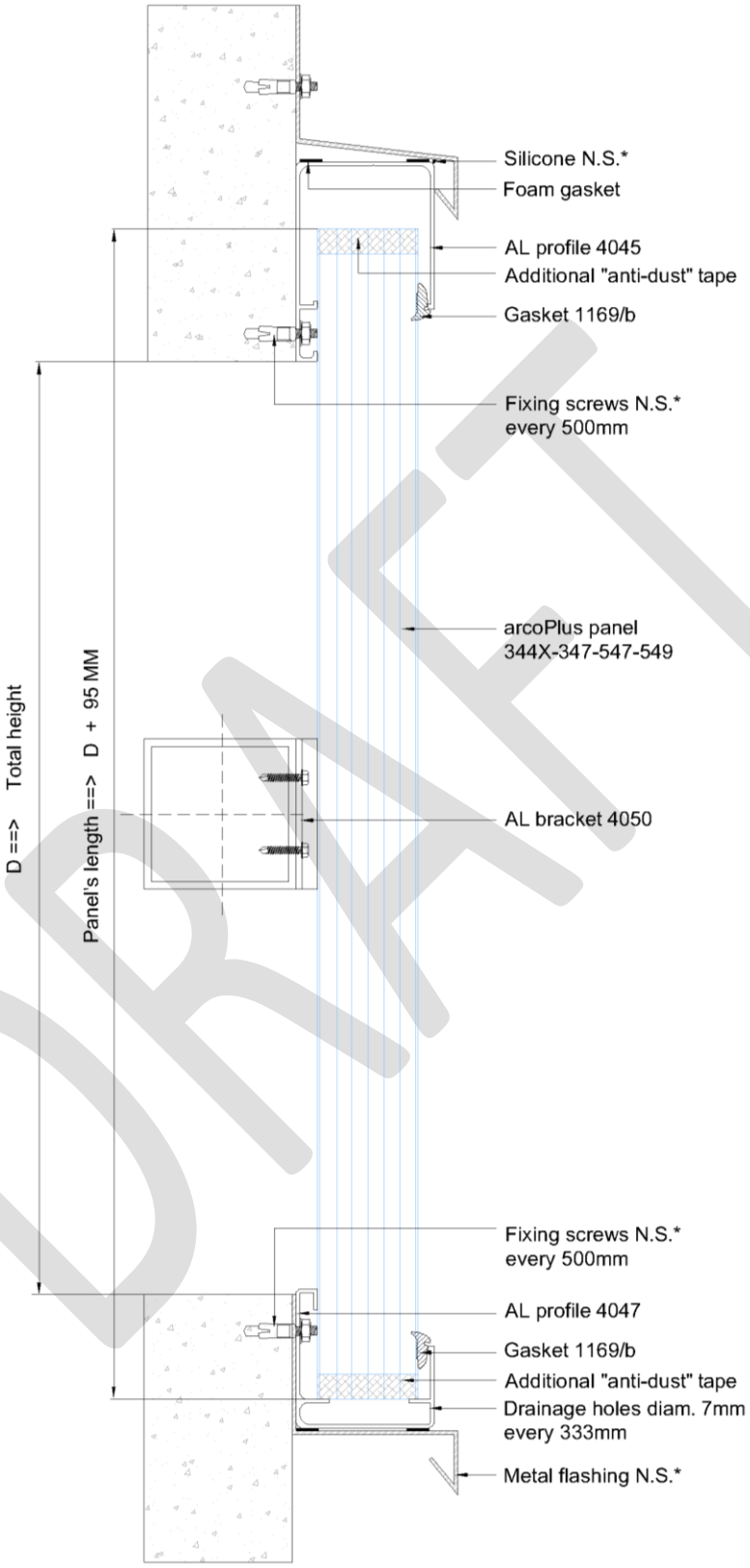

N.S.* = Not supplied by Gallina

## Vertical installation: fitting between two supports with profiles cod. 4046 e 4045



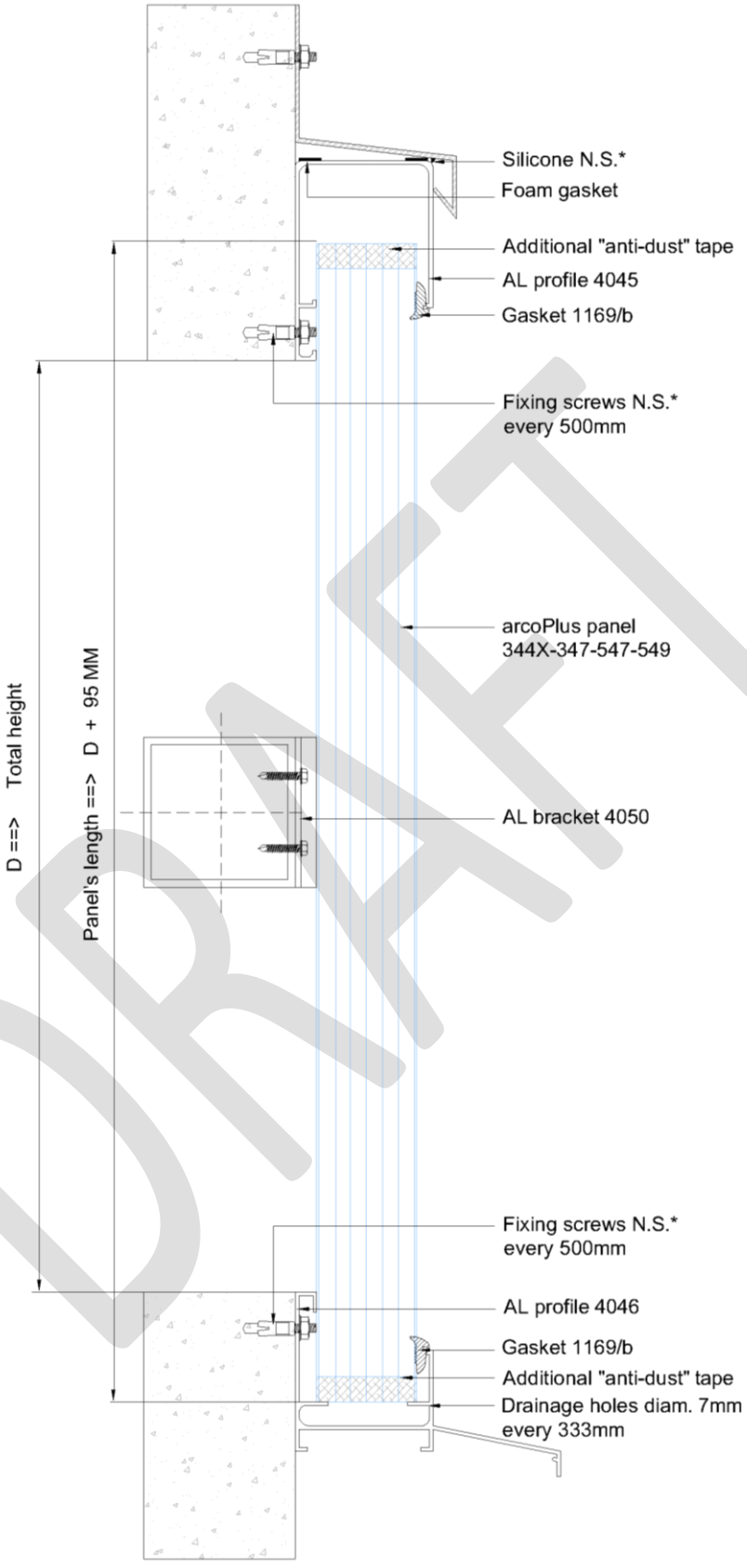

N.S.* = Not supplied by Gallina

## Vertical installation: front of the building installation with profiles cod. 4047 e 4045



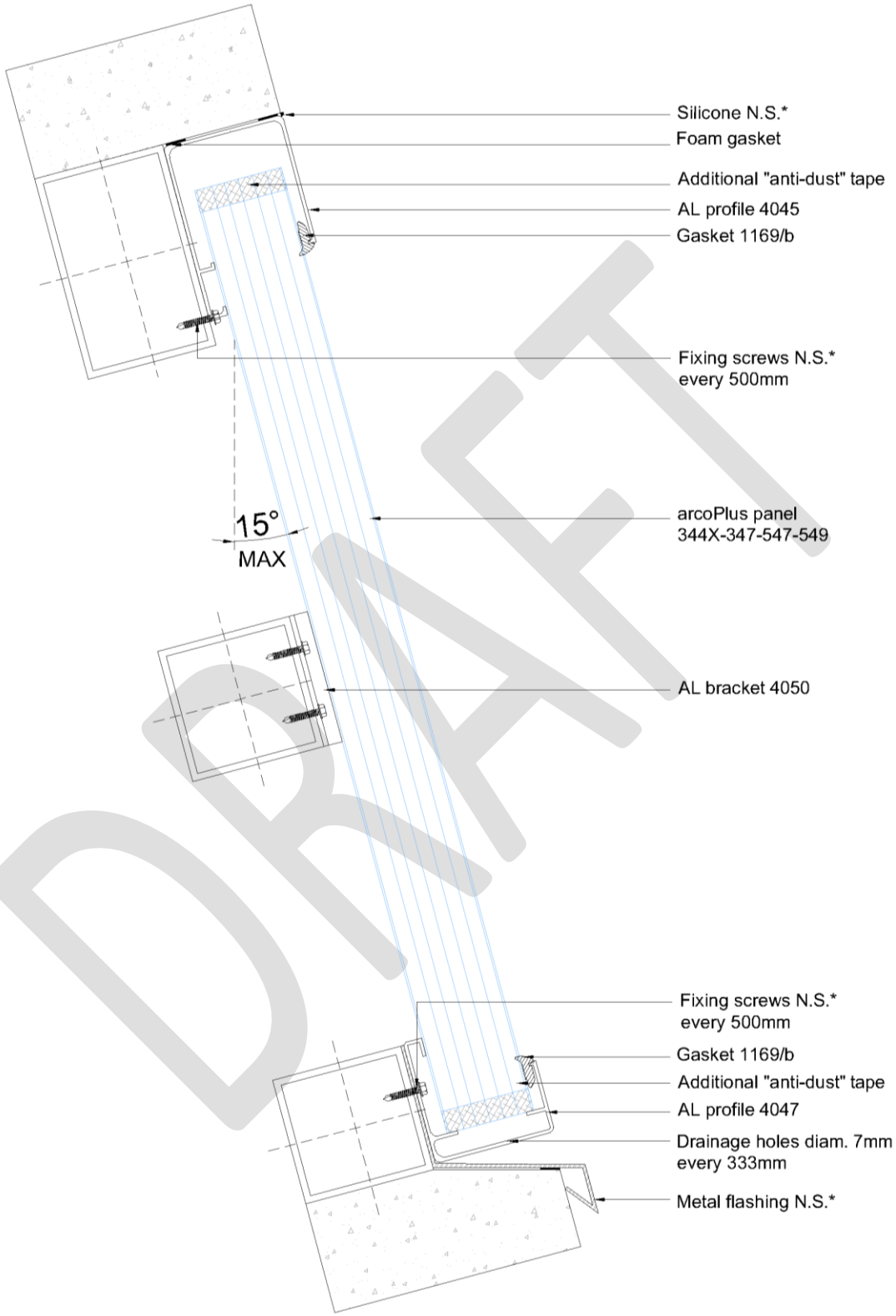

N.S.* = Not supplied by Gallina

## Vertical installation: front of the building installation with profiles cod. 4046 e 4045



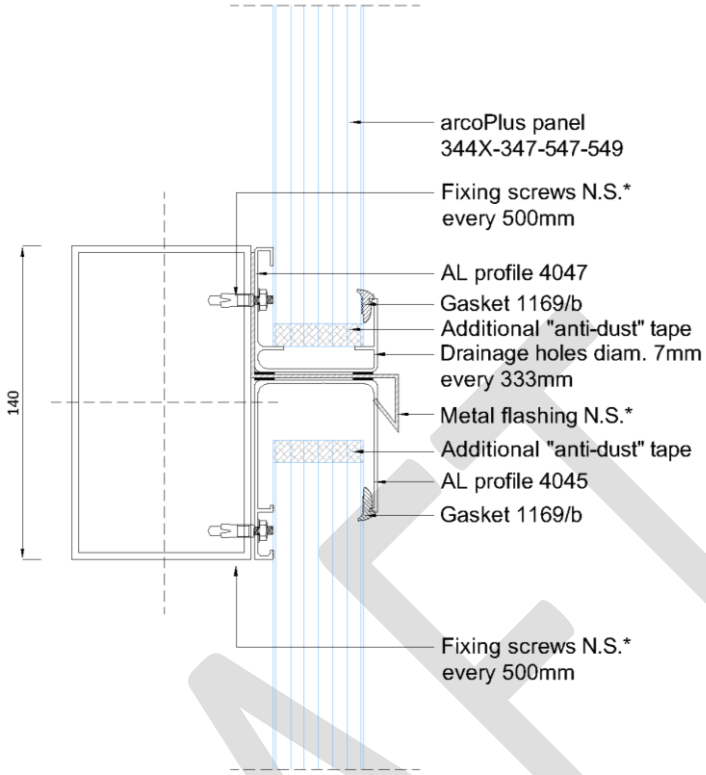

N.S.* = Not supplied by Gallina

## Inclined installation: fitting between two supports with profiles cod. 4047 e 4045

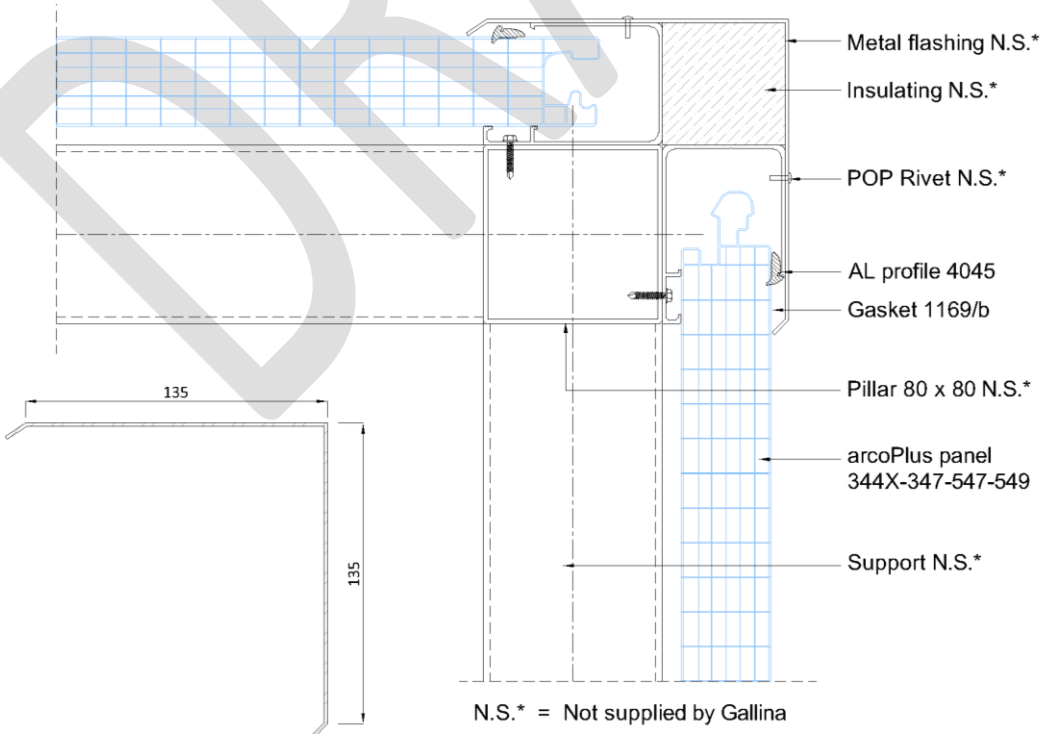



N.S.* = Not supplied by Gallina

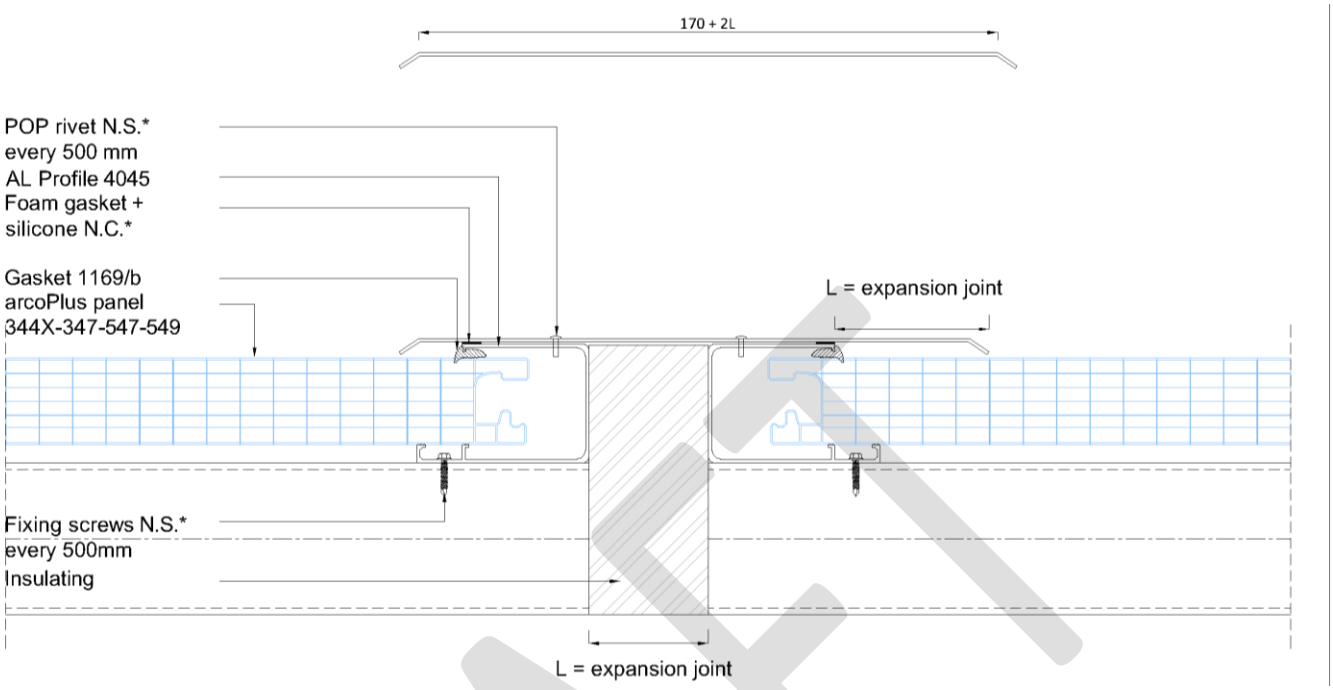
## Junction of superposed cladding with profiles cod. 4047 e 4045



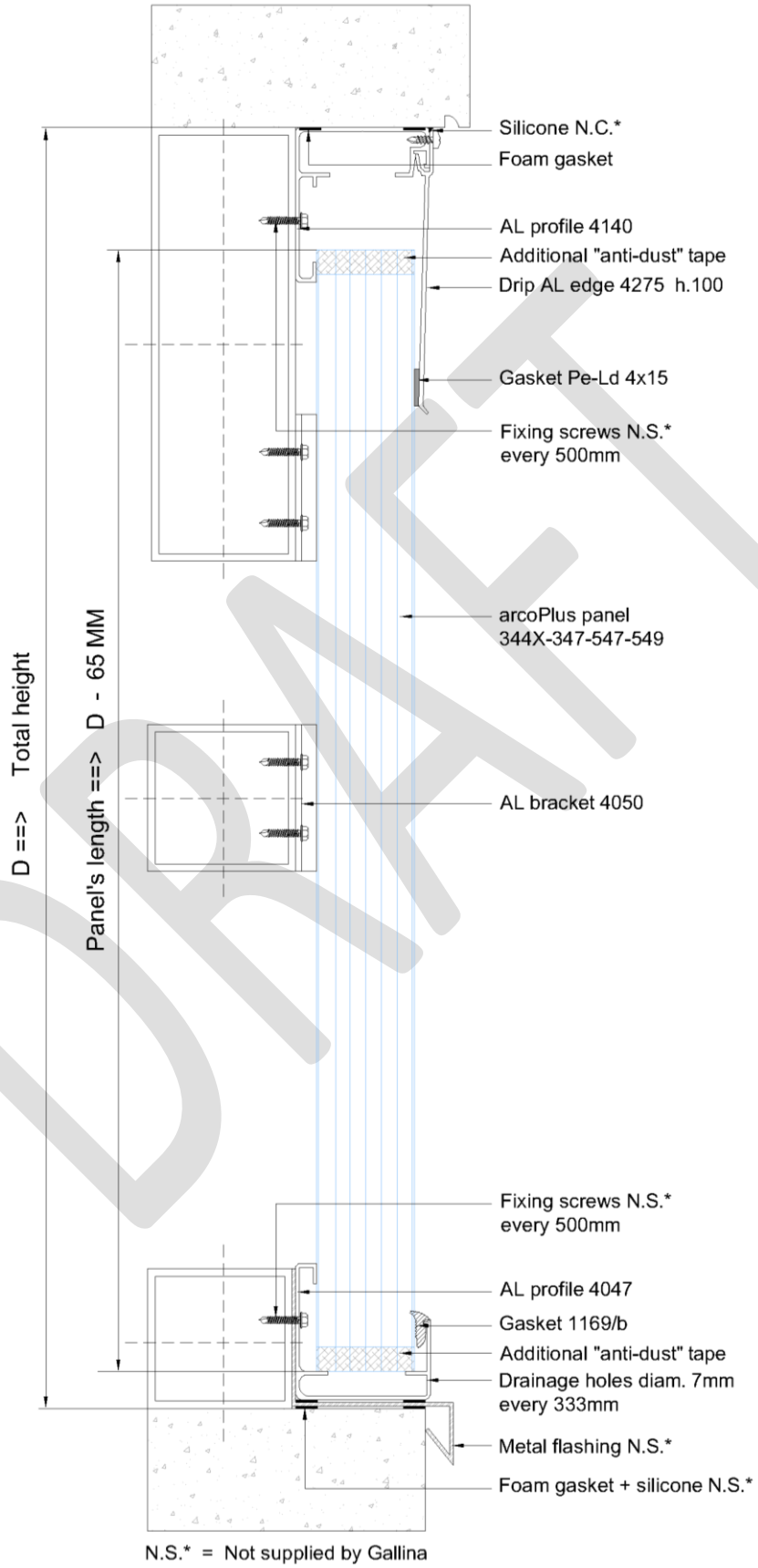

## Angle detail with standard profile cod. 4045



# Expansion joint's detail with standard profile cod.4045

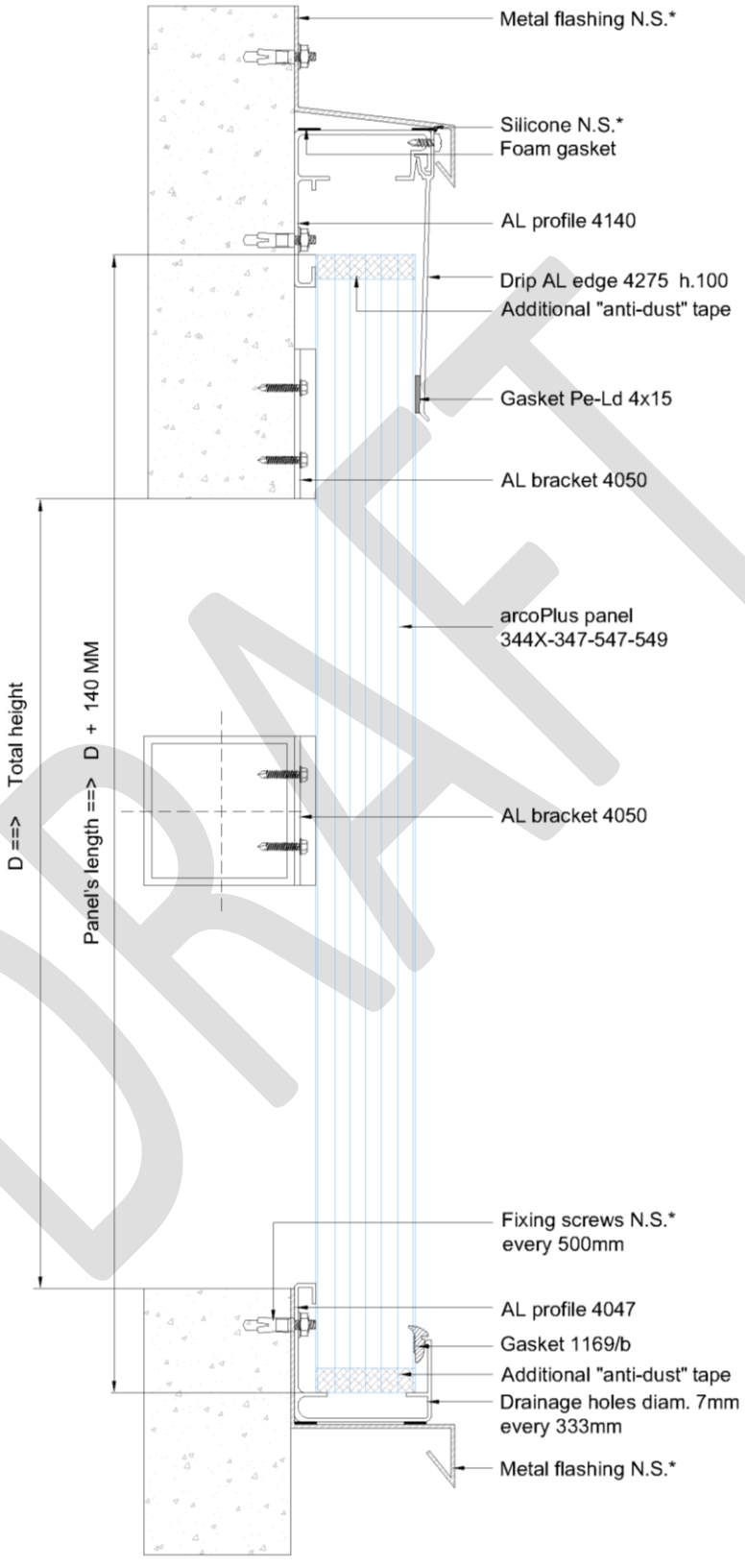


## Vertical installation: fitting between two supports for “grand longueur” with profiles cod. 4047 & 4140 + 4275



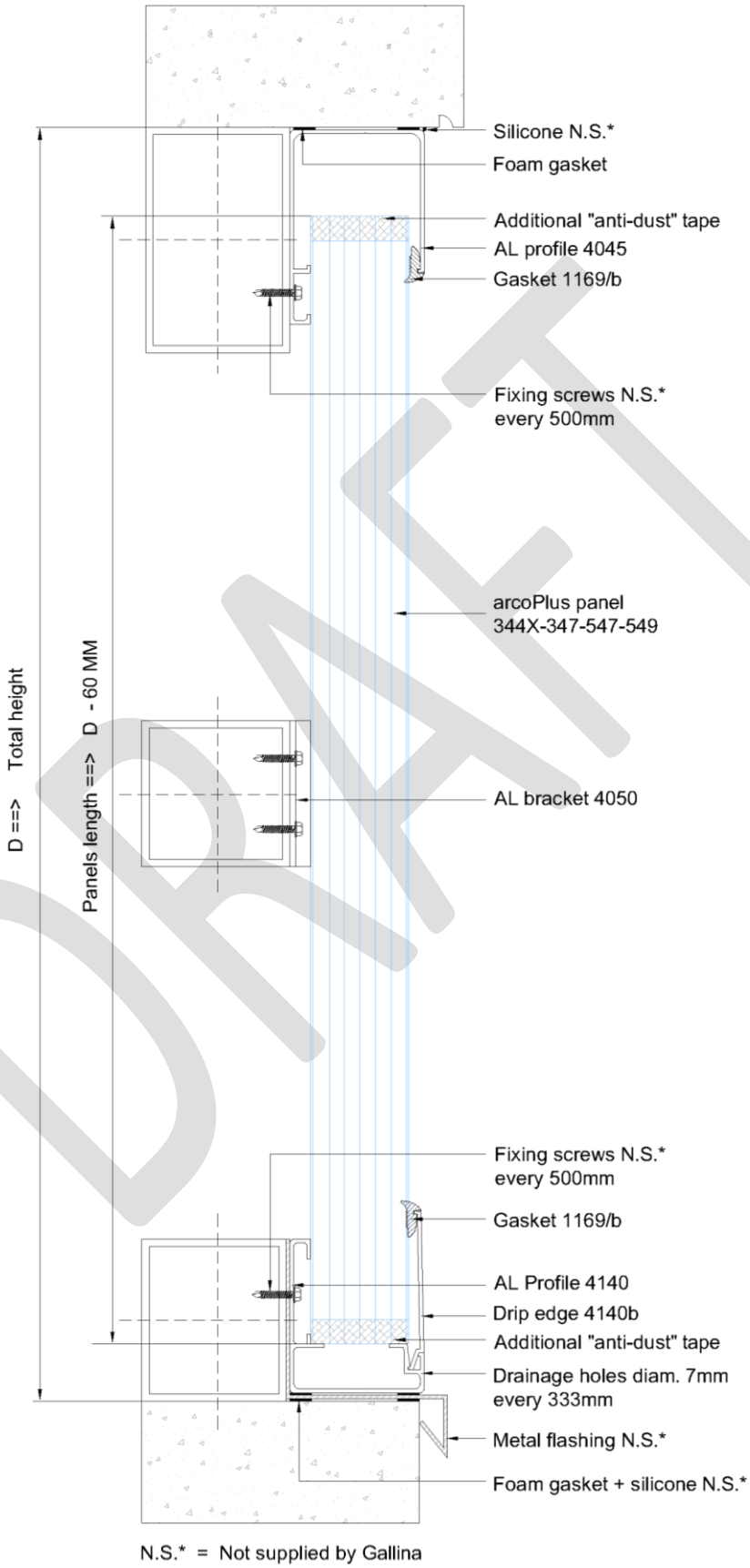

N.S.* = Not supplied by Gallina

# Vertical installation: front of the building installation for “grand longueur” cod. 4047 & 4140 + 4275



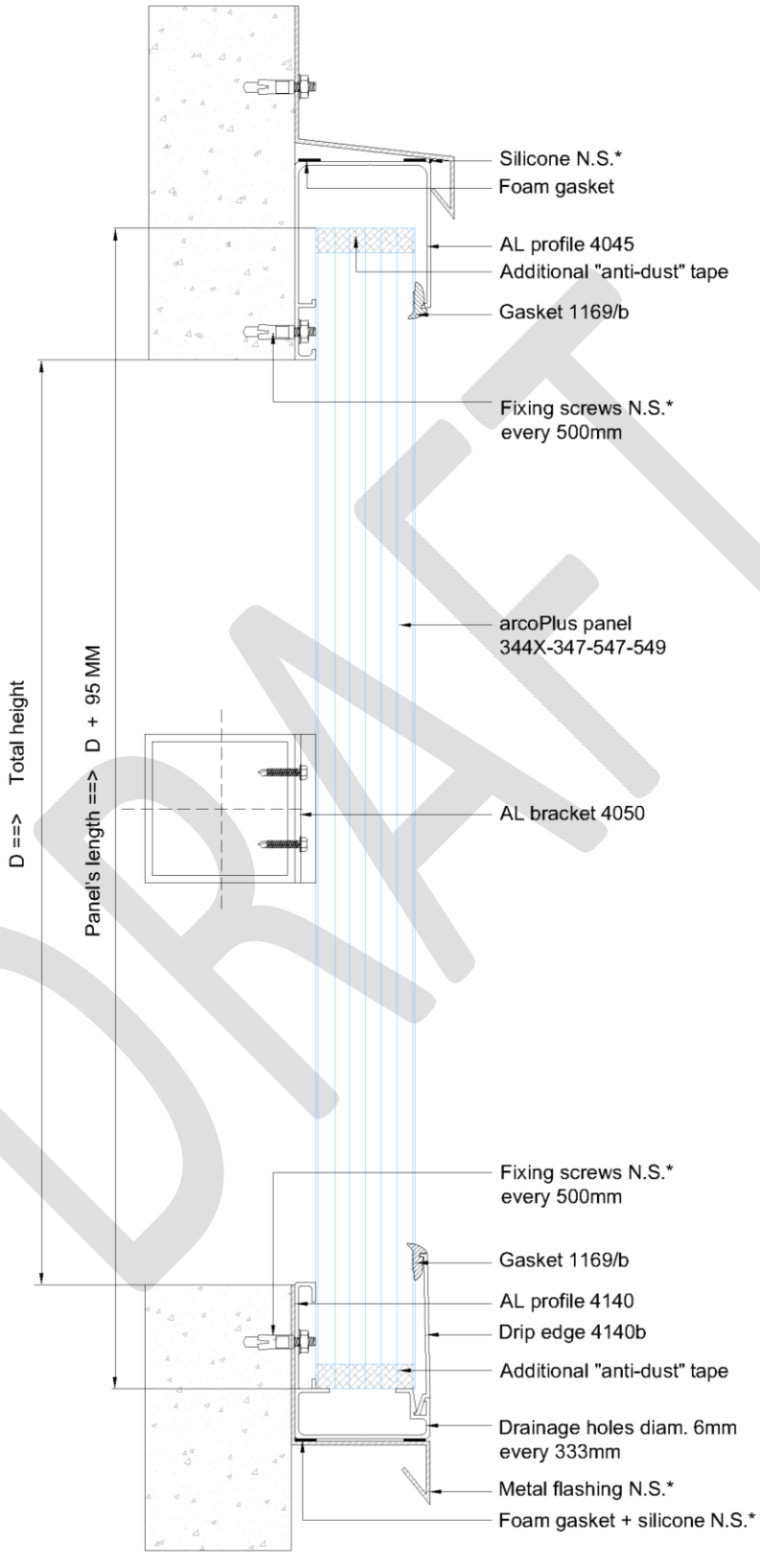

N.S.* = Not supplied by Gallina

## Vertical installation: fitting between two supports with frontal opening profiles cod. 4140



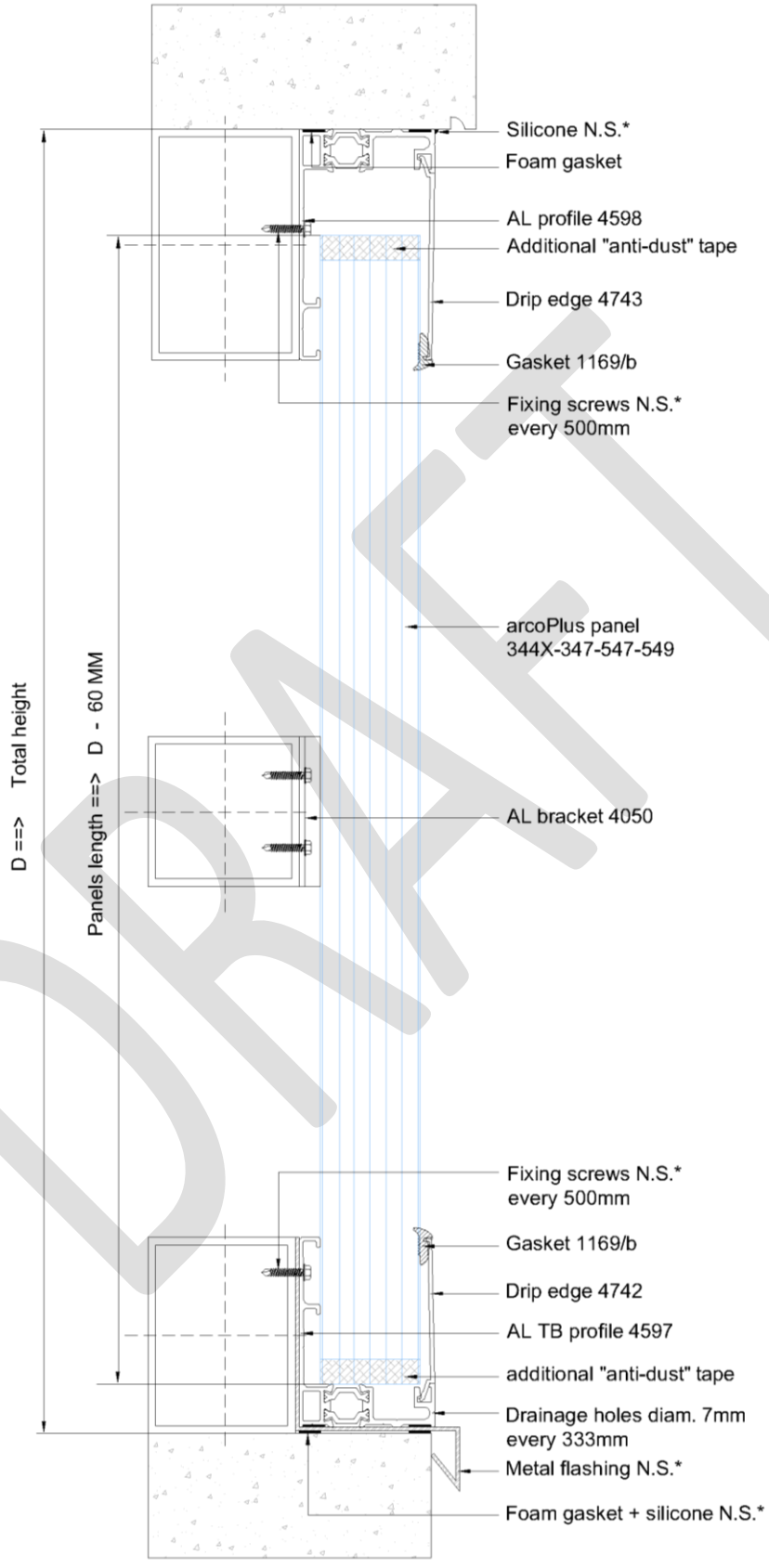

N.S.* = Not supplied by Gallina

## Vertical installation: front of the building installation with frontal opening profiles cod. 4140



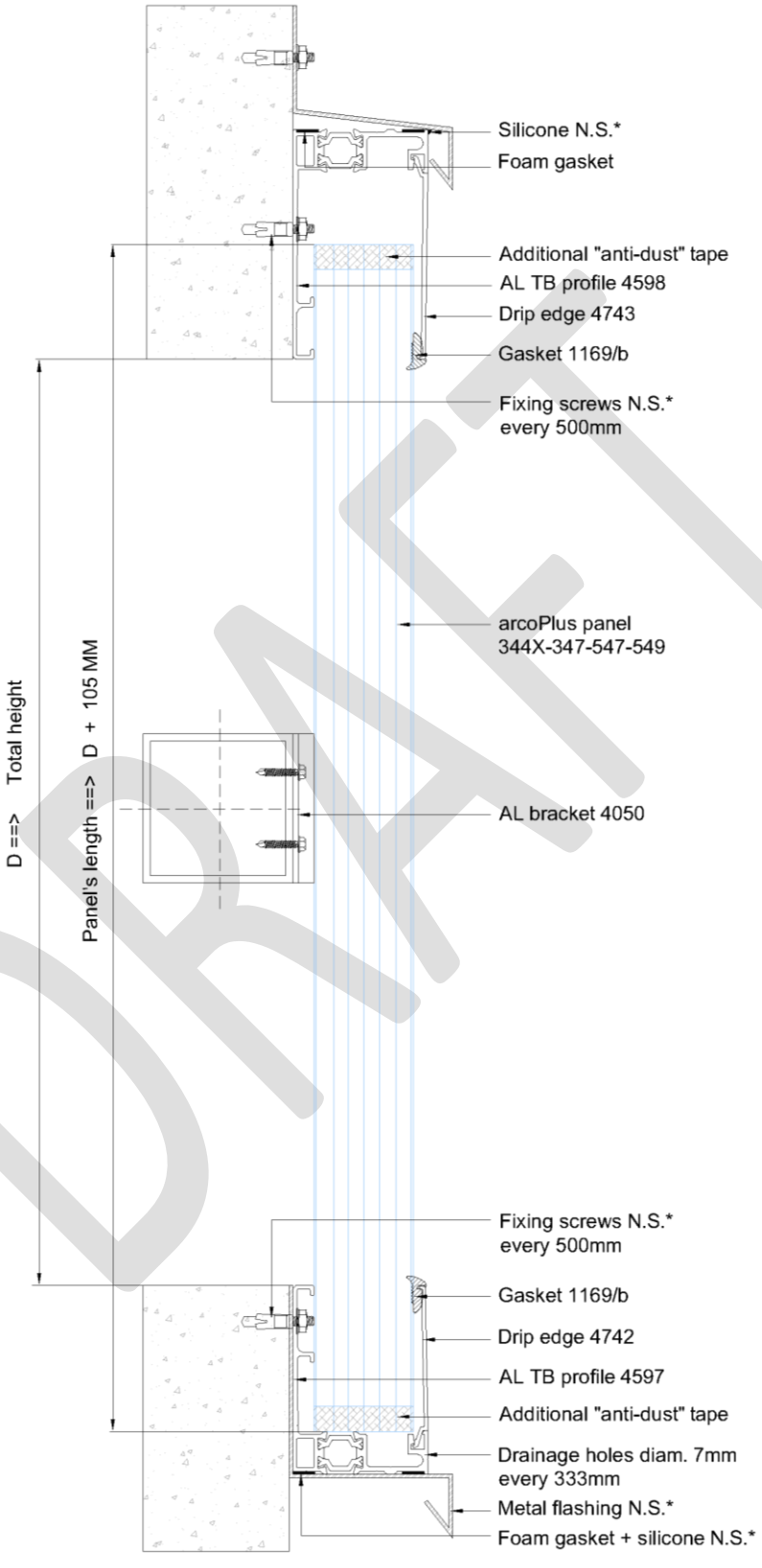

N.S.* = Not supplied by Gallina

## Vertical installation: fitting between two supports with TB profiles cod. 4597 e 4598



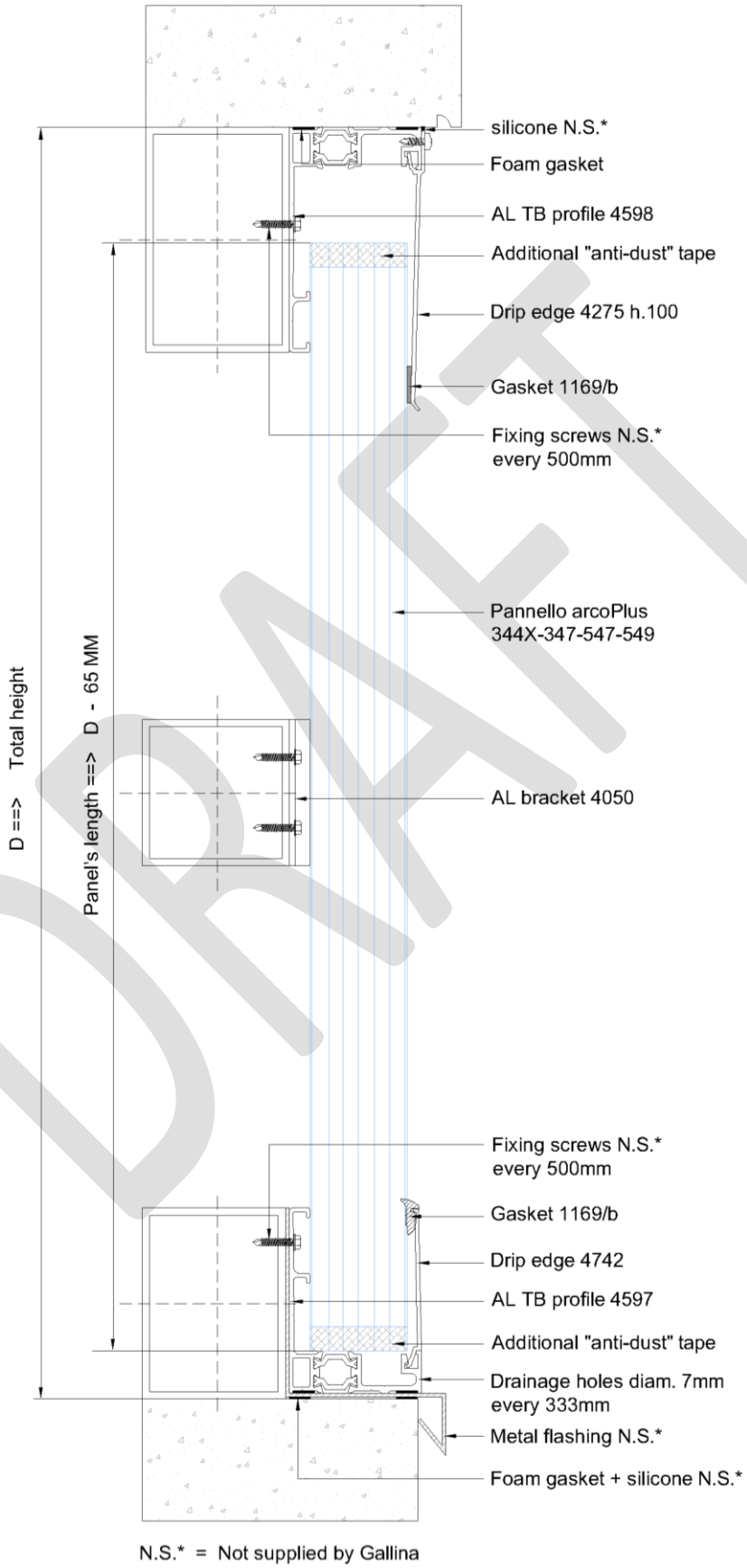

N.S.* = Not supplied by Gallina

## Vertical installation: front of the building installation with TB profiles cod. 4597 e 4598



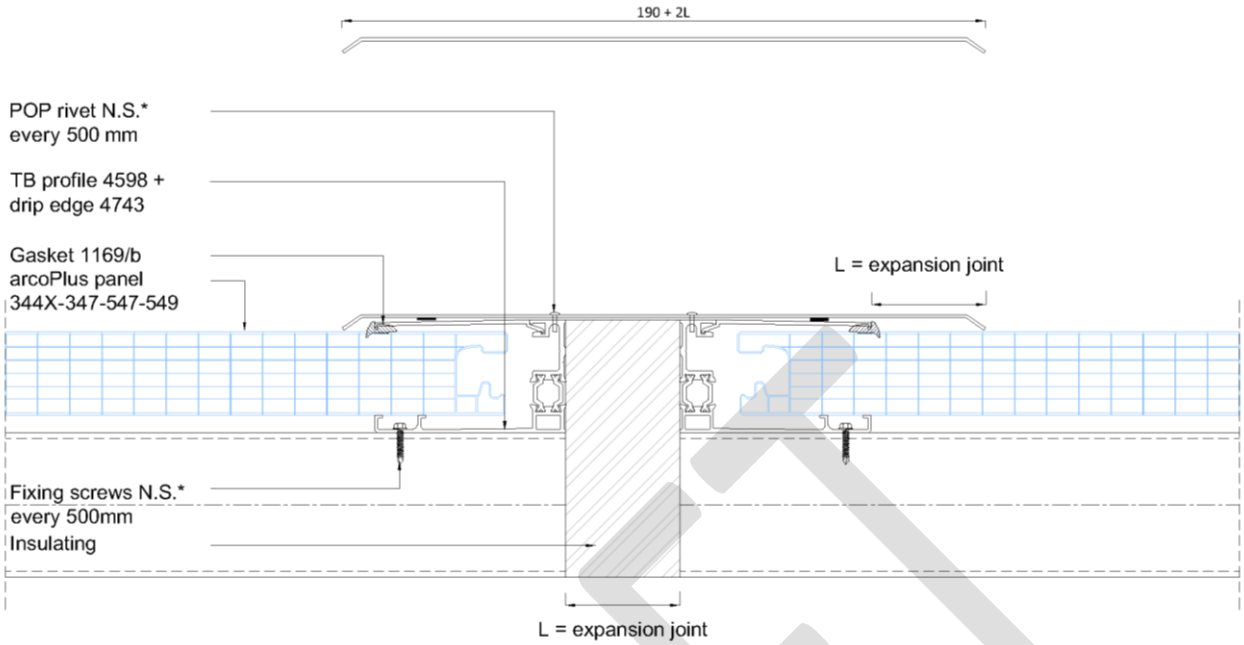

N.S.* = Not supplied by Gallina

## Vertical installation: fitting between two supports for “grand longueur” cod. 4597 & 4598 + 4275

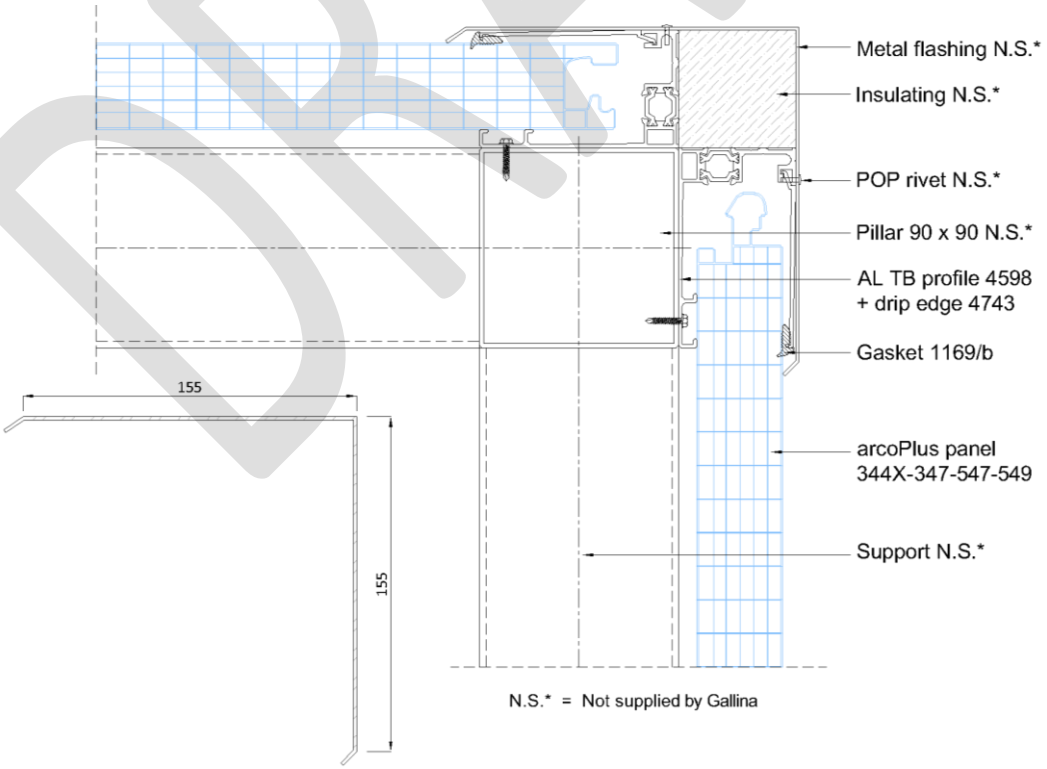



N.S.* = Not supplied by Gallina

## Expansion joint detail with profile 4598




## Corner detail with TB profiles cod. 4598



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