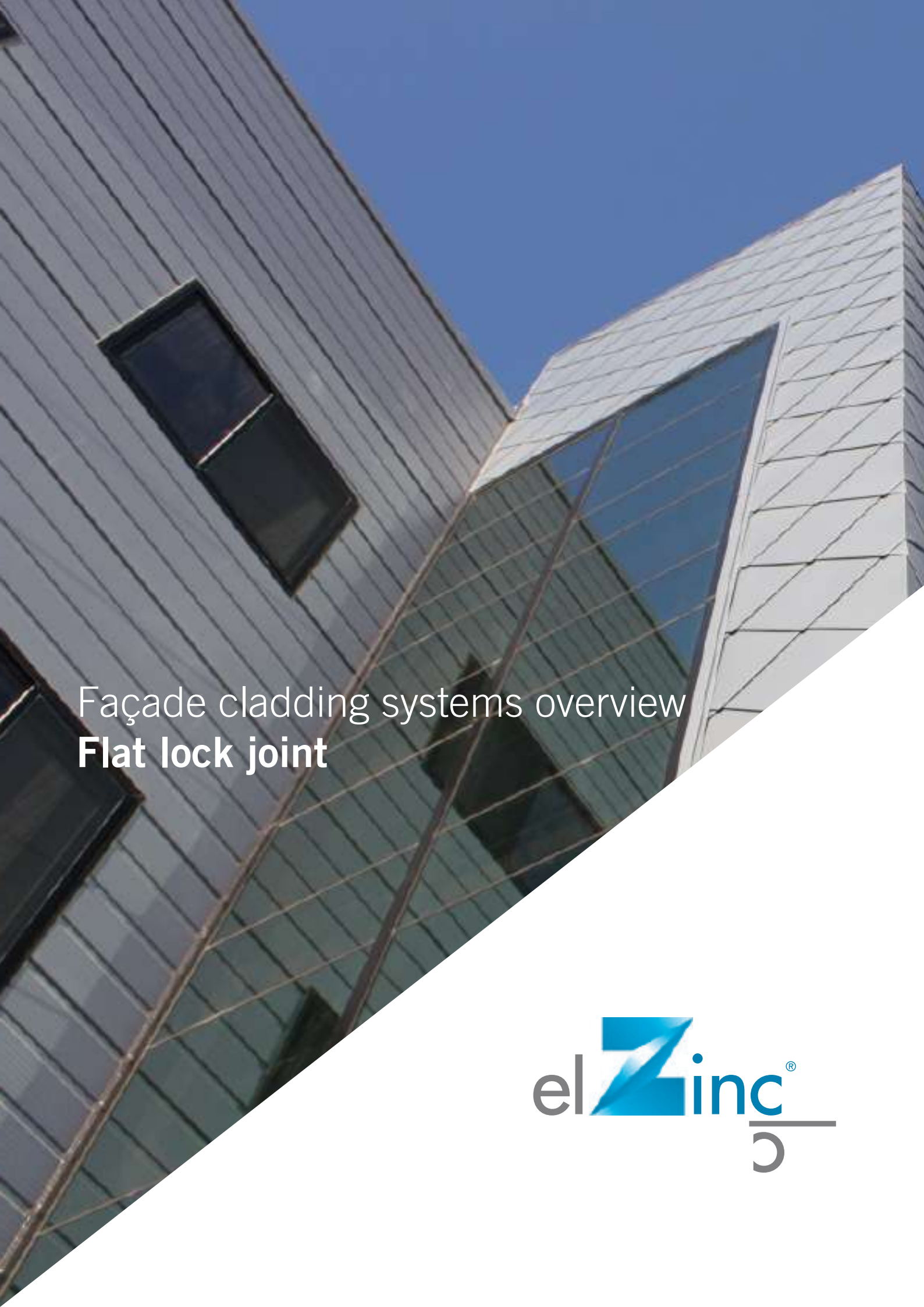


Façade cladding systems overview
Flat lock joint

Index

Main characteristics

The system is suitable for flat and curved façades. Also known as the shingle system, it offers a convincing combination of delicate appearance, economy, and real ease of installation. It is a very durable, light-weight and very low maintenance construction. The shingles can be set at various orientations and in different geometric shapes, giving many design possibilities that allow the system to be equally well adapted to classical or contemporary architecture.
The system is usually built in a vented façade construction, with all of the advantages that this brings for the building. The fixing is hidden and indirect. It needs a continuous support behind it and normally uses thicknesses of 0.7 and 0.8mm.

Diagram showing the flat lock or shingle system:

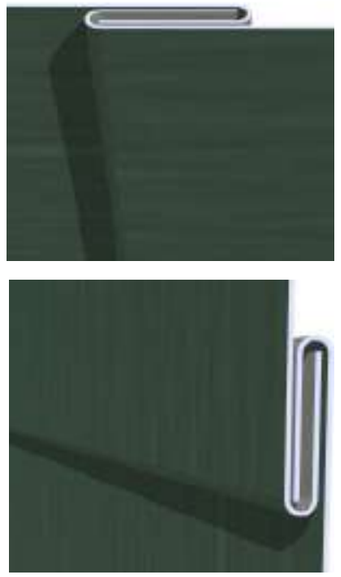
1 – Flat lock shingle
2 – Flat lock joint
3 – Fixing clip
4 – Axis measurement

Principal joints

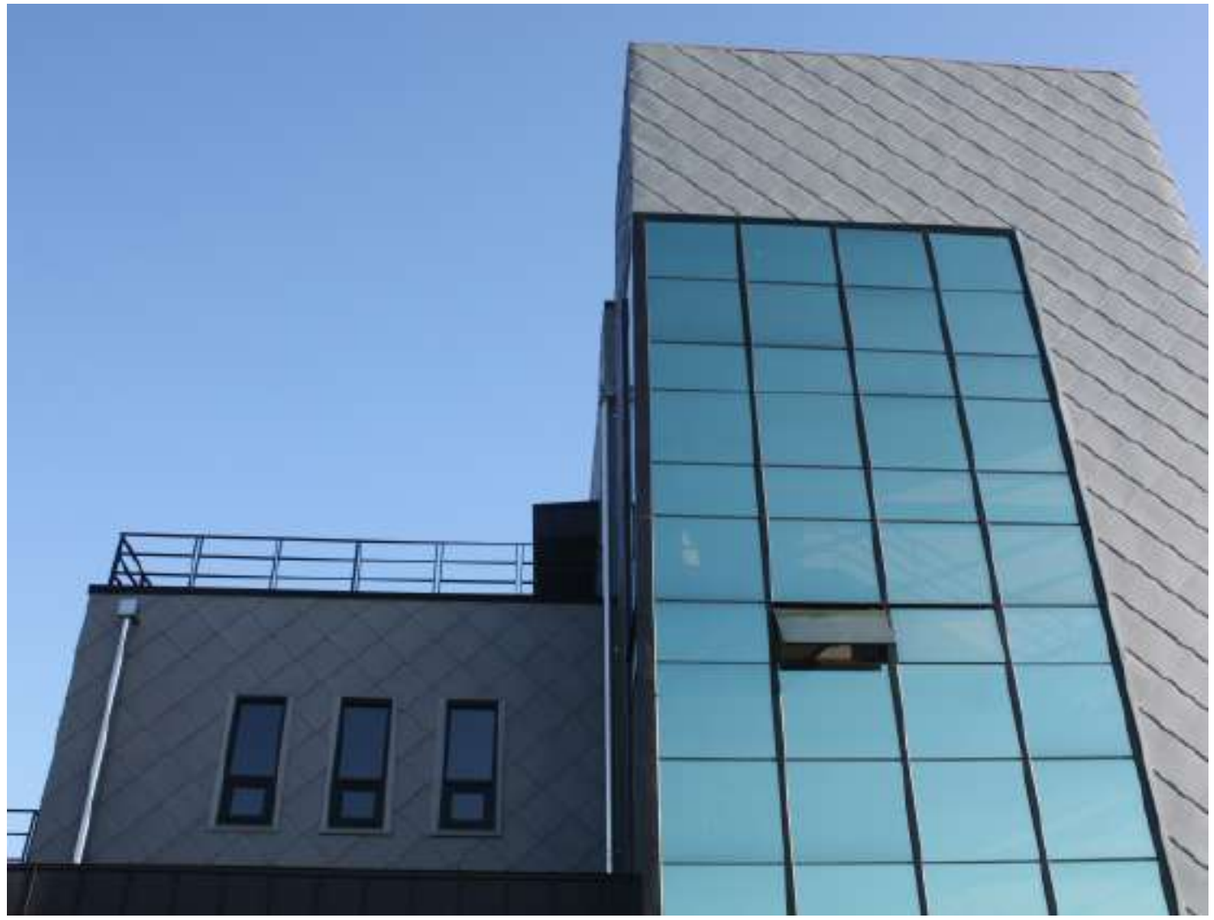
The flat lock joint, also known as the single lock cross welt, is used longitudinally and vertically in this system. It generates a jump between the faces of adjoining shingles.

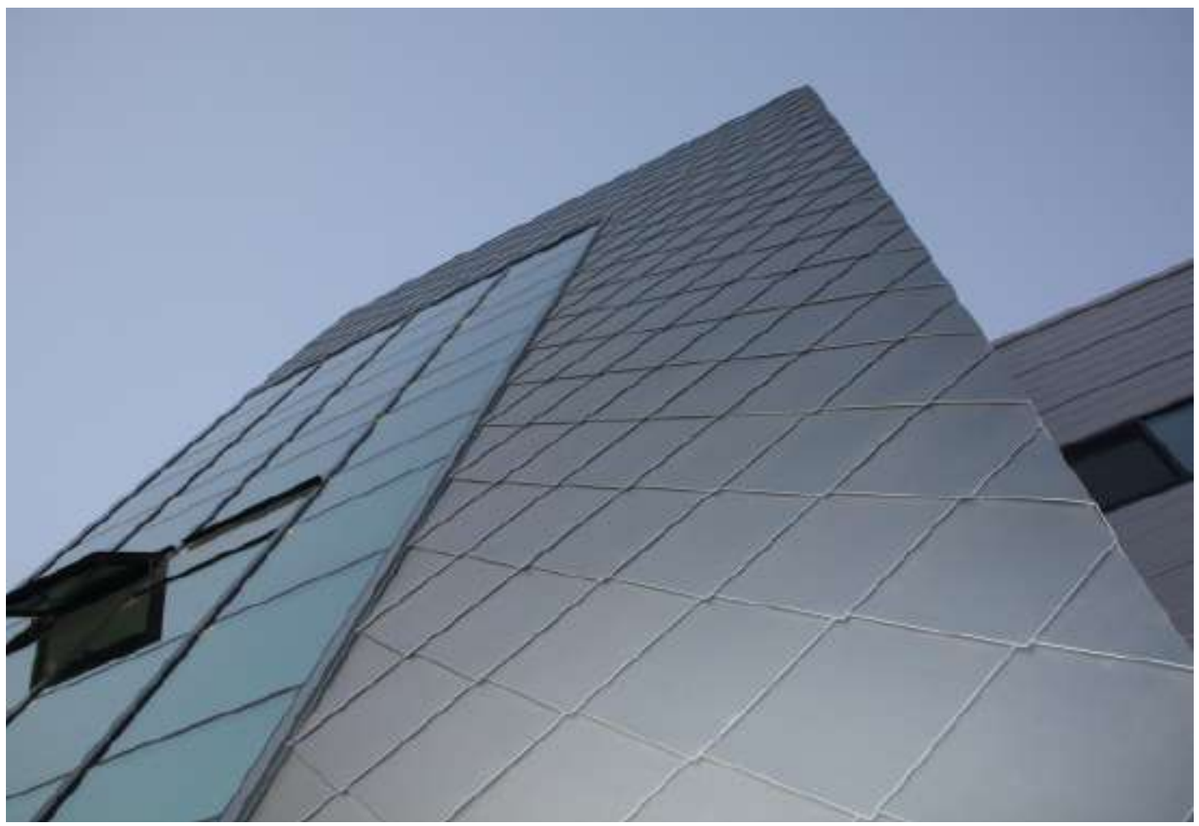
The flat lock joint is formed by bending a 180° fold (hem) along the perimeter of each shingle. Along the top edge and one of the sides the fold is bent outwards, and along the bottom edge and the other side it is bent inwards. The outward fold receives the clips and the next shingle is hooked into it, covering the clips.

The dimension of the 180° fold usually varies from 23mm to 30mm. The material needed to form the joint is roughly three times the fold dimension, so hems of 23mm give a 'loss' of 70mm in the joint, which is the same as the standing seam and therefore this dimension is often used when combining the two systems next to one another to line them up correctly, for example a flat lock fascia running along the eaves of a standing seam roof.



Vertical and horizontal flat lock joint





Fixing

Fixing is indirect, using clips that are hooked into the outward folds of the singles and are screwed or nailed to the substrate behind. In this system the concept of fixed and sliding clips does not exist – they are all the same type. Given that the shingles are not tightly fixed (they are simply hooked into one another) free thermal movement of the shingles is ensured.

These clips should be sufficient in number to resist the design wind loading for each project. Normally 6 clips per sq. m prove to be enough for buildings not taller than 8m, whereas corners and edges of taller buildings will need more – please see our technical documentation for additional detailed information.

Stainless Steel fixing clip

Installation

The singles are installed from the bottom of the façade to its top and either from left to right or right to left and, if the cladding is installed at an angle to the vertical, the joints are set to shed rainwater rather than to collect it.

Appearance

The flat lock joint is quite discrete and so the general appearance of the cladding is one of fine joints. Nevertheless, during sunny weather, the shadow cast by the joint can be quite visible. Depending on the design of the layout and the dimensions of the shingles, the appearance can be either directional or non-directional so, visually, it is a versatile system.
The shingles are normally set out horizontally, vertically or at 45°, however for reasons of design they are sometimes set at a different angle. In a vertical design the shingles can be long, but in horizontal they are normally limited to 2m due to site handling considerations, somewhat shorter than standing seam trays due to the fact that singles are not as ridged and can be accidentally bent quite easily during installation. Good coordination of window and door openings in the façade with the shingle layout contributes to the façade transmitting a feeling of order and harmony to the observer, as with other systems. However, given the joint's modest dimensions, the divisions it creates are quite subtle and therefore it is not as important as with the standing seam or panel systems, especially if the design is not directional.
A unique characteristic of light gauge metal façades is the subtle quilting that can appear naturally under different light conditions, bringing a bit of visual 'vibration' and 'energy' to the building. Many architects appreciate this. On the other hand, this can, if desired, be reduced to a minimum and elZinc® material helps here by having excellent flatness and low residual tension leading to very flat trays anyway. Other typicalmeasures that can be adopted are:

- Use 0,8mm thick elZinc®
- Limit the width of the shingles to 430mm
- Limit the length of the shingles to 2000mm
- Ensure the support is plumb (by using adjustable wall anchors if required).

Horizontal layouts

The small step between each shingle gives the architect the opportunity to employ them creatively in the design to generate varied shadow effects and geometric shapes, thus enabling different 'sensations' to be communicated. As an example, a façade in which window openings line up with the flat lock joints gives the feeling of order and formality.

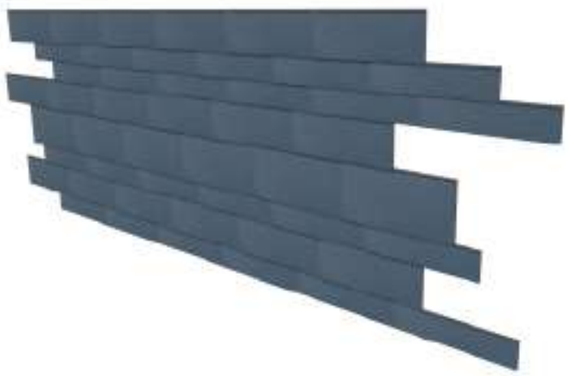
On the other hand, a design in which the continuous skin of the façade is randomly 'punched' through by openings will give a more light-hearted and 'disconnected' feeling. The vertical joints can also be used to strengthen other aspects of the façade. The appearance and visibility of these joints varies depending on our viewing position and prevalent shadow effects, which can exert a defining influence on our perception of the façade.
Below are shown some common layout designs. Other designs are possible – please contact us for more examples. The images are shown with a shadow effect for clarity.

Cross joints seen:
a-From the front without casting a shadow
b-From the front casting a shadow.
c: From the rear.

Staggered design:
It is advised to limit shingle lengths to 2m. Typical axis dimensions are 430, 530, 580 and 600mm. It has a visually unifying effect on the façades it dresses.

Stepped design:
The same axis measurements and tray lengths as above are used. It also brings together the façade and provides a sense of movement to the cladding. It is common practice to line up each fourth or fifth cross joint.

Random design:
Design using different shingle widths and without any horizontal reference (in this case 263, 430 y 600mm). Other common widths are 530 and 580mm. Other widths under 600mm can be used but they will generate offcuts. This design adds character and identity to the façade and it is quite horizontal even in the flat lock system.



Vertical layouts

Installation of longer shingles in the vertical does not present quite the same handling problems as in the horizontal, but still a shingle longer than 2m is easily bent on site and requires careful handling. These layouts are normally used on 'vertical' buildings, where they look to enhance the building's geometry even if using a 'flat' system with discrete joints. Vertical staggered or stepped designs can be used to achieve this effect. It is advised to coordinate the positions of window and door jambs with the seams if an ordered appearance is desired for the façade.

Staggered design:
A wide fixing plate should be used at the top of the singles if they are over 4m long to ensure they are fixed securely in position.

Other layouts

Shingles are often laid at a 45° angle which sets the cladding apart from the horizontal and vertical lines running over the rest of the building. In addition, because there is no running joint in this system, other designs are easily created such as rhomboidal, triangular, or hexagonal – the only requirement is that the shapes tessellate, that they can be fixed by hooking in from one direction and that all the joints shed water properly.

The same types of designs described earlier for horizontal layouts can be used in the vertical. Layouts can also be set at a particular angle to the horizontal if so wished.

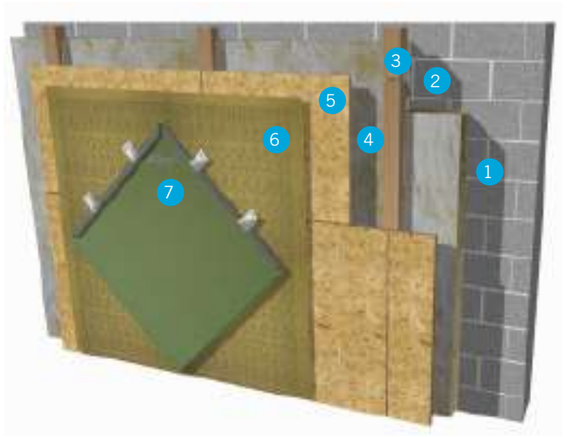
Shingles laid at 45°:
This design nearly always uses square singles. The installation can be fully aligned (as in illustration 5) or ever so slightly staggered (as in the photograph above) to produce a more traditional look.

Rhomboid design:
An example of a more complicated design using two rhombus shaped singles. The shingles in each row are displaced one position in the horizontal to achieve this effect. It is executed using two types of shingle and no extra waste need be produced if the design is done correctly.

Substrates and façade construction

Flat lock shingles are not self-supporting and require a fully or almost fully supporting substrate against which they rest and to which their clips are fixed. The substrate is usually ventilated with an air layer (minimum 2cm) between it and the insulation. Three examples of the many possibilities that exist are shown here. For more detailed information on supporting materials and wall construction, please consult our technical documentation.
Wood is the most common material used for the substrate. This can be in the form of soft wood planking or OSB or plywood boarding. All of these materials are combustible and therefore the relevant national building codes should be consulted to ascertain any possible limitations placed on their use in external walls.

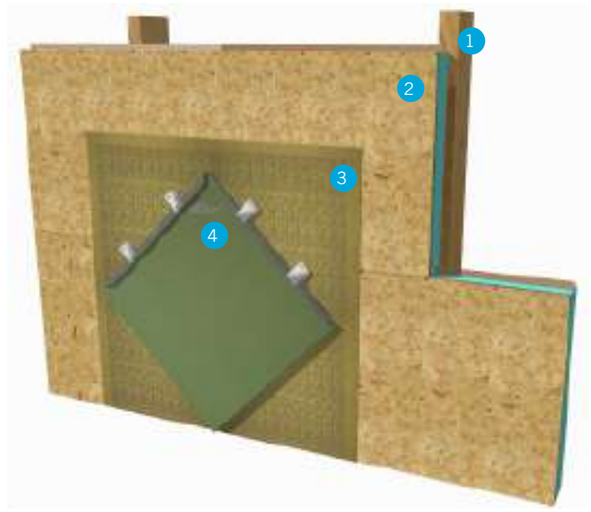
Lacquered steel trapezoidal sheet can be used as an alternative to wooden substrates. A sheet thickness of 0,8mm is advised to ensure the required pull-out values for the clips are met if they are to be fixed to the sheet using screws.



Traditional vented support:

1. Concrete block structural support
2. Adjustable wall bracket
3. Soft wood batten
4. Insulation and air gap
5. Class 3 OSB board
6. Separating membrane
7. elZinc® shingle cladding

WBP plywood or soft wood boarding can be used instead of OSB.



Sandwich insulating panel:

1. Timer or steel structure
2. Wooden insulating panel
3. Separating membrane
4. elZinc® shingle cladding

The outside wooden skin of the panel should be at least 18mm if using screw-fixed clips, 20mm if using nail-fixed clips, and apt for external use. This is an unvented construction and interstitial condensation risks should be checked.

Lacquered steel trapezoidal sheet:

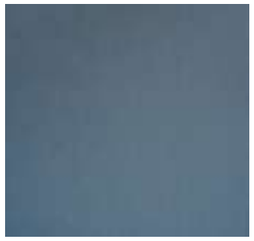
1. Concrete block structural support
2. Adjustable wall bracket
3. Metal profile
4. Insulation and air space
5. Trapezoidal sheet
6. Separating membrane
7. elZinc® shingle cladding

The orientation of the sheet cannot be parallel to the standing seams of the zinc trays, and must be fixed in its ‘façade’ position to provide the maximum support to the zinc. The trapezoidal sheet is vented through its own profile.

Summary

CHARACTERISTIC		OBSERVATIONS
Field of application	Flat and curved façades, soffits.	Minimum radius depends on the size of the singles – contact us for more detailed information.
Principal joint	Single lock cross welt along all edges of shingles.	Produces a jump of about 5mm between shingles. Normally uses between 70 and 90mm of material.
Minimum thickness	0,65mm	0,7 or 0,8mm is normally used on façades.
Maximum thickness	1,0mm	
elZinc® finishes	elZinc® Natural, elZinc Slate®, elZinc Rainbow® range of finishes.	Mill finish zinc is not generally very popular for façades due to its initial shine and the natural weathering characteristics of zinc, which can be rather patchy at first on vertical surfaces.
Weather tightness	Complete on vertical surfaces for all designs.	Minimum pitch is 25º
Fixing method	Indirect and hidden using stainless steel clips nailed or screwed to the substrate (or riveted in the case of sheet metal support).	Minimum pull-out values for the clips should be 560N.
Layout designs	Horizontal and vertical, or set at an in-between angle.	———
Shingle width	Normally between 430 a 600mm.	530 and 580mm are also possible.
Shingle length	Normally between 1 and 2m in horizontal layouts. In vertical layouts singles over 4m are not advised.	Shingles longer than 2m in horizontal designs give rise to handling problems, as do singles over 4m in vertical designs.
Substrate	Continuous or semi continuous of soft wood boarding, OSB or plywood sheathing, or trapezoidal metal sheet.	———
Wall construction	Normally ventilated with a ventilation space behind the substrate.	Ventilation layer a minimum of 2cm deep.
System weight	From about 5 to 7kg/m² (zinc only).	Wooden support - 10 to 14kg/m²; trapezoidal sheet 7 to 12kg/m², both depending on types and thicknesses.
Cost	Economical.	It is one of the quickest and most economical cladding systems for façades.
Means of elevation for fixers	Platforms or scaffolding.	Ideally the positioning of the scaffold anchors should be agreed upon with the installer of the elZinc® cladding.
Variations	———	———

Samples



elZinc Rainbow® blue

elZinc Rainbow® red

elZinc Rainbow® green

elZinc® Natural

elZinc Slate®

elZinc Rainbow® brown

elZinc Rainbow® gold

elZinc Rainbow® black

Note: The colours shown in this document are for illustrative purposes only and should not be taken as representative of the real finishes. Please request our sample card to see the real elZinc® finishes.

For more detailed technical information, please consult our technical literature or contact our technical advisory Service.

ASTURIANA DE LAMINADOS, S.A. has developed the instructions and recommendations herein with the aim of providing a better service for its customers. It is generic information for standard installation of elZinc® products in a European climate.

This information must not substitute the considerations and requirements that, in each project, architects, designers and consultants may offer.

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We remind readers that ASTURIANA DE LAMINADOS, S.A. provides an advisory service to assist in the interpretation and use of this information should any doubts arise in this regard.

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