# Façade panels bonded on a wooden supporting structure

## Ventilated façade

### 1 General

These application instructions are specifically intended for the fastening with adhesive of EURO PANELS OVERSEAS N.V. façade panels as façade cladding on a ventilated and insulated structure in wood, fixed to a back construction. 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..

*Bonding on a metal supporting structure is a more durable system than bonding on a wooden supporting structure. Reference is made to the application instructions " Façade panels bonded on an aluminium supporting structure".*

### 2 Cladding material

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

| | |
|---|---|
| • ETER-COLOR | 8 mm |
| • TEXTURA | 8 mm |
| • NATURA | 8 mm |
| • NATURA PRO | 8 mm |
| • PICTURA | 8 mm |

Product data and processing information can be found in the product information sheets, available from EURO PANELS OVERSEAS N.V..

Only rectified boards may be used, non-rectified boards should not be used uncut.

REMARK: when sawing NATURA and NATURA PRO, the sawed edges must be impregnated with LUKO (a transparent impregnating agent) to minimize local colour differences due to moisture absorption.

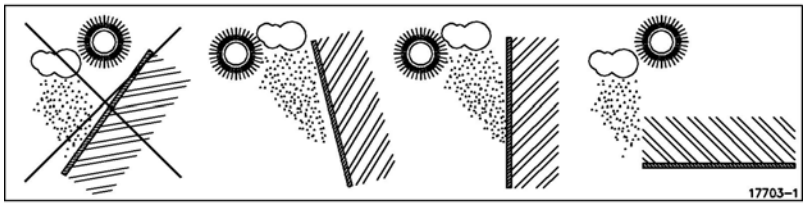
### 3 Area of application

These instructions apply for buildings up to a certain height and subjected to a maximum actual wind load in a certain wind zone. The maximum intermediate distance of the supporting structure is determined in relation to the occurring wind load taking into account a safety factor. The table below only shows non-binding reference values for the wind loads. The exact values can be found in the standards NBN B 03-002-1; NEN 6702:2001 and NBN-EN 1991-1-4.

| Location | Building height | Middle area façade | | Edge area façade and single span | |
|---|---|---|---|---|---|
| | | Max. actual wind load | Max. center-to-center distance supporting laths | Max. actual wind load | Max. center-to-center distance supporting laths |
| Wind zone | m | N/m² | mm | N/m² | mm |
| Land | 0-10 | 650 | 600 | 1000 | 500 |
| Land | 10-20 | 800 | 600 | 1200 | 500 |
| Land<br>Coast | 20-50<br>0-20 | 1000 | 500 | 1500 | 400 |

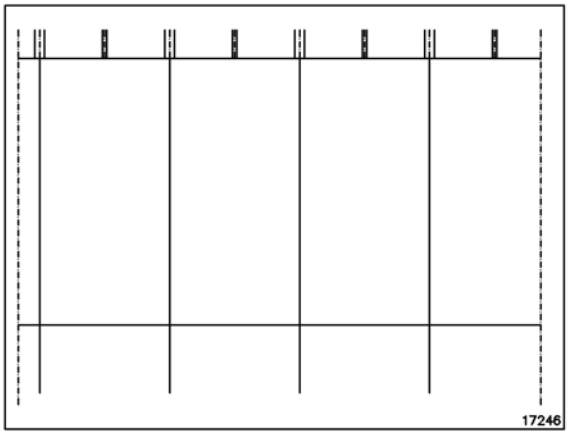
The width of the edge area amounts to at least 1 m from the corner of the building and must be further determined on the basis of prevailing national standards and conditions. If variations of the aforementioned load limits occur (e.g. due to certain location or form factors, etc.), the design must be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

When the façade panels are exposed to weather conditions (rain, sun) they may only be assembled on a vertical or leaned over supporting structure. For ceiling applications reference is made to the relevant application guidelines.

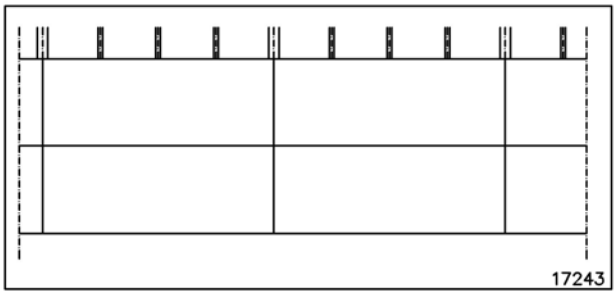


## 4 Patterns with large-size façade panels

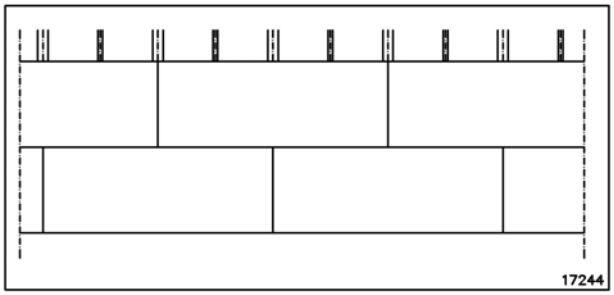
The following patterns with large-size façade panels are possible. For aesthetic reasons, use rectified (= cut rectangularly) façade panels only.



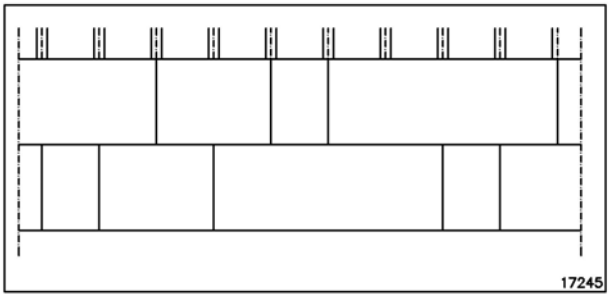

Straight pattern
with vertical panels




Straight pattern
with horizontal panels




Semi pattern
with horizontal panels




Free pattern
with horizontal panels

NOTE: semi pattern and free pattern are only advised for dark colours.

## 5 Supporting structure

The EURO PANELS OVERSEAS N.V. large-size façade panels are fixed on vertical wooden supporting laths. The vertical supporting laths are fixed at a certain distance (depending on the required insulation thickness and air cavity) on the back construction by means of adjustable brackets or horizontal wooden cross laths.

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

- maximum buckle under the influence of strain : ≤ span/300
- safety factor calculation of strength : 3

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.

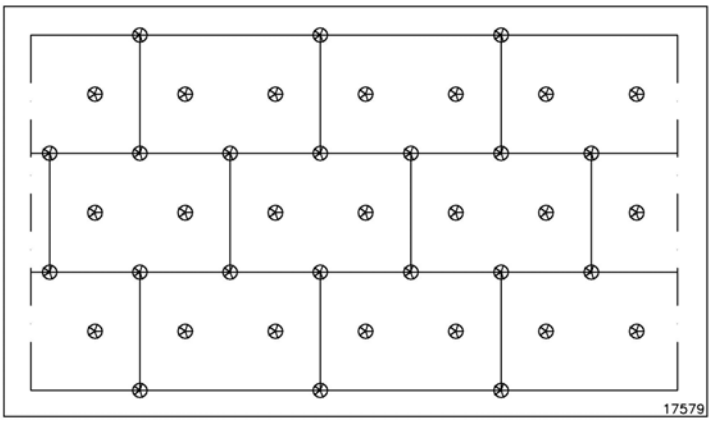
- minimum characteristic bending strength of wood : 18 N/mm$^2$
- minimum average modulus of elasticity : 9000 N/mm$^2$

The fastening of EURO PANELS OVERSEAS N.V. façade panels 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 façade panels could result physic problems for the construction and differences in colours under influence of humidity for panels with a semi-transparent coating.

- ventilation openings above/below : ≥ 10 mm/m or 100 cm$^2$/m

| Building height | 0-10 m | 10-20 m | 20-50 m |
|---|---|---|---|
| Minimum cavity width | 20 mm | 25 mm | 30 mm |

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




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

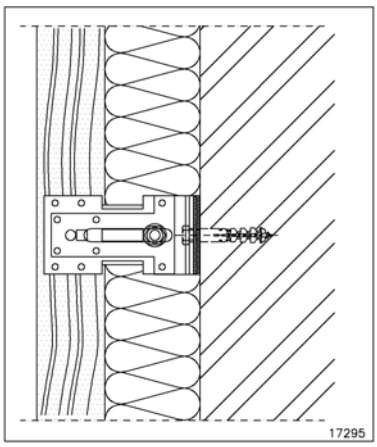
It is preferable to isolate the bracket from the supporting wall by placing a piece of hard insulation material (THERMOSTOP) between the supporting wall and the bracket.

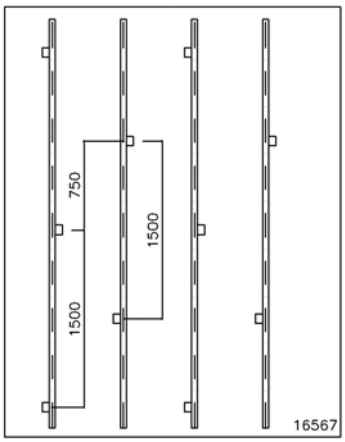
If the wooden supporting laths are fixed on horizontal wooden cross laths, the insulation is placed in between the horizontal cross laths before fixing the wooden supporting laths.

# Façade panels bonded on a wooden supporting structure

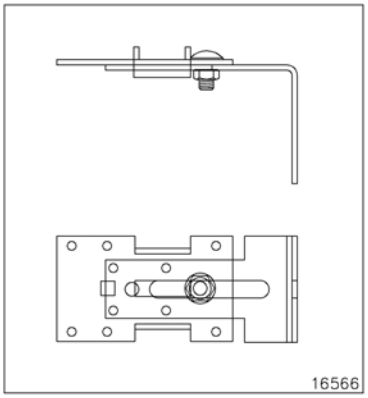
VARIANT 1: INSULATION BETWEEN ADJUSTABLE BRACKETS

With uneven back constructions the vertical wooden supporting laths can be fixed using adjustable brackets. Corner brackets are available on request for the corners.

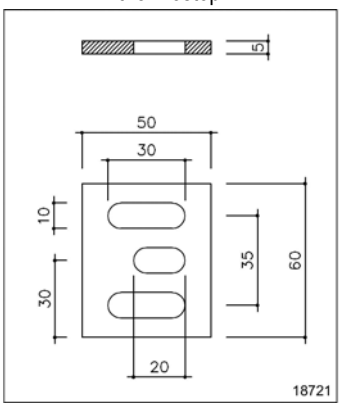



Adjustable bracket




thermostop




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
- continuous remote control : 60 - 120 mm (back construction - rear lath)

The fixing of the adjustable brackets to the back construction is individually determined for each project depending on the nature and the state of the wall to be cladded.

In general a minimum pull-out value per fixing point of 3 kN (300kg) is recommended. This must however be verified for each project. For concrete and solid brick a stainless steel wood screw (min. 7 mm diameter) with a hexagonal head and associated nylon plug is used. The screws with hexagonal head are, however, not tightened too firmly so thread in the nylon plug is not damaged.

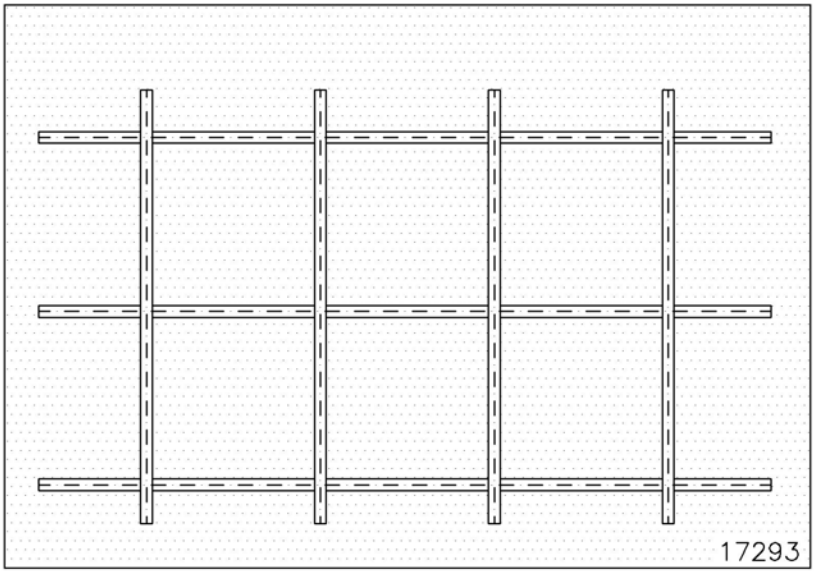
For other surfaces (hollow brick, cellular concrete, system walls, etc.) suitable fastening means must be used to be able to accommodate the tractive force occurring as a result of the wind load and the shearing forces as a result of the own weight. If necessary a pull-test must be conducted on site. The supporting laths are to be fixed to the adjustable bracket by means of four stainless steel wood screws per bracket. The screws must penetrate at least 25 mm in the supporting lath.

To obtain a stable supporting structure, the adjustable brackets are alternately placed to the left and the right of the supporting lath. The brackets of two supporting laths located next to each other are also fitted staggered.

# Façade panels bonded on a wooden supporting structure

VARIANT 2: INSULATION BETWEEN HORIZONTAL CROSS LATHS

For wooden frame constructions or sufficiently smooth back constructions, the insulation is placed between horizontal wooden cross laths to which the vertical supporting laths are fixed.



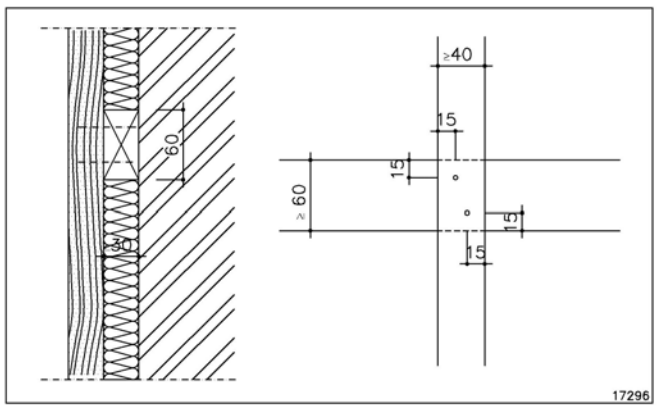

The fixing of the horizontal cross laths to the back construction is individually determined for each project depending on the nature and the state of the wall to be cladded.

In general a minimum pull-out value per fixing point of 3 kN (300kg) is recommended. This must however be verified for each project. For concrete and solid brick a stainless steel wood screw (min. 7 mm diameter) with a countersunk head and nylon plug is usually used. The screws are, however, not tightened too firmly so thread in the nylon plug is not damaged.

For other surfaces (hollow brick, cellular concrete, system walls, etc.) suitable fastening means must be used to be able to accommodate the tractive force occurring as a result of the wind load and the shearing forces as a result of the own weight. If necessary a pull-test must be conducted on site.

The vertical supporting laths are fixed to the horizontal wooden cross laths by two stainless steel wood screws per crossing point.

- minimum width of horizontal cross lath : 60 mm
- minimum thickness of horizontal cross lath : 30 mm



VERTICAL WOODEN SUPPORTING LATHS

The vertical wooden supporting laths are planed on one side and aligned in the same plane when placing to obtain sufficient evenness. The wood must also be sufficiently stable so that alignment is retained. A small expansion joint is left between the wooden supporting laths.

- maximum unevenness : ≤ L/1000
- joint between supporting laths : ≥ 5mm

The wooden supporting laths are placed vertically so that penetrating or condensation water can run down from the back of the panel (and does not stagnate on the wooden laths). The design plan of the façade cladding shows the supporting laths.

The wooden supporting laths must be sufficiently wide for sufficient water sealing and the correct fitting of the fastening accessories. At vertical joints it is recommended to use slightly wider wooden supporting laths than the minimum width to be able to accommodate tolerances in alignment (and therefore avoid "air screws").

| Fastening | glue |
|---|---|
| Minimal width supporting lath without joint | ≥ 40 mm |
| Minimal width supporting lath with joint | ≥ 100 mm |
| Advised width supporting lath with joint | 100 mm |

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

Fixing of the supporting laths with adjustable brackets

- Minimum thickness of supporting laths : 50 mm
- Maximum distance between brackets : maximum 1500 mm

Fixing of supporting laths on horizontal cross laths

| Distance between horizontal cross laths | Minimum thickness of the vertical supporting laths |
|---|---|
| 600 mm | ≥ 30 mm |
| 800 mm | ≥ 35 mm |
| 1000 mm | ≥ 40 mm |
| 1200 mm | ≥ 45 mm |
| 1500 mm | ≥ 50 mm |

APPLICATION PROCEDURE

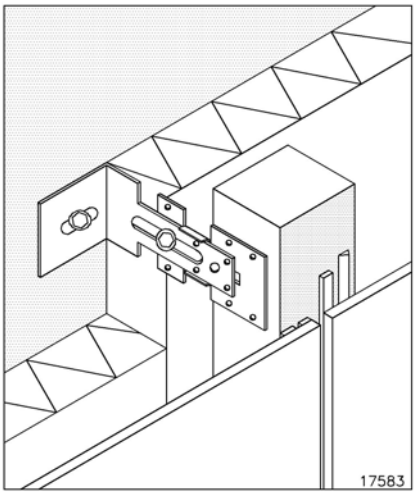
The following procedure can be used for the fitting of large-size façade panels on a wooden supporting structure fixed with adjustable brackets.

1. Check the straightness of the wooden laths
2. Use the façade cladding design plan to mark off the centre to centre distances between the supporting laths on the façade by means of a plumb-rule or a laser
3. Fit the adjustable brackets
4. Fit the supporting laths on the brackets
5. Align the supporting laths horizontally and vertically in a section by the gradual arrangement of the brackets (maximum unevenness is less than L/1000)
6. Fit the EURO PANELS OVERSEAS N.V. large-size façade panels. One starts at the top of and fits the panels using a metal lath with straight edge that is clamped on the supporting laths. Damaging the panel is avoided by assembling from top to bottom. Calibrated plates can be used to assemble the panels with the correct joint width. To obtain an attractive result it is best to minimise the tolerance of the vertical joints compared to the tolerance of the horizontal joints.
7. The calibrated plates have to be removed carefully in order not to damage the edges of the panel.

## 6 Fixing method

### 6.1. Invisible fixing through bonding[1]

*Bonding must always take place in accordance with the conditions of the supplier of the bonding system and under his supervision and guarantee conditions. Gluing on a metal supporting structure is a more durable method than gluing on a wooden supporting structure.*




Whether panels can be glued or not depends on the chosen bonding system. The following table gives an overview of the different suppliers that have bonding systems for the indicated Euro Panels Overseas N.V. façade panels.

| | Textura | Natura | Eter-Color | Pictura | Natura Pro |
|---|---|---|---|---|---|
| Bostik | ● | ● | | ● | ● |
| Innotec | ● | ● | | ● | ● |
| Sika | ● | ● | | ● | ● |
| Soudal | | PA | | | |
| Tweha | ● | ● | ● | ● | ● |

PA= project advice

- Always consult the complete gluing advice of the manufacturer of the glue!
- An excellent quality of the glue can only be obtained by strictly following these instructions.
- Always work with certified products (KOMO, ATG or equivalent), tested on Euro Panels Overseas N.V. material.
- The above mentioned list is regularly subject to changes. Always consult the manufacturer of the glue to be informed on the latest updates.

Depending on the chosen bonding system it is possible that:

- The backside of the panel must be raised with sandpaper P80 on the spot of the adhesive bonding
- The supporting laths must undergo prior treatment with an adhesion primer. Hereby the supporting laths must suffice with regard to the requirements made for the application of the adhesion primer (e.g. maximal moisture level, prescribed wood preservation techniques).
- The façade panel must be cleaned and be given prior treatment with an adhesion primer.

A double-sided adhesive strip is applied as support for the façade panel during the hardening period of the glue, while also indicating the distance between the façade panel and the wooden supporting laths. The correct quantity of glue must be applied. The application of the façade panel requires the necessary precision.

Gluing always has to be done on multiple support structure, or in other words, gluing on a simple support structure is forbidden because of aesthetic reasons.

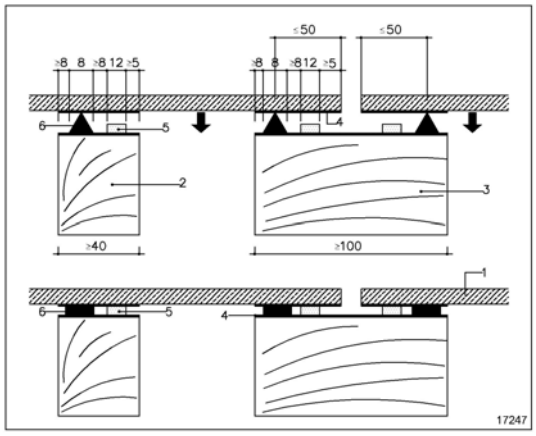
[1] The maximum height can be restricted by the conditions of the supplier of the glue or by prevailing legislation.

## 6.2. Edge distance

The following maximum edge distance must be respected.

- Maximum edge distance of the adhesive : 50 mm

The following schematic drawing illustrates the gluing procedure.




1. façade panel
2. supporting lath without joint
3. supporting lath with joint
4. adhesion primer
5. double-sided adhesive strip
6. glue

## 6.3. Maximum distance between the fixing accessories

The horizontal centre to centre distance between the fixing accessories is determined by:
- the width of the panel
- the maximum distance centre to centre distance between the vertical supporting structure (see § 3 page 1)
- the maximum distance between the fastening accessories in relation to the actual wind load
- the distances from the edge of the fastening accessories (see § 6.2)
- the joint opening

As a general rule the following maximum distances between the fixing accessories must be respected.

| Actual wind load | Maximum center-to-center distance for the fixing accessories |
|---|---|
| N/m² | mm |
| ≤ 800 | 600 |
| ≤ 1200 | 500 |
| ≤ 1500 | 400 |
| > 1500 | 300 |

For single spans the following maximum distances between the fixing accessories must be respected.

| | Maximale centre distance of fasteners | |
|---|---|---|
| | mm | |
| | Land 0-20 m | Land 20-50 m<br>Coast 0-20 m |
| Single span | 500 | 400 |

Example (fixing with glue):
width of panel = 1220 mm, maximum distance between adhesive beads = 600 mm, edge distance adhesive bead = 50 mm, joint opening = 10 mm

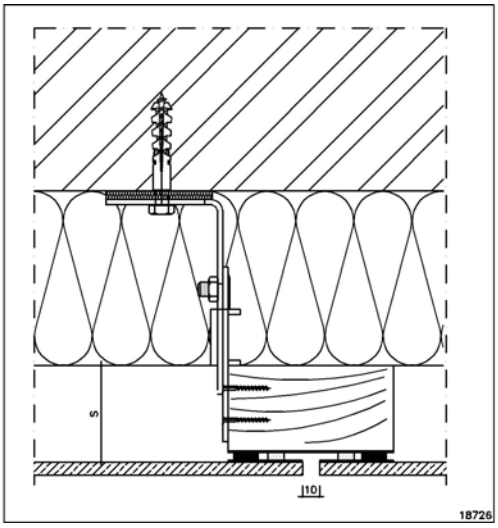
→→→centre to centre distance between supporting profiles = (1220+10)/2 = 615 mm
→→→ distance between the adhesive beads = (1220-2*50)/2 = 560 mm ≤ 600 mm

## 7 Joints

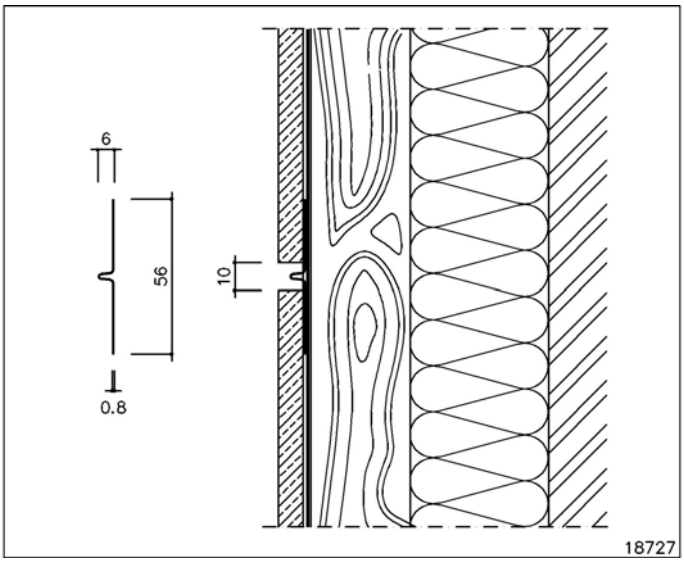
The façade panels are fixed with open joints to allow the free movement of the panel.

- joint width (horizontal/vertical) : 10 mm
- maximum thickness of underlying finishing profiles : 0.8 mm

At the vertical joints, the supporting laths are treated with the black adhesion primer of the gluing system. The vertical joints can be finished with decorative covering sections in wood or aluminium.




The horizontal joints can be finished with a black aluminium joint profile. This is particularly useful when the underlying insulation must be protected against the infiltration of rain. The part of the aluminium profile behind the panel may not be too thick to avoid tension. If this is the case, the wings of the profile must be wide enough for the fixing of the panel through the joint profile. The horizontal joint section is the same width as the panel so the vertical joint remains open. One can also make use of decorative horizontal joint sections. If necessary, the horizontal joints can be left open.



## 8 Accessories[2]

The following accessories can be obtained from EURO PANELS OVERSEAS N.V..

| | | |
|---|---|---|
| Horizontal joint profile | Black coated aluminium | 56 x 2500 mm |
| Perforated sealing profile | Blank aluminium | 50 x 30 x 2500 mm |
| Perforated sealing profile | Blank aluminium | 70 x 30 x 2500 mm |
| Perforated sealing profile | Blank aluminium | 100 x 30 x 2500 mm |
| Outer corner profile | Black pvc | 12 x 12 x 2500 mm |
| Outer corner profile | Anodised extruded aluminium | 12 x 12 x 2500 mm |
| Outer corner profile | Black coated aluminium | 15 x 15 x 2500 mm |
| Open outer corner profile | Black coated aluminium | 17 x 17 x 2500 mm |
| Connection profile window | Black coated aluminium | 8 x 15 x 45 x 3000 mm |
| Single sided adhesive foam strip | PVC | 6 x 9 mm x 15 rm |

## 9 Other construction details

*Movements in the metal sections (corner section, bottom section, etc.) must always be detached from the panels. If necessary, the aluminium sections must be pre-drilled, and are fixed according to the principle of fixed and free fastening points. Joints between the metal sections must coincide with joints between the panels.*

*Finishing sections in metals that can leach (such as zinc, copper, lead, etc.) are advised against because of possible soiling.*

The following construction details can be found on the EURO PANELS OVERSEAS N.V. website.

OUTER CORNER: Corner finishing can be provided by means of a finishing profile of aluminium or PVC.

INNER CORNER: A finishing profile in aluminium or PVC can also be used here.

TOP FINISHING: Sufficient ventilation openings must be provided.

BOTTOM FINISHING: The open cavity between the back of the panel and the insulation or the back construction must be sealed at the bottom by a perforated aluminium sealing profile. This profile prevents the entry of birds and vermin. The raised leg of the sealing profile is clamped between the aluminium supporting profile and the panel and is not thicker than 0,8 mm.

WINDOW FINISHING WITH RETURN: Sufficient ventilation openings must be provided at the top and bottom of the window. The corner can be finished by means of a finishing profile in aluminium or PVC or special corner pieces.

WINDOW FINISHING WITHOUT RETURN: Sufficient ventilation openings must be provided at the top and bottom of the window. The corner can be finished by means of a finishing profile in aluminium or PVC.

EXPANSION JOINT: The expansion joints in the building must also be included in the cladding. They are obtained by placing an aluminium profile on both sides of the joint.

[2] Use Euro Panels Overseas N.V. accessories; not using standard Euro Panels Overseas N.V. accessories may lead to cancellation of the Euro Panels Overseas N.V. guarantee.

## 10 Information on external suppliers

The following manufacturers of glue dispose of specific gluing advices and warranty declarations.

| | |
|---|---|
| Bostik | www.bostik.com |
| Innotec | www.innotec-world.com |
| SIKA | www.sika.com |
| Soudal | www.soudal.com |
| Tweha | www.tweha.nl |

## 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..

EURO PANELS OVERSEAS NV,
p.o. Central Services
Kuiermansstraat 1
B-1880 Kapelle-op-den-Bos
Belgium
Tel 0032 (0)15 71 73 80
Fax 0032 (0)15 71 73 89
info@europanels.be
www.europanels.be

Registered office address: Bormstraat 24, B-2830 Willebroek - BELGIUM
RPR 0 466 056 888, Mechelen – VAT BE 0 466 056 888 – Bank account nr. 482-9098051-96