

INSTALLATION MANUAL

*Installation manual for Traditional
and H-Selection roof tiles of
Cerámica La Escandella*



La Escandella
ROOFING THE WORLD

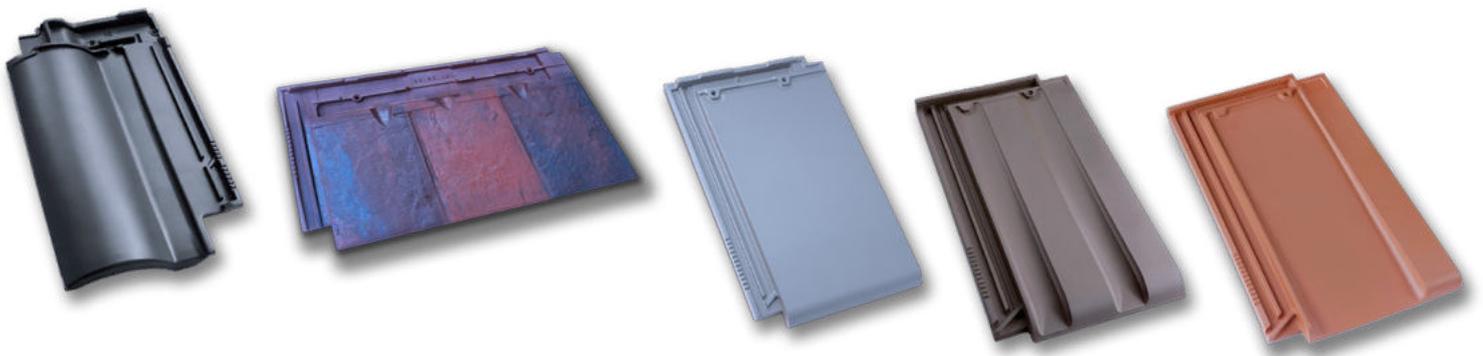
La Escandella

ROOFING THE WORLD

TRADITIONAL



H-SELECTION



TRADITIONAL



H-SELECTION



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La Escandella's growth rate, together with the success of projects it has undertaken in recent years, is proof that it's a rising star in our sector. Over the last ten years, La Escandella has consolidated its position as market leader in Spain and one of the main manufacturers in the European arena, on the strength of R&D&I investments and new product developments that reflect the requirements, habitat and architectural style of each market it is present in.

PRODUCTION CAPACITY

Located next to the Mediterranean Sea, La Escandella's plant offers the largest on-site production capacity worldwide. Our 55.000m² manufacturing facility ensures that the company can react immediately to any need, anywhere in the world.

La Escandella's production, operations and logistics processes, together with its storage space of 230,000 m² and an average in-stock level of 240,000 pallets, have been designed to be able to respond immediately to the demands of our customers.

PURSUIT OF INNOVATION

From the outset, La Escandella has worked on the principle of constant incorporation of the latest technological innovations into its production processes. This means we have the most advanced installations on the market.

WIDE RANGE OF PRODUCTS

La Escandella's versatile range includes eight main tile shapes: Mixed "S" large", Mixed "S" small, Curved, Flat, Selectum, Visum3, Planum, Vienna and Innova roof tiles. These styles come in the widest range of attractive colours, covering every type of architectural requirement, from colonial-style to the most contemporary buildings.

These products are complemented by a huge range of special pieces and roof accessories, which make installation easier and give a perfect, polished finish to the roof.



UNPARALLELED QUALITY

During the production process we submit each item to rigorous and daily quality control checks. This ensures that Cerámica La Escandella's roof tiles comply with a strict national standard, and are guaranteed to carry out the purpose of its intended use.

La Escandella roof tiles have achieved the best ratios into the values required by the European quality control standard for baked clay tiles. Our international approvals include **European Standard** for Clay roof tiles **EN-1304**, and also **French Certification AFNOR**; **Australia's** (sea salt/coastal protection); **United States ICC-ES** (ASTM C-1167 Grade 1), **Miami-Dade's NOA**...

Nowadays, **La Escandella** provides two types of guarantee that are defined by the product line and its manufacturing process:

- **35 years warranty** to traditional tiles: Large Mixed, Small Mixed, Curved and Flat.
- **100 years warranty** to H-Selection tiles: Selectum, Visum3, Planum, Innova and Vienna.

COMMITMENT TO THE ENVIRONMENT

Cerámica La Escandella is totally committed to protecting and conserving the environment. These values are reflected in the way it uses a cogeneration power station to minimize its energy consumption, thereby making its kilns and driers cleaner and greener.

LA ESCANDELLA WORLDWIDE

La Escandella is present in over 85 countries spread over all continents. We are an entrepreneurial company that offers true quality, as our track record and international projects testify.





1

CLAY

ROOF TILE

2.1 CLAY ROOF TILE

Throughout history, roofs have played a fundamental role in protecting and decorating homes. They have allowed us to protect buildings from the elements, while helping blend them into their environmental and architectural surrounds using a variety of colours and shapes.

Specifically, ceramic tile roofs carry out the following functions:

Waterproofing

The principle purpose of a ceramic tile roof is to prevent water from entering the building, protecting it from rain, snow, frost and hail. The correct slope and the tiles themselves ensure that a roof is watertight.

Thermal insulation

Roofs can be submitted to extremes of heat and cold. To ensure correct hygrothermal behaviour, a roof must be correctly built, so that it provides energy savings and comfort.

Fire Performance or Fire Resistance (A1)

The roof provides protection from lightening and various rays, so the tiles and materials must be fireproof.

Load resistance

The roof must support occasional heavy weights, such as snow or people accessing it.

Wind and vapor tightness (avoid condensation)

The roof provides shelter from strong winds and safeguards against internal condensation from homes, so it must be perfectly ventilated in order to avoid damage to the foundations.

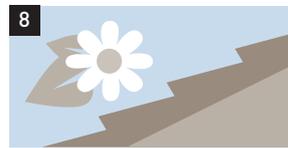
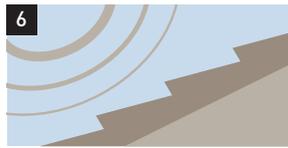
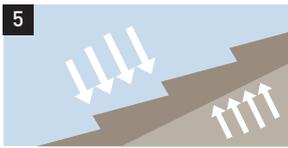
Sound isolation

It provides insulation against both internal and external noise.

Go Green

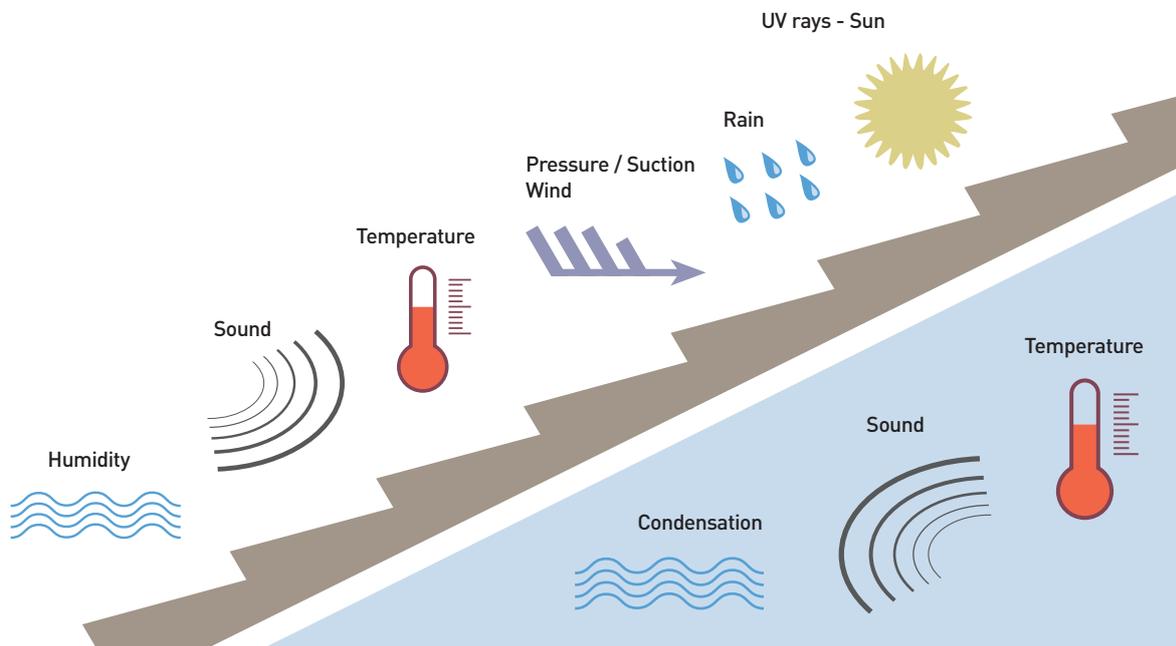
Clay Roof Tiles are made from natural materials: they are recyclable, energy consumption for their production is lower than that required for other materials, and they are chemically inert and do not corrode. Their design and raw materials work in aesthetic harmony with their surroundings.

PROPERTIES OF CLAY ROOF TILES

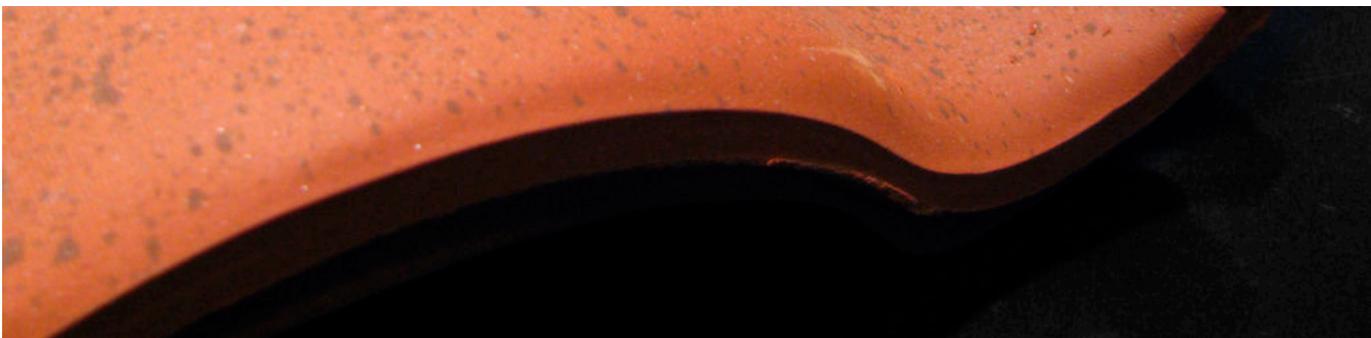
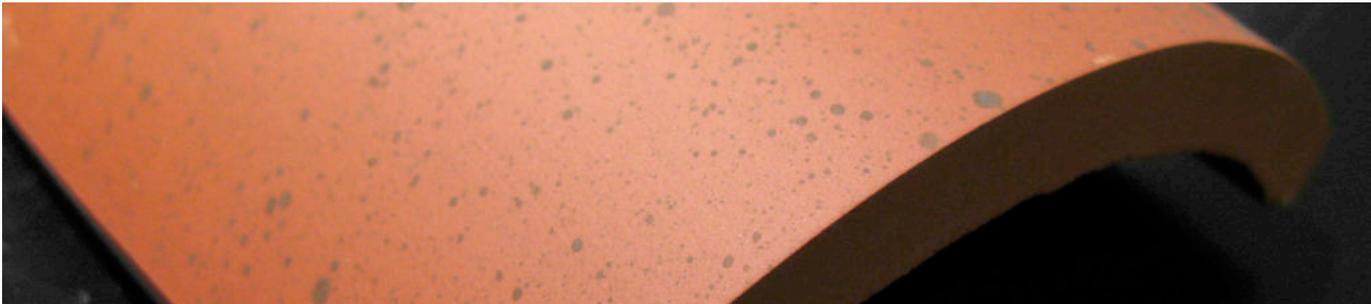


1. Water tightness
2. Thermal insulation
3. Frost Resistance
4. Fire Performance or Fire Resistance
5. Air tightness and vapor
6. Sound isolation
7. Aesthetic and harmonised with their surroundings
8. Go Green

FACTORS THAT HAVE AN IMPACT ON ROOFS



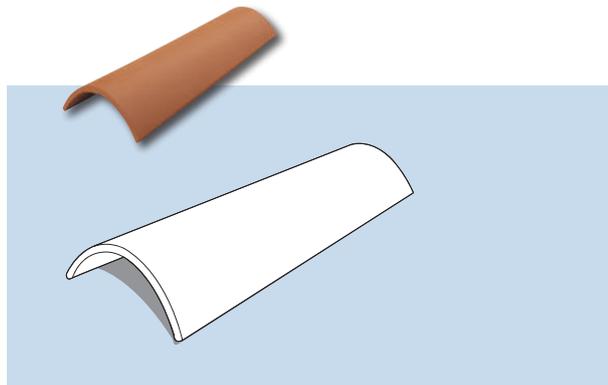
2.2 TYPES OF CLAY ROOF TILES



Curved roof tile

Curved tiles are roofing elements in the form of a gutter. Their design allows variable overlapping between pieces. Their edges may be parallel or conical.

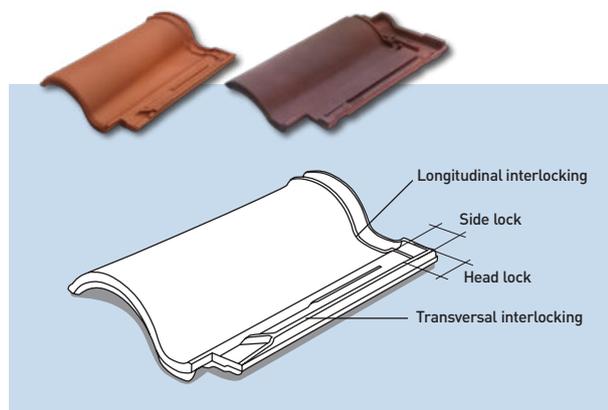
Available in three different formats, they are used in the construction of new homes for the beauty and variety of their colours.



Mixed roof tile

These are double curved “S” roof tiles, with a longitudinal and transversal interlocking system, so that the laid tiles provide a seal in both the vertical and horizontal courses.

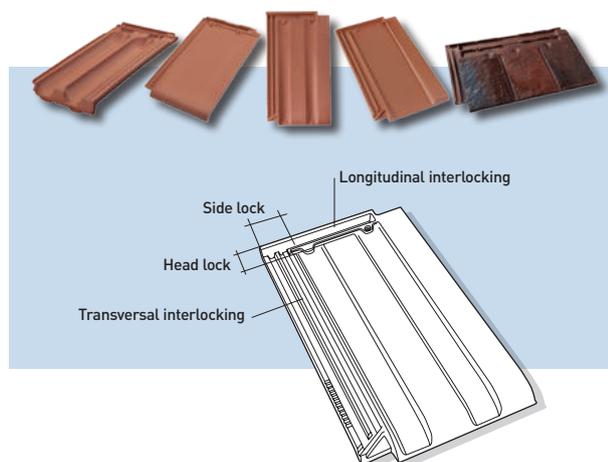
A double curvature mixed “S” roof tile where eaves and ridge tiles assure design and functionality to provide easy-to-install roofs with the special characteristic beauty of the Mediterranean roofs



Flat roof tile

These are flat profile tiles, with a ribbing system for longitudinal and transversal interlocking.

A versatile and easy-to-fit roof tile. As there are bigger pieces, the installation and material costs are consequently reduced, enhancing the elegance and durability of this kind of roof tile.

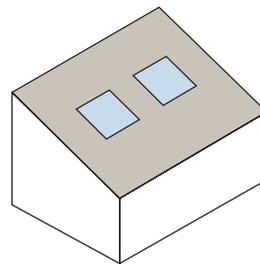




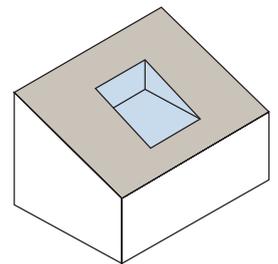
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TYPES OF ROOF AND ROOFING COMPONENTS

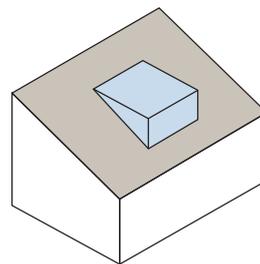
3.1 TYPES OF ROOFING FOR DIFFERENT GEOMETRIES



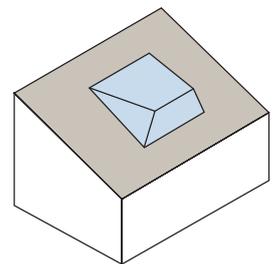
Roof with in-plane /
Out-of-plane skylight



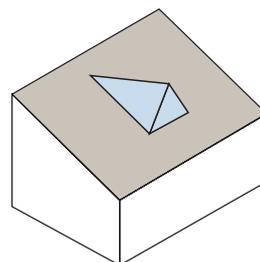
Glazed roof / Roof lantern



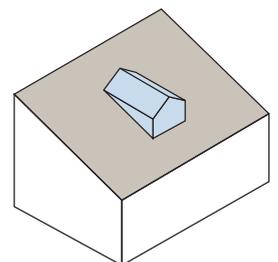
Shed / Pent roof



Mansard Roof



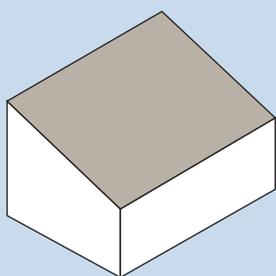
Triangular Mansard



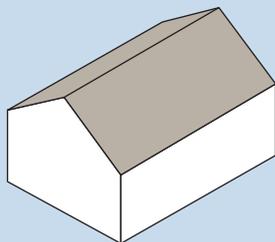
Gabled dormer

When planning a roofing project, all the details that ensure the home is well protected against external aggression must be taken into account. Special care must be taken over the correct evacuation of rain water; the effect of winds; what the minimum slope is depending on the geographic location; ventilation, and correct fixing of the parts, to comply with norm UNE-136020, Code Of Practice For The Design And Fixing Of Roofs With Clay Roofing Tiles.

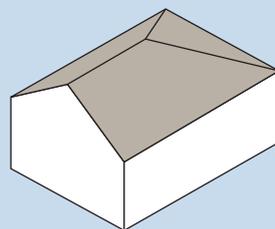
There are many different types of roof, although most are combinations of the main four:



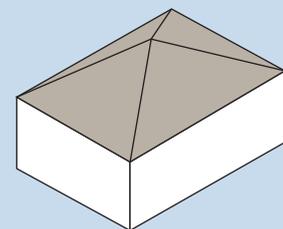
Monopitch



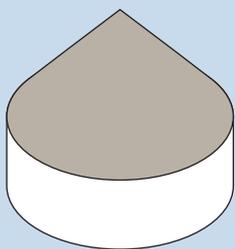
Double pitch



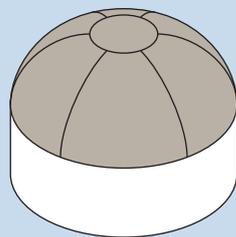
Triple pitch



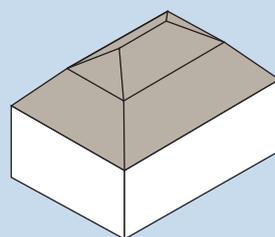
Four Pitch



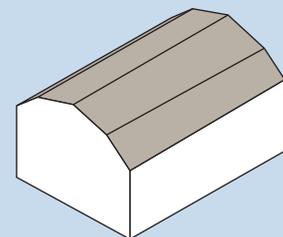
Conical Roof



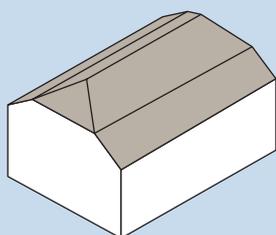
Dome Roof



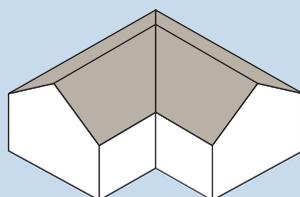
Gambrel roof



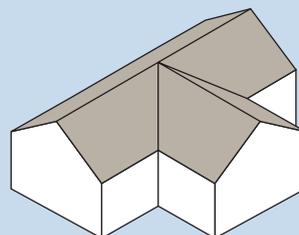
Straight mansard roof



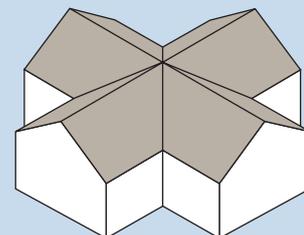
Gambrel roof / Roof with eyebrow dormer



L- shape roof



T- shape roof



Double pitch crossing roof

3.2 TYPES OF ROOFING DEPENDING ON VENTILATION NEEDS

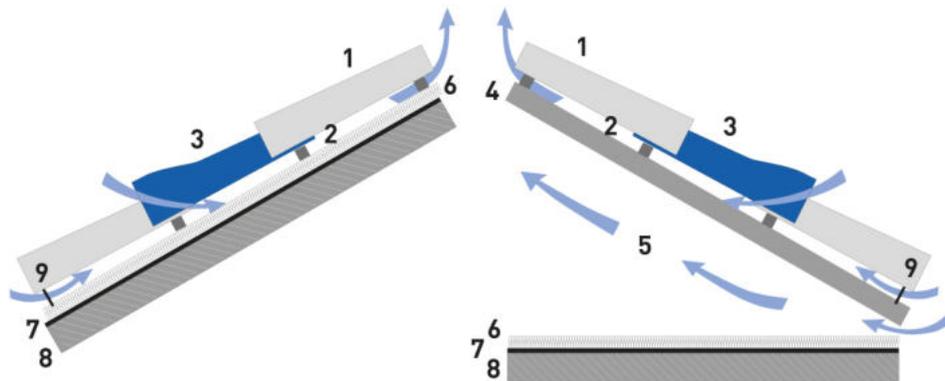
Ventilation is a differentiating factor in the control of a roof's hygrothermal behaviour. The level of ventilation is a deciding factor, and must be adequate to ensure that the humidity levels remain below saturation point.

NON-VENTILATED ROOF

This is made up of a single sheet formed from several layers, which separates the interior of the building from the exterior, without any intermediary air-space (attic or loft). This roof is subjected to strong temperature and water-pressure differences between its interior and exterior surfaces.

VENTILATED ROOF

This is made up of two sheets, made from several layers, which are separated by a ventilating air space (attic or loft). This space regulates the roof's hygrothermal behaviour, which ensures that the roof is more functional and is recommended.



NON-VENTILATED ROOF

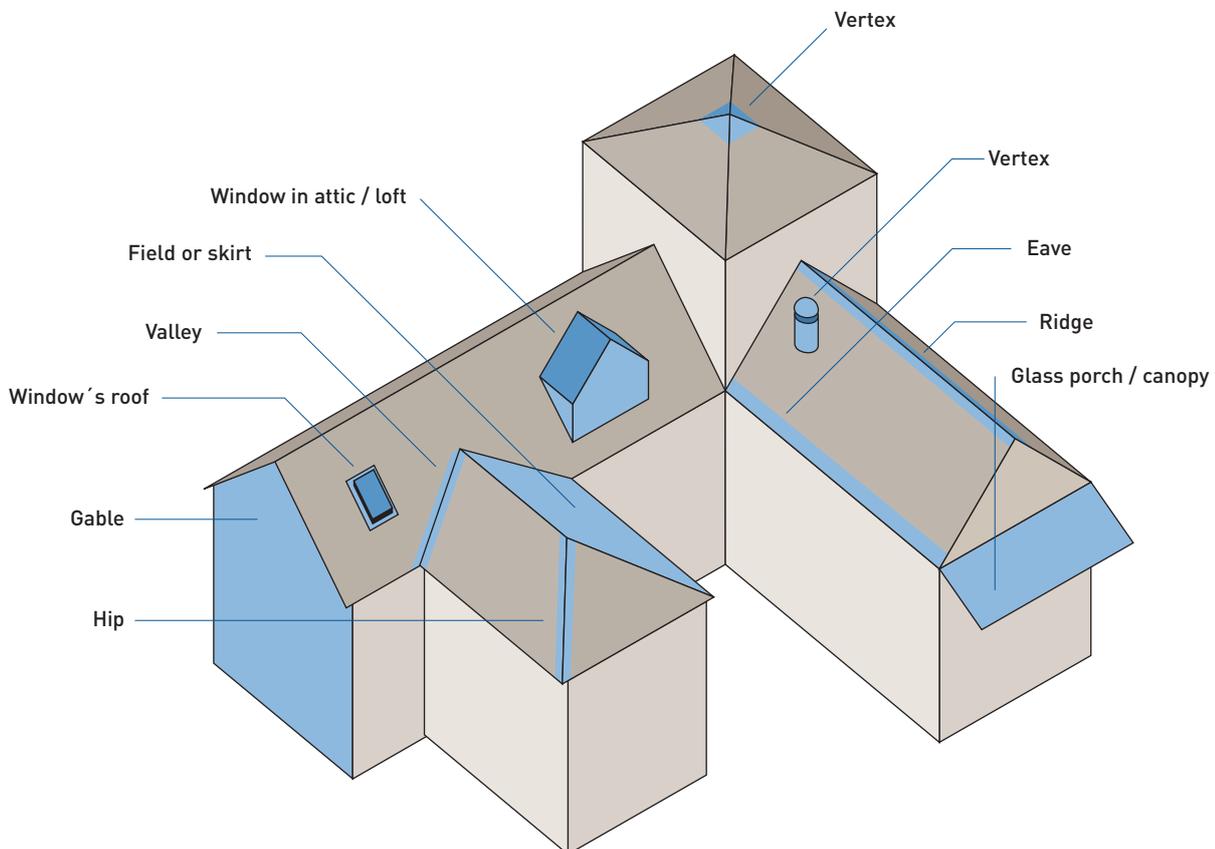
VENTILATED ROOF

- | | | |
|---------------------------|-------------------------------------|---------------------------------------|
| 1. Roof tile | 5. Heat insulation underlayment | 7. Frame |
| 2. Micro-ventilation void | 6. Waterproof underlayment material | 8. Eaves ventilation comb / bird stop |
| 3. Ventilation roof tile | | 9. Attic |
| 4. Rafter | | |

If the attic is to be used as a habitable space, the supporting roof structure must have a sloping plane such that the attic is of a regular section and its slope is parallel to the micro-ventilation layer.

3.3 ROOF ELEMENTS

- **FIELD OR SKIRT:** Each of the sloped planes that form the roof.
- **MAXIMUM SLOPE LINE:** The trajectory described by the free flow of water down a field
- **EAVE:** The overhanging edge of the slope of a roof. It prevents the water collected by the roof from falling on the vertical wall
- **RIGHT OF A FIELD OR SKIRT:** The right-hand side of the field when looking facing the roof from the eaves
- **LEFT OF A FIELD OR SKIRT:** The left-hand side of the field when looking facing the roof from the eaves
- **VALLEY:** The line of intersection of two fields of a roof, into which water runs.
- **HIP:** The sloping line created by the intersection of two fields, from which the water is distributed onto these fields.
- **RIDGE:** The horizontal line created by the intersection of two fields (gabled roof) or of the intersection of a field with a vertical plane (skillion, lean-to or pent roof)
- **GABLE:** Supporting wall delineated by the roof above



3.4 TYPES OF ROOF SUPPORT

CONTINUOUS FRAME

The continuous frame or structure must have the required slope, with no more than a 3cm difference from the theoretic slope, in order to ensure the correct laying and fixing of the tiles and to prevent water from getting between the interlocks and overlaps of the tiles.

TYPES OF CONTINUOUS FRAME

a) FIBERCEMENT SHEETS

Fibercement panels act as a frame and an impermeable substrate, and can have heat-insulating characteristics. Tiles can be laid directly on the panels, or on battens.

b) PREFABRICATED CONCRETE

Prefabricated cement frames come in panels and must have adequate dimensional stability and levels of non-deformity, to guarantee they are flat enough for purpose.

c) CONCRETE FOUNDATION /SLAB

Sloped fields of cement slabs act as a structural foundation. To achieve the level of flatness necessary for the tiles to be laid, apart from careful workmanship and finishing, the slabs must be screed.

d) CERAMIC MATERIAL WITH A COMPRESSION LAYER

The panel is made up of hollow-cavity ceramic pieces and is laid on hollow brick walls that must be correctly aligned and spaced, in order to be subsequently given a finishing layer of cement.

e) INSULATION PANELS

Insulating panels are elements made from an insulating core of expanded or extruded polyurethane, mineral wool, etc., and one or two layers of fibre cement, laminated plaster, wood, sheet metal etc. Laying them is a construction system specific to roofing.

They are dry-laid, at a slope that is adequate for ceramic tiles to be laid using battens.



DISCONTINUOUS SUPPORT

Discontinuous support is made up of a frame of linear elements called battens, which provide a supporting plane to the tiles. The battens must be perfectly aligned and of regular size in both height and width, to provide uniform support.

For Curved Roof Tiles (T5, T40, T4, T45), the battens are generally laid parallel to the maximum slope line of the field. The curved tiles simply rest between two battens. The distance between these must enable a minimum tile overlap of 30mm to guarantee a correct flow of water.



For Mixed Roof Tiles (Large and Small), Flat Roof Tiles (Marseille) and Selectum, Planum, Visum3, Innova and Vienna roof tiles, the battens are laid perpendicular to the maximum slope line. The tiles are laid and fixed on them. The laying of the battens must take into account the dimensions of the tiles, in order to place them correctly so that the tiles can be correctly laid on them, and interlock perfectly.



TYPES OF BATTENS

a) SELF-SUPPORTING BATTENS

Self-supporting battens are nailed, screwed or welded to the slats, straps, hollow brick walls, etc., which are similarly fixed to the beams or trusses. Together, they form a supporting lattice.

The battens role is to ensure resistance, stability and durability, to prevent corrosion and deterioration processes. NO warping of more than 5mm is allowed.

b) METAL OR WOOD BATTENS FIXED ...

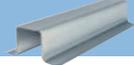
In this instance, battens are laid by the discontinuous supports, at least every two metres, to improve ventilation of the underside of the tiles.

Wood battens will be 45mm wide and 35mm high, +/- 5mm tolerance. They are normally made in pine, matured for 6 months, humidity under 8% and treated against fungus and insects.

Battens shall be fixed by means of nails, screws or welds. Anti-perforation adhesive tape (CAM43) shall be used under the battens in contact with the vapour barrier to prevent leaks at the points where the treads are nailed and which could pierce the waterproof film.

Standard section of wooden battens

Dimensions of the section	Maximum spacing distance (mm) between support axes depending on charge		
	100 kg/m ²	150 kg/m ²	300 kg/m ²
25 x 18	400	350	400
25 x 22	450	430	450
25 x 25	550	500	450
32 x 25	600	540	500
32 x 25	640	570	520
50 x 25	700	600	550
32 x 32	790	700	650
38 x 32	830	740	680
38 x 38	1.000	890	820
50 x 38	1.000	980	900

	CAM68	L.M. of trated wood batten (4 x 3 x 240 cm)
	CAM042	Rastrel de chapa galvanizada (210 cm / 0,6 mm grosor)
	CAM043	Rastrel de acero ventilado (3 x 2 x 250 cm / 0,6 mm grosor)
	CAM044	Rastrel de acero galvanizado (2 x 2 x 250 cm / 0,6 mm grosor)
	CAM050	Rastrel de acero galvanizado (5 x 3 x 250 cm / 0,6 mm grosor)



CALCULATION OF SPACING BETWEEN BATTENS

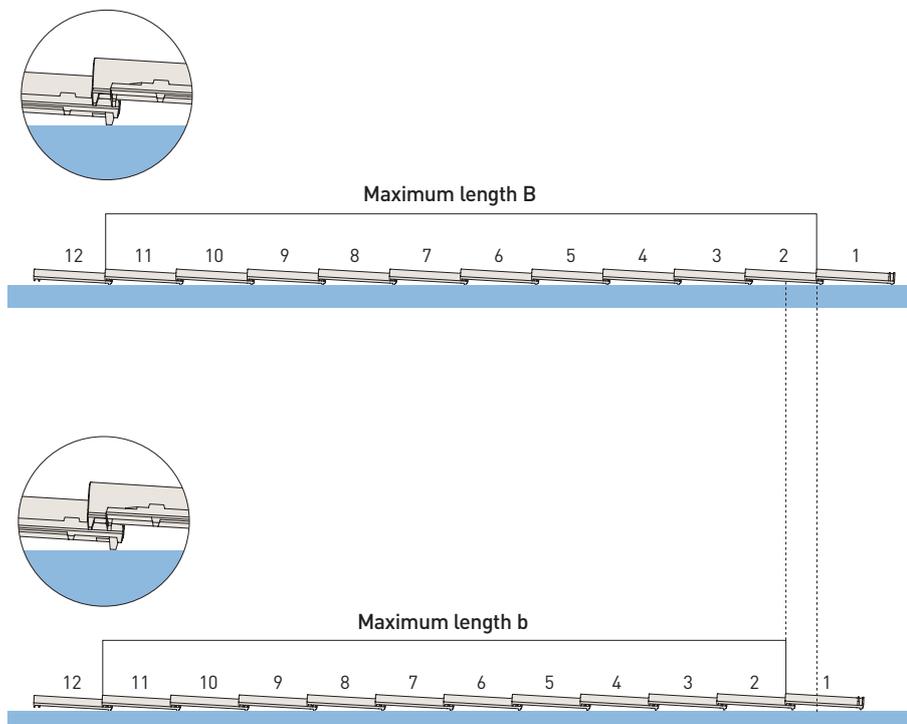
The distance between battens must be calculated based on the tiles that will be used for the roof, thus:

a) Randomly select 12 tiles from several palets on a flat area, set up the tiles properly overlapped, in a longitudinal line ensuring that the tiles are spaced as widely as possible. Measure the length **B** (in cm) between the 2nd and the 12th tile, as shown in the figure below:

b) Next lay a row with the shortest possible spacing between the tiles and, between the same points, measure the minimum longitude **b** (in cm).

c) When the size of the posterior interlock of the tiles is small, the distance between battens (**A**) will be calculated as $A = (B+b) / 20$.

d) The distance must be accurately marked on the two lateral edges of the slope, using a metric rule laid out at its full length following the maximum slope line, that is, perpendicular to the line defined by the eaves. After doing this, use a chalk line stretched between each of the opposite points, placed at the same level between the two extreme sides of the slope, to successively mark up the whole roof. Battens must always, at every level, follow the marked line.





4

GETTING STARTED

When laying a roof, the following principle factors must be taken into account:

SITUATION:

- Geographic Area / Housing Location
- Climatic Zones
- Shape of construction
- Type of roofing

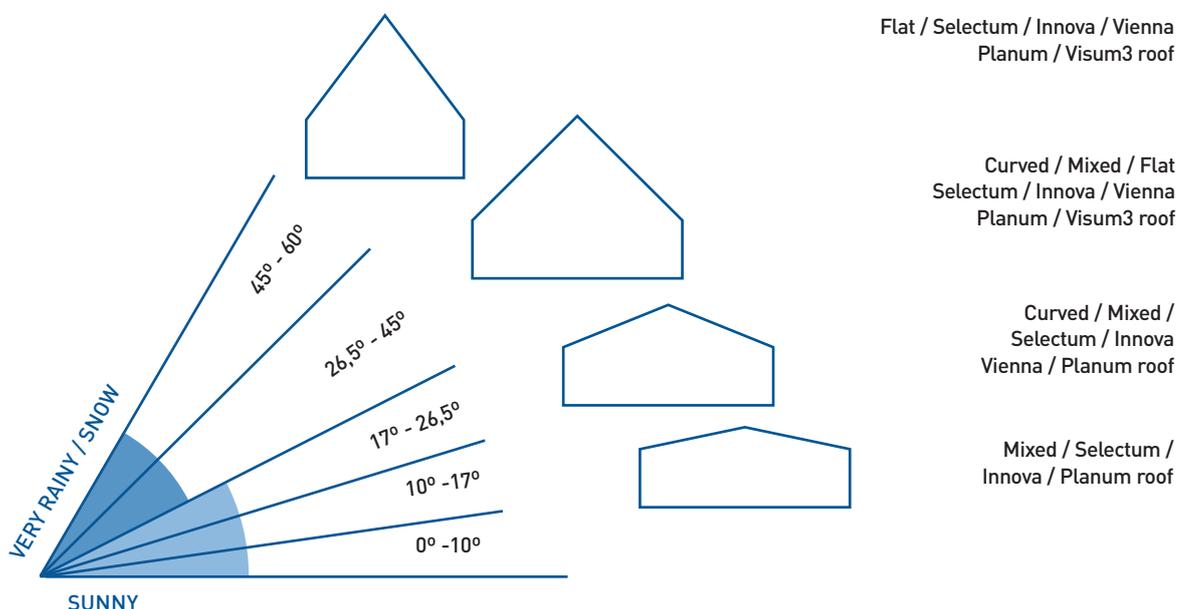
PHYSICAL CHARACTERISTICS:

- Type of clay used
- Shapes and designs
- Ribbing, nibs and interlocks

FORM OF INSTALLATION:

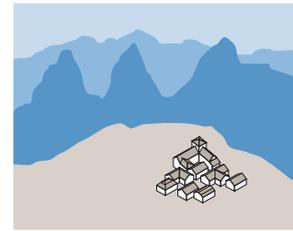
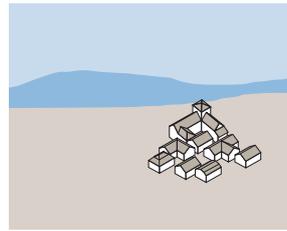
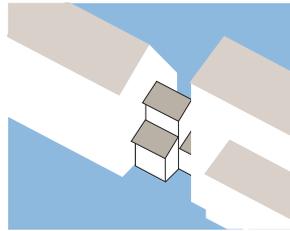
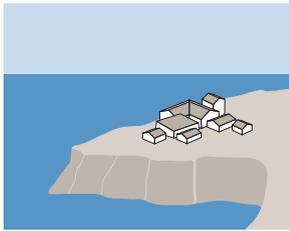
- Slope of the roof
- Tile laying: linear or broken bond (cross bond)
- Overlap and distance between battens
- Type of batten and their installation method
- Fixation materials for the tiles

BUILDING SHAPES USED DEPENDING ON CLIMATE



4.1 GEOGRAPHICAL AREA / HOUSING LOCATION

In order to decide on a roof design, we must take into account the geographical location of the house. From that, three different situations can be defined:



Exposed Locations:

Places open to strong winds, coastal areas (up to 5 km / 3 miles from the shoreline), islands or narrow peninsulas, estuaries or closed bays, narrow valleys, isolated mountains, mountain passes and earthquake zones.

Normal Locations:

Flat area, plateau with minimal elevation changes.

Protected locations:

Hollow area which is surrounded by hills that protect the hollow from the winds in all directions.

4.2 CLIMATIC ZONES

EXPOSURE ZONES

When deciding on a roof design, we must take into account factors such as the altitude, the strength of the prevailing winds, rain levels and the frequency of storms. These factors can define three different zones of exposure.

Zone 1: Zones at an altitude below 200m.

Zone 2: Zones at altitudes between 200m and 500m.

Zone 3: Zones above 500m.

NOTE: Over 700m, dry laying. Over 900m [zone 3] refer to Code of Limitations and Installation in High Mountains, provided by The Technical Centre for Natural Construction Materials (CTMNC- France).

4.3 PRIOR INSPECTION OF THE FIELD

The real length of the field, indispensable for laying a roof, is calculated by multiplying the ground length of the eaves by coefficient 'K', obtained from the data of the slope or pitch using the following table:

**REAL LENGTH
CALCULATION**



Slope (%)	19	20	21	22	23	24	25	26	27	28	29	30
Slope (°)	10°45	11°18	11°51	12°24	12°57	13°29	14°02	14°34	15°06	15°38	16°10	16°41
"K" Coefficient	1,0179	1,0198	1,0218	1,0239	1,0261	1,0284	1,0308	1,0232	1,0358	1,0384	1,0412	1,0440

Slope (%)	31	32	33	34	35	36	37	38	39	40	41	42
Slope (°)	17°13	17°44	18°15	18°46	19°17	19°47	20°18	20°48	21°18	21°48	22°17	22°46
"K" Coefficient	1,0469	1,0499	1,0530	1,0562	1,0595	1,0628	1,0662	1,0697	1,0733	1,0770	1,0808	1,0846

Slope (%)	43	44	45	46	47	48	49	50	51	52	53	54
Slope (°)	23°16	23°44	24°13	24°42	25°10	25°38	26°06	26°33	27°01	27°28	27°55	28°22
"K" Coefficient	1,0885	1,0925	1,0965	1,1007	1,1049	1,1092	1,1135	1,1180	1,1225	1,1271	1,1317	1,1365

Slope (%)	55	56	57	58	59	60	61	62	63	64	65	70
Slope (°)	28°48	29°14	29°40	30°06	30°32	30°57	31°22	31°47	32°12	32°37	33°01	34°59
"K" Coefficient	1,1413	1,1461	1,1510	1,1560	1,1610	1,1661	1,1713	1,1766	1,1819	1,1872	1,1927	1,2206

Slope (%)	75	80	85	90	95	100	105	110	115	120	125	130
Slope (°)	36°52	38°39	40°21	41°59	43°31	45°00	46°40	47°73	48°99	50°19	51°34	52°43
"K" Coefficient	1,2500	1,2806	1,3124	1,3453	1,3793	1,4142	1,4500	1,4866	1,5240	1,5620	1,6008	1,6401

Slope (%)	135	140	145	150	155	160	165	170	175	180	185	190
Slope (°)	53°47	54°46	55°41	56°31	57°17	57°99	58°78	59°53	60°26	60°95	61°61	62°24
"K" Coefficient	1,6800	1,7205	1,7614	1,8028	1,8446	1,8868	1,9294	1,9723	1,0156	1,0591	1,1030	1,1471

Slope (%)	195	200	205	210	215	220	225	230	235	240	245	250
Slope (°)	62°85	63°43	64°00	64°54	65°06	65°56	66°04	66°50	66°95	67°38	67°80	68°20
"K" Coefficient	2,1915	2,2361	2,2809	2,3259	2,3712	2,4166	2,4622	2,5080	2,5539	2,6000	2,6462	2,6926

The installation sections for each of the La Escandella tile types ensures we know how many pieces per square metre of each type is needed to lay the roof correctly.

4.4 SLOPES / PITCHES

The slope is a base parameter in roof design. It ensures the correct evacuation of water, dictates the fastening methods, etc. A steeper slope will ensure a roof dries more quickly in times of heavy rain.

To guarantee correct behaviour of a roof, the recommended minimum slope must be taken into account. These are calculated based on the length of the field and the climatic conditions in the installation location, as shown in the tables. For slopes that are less steep than recommended, a waterproof membrane will be required in order to ensure the roof remains watertight. For fields greater than 12m long, the whole field must be waterproofed, and an intermediate gutter must be laid, for water evacuation.

CURVED ROOF TILE

PROTECTED LOCATIONS	Slope	26%	28%	30%	32%	34%	36%	38%	40%	42%	44%	>46%
	Slope	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	>25°
	Overlapping	15,0	14,0	13,5	13,0	12,5	12,0	11,5	11,0	10,0	10,0	7,0
NORMAL LOCATIONS	Slope	26%	28%	30%	32%	34%	36%	38%	40%	42%	44%	>46%
	Slope	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	>25°
	Overlapping	*	15,0	14,5	14,0	13,5	13,0	12,5	12,0	11,0	10,0	7,0
EXPOSED LOCATIONS	Slope	26%	28%	30%	32%	34%	36%	38%	40%	42%	44%	>46%
	Slope	15°	16°	17°	18°	19°	20°	21°	22°	23°	24°	>25°
	Overlapping	*	*	*	15,0	14,5	14,0	13,5	13,0	12,0	11,0	7,0

*Critical situation: a waterproofing underlayment on the entire deck MUST be applied.

Note: for hips LESS than 6.5m long, in normal locations or unfavorable climatic zone, the 32% slope MUST BE APPLIED.

FLAT ROOF TILE

	WITHOUT UNDERLAYMENT		WITH UNDERLAYMENT
Protected	35% / 19,5°	< 6,5 m < 21.32'	30% / 17°
Normal	40% / 22°		35% / 19,5°
Exposed	60% / 31°		50% / 26,5°
Protected	35% / 19,5°	6,5 m - 9,5 m 21.32' - 31.13'	30% / 17°
Normal	50% / 26,5°		45% / 24,5°
Exposed	70% / 35°		60% / 31°
Protected	50% / 26,5°	9,5 m - 12 m 31.13' - 39.37'	45% / 24,5°
Normal	60% / 31°		50% / 26,5°
Exposed	80% / 39°		70% / 35°

Note: For hips MORE than 12m long (39.4'), a waterproof underlayment on the entire roof deck MUST be applied and the ventilation underneath must be reinforced (check with the manufacturer).

Note: La Escandella warranty will be honored when installation is in strict accordance with local building codes, particularly to those referring to the ventilation of the deck and minimum slope requirements. Clay roof tiles should always be installed in full compliance with the local building codes and good tiling practice. For each country, please refer to local building codes.

MIXED / INNOVA / PLANUM / SELECTUM ROOF TILE

	WITHOUT UNDERLAYMENT				WITH UNDERLAYMENT			
	ZONE 1	ZONE 2	ZONE 3		ZONE 1	ZONE 2	ZONE 3	
Protected	25% / 14°	27% / 15,5°	30% / 17°	Hip < 6,5 m	19% / 10°	21% / 11°	23% / 12°	Protected
Normal	25% / 14°	27% / 15,5°	30% / 17°		21% / 11°	23% / 12°	26% / 14°	Normal
Exposed	33% / 18,5°	37% / 20,5°	40% / 22°		28% / 15°	32% / 17°	34% / 18,8°	Exposed
Protected	28% / 16°	32% / 18°	36% / 20°	Hip 6,5 m - 9,5 m	22% / 12°	24% / 13°	26% / 14°	Protected
Normal	28% / 16°	32% / 18°	36% / 20°		24% / 13°	27% / 15°	31% / 17,5°	Normal
Exposed	35% / 19,5°	39% / 21,5°	43% / 23,5°		30% / 17°	33% / 18°	37% / 20,5°	Exposed
Protected	32% / 18°	35% / 19,5°	40% / 22°	Hip 9,5 m - 12 m	23% / 12°	26% / 14°	30% / 17°	Protected
Normal	32% / 18°	35% / 19,5°	40% / 22°		27% / 15°	30% / 17°	34% / 18,8°	Normal
Exposed	42% / 23°	45% / 24,5°	50% / 26,5°		36% / 19°	39% / 21°	43% / 23,5°	Exposed

VIENNA ROOF TILE

	WITHOUT UNDERLAYMENT				WITH UNDERLAYMENT			
	ZONE 1	ZONE 2	ZONE 3		ZONE 1	ZONE 2	ZONE 3	
Protected	25% / 14°	25% / 14°	27% / 15,5°	Hip < 6,5 m	23% / 13°	23% / 13°	25% / 14°	Protected
Normal	25% / 14°	27% / 15,5°	30% / 17°		23% / 13°	25% / 14°	28% / 16°	Normal
Exposed	33% / 18,5°	37% / 20,5°	40% / 22°		31% / 17,5°	35% / 19,5°	38% / 21°	Exposed
Protected	26% / 15°	25% / 14°	30% / 17°	Hip 6,5 m - 9,5 m	24% / 13,5°	26% / 14,5°	30% / 17°	Protected
Normal	28% / 16°	32% / 18°	36% / 20°		26% / 14,5°	28% / 16°	32% / 18°	Normal
Exposed	35% / 19,5°	39% / 21,5°	43% / 23,5°		33% / 18,5°	37% / 20,5°	42% / 23°	Exposed
Protected	27% / 15,5°	30% / 17°	35% / 19,5°	Hip 9,5 m - 12 m	25% / 14°	27% / 15,5°	32% / 18°	Protected
Normal	32% / 18°	35% / 19,5°	40% / 22°		30% / 17°	33% / 18,5°	37% / 20,5°	Normal
Exposed	42% / 23°	45% / 24,5°	50% / 26,5°		40% / 22°	43% / 23,5°	47% / 25°	Exposed

VISUM3 ROOF TILE

	WITHOUT UNDERLAYMENT				WITH UNDERLAYMENT			
	Gables	< 6,5m	6,5m-9,5m		9,5m-12m	Gables	< 6,5m	6,5m-9,5m
Protected		55% / 29°	60% / 31°	70% / 35°		45% / 24°	50% / 27°	60% / 31°
Normal		60% / 31°	70% / 35°	80% / 39°		50% / 27°	60% / 31°	70% / 35°
Exposed		80% / 39°	90% / 42°	100% / 45°		70% / 35°	75% / 37°	85% / 40°

Selectum: transversal fit closed (207mm).

Innova: straight bond installation.

Waterproof membrane: minimum weight 135 gr/m².

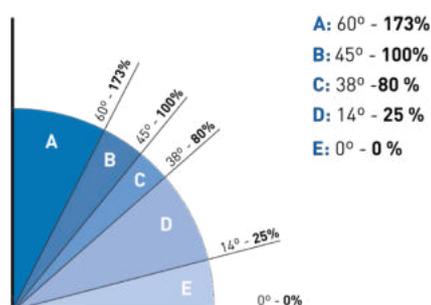
NOTE: For hips MORE than 12m long (39.4'), a waterproof underlayment on the entire roof deck MUST be applied and the ventilation underneath must be reinforced (check with the manufacturer). La Escandella warranty will be honored when installation is in strict accordance with local building codes, particularly to those referring to the ventilation of the deck and minimum slope requirements. Clay roof tiles should always be installed in full compliance with the local building codes and good tiling practice. For each country, please refer to local building codes.

Slopes expressed in this document are those recommended by La Escandella according to its experience and the specific tests it has been able to carry out.

4.5 FIXING METHODS AND COMPONENTS REQUIRED

The slope of a roof determines the level of fixation of the tiles required. **In eaves, side courses, ridge lines, valleys, vertical walls, encounters with vertical walls and other points, all parts will be fixed, always avoiding the simple support (without attachment) whatever the support material.** For the rest of the pieces, the fixing level will depend on the slope. **Slopes lower than recommended, an impermeable sheet shall be used to ensure the tightness of the deck.**

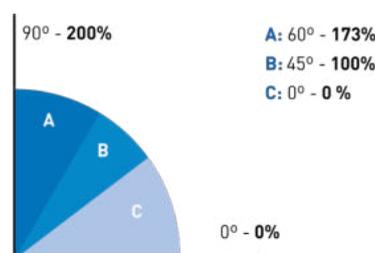
FASTENING METHODS FOR CURVED ROOF TILE



- A:** Every tile should be securely fastened (Nailed, screwed, clipped...) [60° / 203/4:12].
B: As a minimum, each tile in every five proportion, should be secured with (10 gauge) non-corrosive ring shank nails or screws [45° / 12:12].
C: Each tile hangs on the batten (held by the nib) [38° / 10:12].
D: Each tile hangs on the batten, held by the nib. When mortar is used, back bed and face point with color matched mortar. Clean off all excess mortar from the face of the tiles. For Foam Adhesive, refer to local building codes.
E: La Escandella recommended minimum slope requirements is 30% [4:12].

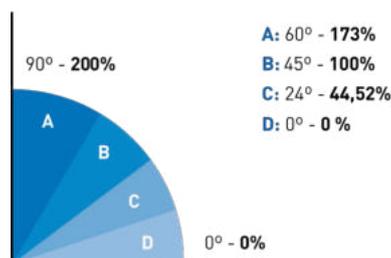
NOTE: La Escandella recommends to fix all tiles independently from a slope.

FIXING METHODS FOR INTERLOCKING TILES AND FLAT TILES (EXCEPT TW)



- A:** Every roof tile should be securely fastened by nailed, screwed, clipped, ...
B: Roof tiles will be fixed at least once every two or three, depending on the exposure of the roof and the height of the building.
C: The roof tiles shall be fixed at least in the proportion of one in five from a horizontal line, initiating fixation by rows alternately and regularly on the battens. In case of high wind exposure, all roof tiles must be fixed.

FIXING METHODS FOR VISUM3 ROOF TILE



- A:** Every rooftile should be securely fastened by nailed, screwed, clipped, ...
B: Roof tiles will be fixed at least once every two or three, depending on the exposure of the roof and the height of the building.
C: The roof tiles shall be fixed at least in the proportion of one in five from a horizontal line, initiating fixation by rows alternately and regularly on the battens. In case of high wind exposure, all roof tiles must be fixed.
D: Fixing not recommended due to the design of the roof tile (exit of water in the overlapping ribs does not work at this slope). Laying in cold areas is prohibited.

NOTE: The locking function is performed by the metal clamps / hooks. Polyurethane foam acts only as a positioner. Any fastening done with screws, nails, clips etc., must be sealed in order to prevent water entering. All fasteners must be non-corroding.

FIXING COMPONENTS FOR TILES

The function of fixing components is to provide the join between the tiles and any accessories, and the support, in order to prevent them from moving.

- Metal-plate screw
- Self-drilling screw
- Stainless steel hook
- Steel rod
- Steel plate
- Hip and Ridge tile fixing clips
- Hip and Ridge tile fixing screws
- Polyurethane foam
- Glue and adhesives

HOOKS AND CLIPS



CAM07
Ridge tile hook
Q01



CAM27
Round ridge tile
hook Q02



CAM70
Angular ridge tile
hook
Q120 - Q145



CAM29
Snow stopper
hook C-315



CAM30
Snow stopper
hook C-380



CAM59
Metal hook/clip for
wood batten for
TN - TV - TI



CAM62
Eave hook/clip for
roof tiles with lace



CAM64
Metal clip clipped
with a bumper for
TN - TV - TI



CAM66
Metal clip clipped
with a bumper for
TW



CAM26
Universal clip for
roof tiles with lace
(except TW)



CAM61
Metal clip for
T5



CAM15
Metal clip for
T5



CAM25
Metal clip for
T4



CAM74
Eave metal clip
for Curved roof
tile

SCREWS AND NAILS



CAM045
Flat head screws
(CONCRETE)



CAM95
Flat head screws
(WOOD- WOOD)



CAM97
Flat head screws
(TILE-WOOD)



CAM94
Self-supporting
flat head drill
screw
(TILE-METAL)



CAM93
Hexagonal head
drill screws
(METAL-METAL)



CAM77
Universal screws



CAM88
Spiral nail



CAM78
Heel nail



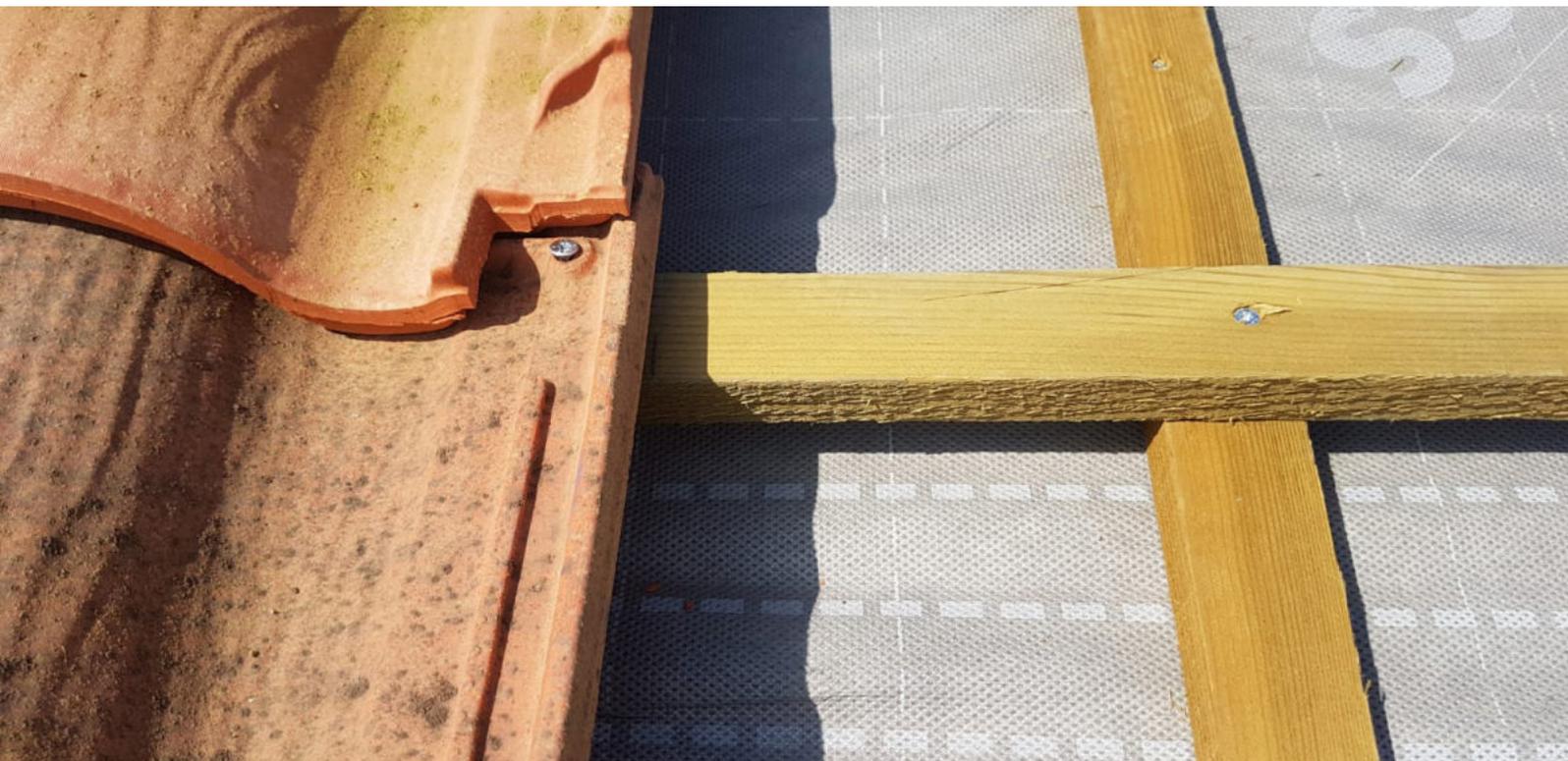
CAM84
Nylon nail



CAM87
Washer
(spiral and heel
nail)



CAM62 Eave hook/clip for roof tiles with lace



CAM95 Screw WOOD-WOOD and CAM97 Screw TILE-WOOD

4.6 VENTILATION AND WATERPROOFING

Ventilation is one of key elements to assure a good hygrothermal behavior of the roof and preservation of the roof structure. The key to a good and well preserved roof is a good ventilated roof. Proper installation of Ventilation tiles combined with ventilated roof can result in energy savings, in a more energy efficient home.

Air should be able to flow through the eave and ridge; be sure not to close these off with cement, mortar or similar. Eave and ridge areas should be protected to help minimize the access of birds and vermin infiltration.

Air will enter through the lower part of the roof, through the eaves or valleys, and will exit through the upper part of the roof, through the ridge and hips. Roof ridge ventilating roll (Alu-Roll) or sealing ventilation tape can be used, or each piece can simply be fixed to the ridge.

The interior circulation length must not exceed 12m, rising from the eaves to the ridge. A minimum air circulation gap of 20-40mm between the lower face of the tile and the support/insulation will be left. For fields greater than 12m, the air passage must be a minimum of 60mm.

Additionally, if you are laying a roof with battens, a 20-30mm gap must be left between them every 2 metres, to guarantee air circulation.

A greater difference in height between the entry and exit provides better ventilation.

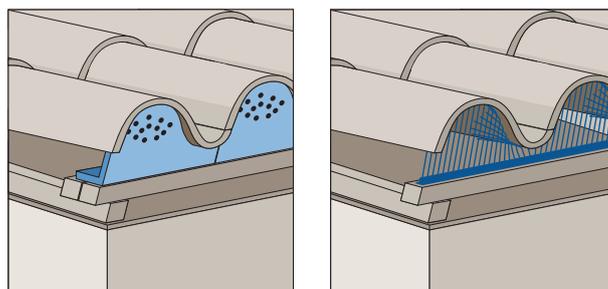
La Escandella offers a wide selection of Accessories designed for each of the different tile models (Mixed, Curved, Flat, Selectum, Visum3, Planum, Innova and Vienna roof tiles) which will ensure roofs are both functional and aesthetic.

- **VENTILATING RIDGE BAND** Alu-Roll. As well as supporting the caps, ventilating ridge band allows the air from the micro-ventilation to exit via the ridge.

- **VENTILATION TILES** correctly for each model and type of tile. The ventilation tile will be placed so that it is staggered with respect to the entry tiles, and never in the row next to the ridge.

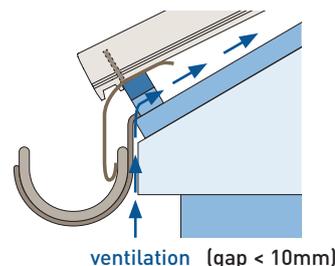
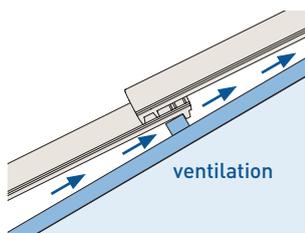
- **ACCESORIES FOR EAVE** This ensures the roof is ventilated through the eaves, and at the same time it provides protection against insects and small creatures.

La Escandella offers various accessories of the eaves, among which stands out the ceramic bird stopper, which maintains the aesthetic of the roof. For more information, see page 85 of this manual.



Bird stopper

Eaves ventilation comb



Note: For slopes of less than 25°, the length of a field may not be greater than half of the number of degrees of the slope. E.g., for a slope of 25°, the maximum field length is 12.5m. For slopes of more than 25°, there is no limit to field ventilation.

Note: La Escandella product guarantee is conditional on correct use of the products, in particular that they are laid with at least the minimum slope and with adequate ventilation. In Spain, refer to UNE 136020 for the full criteria, and in other countries refer to the current building regulations.

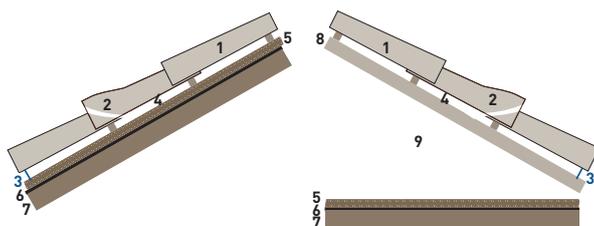
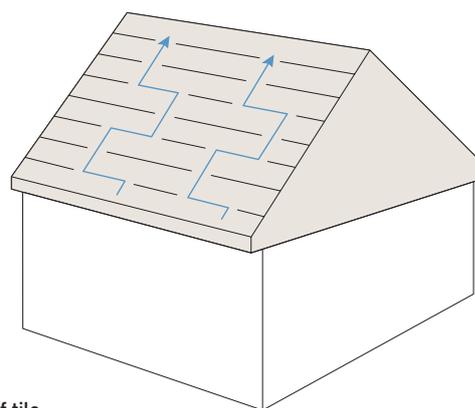
Furthermore, there must always be a space between the supporting frame and the tiles, which will allow air to circulate under them and micro-ventilation. Additionally, a ventilation tile must be laid every 7m² and at minimum two per field.

Depending on the type of tile used, the following accessories will be needed:

						
Q22-Q23 Curved*1 Ventilation Tile	Q19-Q20 Mixed Ventilation Tile	Q21 Flat Ventilation Tile	Q86K Planum Ventilation Tile	Q96K Visum3 Ventilation Tile	Q117K Innova / Vienna Ventilation Tile	Q131K Selectum Ventilation Tile
Airflow section: Q22: 24,6 Q23: 27,8 cm ²	Airflow section: Q19: 17,5 Q20: 4,3 cm ²	Airflow section: Q21: 3,4 cm ²	Airflow section: Q86K: 18,9 cm ²	Airflow section: Q96K: 16,7 cm ²	Airflow section: Q117K: 20,2 cm ²	Airflow section: Q131K: 18,9 cm ²

These ventilation accessories will prevent there being an excessive temperature difference between the underside of the tiles and the upper side of the support, which could initially create humidity problems through condensation, and could later cause cracking in areas subject to frost.

To ensure correct ventilation, the interior air circulation must not be blocked by any intermediary component, and the circulation flow length must not exceed 12m. The air should circulate from the eaves to the ridge.



1. Roof tile
2. Ventilation roof tile *2
3. Eaves ventilation comb
4. Micro-ventilation void
5. Heat insulation underlayment
6. Waterproof underlayment material
7. Frame
8. Rafter
9. Attic

*1Note: Where Curved Tiles have been placed on corrugated sheeting, refer to the sheeting manufacturer's manual.

*2Note: The ventilation tile will be offset to free the air entry, and must never be laid in the row next to the ridge.

BENEFITS OF A VENTILATED ROOF

- QUALITY OF LIFE

High levels of humidity in the atmosphere can trigger or aggravate certain health problems.

- SAVING ENERGY

Ventilated roofs can provide energy savings of 20 to 30%. What is more, a damp house takes much longer to warm up, increasing the heating bill by as much as 25%.

- NOISE PROTECTION

- HUMIDITY PROTECTION

Damp gradually damages your home, and can even lead to its demolition. Lack of ventilation in a roof can lead to problems of humidity through condensation and could later cause cracked tiles in areas subject to frost.

- DURABILITY

A well designed pitched roof will last a life time. This lifespan translates into economic saving for roof maintenance.

THERMAL INSULATION AND WATERPROOFING

The roof of a building is very exposed to severe weather conditions, and so it must be built to ensure it is completely waterproof.

Some options:

• **ASPHALT TILES.** Ideal for flat roofs.

• **EPDM RUBBER SHEETS.** For all roof types

• **LIQUID POLYURETHANE MEMBRANES.** For roofs with a lot of installations, skylights etc.

• **MULTILAYER POLYPROPYLENE SHEETS.** For sloping roofs (under-tile waterproofing).

• **BITUMEN BOARDS.** For sloping roofs (under-tile waterproofing)



Humidity problems due to poor ventilation.



SUSTAINABILITY FACTS

“Insulating the roof, as well as waterproofing, can provide savings of as much as 900€/year (£650-£700) and reduces CO₂ emissions by 200kg/year (a dwelling of 80m² or around 260 sq ft). In this case, roof insulation pays for itself in less than two years”

WATERPROOF MEMBRANES

Waterproof underlay is a flexible, impermeable sheet whose main function is to protect the roof. The layers breathe, so dissipating moisture outside and at the same time preventing water from entering inside, should there be any fault in the protecting cover.

The high ventilation capacity provided by these membranes, together with correctly laid tiles to ensure micro-ventilation, ensures proper ventilation and elimination of interior humidity and **prevents condensation, which has a detrimental effect on the struc-**

tural materials of the roof, especially when it has a continuous or discontinuous wooden frame.

This breathing layer is laid on sloping roofs using mechanical fixings. A ventilation layer should be allowed for in the lower part of the ridge if necessary. A space of at least 2.5cm should be left between the membrane and the tiles.

Although the product is not water-permeable without pressure, it should not be left without a covering for a prolonged period once it has been laid. It is worth noting that waterproof membranes, depending on their type, come in different weights, which makes them more or less water-resistant (higher weight, higher water-resistance).



The waterproof membrane should ideally be laid perpendicular to the maximum slope line, with overlaps of at least 15cm if the slope is greater than 30%, and at least 20cm for lesser gradients.



The battens laid on the waterproof membrane are nailed to the surface or onto the supporting slats. The finishing studs are fixed on the battens.



To achieve a perfect microventilation of the roof, we shall place horizontal battens on the vertical ones which we have already placed.

THE MAIN ADVANTAGES OF WATERPROOF MEMBRANES ARE:

- **Impermeability to water** (protects from accidental water infiltration and from condensation and channels the waters to the gutters)
- Better thermal efficiency of the roof, so **improved insulation**
- **Protects against infiltration of fine sand**, dust, pollen, snow flakes etc.
- Construction of **sloped roofs with minimum slopes**
- **Protects against the entry of birds**, insects and small rodents
- Assists in **roof ventilation** (enables continuous evacuation of water vapour)
- Improves the **roof's behaviour in windy conditions** by reducing the pressure level under the tiles



5

INSTALLATION BY TILE TYPE

Once the geographical situation of the house, the roof slope and size of the field are known, it is time to start calculating the number of tiles needed for that field area, and how it is to be laid, which will depend on the type of roof we are installing.

The calculated field area will be multiplied by the number of pieces per square metre, based on the type of tile we are using.

A further 5% is added to the final number of pieces, since we take into consideration possible losses through cutting, to make adjustments for ridges, hips and valleys.

5.1 MECHANICAL ROOF TILES

Interlocking or mechanical tiles have a longitudinal or transversal interlocking system, which may be **single or multiple**. With these systems, laid tiles create a seal between pieces, in both the vertical and horizontal courses.

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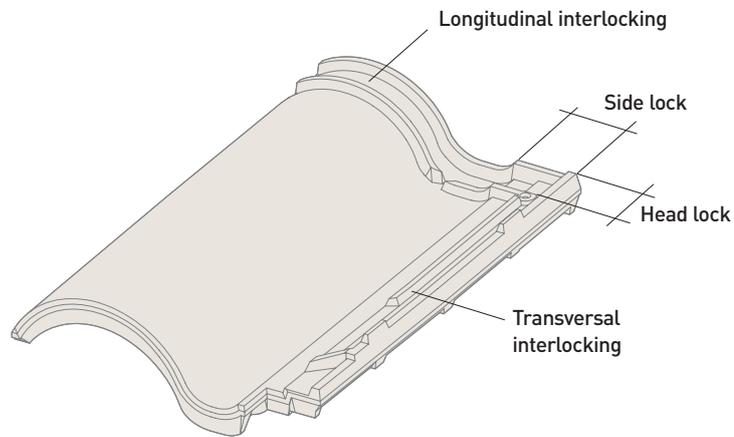
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The interlocking system reduces the likelihood of tile slippage and its purpose is to prevent the passage of water. The longitudinal and/or transversal interlocking of the pieces facilitates the assembling of tiles in horizontal or vertical rows, respectively.

On their underside and along their upper edge, the tiles have one or more flanges or nibs which allow them to be hooked onto the support.



TRADITIONAL ROOF TILES

		TRANSVERSAL FIT	LONGITUDINAL FIT	
MIXED ROOF TILE		TG: 6mm / TP: 8mm 	TG: 11mm / TP: 10mm 	Full length
				Short length
FLAT ROOF TILE		2mm 	10mm 	Full length
				Short length

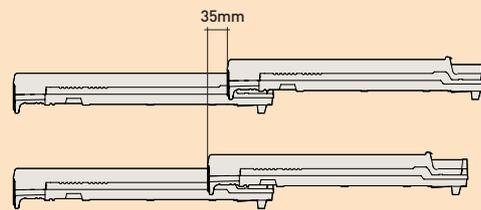
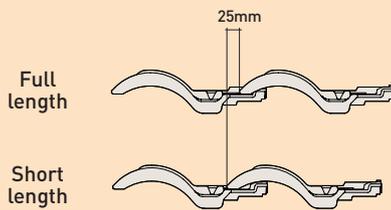
FITTING OF LONGITUDINAL AND TRANSVERSAL INTERLOCKS

Mechanical tiles do not have a fixed interlock system, the interlocks are variable, allowing the installer to reset the tiling in the other direction without any cutting.

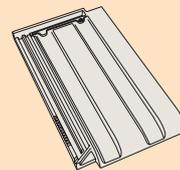
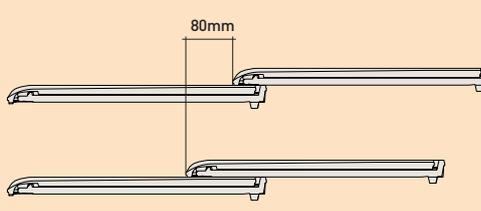
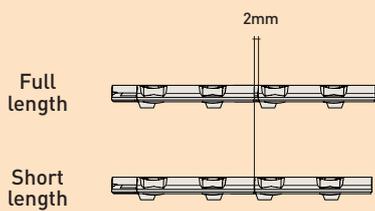
H-SELECTION ROOF TILES

TRANSVERSAL FIT

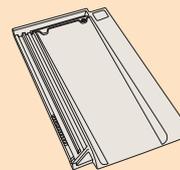
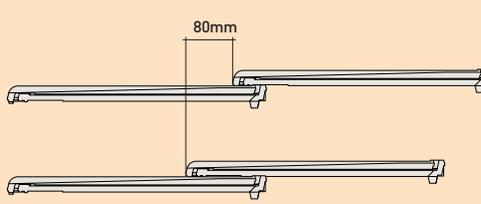
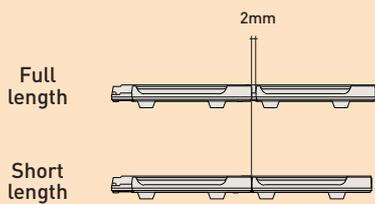
LONGITUDINAL FIT



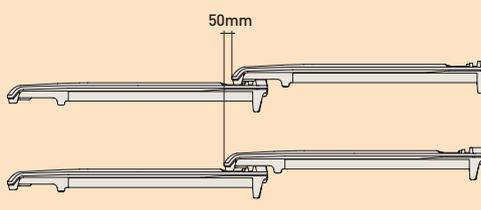
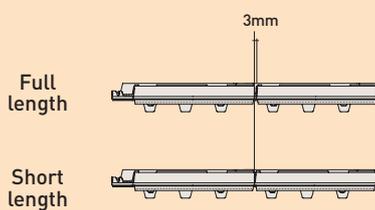
SELECTUM



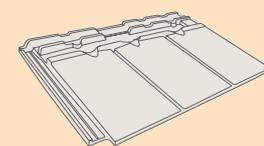
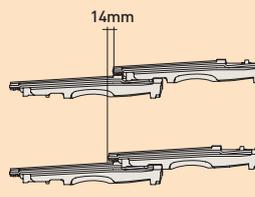
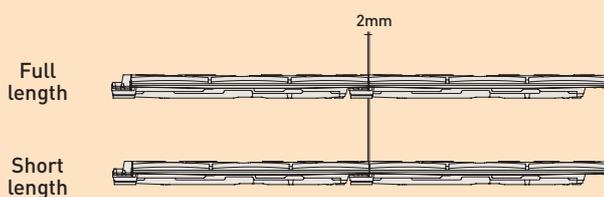
INNOVA



VIENNA



PLANUM



VISUM3

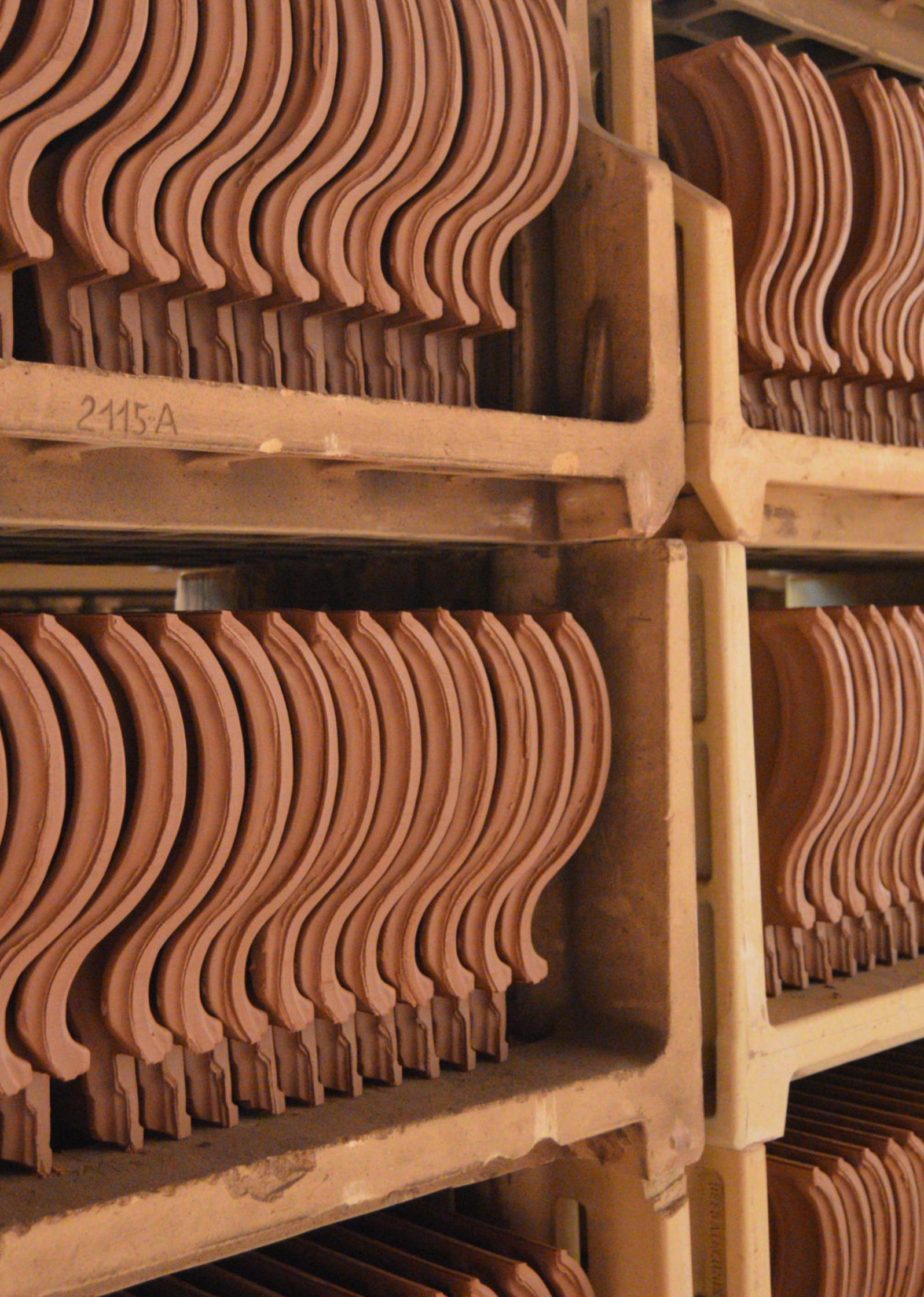
Note: The measurements shown are indicative. La Escandella reserves the right to change any of these dimensions without prior notice. For more information, contact your representative or Customer Service.

5.1.1 MEDITERRANEAN ROOF TILES

Classicism and avantgarde join in a new concept of traditional La Escandella tiles.

The colors of the mediterranean sea merge with the curves of history.

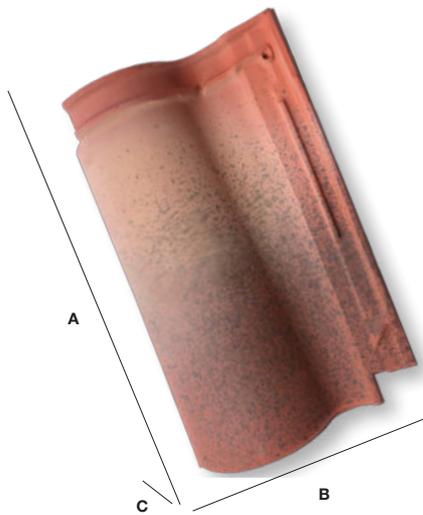




2115-A

ARRETRATI

Mixed roof tile (TG - TP)



Technical Characteristics

LARGE TG	Dimensions*	A 470 mm B 286 mm C 75 mm / A 18.5" B 11.26" C 2.95"
	Pieces per m ² / sq.	10.5 / 97
	Weight per piece	3.85 kg / 8.49 lbs
	Longitudinal fit**	396 mm (+7 mm; -4 mm) / 15.6" (+0.27";-0.16")
	Transversal fit**	230 mm (±3 mm) / 9.05" (±0.11")
	Units per pallet	180 / 240
	Weight per pallet	693 kg / 1.527,8 lbs (180 pieces) / 924 kg / 2.037,1 lbs (240 pieces)

SMALL TP	Dimensions*	A 441 mm B 263 mm C 73 mm / A 17.36" B 10.35" C 2.87"
	Pieces per m ² / sq.	12.5 / 116
	Weight per piece	3.4 kg / 7.49 lbs
	Longitudinal fit**	370 mm (±5 mm) / 14.56" (±0.19")
	Transversal fit**	203 mm (±4 mm) / 8" (±0.16")
	Units per pallet	210 / 280
	Weight per pallet	714 kg / 1.574,1 lbs (210 pieces) / 952 kg / 2.098,8 lbs (280 pieces)

* The Tile dimensions indicated in this chart, allow a tolerance of approximately ±2%.

** Theoretic value: this should be re-calculated on site with the tiles that are to be used.

Double curvature

Its double curvature, eave and ridge joints design and functionality as Arab roofs looking. Mediterranean aesthetics with the easiest fixation

Wide range of colors

A roof tile with a wide range of colors and complements to satisfy all professionals' needs and preferences; suitable to all type of roofs (new and aged ones)

Double interlocking

The double interlocking -horizontal and vertical- allows the roof to be more watertight, ensuring its impermeability

Higher Resistance

The clay's composition and its perfect press performance make flexion rates even higher than Standard

Cost reduction

Its large format (10.5 pcs/sqm for Large Mixed and 12.5 pcs/sqm for Small Mixed) and strapping every 5 units allow to reduce installation costs.



*Valid for Large Mixed roof tile

**Valid for Small Mixed roof tile

NOTE: during the manufacturing process, handling or transport, small friction can occur on the gloved decorated roof tiles, due to the contact of support of some tiles on others. Such friction doesn't affect the structure of the tile or its quality. It's only perceptible on the hand and, therefore, comply with the guarantee of Cerámica La Escandella.

LAI D METHOD

1. Installation will begin with La Escandella Mixed "S" left side courses (rakes) from the eave to the ridge, allowing a 5 cm (2") overhang at the eave. All side course (rake) tiles shall be installed with fasteners typical of the field tile installations.
2. The starter course will begin with a full tile from the eave to the ridge, allowing a 5cm (2") overhang at the eave. The tiles structuring the eave will have to overlap the side course (rake) and fit together one to another. The second course of the tile will lay up directly over the previously installed field tile to the proper exposure and overlapping.
3. See (fig.1) for sequence of installation for fist and succeeding courses of tiles from the eave to the ridge.

To avoid breaking of the roof tiles and accessories It's necessary pierce the pre-hole with a screw stroke (Ø max. 4mm / 0.16"), before stick or drill the piece directly.

NOTE: A control line between 3 and 5 rows of tiles (maximum) is recommended.

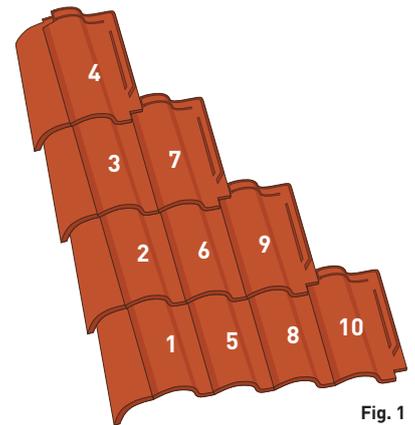
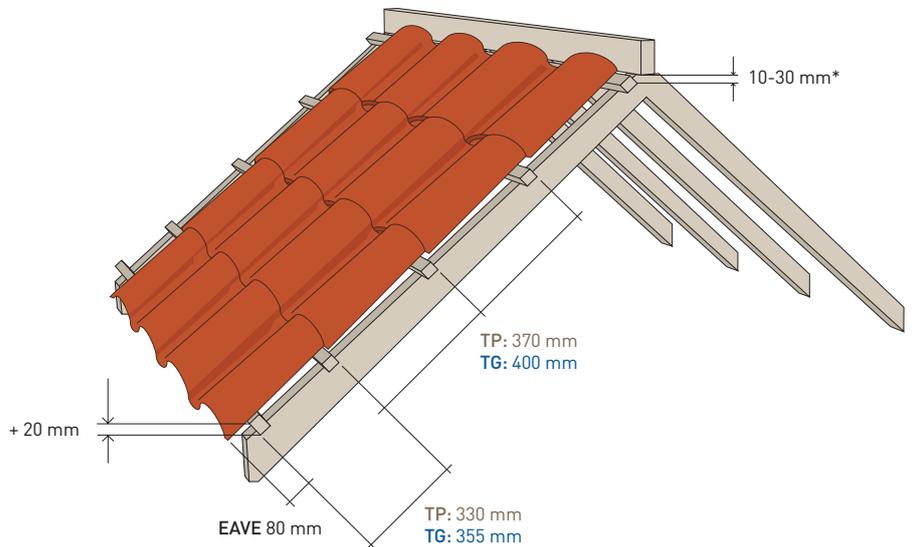


Fig. 1



First course batten should be 20 mm (3/4") higher than all succeeding course battens to provide a vertical alignment and to assure a symmetrical installation



*Depending on the slope. See pages 73-77 ridge section.

4. The right section (vertical terminating end) of the roof can be finished by using either a Half (1/2) Tile (Q16 - Q17) (fig.2) or a Double Tile (Q33 - Q34) (fig.3).

5. For a faster installation and extra ridge ventilation, an Under Ridge Tile (Q70) (fig.2) and/or a Double Under Ridge Tile (Q71) (fig.3), is recommended when reaching the ridge line.

Half Mixed “S” roof tile laying

- Mixed “S” roof tile
- Q10 Straight left side course
- Q11 Straight right side course
- Q16 (TG) - Q17 (TP) Half Mixed “S” roof tile
- Q33 (TG) - Q34 (TP) Double Mixed “S” roof tile
- Q70 (TG) Under Ridge tile
- Q71 (TG) Double Under Ridge tile
- Q35 (TG) - Q36 (TP) 2/3 under ridge tile
- Q37 (TG) - Q38 (TP) Double 2/3 under ridge tile

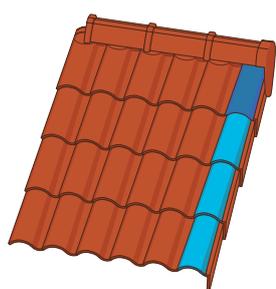
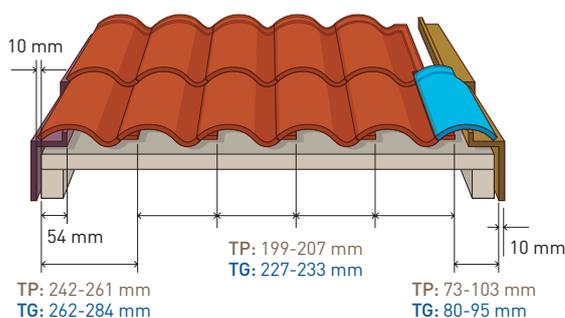


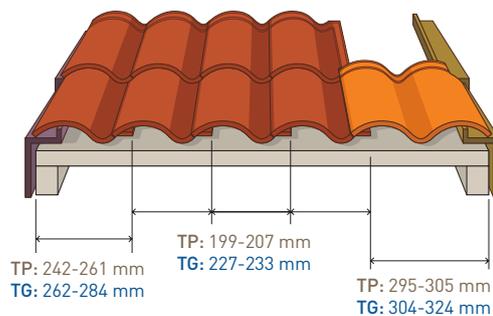
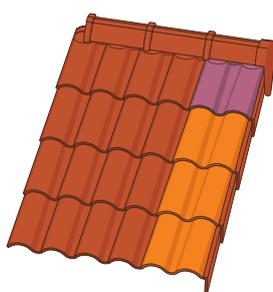
Fig. 2



When installing with half tiles, an additional vertical batten must be added to fix them.

Double Mixed “S” roof tile laying

Fig. 3



To avoid cutting the field tiles when reaching the ridge line, a 2/3 under ridge tile (Q35 - Q36) can be used in the upper course and closed by using a Double 2/3 under ridge tile (Q37 - Q38).

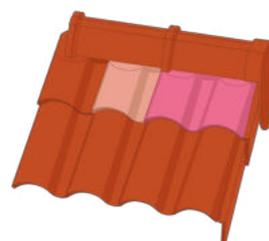


Fig. 4

Flat roof tile (TL)

Double interlocking

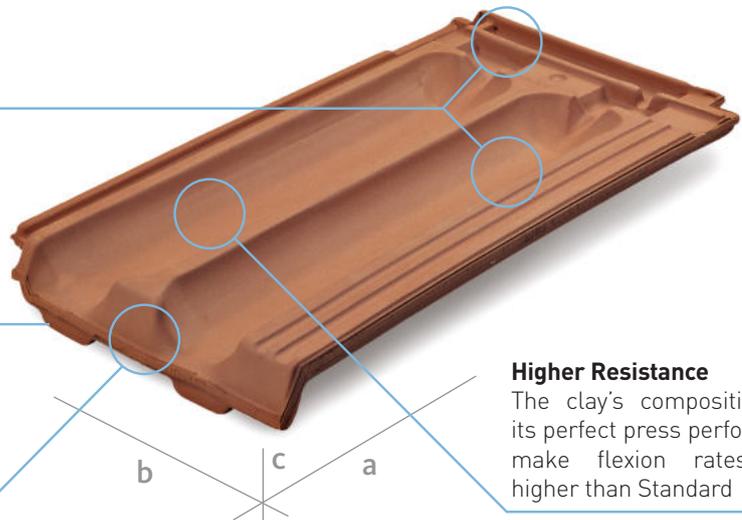
The double interlocking - horizontal and vertical - allows the roof to be more watertight, ensuring its impermeability

Cost reduction

Its large format (11units/m²) and strapping every 5 units, as well as its packaging on pallets of 180 and 240 units, reduce installation costs

Easy and quick fixation

Its traditional shape together with its installation by crossbond, allows a great adaptation to restoration



Higher Resistance

The clay's composition and its perfect press performance make flexion rates even higher than Standard

Technical Characteristics

Dimensions*	A 466 mm / 18.35" B 260 mm / 10.24" C 55 mm / 2.16"
Pieces per m ² / sq.	11 / 101
Weight per piece	3.6 kg / 7.93 lbs
Longitudinal fit**	403 mm (±5 mm) / 15.86" (±0.19")
Transversal fit**	225 mm (±1 mm) / 8.85" (±0.04")
Units per pallet	180 / 240
Weight per pallet	648 kg / 1.428,6 lbs (180 pieces) / 864 kg / 1.904,8 lbs (240 pieces)
Laying	Straight / Broken bond

*The Tile dimensions indicated in this chart, allow a tolerance of approximately ±2%.

**Theoretic value: this should be re-calculated on site with the tiles that are to be used.



According to European standard



Test of frost resistance



Impermeability



Flexural strength test



Geometric characteristics



LAI D METHOD

Straight bond pattern:

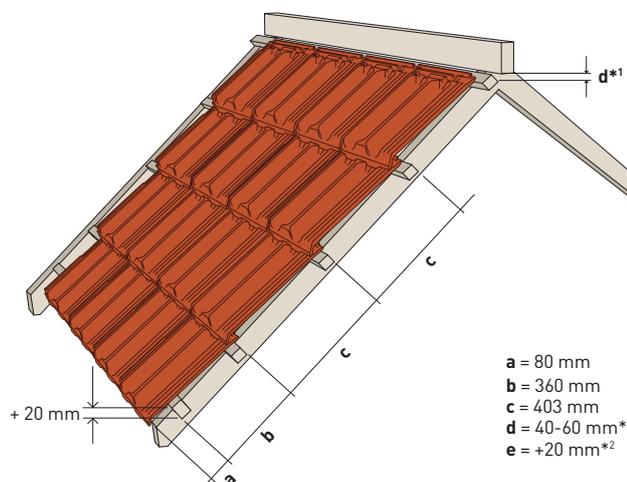
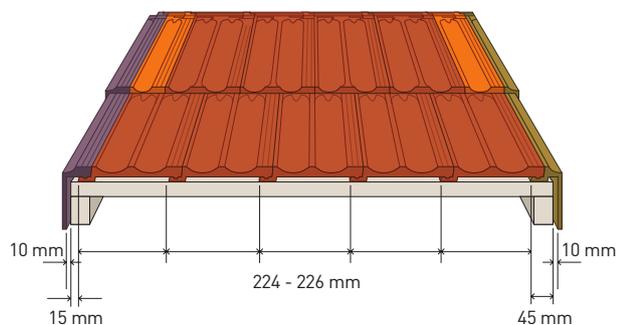
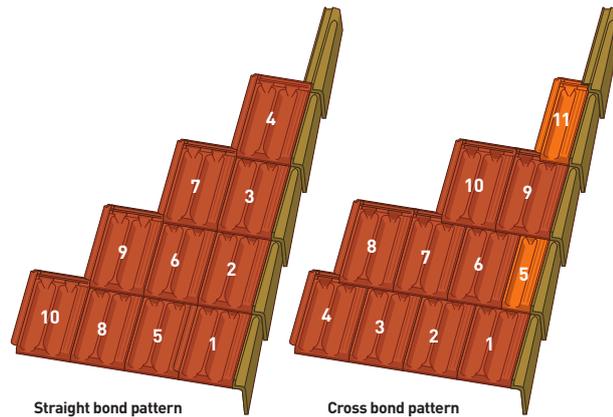
1. The starter course will begin with a full tile from the eave to the ridge, (allowing a 3.15" (8cm) overhang at the eave).
2. The tiles structuring the eave will have to overlap the side course (rake) and fit together one to another.
3. The second course of the tile will lay up directly over the previously installed field tile to the proper exposure and overlapping. See Figure for sequence of installation for fist and succeeding courses of tiles from the eave to the ridge.
4. The left section (vertical terminating end) of the roof can be closed by using a half (1/2) tile (end band) - Q18 to overlap the left side course (rake) - Q14.

Cross bond pattern:

1. The starter course will begin with a full tile from the eave to the ridge, (allowing a 3.15" (8cm) overhang at the eave). The tiles structuring the eave will have to overlap the side course (rake) and fit together one to another.
2. The second course will be started with half (1/2) tile (end band) - Q18 and will be laid to provide the proper vertical exposure.
3. All joints of the second course and succeeding courses should be at the center line of the previous course, alternating half tiles and full tile at the start and at the end of each course. This is continued through each successive course.

To avoid breaking of the roof tiles and accessories It's necessary pierce the pre-hole with a screw stroke (Ø max. 4mm / 0.16"), before stick or drill the piece directly.

NOTE: A control line between 3 and 5 rows of tiles (maximum) is recommended.



*Depending on the slope. See pages 73-77 ridge section.

First course batten should be 20 mm (3/4") higher than all succeeding course battens to provide a vertical alignment and to assure a symmetrical installation

Accessories

TG-TP / TL

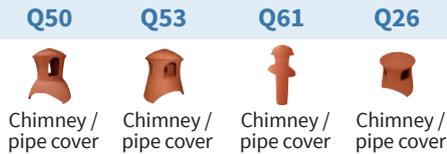


Q47 - Q48 Q49 Q24 - Q25 Q46



Chimney support Mixed roof tile Chimney support Large Mixed roof tile Chimney support Mixed roof tile Chimney support Flat roof tile

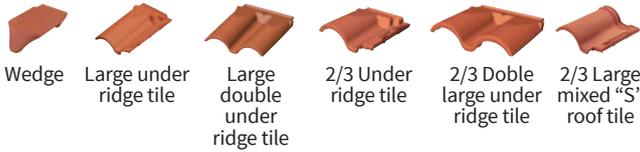
Chimneys and supports*



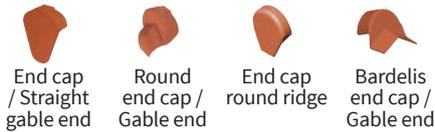
Q19 - Q20 Q21 Ventilation



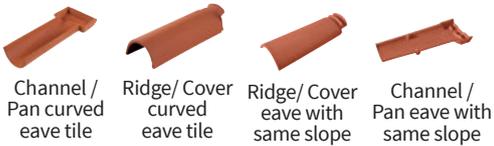
Q08 Q70 Q71 Q35 - Q36 Q37-Q38 Q56 Under Ridge



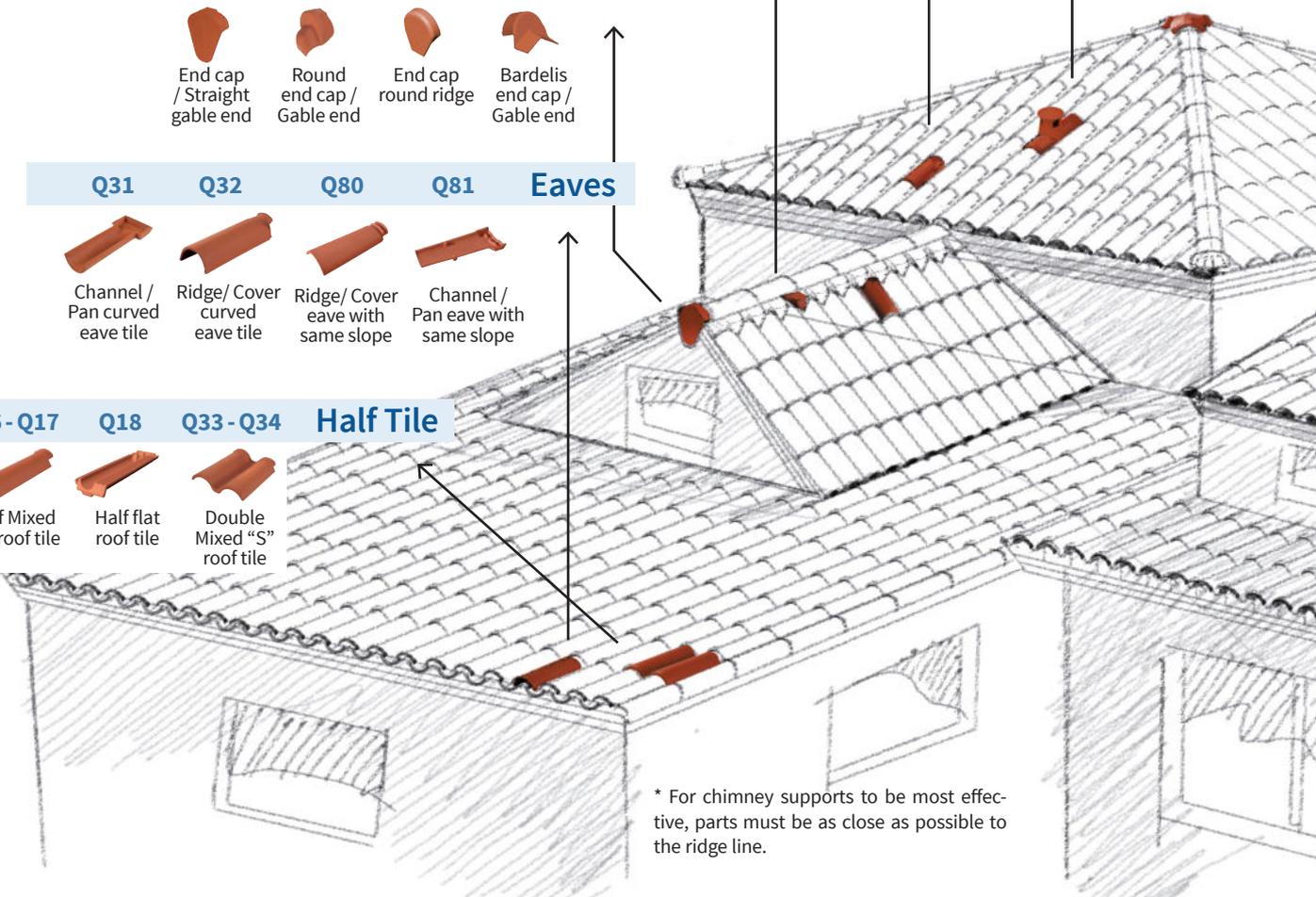
Q05 Q06 Q83 Q64 End-cap



Q31 Q32 Q80 Q81 Eaves



Q16 - Q17 Q18 Q33 - Q34 Half Tile



* For chimney supports to be most effective, parts must be as close as possible to the ridge line.

Joins

- | | | | | | | |
|---|---|---|---|---|---|---|
| Q07 | Q42 | Q60 | Q30 | Q44 | Q45 | Q55 |
|  |  |  |  |  |  |  |
| 3 way ridge
(same slope) | 3 way ridge
female
with slope | 3 Way ridge
with slope | 4 way ridge | Round 3
way ridge | Round 4
way ridge | Round 3
way ridge
female |

Ridges

- | | | | |
|--|---|---|---|
| Q01 | Q02 | Q65 | Q82 |
|  |  |  |  |
| Ridge /
Hip | Round
ridge / Hip | Two way
female
ridge | Two way
male
ridge |

Ridge ends

- | | |
|---|---|
| Q03 | Q04 |
|  |  |
| Ridge end /
Hip starter | Round
ridge end /
Hip starter |

Side courses

- | | | | | |
|---|--|---|---|---|
| Q09 | Q10 | Q12 | Q62 | Q14 |
|  |  |  |  |  |
| Universal
side course
/ Rake | Straight left
side course
/ Rake | Round left
side course
/ Rake | Bardelis left
side course
/ Rake | Left side
course for
flat roof tile |
| | Q11 | Q13 | Q63 | Q15 |
| |  |  |  |  |
| | right side | right side | right side | right side |

Decorations

- | | | |
|---|---|---|
| Q57 | Q28 | Q29 |
|  |  |  |
| Acorn | Small piruli | Large piruli |

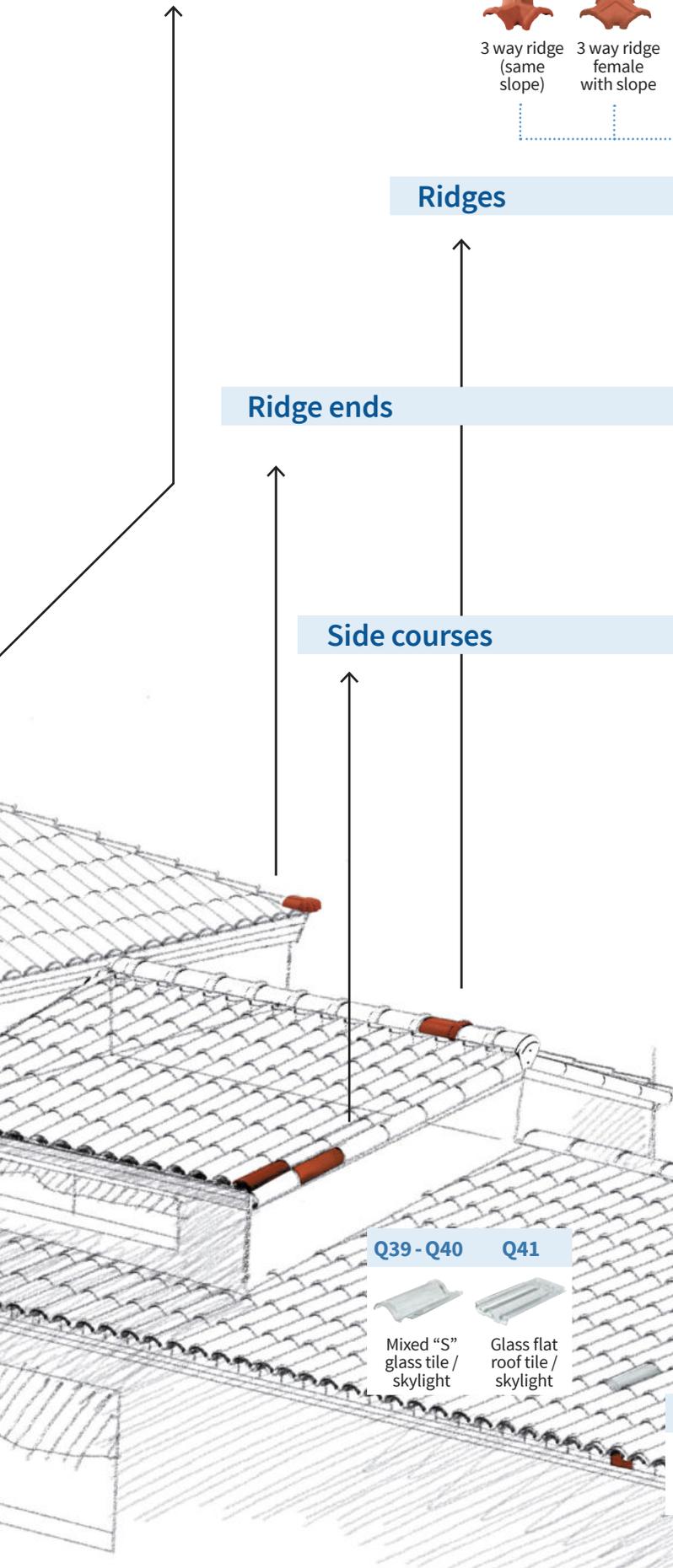
Q39 - Q40 **Q41**

- | | |
|---|---|
|  |  |
| Mixed "S"
glass tile /
skylight | Glass flat
roof tile /
skylight |

Q72

- | |
|---|
|  |
| Bird stopper |

To avoid breaking of the roof tiles and accessories It's necessary pierce the pre-hole with a screw stroke (Ø max. 4mm / 0.16"), before stick or drill the piece directly.



5.1.2 H-SELECTION ROOF TILES



EXCELLENT FLATNESS

Individual curing of each tile thanks to support in H. Excellent flatness with no contact points.



HIGH DEFINITION ON EACH PIECE

It provides a perfect definition on each piece, made with gypsum moulds, providing a much finer texture.



LOW ABSORPTION

Higher resistance to ice and mould formation.



LIFETIME WARRANTY

Our 100 years of warranty ensure your peace of mind and demonstrate the quality of our manufacturing process.





Selectum roof tile (TS)



FlexiLock
11-14 u. /m²

Technical Characteristics

Dimensions*	A 468 mm / 18.4" B 280 mm / 11" C 75 mm / 2.95"
Pieces per m ² / sq.	11 - 14 / 116
WEIGHT/unidad	3.5 kg / 7.71 lbs
Longitudinal fit**	348 - 383 mm / 13.7" - 15.07"
Transversal fit**	206 - 231 mm / 8.1" - 9.09"
Units per pallet	240 / 320
Weight per pallet	40 kg / 1120 kg // 1.852 lbs/ 2.469 lbs
Laying	Straight bond

* The tile dimensions indicated in this chart, allow a tolerance of approximately $\pm 2\%$.

** Theoretic value: this should be re-calculated on site with the tiles that are to be used.

Flexilock system offers vertical and lateral tolerance, which make the installation easier and guarantee a perfect fit for any roof. The number of tiles per square meter may vary from 11 (long. fit 383 and transv. fit 231) to 14 (long. fit 348 and transv. fit 206).

Protection 4X

The most exposed area has 4 layers of protection.

Higher resistance

The clay composition together with the perfect pressing allows flexion higher than the required while only weighing 3,5 kg.

Lower absorption (<5%)

High quality clay together with high firing temperature mean higher resistance to ice and mildew.

High definition on each piece

The gypsum moulds provide a perfect finish, obtaining a smoother texture, no contact points nor creases.



Flexilock

A system to make the installation easier and guarantee a perfect fit for any roof. The number of tiles per square meter may vary from 11 to 14.

Low pitch

Design optimized to be used in pitches as low as 19%/10°

Cost reduction

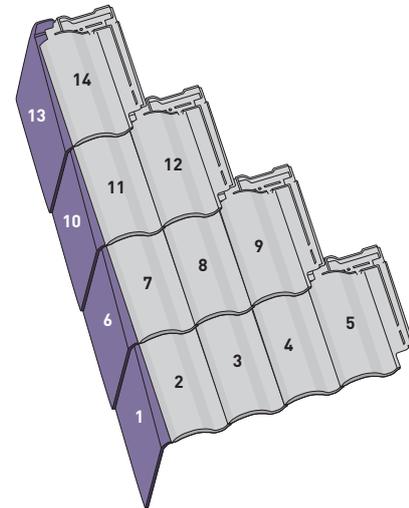
-30% weight vs. a concrete tile. Lighter roof. Cost-effective installation.



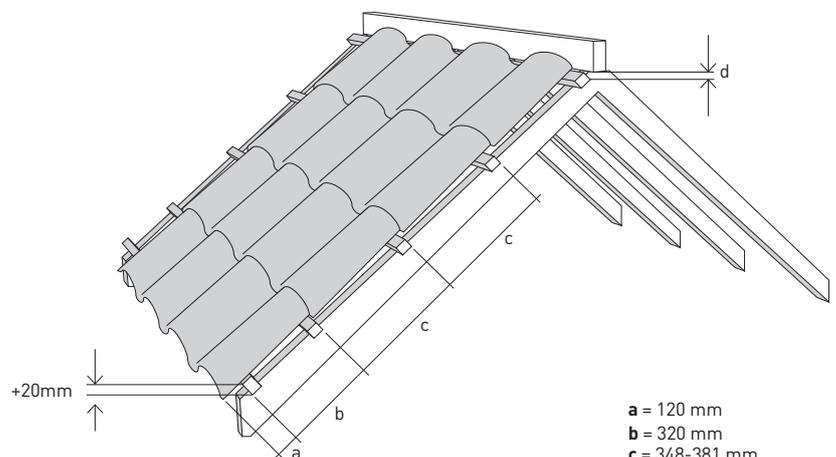
LAI D METHOD

1. The starter course will begin with the Selectum left side course (Q133K).
2. Start laying tiles structuring the eave from left to right and allowing a 5 cm (2") overhang at the eave.

To avoid breaking of the roof tiles and accessories It's necessary pierce the pre-hole with a screw stroke (\varnothing max. 4mm / 0.16"), before stick or drill the piece directly.



NOTE: A control line between 3 and 5 rows of tiles (maximum) is recommended.



First course batten should be 20 mm (3/4") higher than all succeeding course battens to provide a vertical alignment and to assure a symmetrical installation

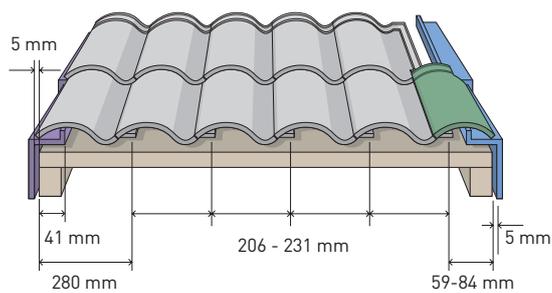
*Depending on the slope. See pages 73-77 ridge section.

3. The right section (vertical terminating end) will be finished with a Half (1/2) Tile (**Q130K**) over the Selectum right side course (**Q134K**).

4. Complete the installation with succeeding courses of tiles from the eave to the ridge.

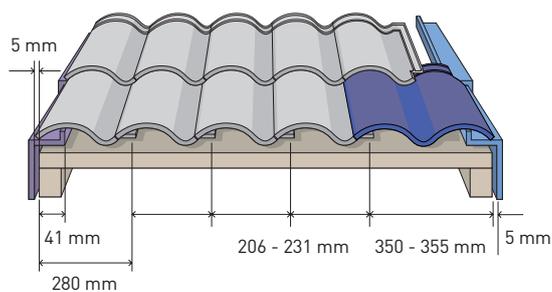
5. Every 5 tiles it is recommended to draw a vertical control line to avoid deviations.

Selectum Half roof tile laying



- Selectum roof tile
- **Q133*K** Selectum left side course klinker
- **Q134*K** Selectum right side course klinker
- **Q130*K** Selectum half roof tile klinker

Selectum Double roof tile laying



- Selectum roof tile
- **Q133*K** Selectum left side course klinker
- **Q134*K** Selectum right side course klinker
- **Q138*K** Selectum double roof tile klinker

Visum3 roof tile (TW)

3 in 1 tile

Visum3 is a patented interlocking tile with an innovative triple cambered design that gives the appearance of three plain tiles.

Wide range of colors

Its triple exclusive decoration system offers a broader range in tones and hues, so no two tiles are alike.

Excellent flatness

H-Cassette manufacturing provides a perfect finish to each product.

Double interlocking

The double interlocking -horizontal and vertical- allows the roof to be more watertight, ensuring its impermeability.

Cost reduction

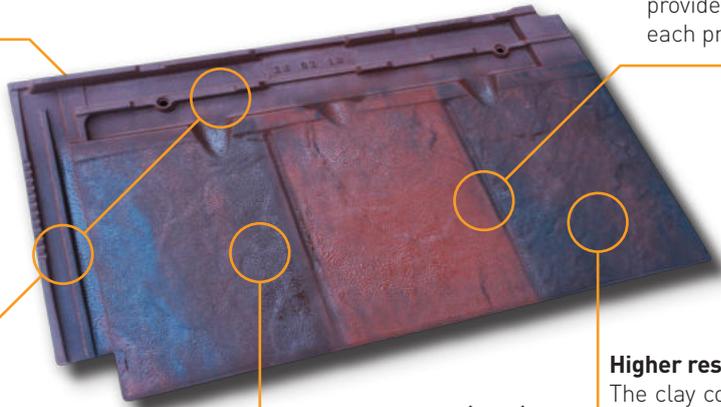
Its large format (11,5 units/m²) and strapping every 6 units, as well as its packaging on pallets of 216 and 288 units, reduce installation costs.

Lower absorption (<5%)

High quality clay together with high firing temperature mean higher resistance to ice and mildew.

Higher resistance

The clay composition together with the perfect pressing allows flexion higher than the required while only weighing 3.6 kg.



Technical Characteristics

Dimensions*	A 280 mm / 11" B 471 mm / 18.54" C 35 mm / 1.38"
Pieces per m ² /sq.	11.5 / 106.7
Weight per piece	3.6 kg / 7,9 lbs.
Longitudinal fit**	187 mm (+4 mm; -10 mm) / 7,36" (+0.16" ; -0.39")
Transversal fit**	435 mm (±1 mm) / 17.12" (± 0.04")
Units per pallet	216 / 288
Weight per pallet	778 kg / 1.715,2 lbs (216 pieces) / 1.037 kg / 2.286,2 lbs (288 pieces)
Laying	Cross bond

* The tile dimensions indicated in this chart, allow a tolerance of approximately ±2%.

** Theoretic value; this should be re-calculated on site with the tiles that are to be used.



LAI D METHOD

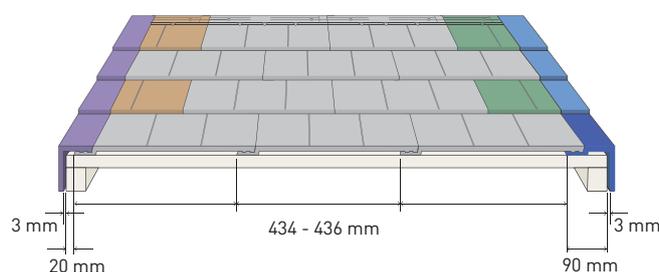
Visum3 roof tile is laid on a discontinuous frame or battens, which will be fixed by building a batten and counter batten deck or by fixing them directly to the frame. The laying of Visum3 roof tile is carried out by broken bond (also referred as cross bond) as follows:

1. The Starter course will begin with a Visum3 Right side start course klinker (Q107*K) (this accesorie includes a metallic part to direct the water to a gutter as shown in Fig. 2). Then continue with full tiles Visum3 all the course.

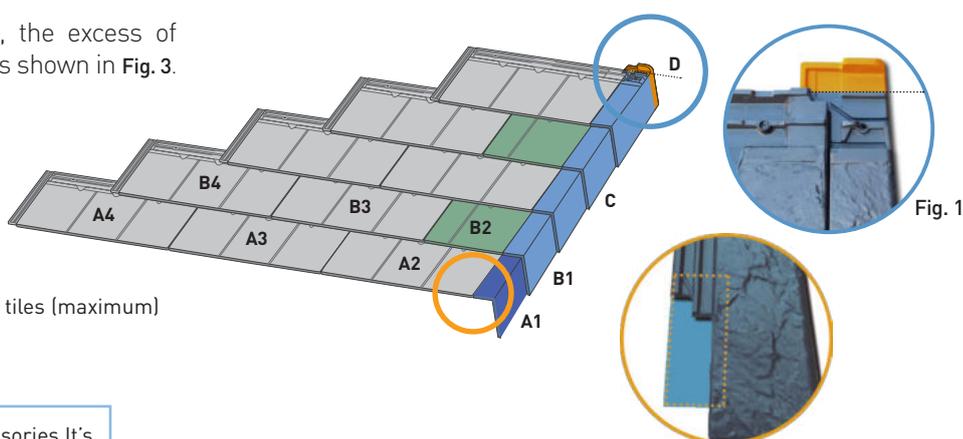
2. The second course will start with the Visum3 right side course (Q99*K) followed by Visum3 Right Half roof tile (Q100*K), creating a cross bond visual effect, with full tiles all the course and ending on the left side with the Visum3 Left Half roof tile (Q102*K) and its Left side course (Q101*K).

3. The process should be repeated alternating steps A and B until reaching the ridge.

4. At top course, beneath ridge line, the excess of Q99*K right side course must be cut, as shown in Fig. 3.

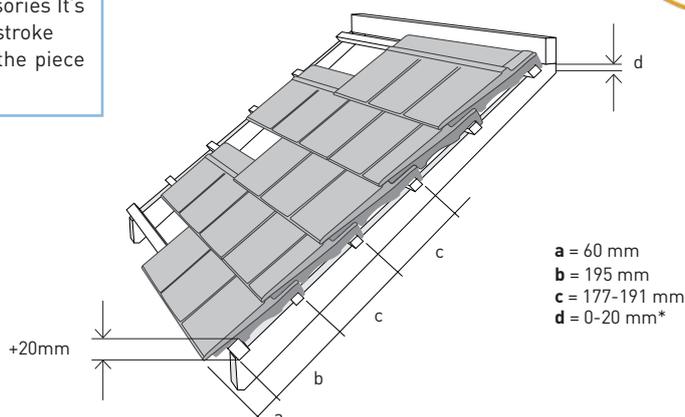


- Visum3 tile
- Q99*K Visum3 right side course klinker
- Q100*K Visum3 right half roof tile klinker
- Q101*K Visum3 left side course klinker
- Q102*K Visum3 left half roof tile klinker
- Q107*K Visum3 right side start course klinker



NOTE: A control line between 3 and 5 rows of tiles (maximum) is recommended.

To avoid breaking of the roof tiles and accessories It's necessary pierce the pre-hole with a screw stroke (Ø max. 4mm / 0.16"), before stick or drill the piece directly.



First course batten should be 20 mm (3/4") higher than all succeeding course battens to provide a vertical alignment and to assure a symmetrical installation

*Depending on the slope. See pages 73-77 ridge section.

Planum roof tile (TI)

Higher resistance

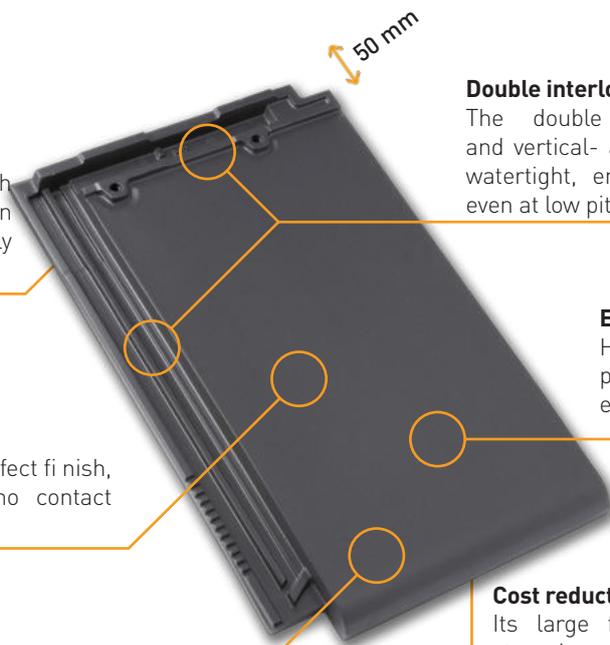
The clay composition together with the perfect pressing allows flexion higher than the required while only weighing 3.5 kg.

High definition on each piece

The gypsum moulds provides a perfect finish, obtaining a smoother texture, no contact points nor creases.

Lower absorption (<5%)

High quality clay together with high firing temperature mean higher resistance to ice and mildew.



Double interlocking

The double interlocking -horizontal and vertical- allows the roof to be more watertight, ensuring its impermeability even at low pitch.

Excellent finish

H-Cassette manufacturing provides a perfect finish to each product.

Cost reduction

Its large format (11 units/m²) and strapping every 5 units, as well as its packaging on pallets of 240 and 320 units, reduce installation costs.

Technical Characteristics

Dimensions*	A 444 mm / 17.48" B 280 mm / 11.02" C 32 mm / 1.26"
Pieces per m ² / sq.	11 / 101
Weight per piece	3.5 kg / 7.71 lbs
Longitudinal fit**	370 mm (+6 mm; - 44 mm) / 14.57" (+0.24"; -1.7")
Transversal fit**	237 mm / 9.22"
Units per pallet	240 / 320
Weight per pallet	840 kg / 1.852 lbs (240 pieces) / 1.120 kg / 2.469,2 lbs (320 pieces)
Laying	Broken bond

* The tile dimensions indicated in this chart, allow a tolerance of approximately ±2%.

** Theoretic value; this should be re-calculated on site with the tiles that are to be used.

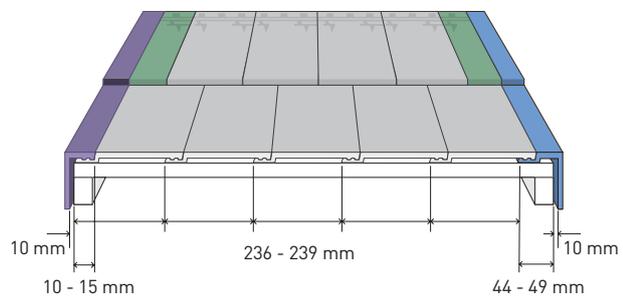
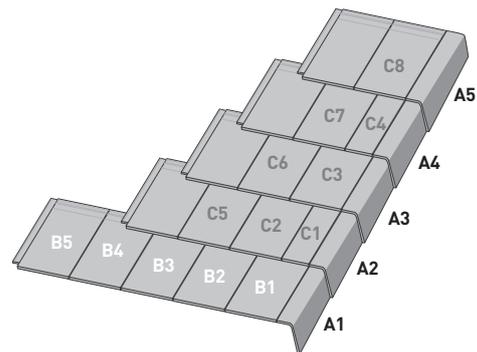


LAI D METHOD

Planum roof tile can be laid on a continuous frame, which has to be completely flat in order to ensure the right laying of tiles and their fixing components (to avoid water-leaking); or on a discontinuous frame or battens (CAM068, CAM042, CAM043, CAM044), which will be fixed by building a batten counter batten deck or by fixing them directly to the frame.

The laying of Planum roof tile is carried out by broken bond (also re-ferred as cross bond) as follows:

1. The starter course will begin with the Planum right side course (Rake trim - Q88*K) from the eave to the ridge (Q02*K, Q90*K, Q110*K, Q120*K).
2. The starter course will begin with a full tile (B1). The tiles structuring the eave will have to overlap the side course and fit together one to another. The second course will be started with half tile (Q85*K) - (C1) and will be laid to provide the proper vertical exposure. This exposure is continued through each successive course.
3. All joints of the second course and succeeding courses should be at the center line of the previous course, alternating half tiles (Q85K) and full tile at the start and at the end of each course (Q89*K).



- Planum roof tile
- Q85*K Planum Half roof tile
- Q88*K Planum right side course / rake
- Q89*K Planum left side course / rake

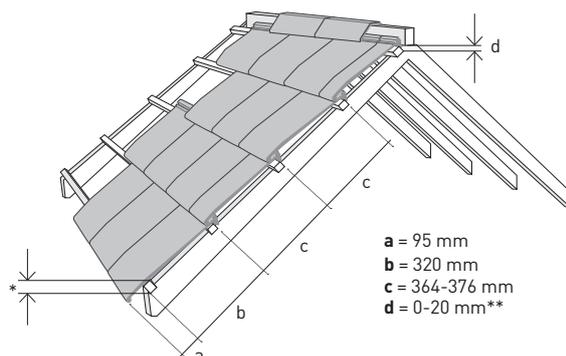
To avoid breaking of the roof tiles and accessories it's necessary pierce the pre-hole with a screw stroke (∅ max. 4mm / 0.16"), before stick or drill the piece directly.

NOTE: A control line between 3 and 5 rows of tiles (maximum) is recommended.

***First course batten of Planum roof tile:**

The total distance between the first eave batten and the second batten (distance b) should be 320mm. The difference in the height of the batten will depend on the width of the crawler:

- If the eave batten are 30mm wide or less, the eaves must be +30mm high.
- If the batten is wider than 30mm with +20mm height is sufficient. Same as other mechanical tiles.



*Depending on the slope. See pages 73-77 ridge section.

Innova roof tile (TN)

Ample longitudinal overlapping (80mm)
 Avoids cutting the tiles, therefore reducing time and installation costs.

Higher resistance
 The clay composition together with the perfect pressing allows flexion higher than the required while only weighing 3,4 kg.

Lower absorption (<5%)
 High quality clay together with high firing temperature mean higher resistance to ice and mildew.

High definition on each piece
 The gypsum moulds provides a perfect finish, obtaining a smoother texture, no contact points nor creases.

Double interlocking
 The double interlocking -horizontal and vertical- allows the roof to be more watertight, ensuring its impermeability even at low pitch.

Excellent finish
 H-Cassette manufacturing provides a perfect finish to each product.

Cost reduction
 Its large format (11.5units/m²) and strapping every 6 units, as well as its packaging on pallets of 216 and 288 units, reduce installation costs



Technical Characteristics

Dimensions*	A 465 mm / 18.3" B 258 mm / 10.16" C 30 mm / 1.18"
Pieces per m ² / sq.	11.5 / 105
Weight per piece	3.4 kg / 7.5 lbs
Longitudinal fit**	396 mm (+5 mm; -75 mm) / 15.6" (+0.19"; -2.95")
Transversal fit**	214 mm (±1 mm) / 8.42" (±0.04")
Units per pallet	216 / 288
Weight per pallet	735 kg / 1.620,4 lbs (216 pieces) / 980 kg / 2.160,5 lbs (288 pieces)
Laying	Straight / Broken bond

* The tile dimensions indicated in this chart, allow a tolerance of approximately ±2%.

** Theoretic value: this should be re-calculated on site with the tiles that are to be used.



*Valid for Broken bond laying

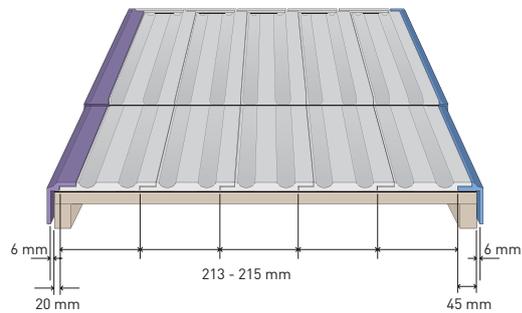
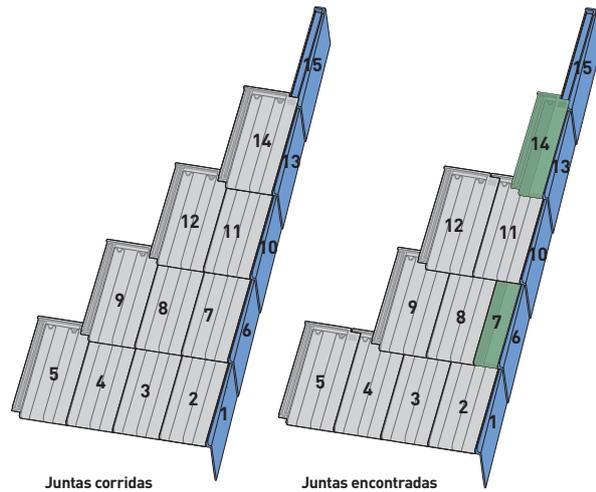
LAI D METHOD

STRAIGHT BOND

1. The starter course will begin with the **Q116*K** right side course, continuing with the full tiles to complete the eave. The tiles structuring the eave will have to overlap the side course and fit together one to another. We will finish the eave with the **Q115*K** left side course.

2. The second course will be started again installing the **Q116*K** right side course and doing the same as in step 1.

3. This exposure is continued through each successive course till the ridge.

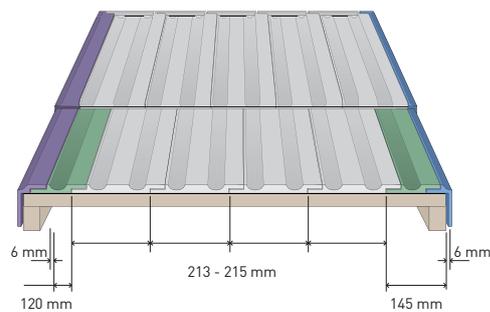


BROKEN BOND

1. The starter course will begin with the **Q116*K** Right side course, continuing with the full tiles to complete the eave. The tiles structuring the eave will have to overlap the side course and fit together one to another. We will finish the eave with the **Q115*K** Left side course.

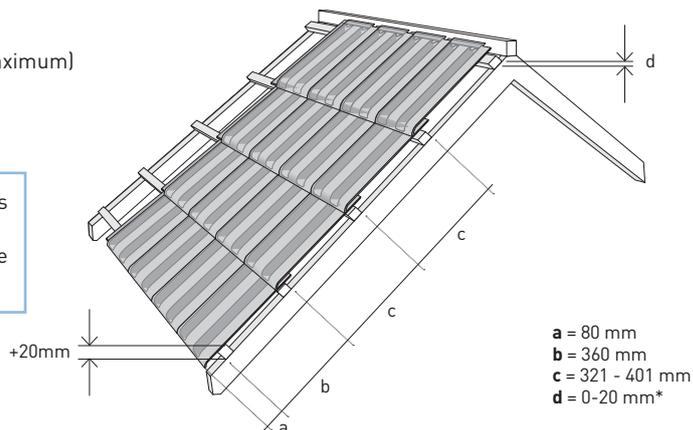
2. The second course will be started again with the **Q116*K** Right side course, continuing with Half tile **Q119*K** and will be laid to provide the proper vertical exposure. This exposure is continued through each successive course.

3. All joints of the second course and succeeding courses should be at the center line of the previous course, alternating half tiles (**Q119K**) and full tiles at the start and at the end of each course.



NOTE: A control line between 3 and 5 rows of tiles (maximum) is recommended.

To avoid breaking of the roof tiles and accessories It's necessary pierce the pre-hole with a screw stroke (\varnothing max. 4mm / 0.16"), before stick or drill the piece directly.



First course batten should be 20 mm (3/4") higher than all succeeding course battens to provide a vertical alignment and to assure a symmetrical installation

*Se define en función de la pendiente. Ver páginas 73-77 de sección cubreras.

Vienna roof tile (TV)

Ample longitudinal overlapping (80mm)

Avoids cutting the tiles, therefore reducing time and installation costs.

Higher resistance

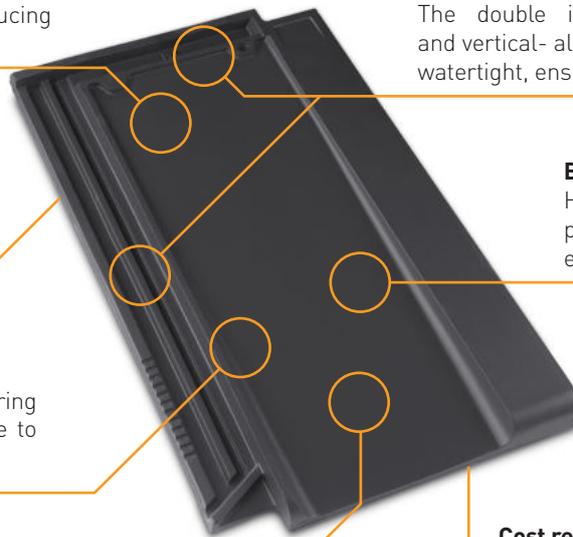
The clay composition together with the perfect pressing allows flexion higher than the required while only weighing 3,4 kg.

Lower absorption (<5%)

High quality clay together with high firing temperature mean higher resistance to ice and mildew.

High definition on each piece

The gypsum moulds provides a perfect finish, obtaining a smoother texture, no contact points nor creases.



Double interlocking

The double interlocking -horizontal and vertical- allows the roof to be more watertight, ensuring its impermeability.

Excellent finish

H-Cassette manufacturing provides a perfect finish to each product.

Cost reduction

Its large format (11.5units/m²) and strapping every 6 units, as well as its packaging on pallets of 216 and 288 units, reduce installation costs

Technical Characteristics

Dimensions*	A 465 mm / 18.3" B 258 mm / 10.16" C 30 mm / 1.18"
Pieces per m ² / sq.	11.5 / 105
Weight per piece	3.6 kg / 7.9 lbs
Longitudinal fit**	396 mm (+5 mm; -75 mm) / 15.6" (+0.19"; -2.95")
Transversal fit**	214 mm (±1 mm) / 8.42" (±0.04")
Units per pallet	216 / 288
Weight per pallet	778 kg / 1.715,2 lbs (216 pieces) / 1.037 kg / 2.286,2 lbs (288 pieces)
Laying	Straight bond

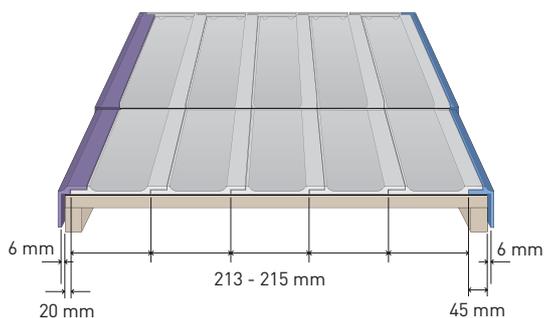
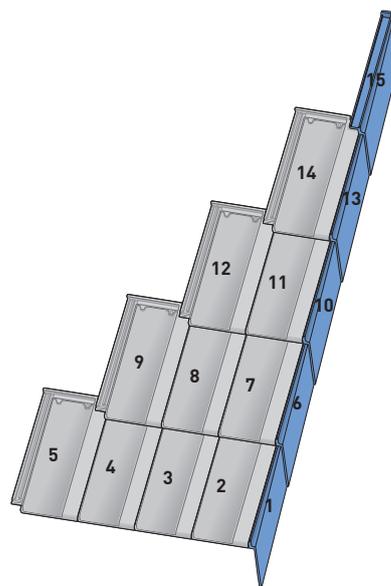
*The Tile dimensions indicated in this chart, allow a tolerance of approximately ±2%.

**Theoretic value: this should be re-calculated on site with the tiles that are to be used.



LAI D METHOD

1. The starter course will begin with the **Q116*K** right side course, continuing with the full tiles to complete the eave. The tiles structuring the eave will have to overlap the side course and fit together one to another. We will finish the eave with the **Q115*K** left side course.
2. The second course will be started again installing the **Q116*K** right side course and doing the same as in step 1.
3. This exposure is continued through each successive course till the ridge.

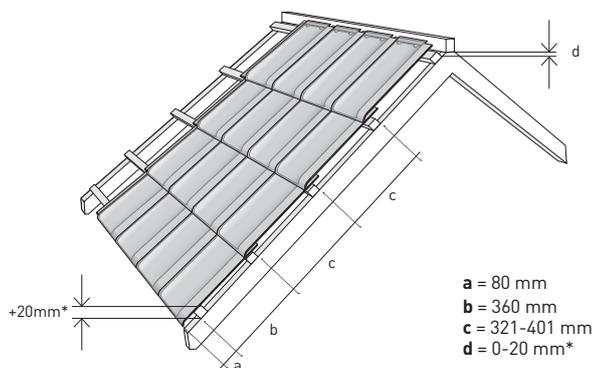


- **Q115*K** Innova/Vienna left side course klinker
- **Q116*K** Innova/Vienna right side course klinker

To avoid breaking of the roof tiles and accessories It's necessary pierce the pre-hole with a screw stroke (Ø max. 4mm / 0.16"), before stick or drill the piece directly.

NOTE: A control line between 3 and 5 rows of tiles (maximum) is recommended.

First course batten should be 20 mm [3/4"] higher than all succeeding course battens to provide a vertical alignment and to assure a symmetrical installation



- a = 80 mm
- b = 360 mm
- c = 321-401 mm
- d = 0-20 mm*

*Se define en función de la pendiente. Ver páginas 73-77 de sección cumbreras.

Accessories



Half Tile

- Q85*K**

 Planum half roof tile klinker
- Q100*K**

 Visum 3 right half roof tile klinker
- Q102*K**

 Visum 3 left half roof tile klinker
- Q119*K**

 Innova half roof tile klinker
- Q130*K**

 Selectum half roof tile klinker

Side courses

- Q89*K**

 Planum left side course / Rake klinker
 - Q99*K**

 Visum3 right side course klinker
 - Q101*K**

 Visum3 left side course klinker
 - Q115*K**

 Innova/Vienna left side course klinker
 - Q133*K**

 Selectum left side course klinker
-
- Q88*K**

 right
 - Q107*K**

 Visum3 eave right side course klinker
 - Q116*K**

 right
 - Q134*K**

 right

End-cap

- Q05*K**

 End cap / Straight gable end klinker
- Q83*K**

 End cap round ridge klinker
- Q92*K**

 Pyramid end cap klinker
- Q124*K**

 Angular end cap klinker
- Q147*K**

 End cap 45° klinker

Ventilation

- Q86*K**

 Planum ventilation roof tile klinker
- Q96*K**

 Visum3 ventilation roof tile klinker
- Q117*K**

 Innova/Vienna ventilation roof tile klinker
- Q131*K**

 Selectum ventilation roof tile klinker

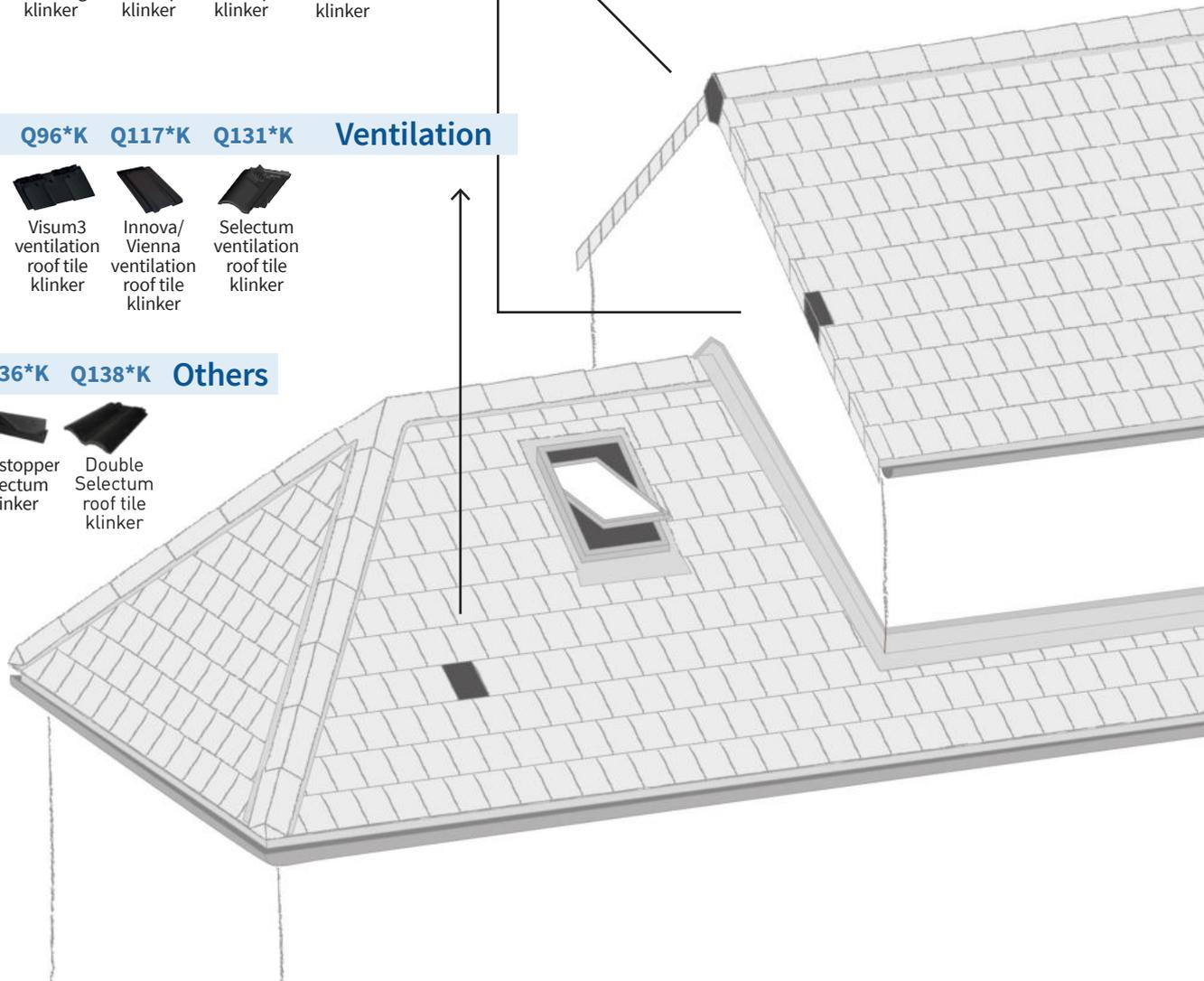
Others

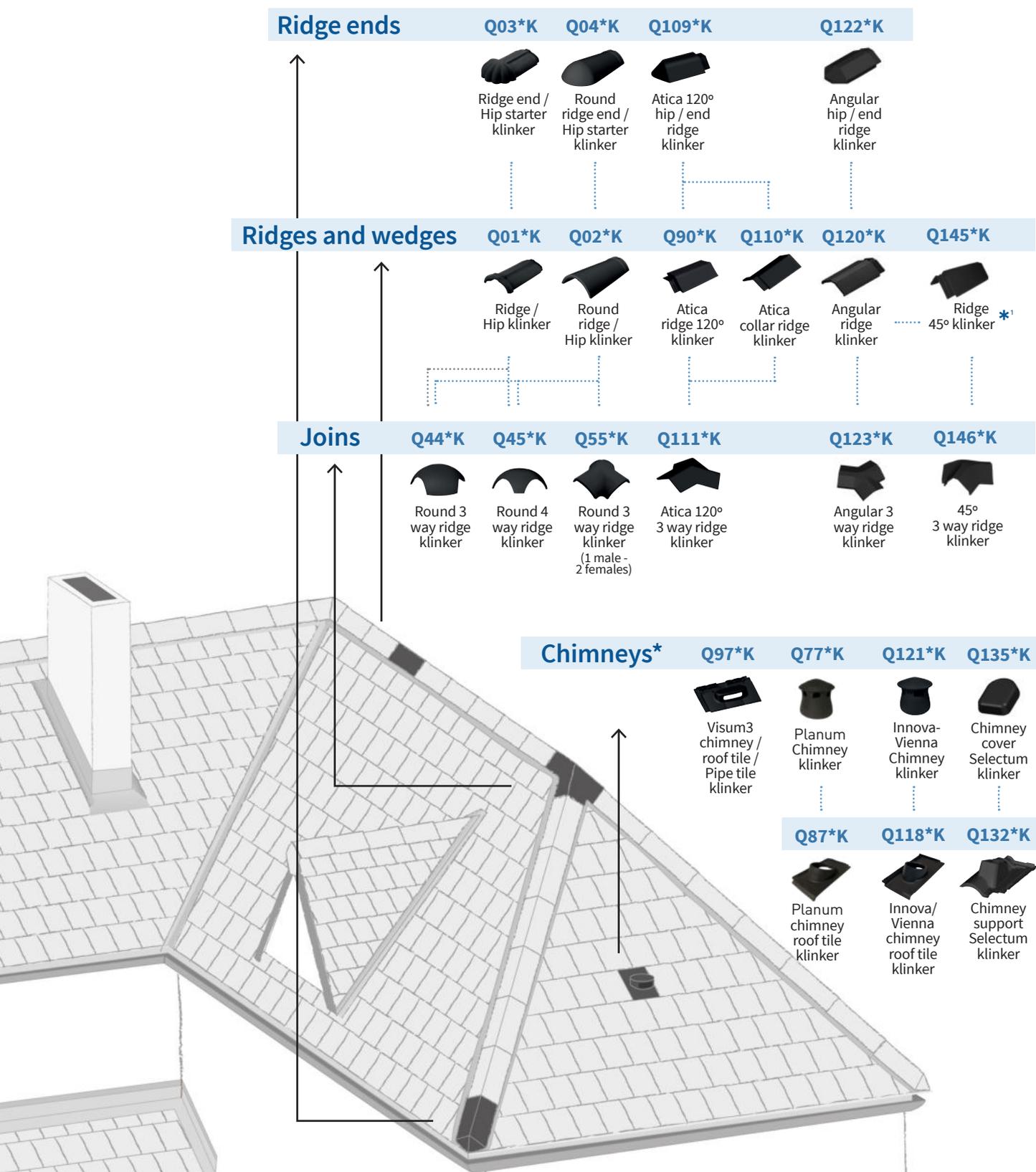
- Q08*K**

 Wedge klinker
- Q136*K**

 Bird stopper Selectum klinker
- Q138*K**

 Double Selectum roof tile klinker





To avoid breaking of the roof tiles and accessories it's necessary pierce the pre-hole with a screw stroke (Ø max. 4mm / 0.16"), before stick or drill the piece directly.

*1 As wedge must be used Q120*K.
 *2 For chimney supports to be more effective, parts must be as close as possible to the ridge line.

5.1.3 INSTALLATION DETAILS

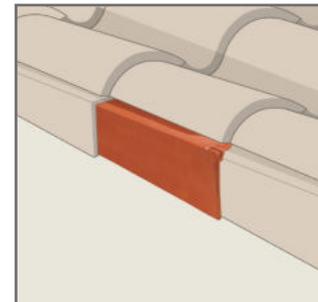
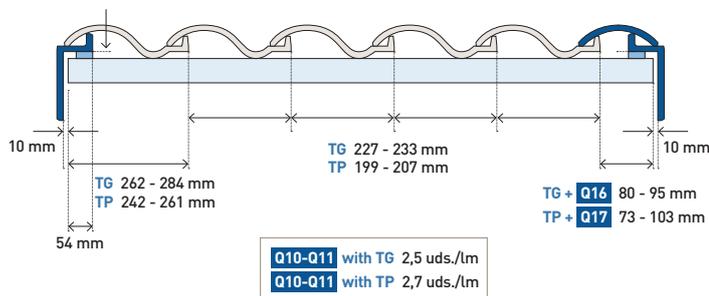
5.3.1.1 Side courses

As well as being attractive, side courses act as gutters. For this, an overhang of a few centimetres over the gable should be allowed for.

The fixings used will be polyurethane mastics or fillers as glue; or metal nails or self-drilling screws with flexible washers. Whenever the tile is perforated in order to nail it, the hole must be sealed.

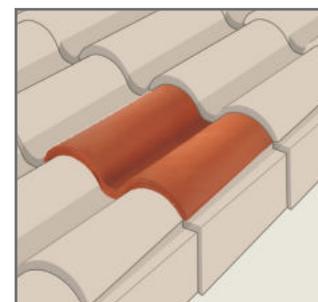
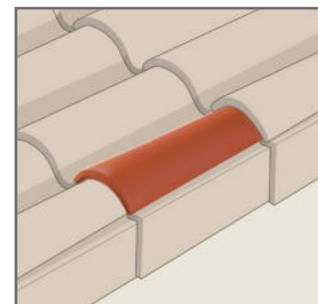
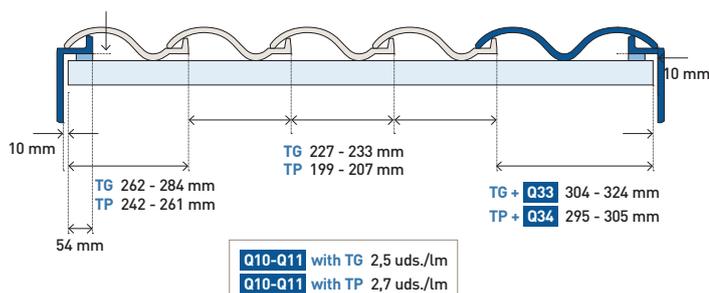
MIXED "S" LARGE AND SMALL ROOF TILE

Right-angle side course Q10 - Q11 with half tile Q16 - Q17

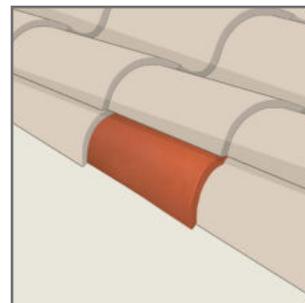
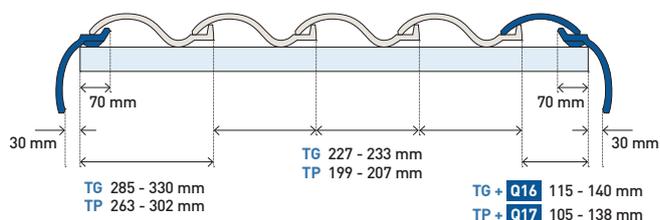


Raise the rake by +20mm on the first batten or, if the installation allows it, nail the rake to the side to prevent it from falling.
 For Small Mixed tiles, do not use a stud or shim.

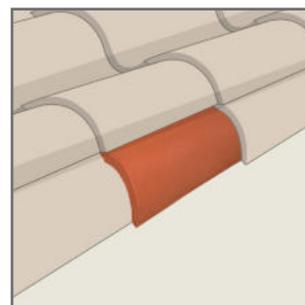
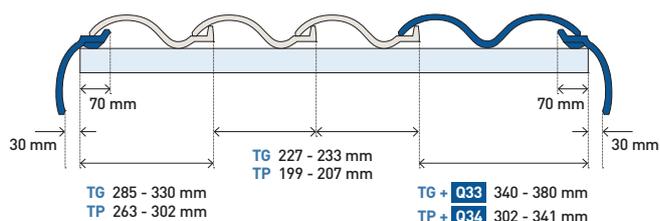
Straight side course Q10 - Q11 with double tile Q33 - Q34



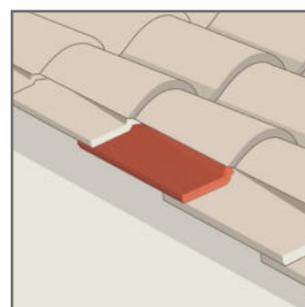
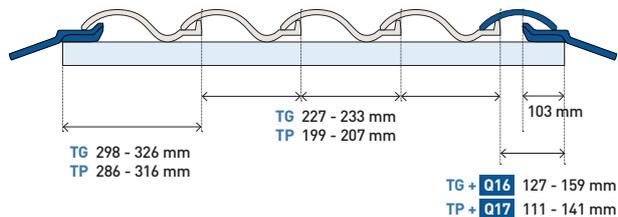
Round side course Q12 - Q13 with Half tile Q16 - Q17



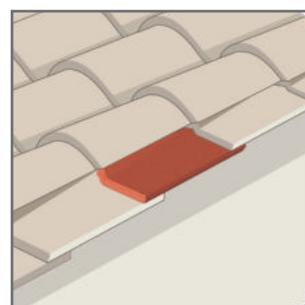
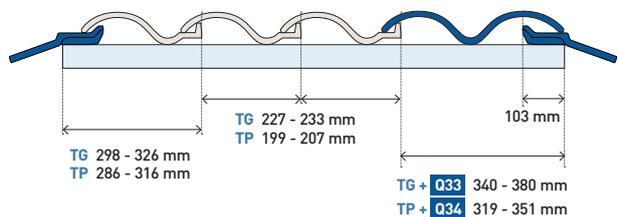
Round side course Q12 - Q13 with Double tile Q33 - Q34



Bardelis side course Q62 - Q63 with Half tile Q16 - Q17

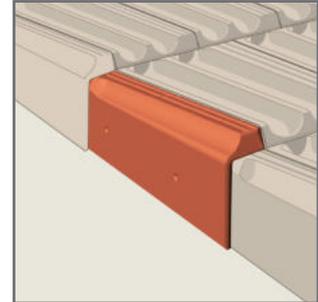
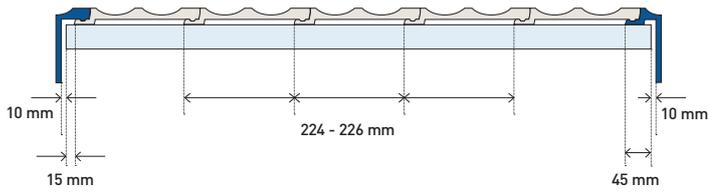


Bardelis side course Q62 - Q63 with Double tile Q33 - Q34

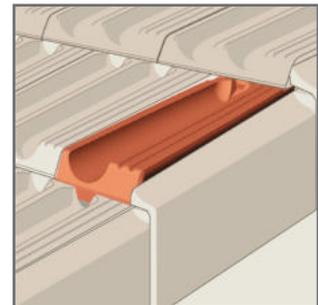
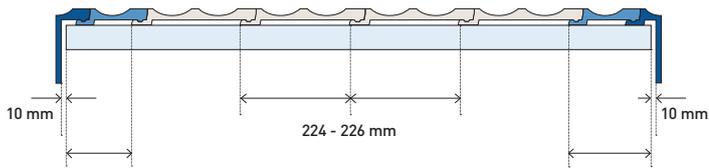


FLAT ROOF TILE

Straight side course **Q14 - Q15**

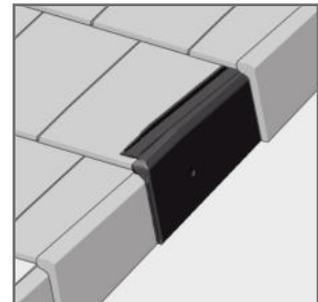
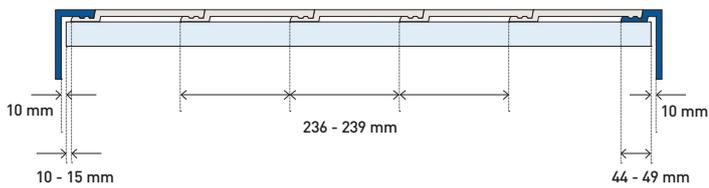


Straight side course **Q14 - Q15** with half tile **Q18**

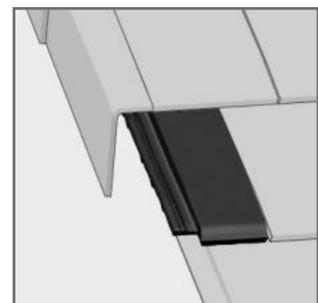
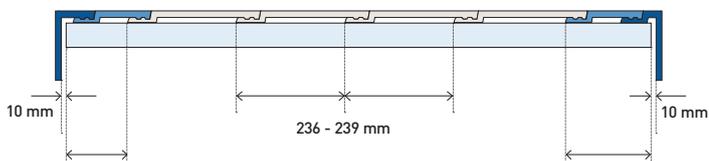


PLANUMN ROOF TILE

Straight side course **Q88 - Q89**

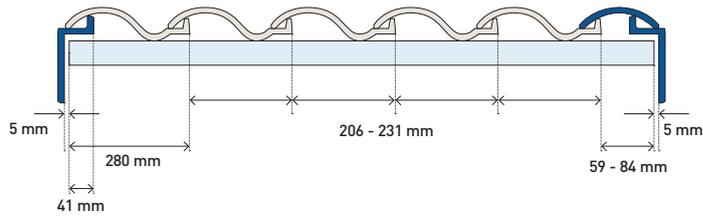


Straight side course **Q88 - Q89** with half tile **Q85**

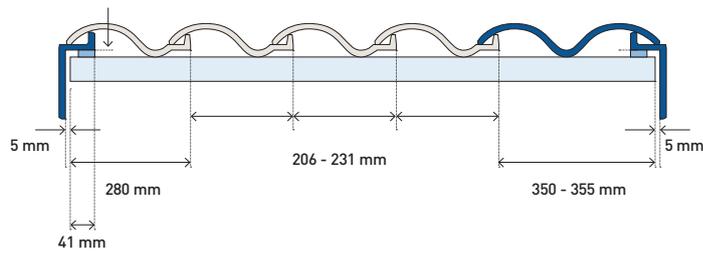


TEJA SELECTUM

Straight side course **Q133 - Q134** with half tile **Q130**



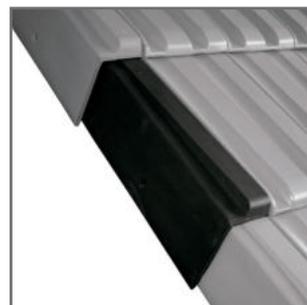
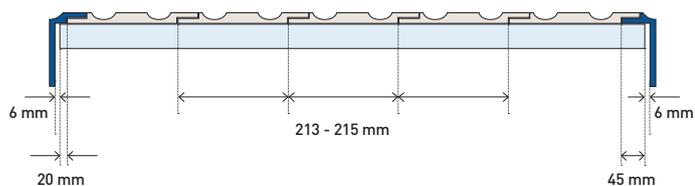
Straight side course **Q133 - Q134** with double tile on double teja **Q138**



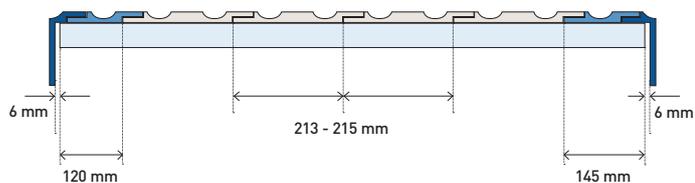
***Note:** Start laying the roof from the right with the right side-course and complete the full row of tiles, then continue with the rest. Unlike other tile types, you do not lay all side course tiles first, followed by the rest of the tiles.

INNOVA ROOF TILE*

Straight side course Q115 - Q116

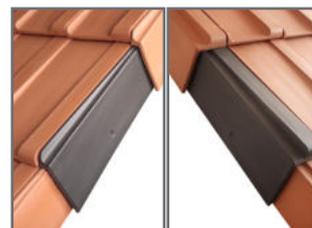
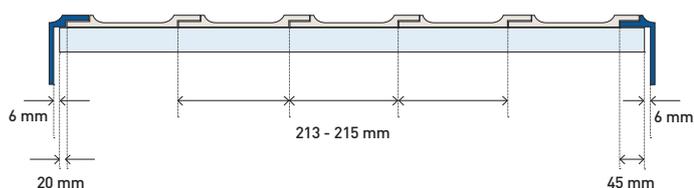


Straight side course Q115 - Q116 with half tile Q119



VIENNA ROOF TILE*

Straight side course Q115 - Q116



***NOTE:** Start laying the roof from the right with the right side-course and complete the full row of tiles, then continue with the rest. Unlike other tile types, you do not lay all side course tiles first, followed by the rest of the tiles.

5.1.3.2 Ridge

Ridge tiles must be fitted so as to ensure they are watertight against rain and provide protection from the dominant winds.

For a gabled roof, both fields must be built up to the ridge, to create a horizontal line.

All the tiles of the upper final horizontal row must be fixed, either on the battens or directly onto the field, using the smallest possible amount of waterproof mortar.

Once the top layer of tiles has been laid, a wedge (Q08) is placed in the curve of each of the tiles of the last horizontal row (fig.1), or the tiles are filled with an under ridge tile (Q70 and Q35).

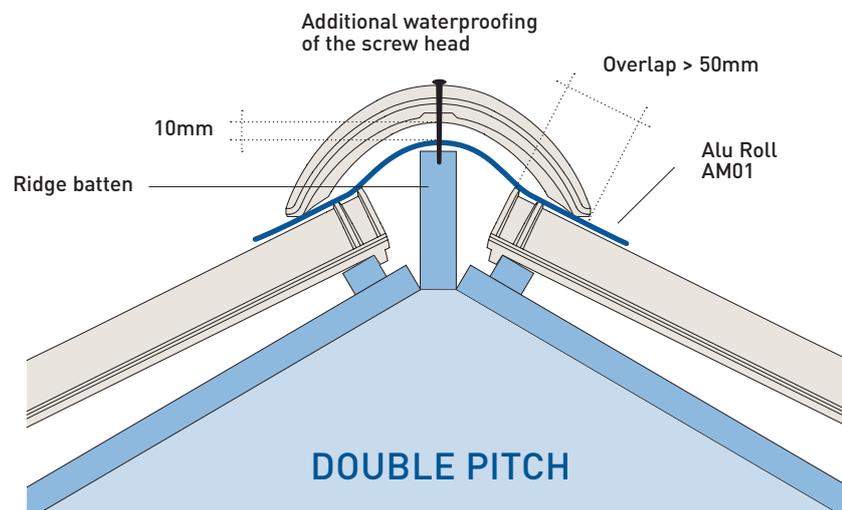
If the ridge goes over battens, ventilating ridge band will be used for the ridge and the hips (CAM01) to ensure proper roof ventilation, laying it on the centre of the uppermost batten and nailing or stapling the roll to it. Once it is fastened to the batten, the flexible part of the roll is spread onto the roof, the protective tape is removed from the adhesive strip, and it is stuck down on the roof.

Then the ridge tiles are laid, ensuring a minimum overlap of 5cm, lying so they face away from the dominant winds, which brings rain in. These tiles will be fastened along the whole length of the ridge.

Where the ridge meets the gable, this is dealt with using a special part, the end-cap, which is fastened using nails or screws.

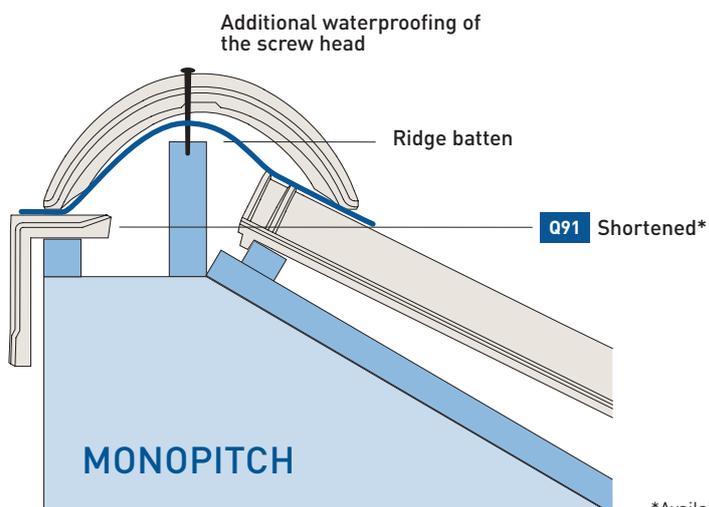


The ventilating ridge band (CAM01) is installed first on the ridge and stuck onto the upper part of the tiles and the wedges so that it is properly watertight.





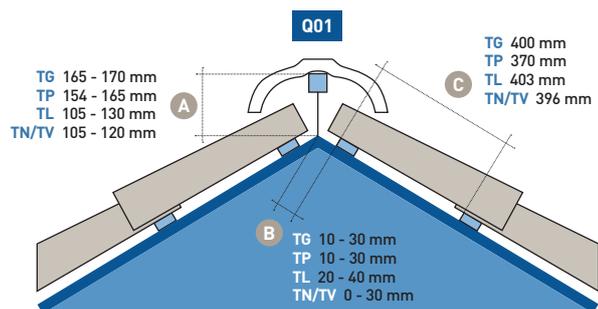
The ridge tiles must be fastened to the roof using a ridge hook (CAM07-CAM27), laying tiles sequentially, each tile on top of the previously placed one. For dry laying, both the Standard Ridge tile (Q01) and the Round Ridge tile (Q02) will need to be laid over ridge roll.



*Available upon request

TG-TP / TL / TS / TI / TN / TV

Ridge installation Q01



Note: Depending on the slope of the roof, the height at which the ridge will be laid must be taken into account to ensure an overlap greater than 50mm.



Q01 Ridge installation with Mixed tile TG-TP

TG / TS

Slope	A	B	C	Overlapping
30% / 17°	165	30	400	70
36% / 20°	165	30	400	70
49% / 26°	170	10	400	60

TP

Slope	A	B	C	Overlapping
30% / 17°	160	30	370	80
36% / 20°	165	30	370	65
49% / 26°	154	10	370	80

TL

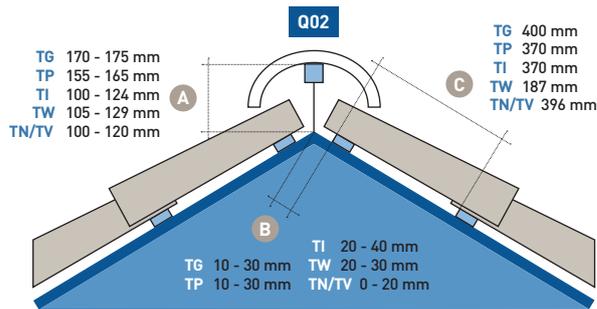
Slope	A	B	C	Overlapping
30% / 17°	130	40	403	80
49% / 26°	125	40	403	60
87% / 41°	105	20	403	65

TN / TV

Slope	A	B	C	Overlapping
30% / 17°	120	30	396	80
49% / 26°	115	20	396	70
87% / 41°	105	0	396	<50

TG-TP / TL / TS / TI / TN / TV

Ridge installation Q02



Q02 Ridge installation with Mixed tile (TG-TP)



Q02 Ridge installation with Planum Tile (TI)

TG / TS

Slope	A	B	C	Overlapping
30% / 17°	175	30	400	60-90
36% / 20°	175	30	400	60-90
49% / 26°	170	10	400	60-90

Note: The two overlap lengths obtained refer to the widest and narrowest part of the ridge, in relation to the tile below.

TP

Slope	A	B	C	Overlapping
30% / 17°	160	30	370	70
36% / 20°	165	30	370	65
49% / 26°	155	10	370	65

TI

Slope	A	B	C	Overlapping
49% / 26°	124	40	370	60-80
87% / 41°	100	20	370	60-80

TW

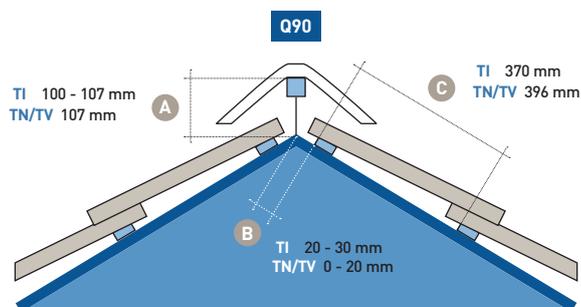
Slope	A	B	C	Overlapping
49% / 26°	129	30	187	77-95
87% / 41°	105	20	187	65-85

TN / TV

Slope	A	B	C	Overlapping
49% / 26°	120	20	396	70-90
87% / 41°	100	0	396	60-80

TI / TN / TV

Ridge installation Q90 - Q110



Q90 Ridge installation with Planum Tile (TI)

TI

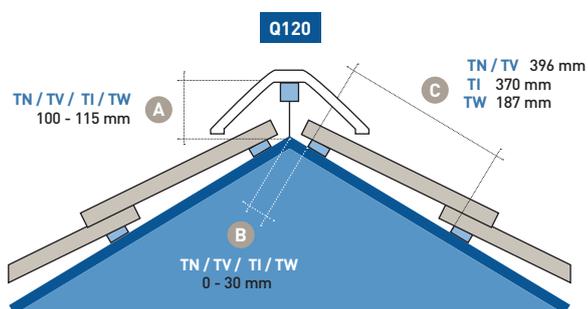
Slope	A	B	C	Overlapping
49% / 26°	100	30	370	95
87% / 41°	107	20	370	80

TN / TV

Slope	A	B	C	Overlapping
49% / 26°	107	20	396	85-90
87% / 41°	107	0	396	80-90

TW / TI / TN / TV

Ridge installation Q120



Q120 Ridge installation with Planum Tile (TI)

TI

Slope	A	B	C	Overlapping
49% / 26°	115	20-30	370	80-90
87% / 41°	100	0	370	80

TW

Slope	A	B	C	Overlapping
49% / 26°	115	20-30	187	80-90
87% / 41°	100	0	187	80

TN / TV

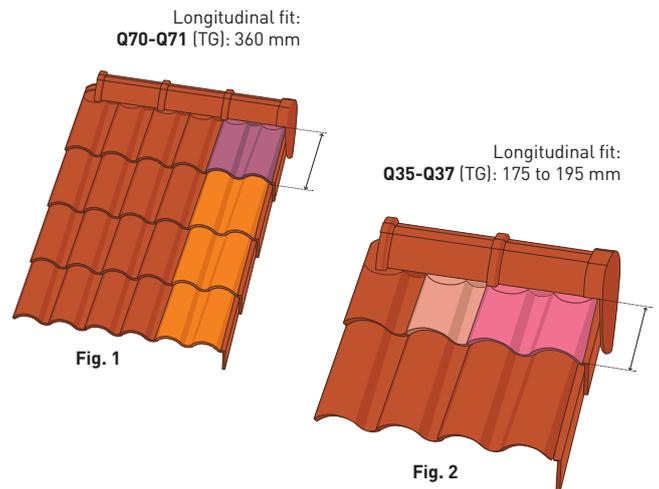
Slope	A	B	C	Overlapping
49% / 26°	115	20-30	396	80-90
87% / 41°	100	0	396	80

Ridge installation with Under Ridge (TG)

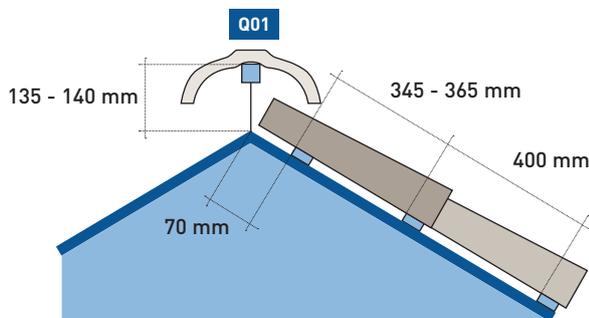
To finish off the field where it meets the ridge, we recommend using the Under Ridge tile (Q70) or the Double Under Ridge tile (Q71) (fig.1). This ensures better ventilation and faster construction.

If, at the end of the ridge line, a full tile will not fit, to avoid cutting tiles a short tile can be used on the last horizontal course, the 2/3 Mixed Under Ridge (Q35) closing this row on the right side-course with a 2/3 Double Under Ridge tile (Q37) (fig.2).

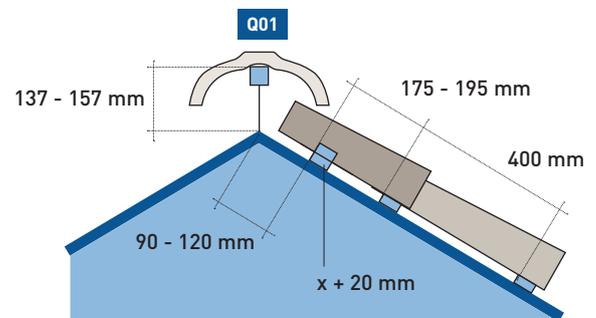
- Mixed roof tile
- Q71 (TG) Large double under ridge tile
- Q33 (TG) Double large Mixed roof tile
- Q35 (TG) 2/3 Large under ridge tile
- Q37 (TG) Double large under ridge tile



Ridge installation Q01 with Under Ridge tile Q70 - Q71



Ridge installation Q01 with 2/3 Under Ridge tile Q35 - Q37 and Q36 - Q38



- > Minimum overlap is always 50mm.
- > The values given are those for Ridge tile Q01. They must be recalculated if using the Circular Ridge tile, Q02.
- > The measurements given are based on a slope at 30%.



After installing the Under Ridge tile Q70 on the last course of the field, the ridge band (CAM01) is laid on the ridge batten, adhering perfectly to the upper face of the tiles and preventing water from entering.

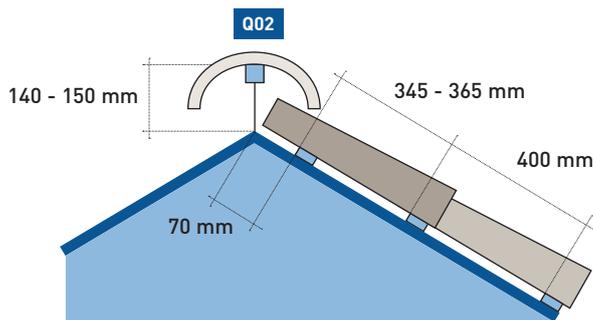


Then the Ridge tile (Q01 or Q02) is laid, which can be capped on the side courses by the Ridge End-cap (Q05 or Q83).

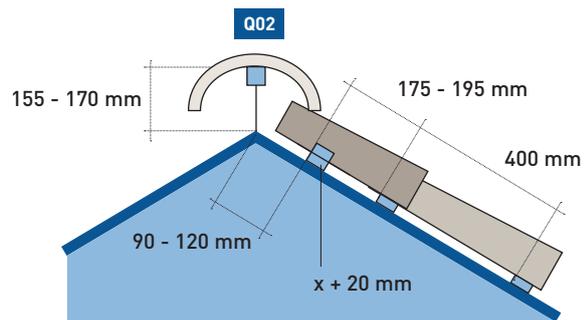


Ridge tiles are fixed to the roof using a Ridge Hook (CAM07-CAM27). The head of the hook must be sealed to prevent the passage of water.

Ridge installation Q02 with Under Ridge tile Q70 - Q71



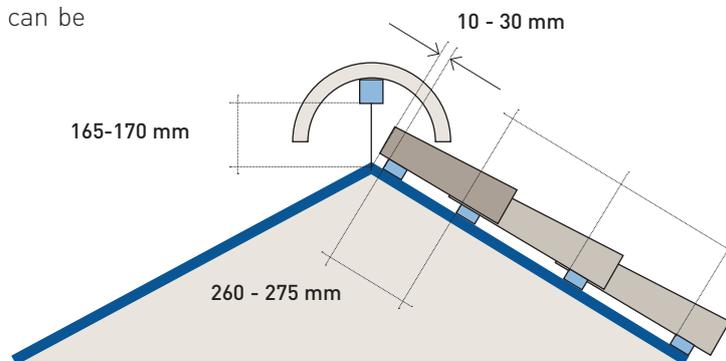
Ridge installation Q02 with 2/3 Under Ridge tile Q35 - Q37 and Q36 - Q38



Laying the 2/3 Mixed tile Q56

When the calculation for the number of tiles needed for the roof identifies the need to cover a length shorter than half a full tile, a 2/3 Mixed Tile (Q56) can be used, avoiding the need to cut full tiles.

This part can carry out two functions:
 - Under Ridge tile
 - Eaves for a concealed gutter or eave



The right side course can be finished in two different ways::

1. **Using half tiles:** These must be cut to fit the part. The cut must be made such that the 2/3 interlock with the half tile is not inhibited.
2. **Using double tiles:** The roof cover can be finished with double tiles, using the half tile on the last course, with the side course as shown in item 1.

5.1.3.3 Eave

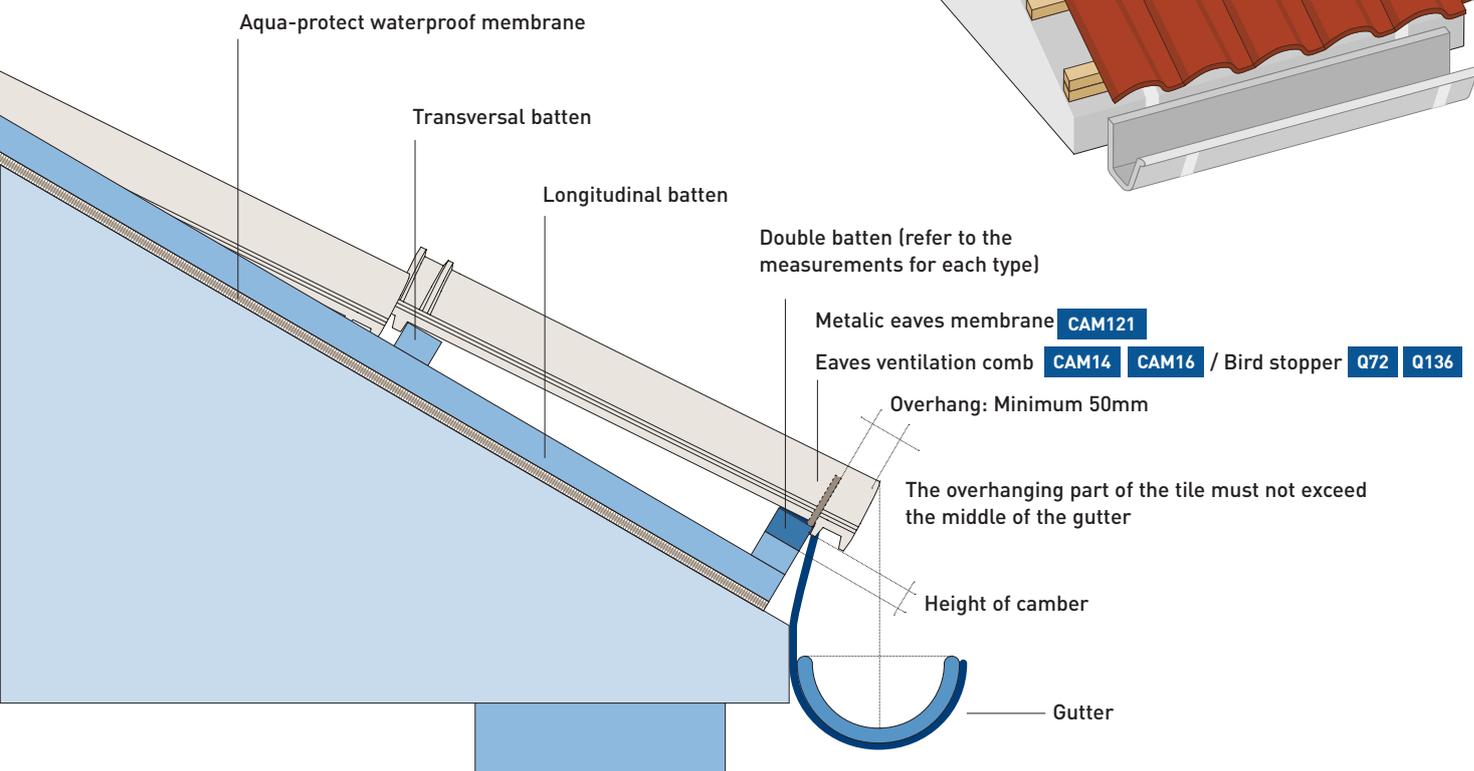
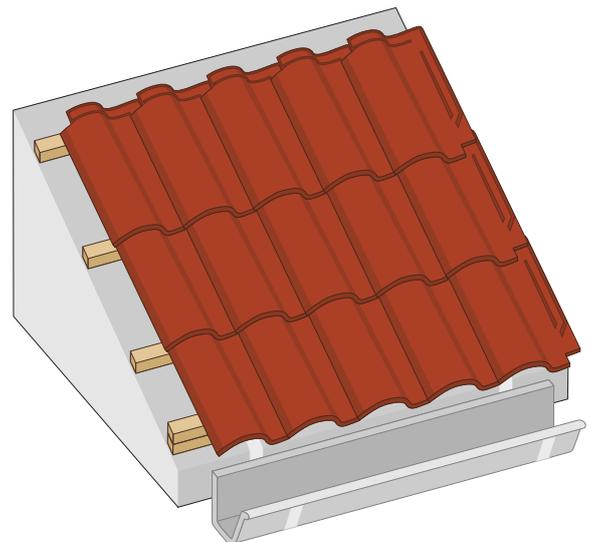
The first tile of the field (eave tile), and all course end-tiles, must overhang the edge by at least 5cm and, where necessary, can be supported at the front to keep the same pitch as the rest of the rows on the field.

TG-TP / TL / TS / TI / TW / TN / TV

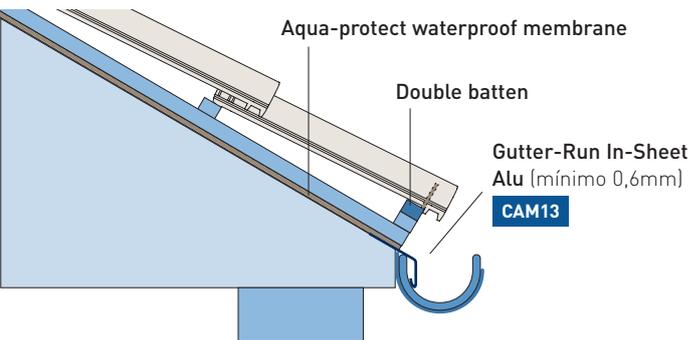
Installation of an eave with gutter / drain

Rain water will be evacuated without backing up or wetting elements underlying the roof. In many cases a gutter will be installed for this.

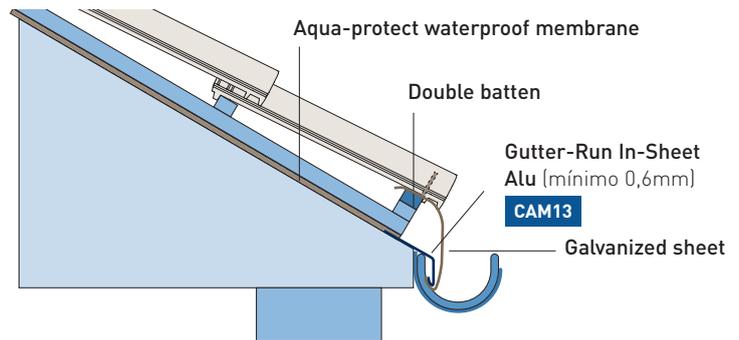
If the eaves are to have a gutter, before fitting the eave tiles, the gutter support braces must be fixed to the field. The gutter in its turn must be installed on a slope greater than 1%, oriented towards the downspout. The tiles will overhang along the full line of the eaves, ensuring that they channel water into the gutters.



Installation of an eave drip-edge



The membrane must cover the whole roof area in order to evacuate any water that runs over it or snow that penetrates.



Installation when tiles do not overlap the gutter enough.



TG-TP

Installation of eave with pan and cover

Our installation process is as follows:

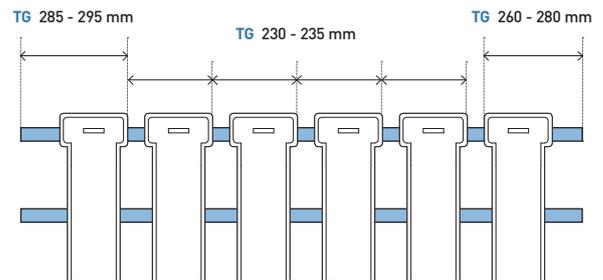
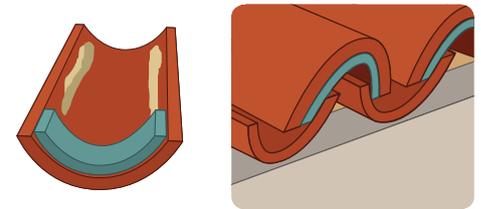
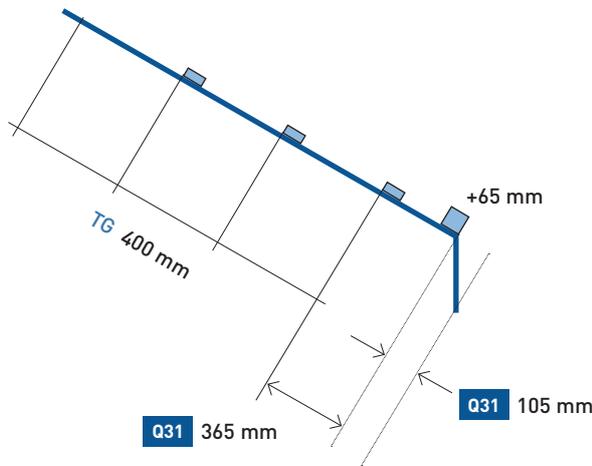
1. We trace a line perpendicular to the maximum slope line, which will be the reference point for laying the eave covers and eave pans parallel to it.
2. The eave line must be raised by 3cm with respect to the roof plane.
3. We begin by laying the eave covers from the left, spacing them at 2.5 to 3.5cm, depending whether they are Small or Large Mixed Tiles.

4. We then lay the eave pans on the eave covers.

Then we start hooking the Mixed Tiles onto the eave piece hooks, so that the caps of the Mixed Tiles discharge onto the eave pans.

The rest of the field is laid like any other Mixed Tile roof. The effect produced is that of a Mediterranean style roof.

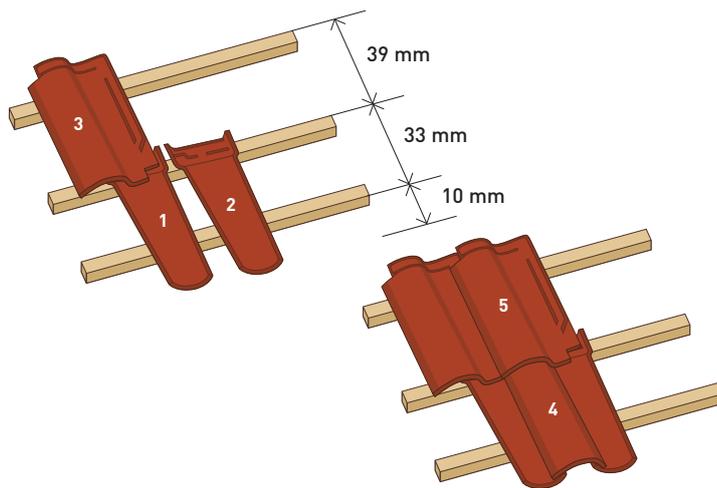
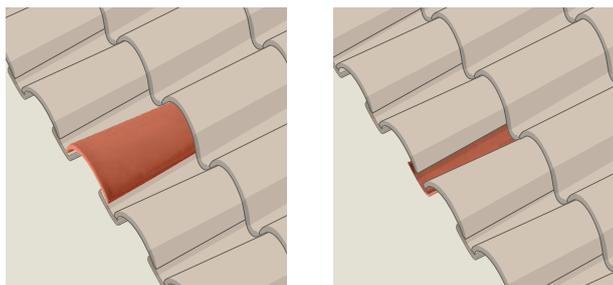
Eave Pan - Channel with a different slope TG



NOTE: The slope shown is 30%. For any other slope, the measurements must be recalculated.



With this type of eaves, the slope is very important. The tile is more or less exposed depending on the slope.

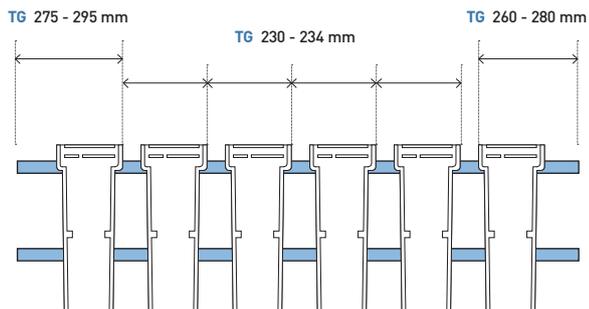


Q81

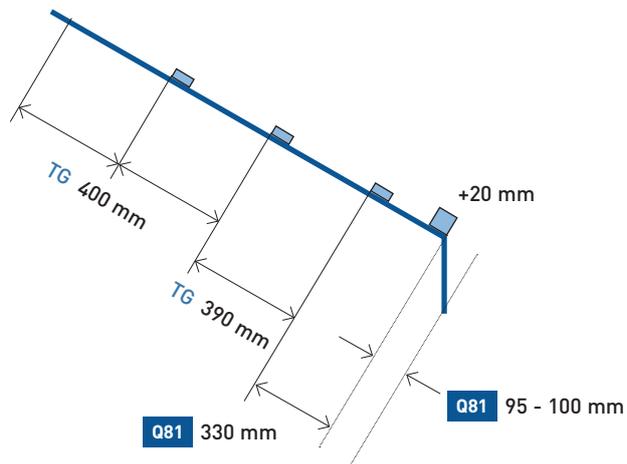
Q80



Eave Pan - Channel with same slope TG



NOTE: The methods discussed are valid for both half tiles and double tiles.



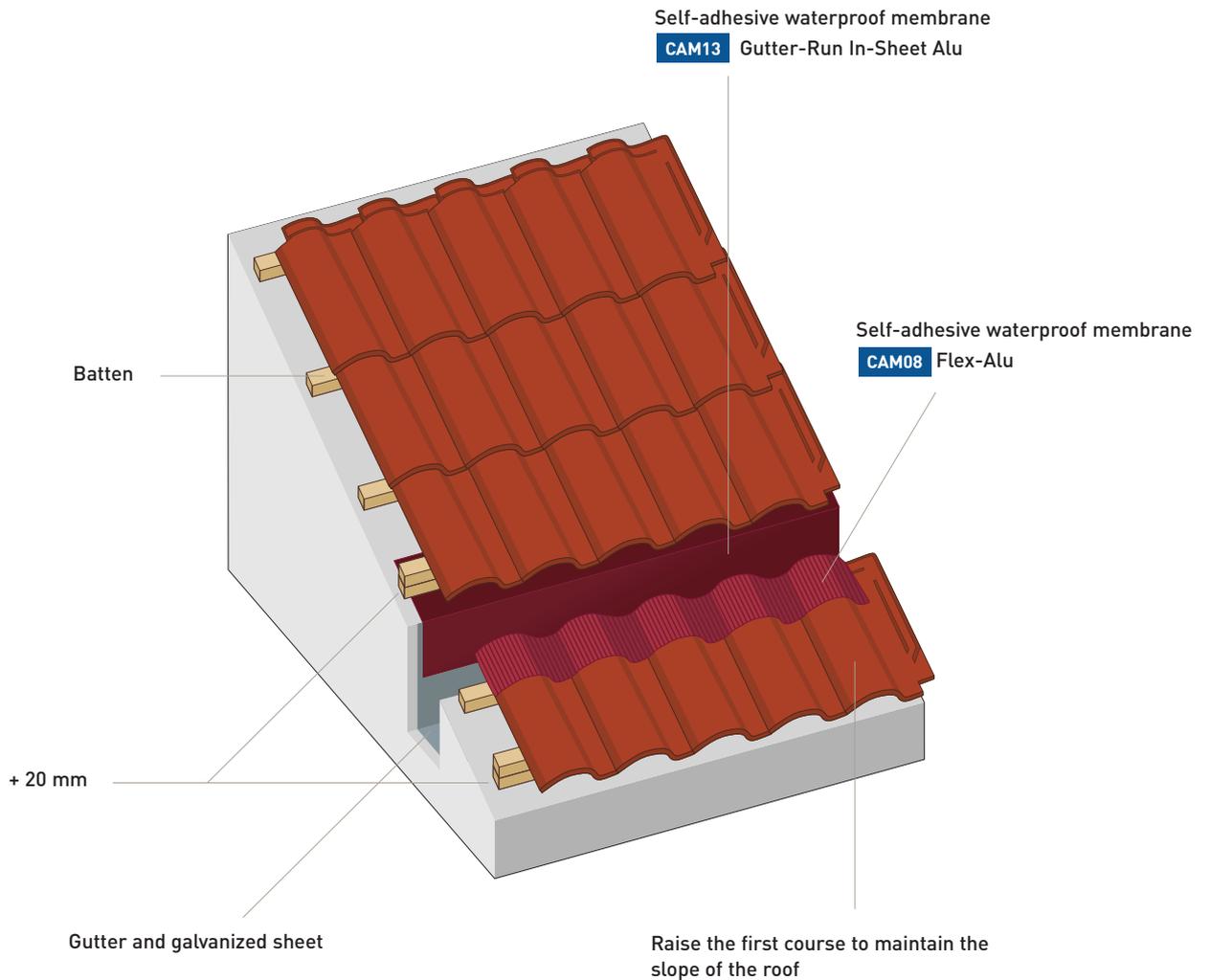
When using Eave Pans - Channel with same slope (Q80-Q81), there is no need to install a double batten to raise them.

TG-TP / TL / TS / TI / TW / TN / TV

Installation of an eave with concealed gutter / flashing

This is when the gutter is placed between two horizontal courses of tiles, near the eaves, and it is recommended when the field is longer than 12m.

The eave line will be finished in the same way as an eave without gutter, although to avoid water penetrating around the gutter tile, it must be protected by a waterproof membrane, which overlaps the tiles and gutter (CAM13 Aluminium membrane for gutter drainage).



Eave accessories installation

Laying eave accessories, such as Comb or Bird-stopper, is done before laying the first course of tiles. The eaves line must never be filled with cement or similar, but must be left clear to facilitate air flow and must be protected against birds, insects and rodents or the like. For this, the Eave Comb or Bird-stopper is used.

Bird stopper (Q72) TG - (Q136) TS

Ceramic eave closure. Prevents entry of birds and small rodents, maintains good roof ventilation. It fits in aesthetically with the roof, making its colours and materials more consistent.

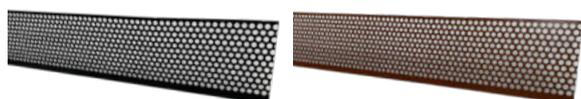
When installing a bird-stopper, the first batten is laid at the same height as for the rest of the roof, and a second batten is added to support the bird-stopper.

When installing a bird-stopper, transversal play in the Mixed tile is limited by interlocking with the bird-stopper.



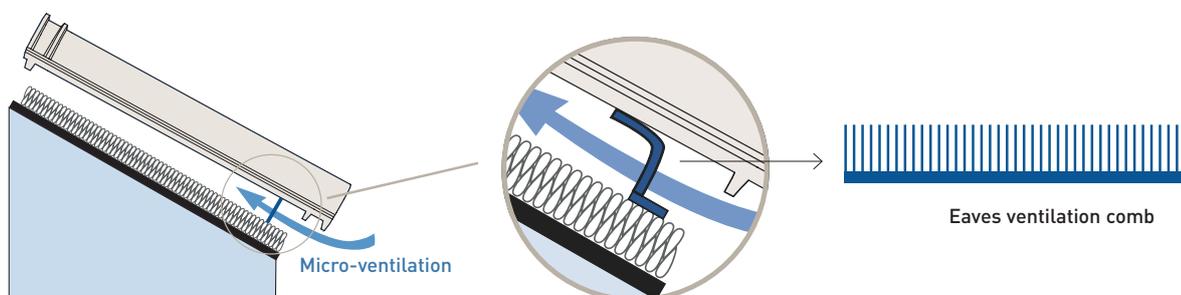
Metallic eave membrane (CAM121) TG -TP-TS

Metal part for eaves. Prevents the entry of birds and small rodents, maintaining roof ventilation.



Eaves ventilation comb (CAM14 - CAM16) TG-TP-TL-TS-TN-TV-TI

PVC comb for eave closure. Prevents entry of birds and small rodents, maintains good roof ventilation.



5.1.3.4 Hip

To lay a hip, it is imperative that ridge tiles be used, proceeding as for the laying of the ridge.

The tiles arriving from each field must be cut parallel to the line of the hip.

The membrane or ridge band (CAM01 / CAM09) must be fixed to the ridge batten with screws. The screw head must be sealed to prevent the passage of water.

Laying should start at the intersection of the hip with the eaves, proceeding from bottom to top. The ridge tiles/caps must overlap the cut tiles by at least 5cm on each side.

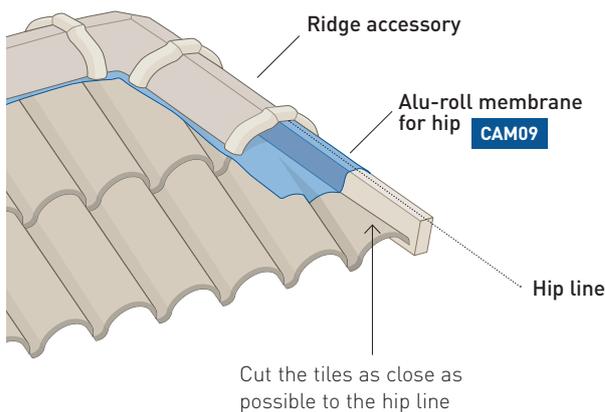
Hip parts depending on the type

TG-TP-TL-TS Q01 Q02

TN-TV-TI-TW Q02 Q90 Q110 Q120 Q145

Where the eaves meet the hip, we recommend using an End Ridge tile for a perfect finish, aesthetical and functional.

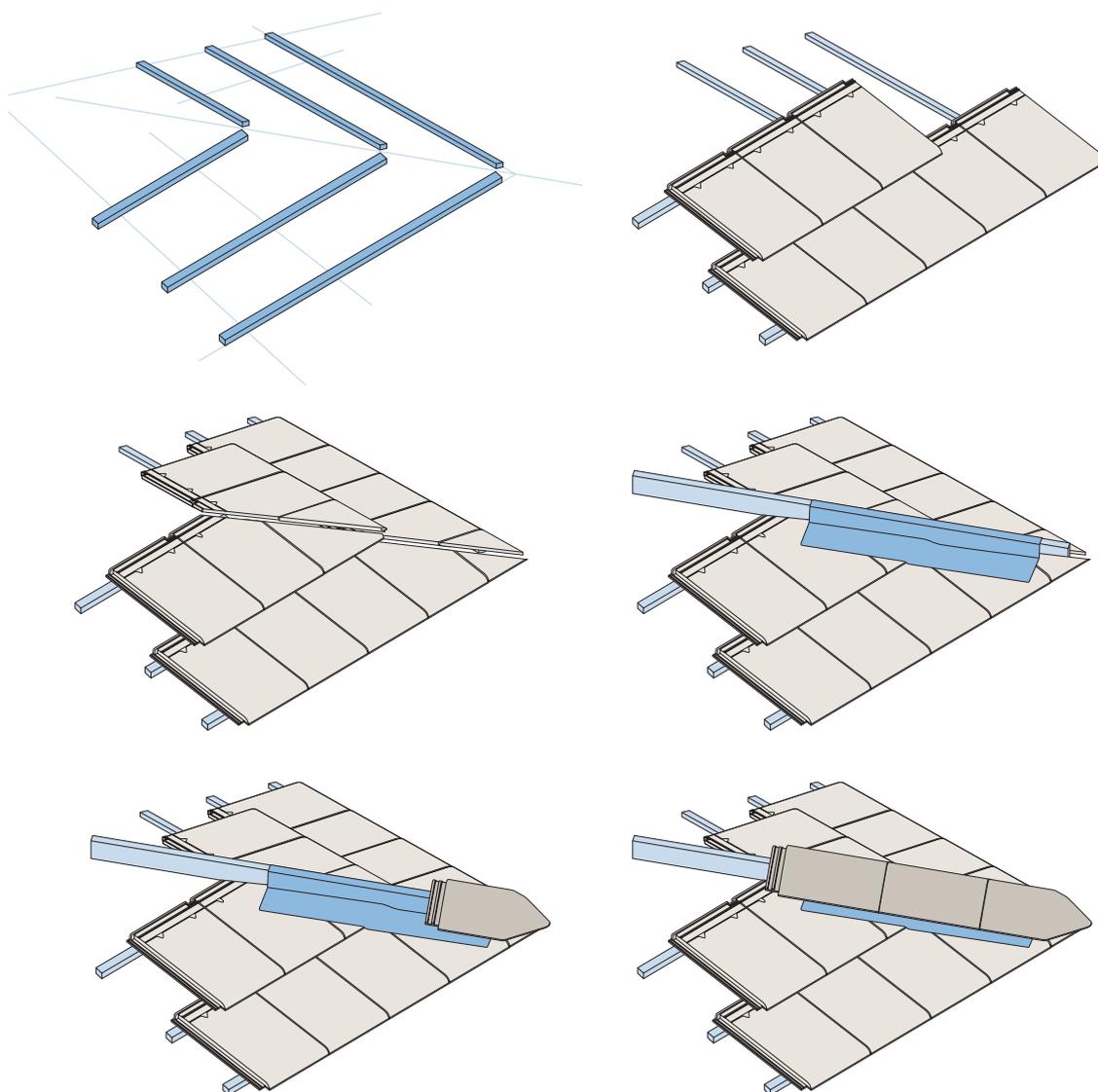
Do not pack or fill in the ridge or hip void, as this would completely block ventilation and would cause cracking, chipping and even peeling in areas subject to frost.



To install the hip, first the full tiles are laid on the left-hand battens, and the cut-line marked up. Then the tiles are cut. The same process is then followed on the right-hand side of the hip.

We place the hip ridge hooks and then lay the wooden slat, on top of which we lay ridge band to cover the upper part.

We dry-lay the last hip tile, and will later finish off with hip clips.



5.1.3.5 Valley

TG-TP / TL / TS / TI / TW / TN / TV

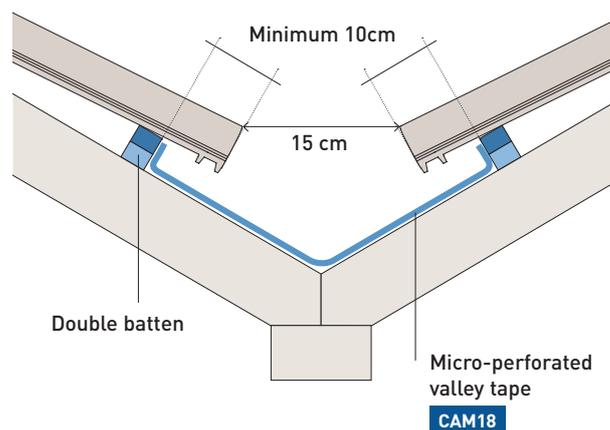
The eave line is the area of the roof that receives the most water, so it is a critical point of watertightness. Once the battens have been laid parallel to the line of the valley on both fields, laying begins from bottom to top, laying an impermeable barrier along it (ridge band for valleys).

The fastening of this material must be flexible: glue, mastic or similar.

Where it meets the ridge line, the ridge band must overlap and protect the intersection with the ridge. Where it meets the eaves, the valley must overhang the fascia boards or gutter by the same amount as the eaves (50mm or greater).

Once the area has been made watertight, the tiles are laid on a line parallel to the valley, and must overhang the valley by at least 10cm. The gap between the tiles on the two fields must be at least 15cm. The tiles must be fixed on both sides of the valley.

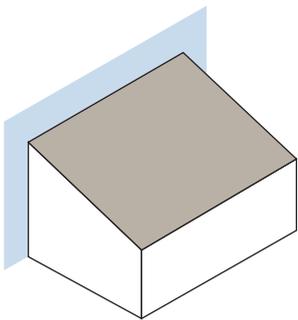
A poorly installed valley can lead to cracking, chipping and subsequently to peeling in areas subject to frost.



5.1.3.6 Vertical walls

TG -TP / TL / TS / TI / TW / TN / TV

The following types of intersections are found:

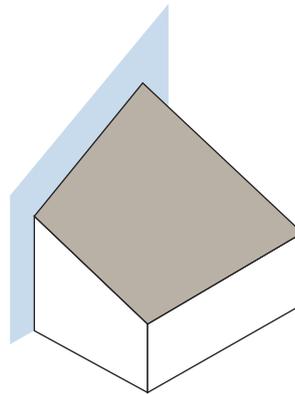


HORIZONTAL UPPER JOIN

The tiles are laid in horizontal courses following the references from the master lines and when reaching the upper section, if possible using full tiles, or 2/3 Mixed Tiles (Q56), which are laid head-on against the vertical wall. All the tiles of the last horizontal covering course are fixed to the batten.

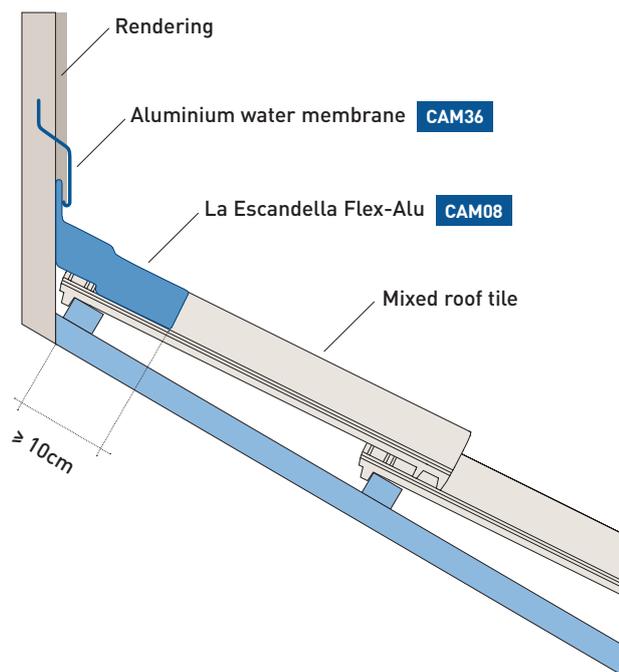
Either a waterproof membrane is laid over the last row of tiles, with a minimum overlap of 10cm; or metal flashing that adapts to the shape of the tiles and is fixed to the vertical wall to a height of 25cm.

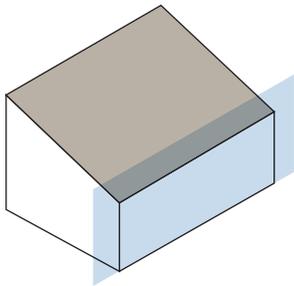
The membrane or flashing joined to the vertical wall is finished with a metal contour, sealed or let into a channel made for this purpose, in which case it will be set in M-15 mortar.



RAKED UPPER JOIN

This is handled like the previous type, but taking into account that the tiles laid head-on against the vertical wall must be cut parallel to it.



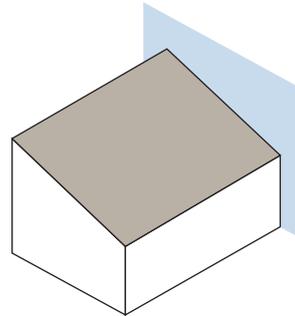


HORIZONTAL LOWER JOIN

Since the field channels water onto this joint, it must be collected in a gutter. The solution is similar to that used for hidden guttering.

The guttering is placed in the intended space, taking into account that the material used must be impermeable, and if it is metal it must be correctly protected against corrosion.

The dimensions of the guttering shall meet the UNEEN 612 norms and will be of a size that will facilitate its cleaning. The guttering shall have a minimum slope of 1% to facilitate water evacuation.



LATERAL JOIN PARALLEL WITH THE MAXIMUM SLOPE LINE

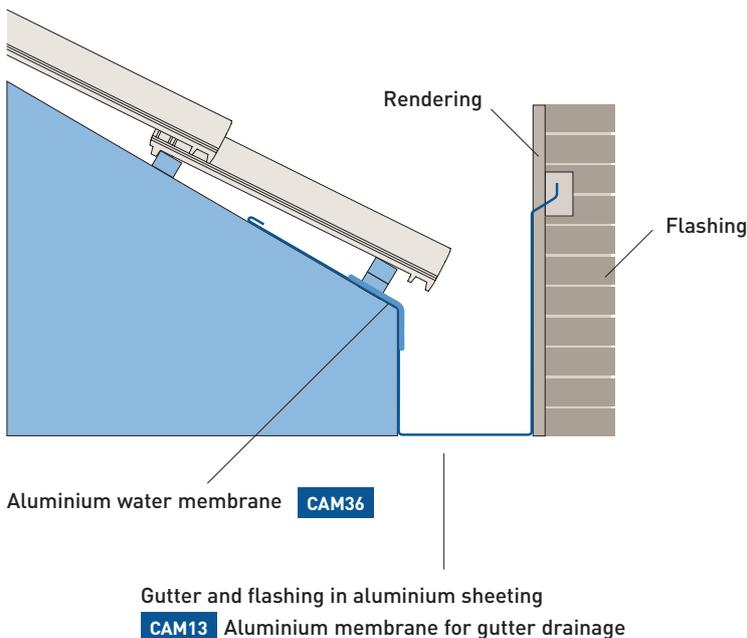
There are two options for this situation:

1. Raked upper joint:

This is handled like the raked upper joint, but taking into account that the tiles laid head-on against the vertical wall must be cut parallel to it.

2. Lateral joint parallel with the maximum slope line:

There are two options for this situation:

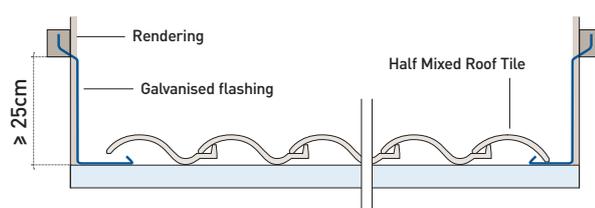
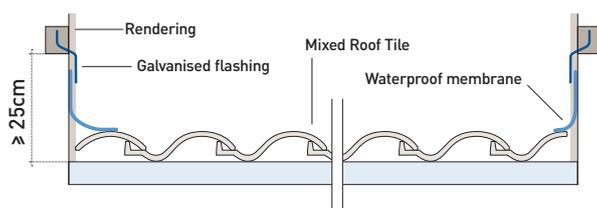


SOLUTION 1:

- Lay the tiles on the field in vertical lines following the line markers from the master lines and, when reaching the lateral join, if possible using full tiles or Half tiles (Q16) or Double tiles (Q56), which are laid head-on against the vertical wall. All the tiles of the first row parallel to the join will be fixed.
- Either a waterproof membrane is laid over the last row of tiles, with a minimum overlap of 10cm; or metal flashing that adapts to the shape of the tiles and is fixed to the vertical wall to a height of 25cm.
- The membrane or flashing joined to the vertical wall is finished with a metal contour, sealed or let into a channel made for this purpose, in which case it will be set in M-15 mortar.

SOLUTION 2:

- This consists of laying a gutter parallel to the maximum slope line, between the tiles and the wall. This is only valid when the water is channelled directly to the eaves or to the component that collects the water from the field (gutter, valley etc.) This join is handled as follows:
- A metal gutter is laid along the join, which overlaps the field by 20cm and will have a vertical rise against the wall of 20cm.
 - A channel is made in the vertical wall, at a height of at least 25cm above the intersection. Metal flashing laid in the channel is set in M-15 mortar and forms a seam with the gutter.
 - The gutter will have a flange on one side for the seam with the metal flashing and to avoid overflow.
 - Tiles are then laid on the field in vertical lines following the marker references by the master lines, remaining at a distance of 15cm from the lateral join and overlapping the gutter by 5cm. All the tiles of the first row will be fixed parallel to the join.

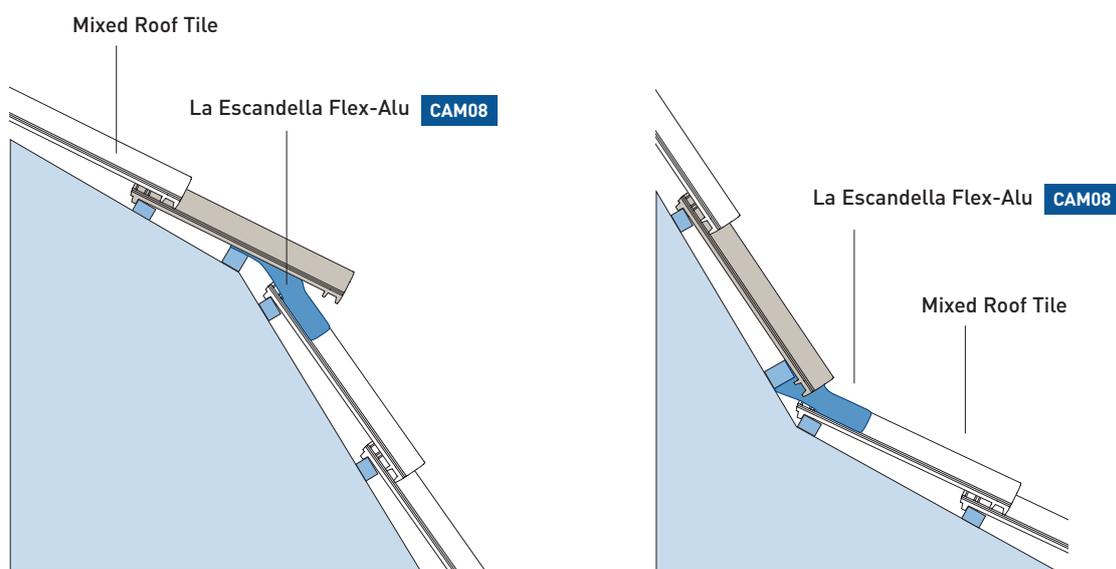


5.1.3.7 Change of slope

TG-TP / TL / TS / TI / TW / TN / TV

To make a join between two verticals with different gradients, a flexible waterproofing membrane connection system (Flex-Alu) will be used under the tiles on the upper slope, overlapping those of the lower slope, to avoid possible water infiltration.

The following types of intersection are found:



Note: The tiles at the change of slope must be fixed to the batten.
Where possible, the last course will be laid using full tiles, or otherwise Large Mixed Tiles with Q56.

5.1.3.8 Chimneys and ventilation conduits

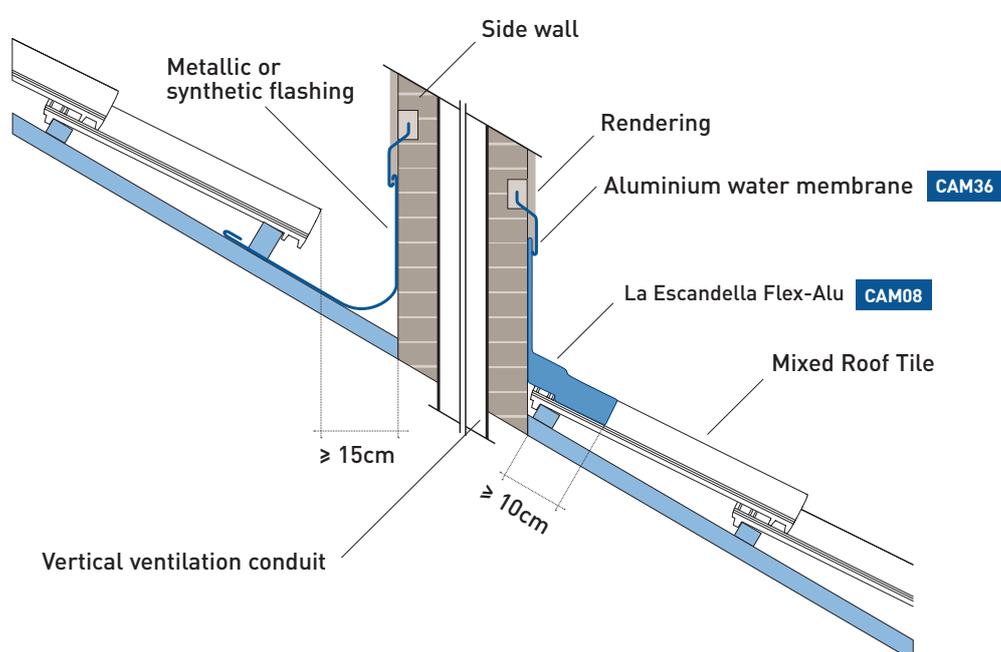
TG-TP / TL / TS / TI / TW / TN / TV

With chimneys and / or ventilation conduits, there are three intersections, which must correctly channel water and prevent its infiltration. For this flexible waterproofing membrane connection system (Flex-Alu) will be used, like for metal flashing which resolves the problem of drainage for the join with the conduit.

The lower join with the chimney or conduit will be treated like any horizontal upper join (see page 79).

Lateral joins will be treated like joins parallel to the maximum slope line (see page 81).

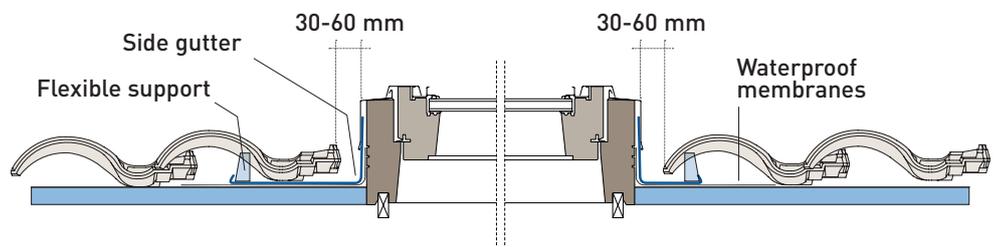
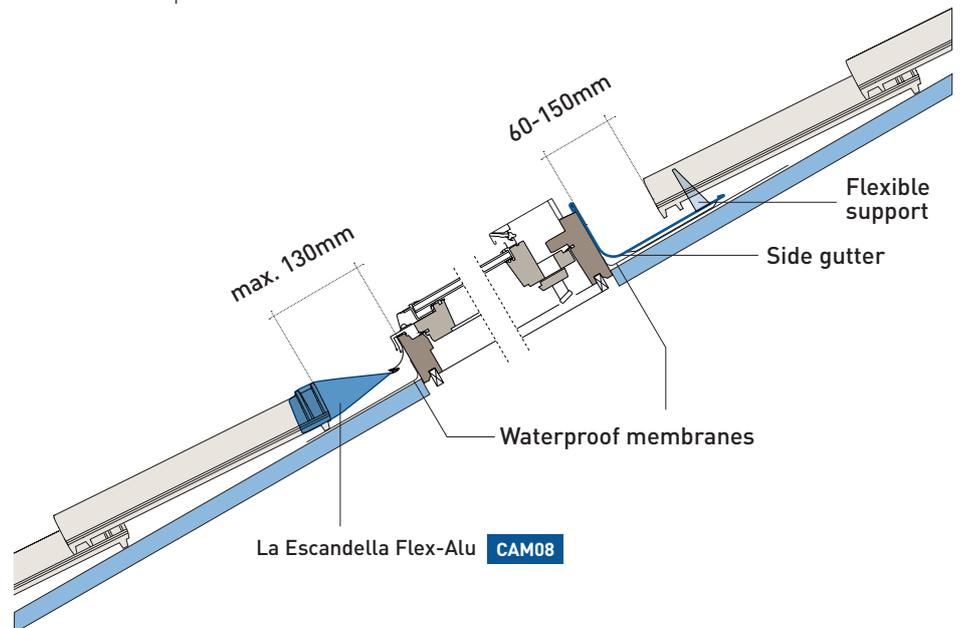
Where the field joins at the upper side of a vertical conduit, the solution is to place a gutter made of an impermeable or metallic membrane which will collect the water that arrives at this intersected, channelling it to the sides.



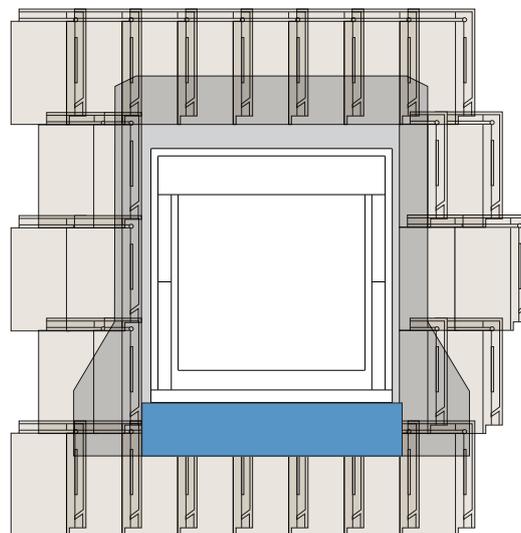
5.1.3.9 Roof's windows and skylights

TG-TP / TL / TS / TN / TV / TI / TW

The perimeter zones of the field in contact with dormer or skylight frames will be made watertight so as to channel the water down to the lower parts of the field.



BIRD VIEW



5.1.3.10 Other

CHIMNEY SUPPORT INSTALLATION.

CHIMNEY KIT **TG-TP**

When laying the components "16cm Chimney Support" for Large Mixed Tiles (**Q47**) and Small Mixed Tiles (**Q48**), a **half tile and a ventilation tile** must imperatively be used. Consequently:

- The **Q47** requires the **Q19** (Large Mixed Ventilation Tile) and the **Q16** (Large Mixed Half Tile).
- The **Q48** requires the **Q20** (Small Mixed Ventilation Tile) and the **Q17** (Small Mixed Half Tile).

A Metal Grid will be laid, covering the hole where the half tile meets the ventilation tile and the chimney support.



La Escandella provides a KIT which includes all the pieces needed for installing the **Q50** Chimney with both chimney supports (Large and Small Mixed), delivered in one case.

Large Mixed 160mm chimney kit:

Includes: Q19, Q47, Q50, Q16 and grid.

Small Mixed 160mm chimney kit:

Includes: Q20, Q48, Q50, Q17 and grid.

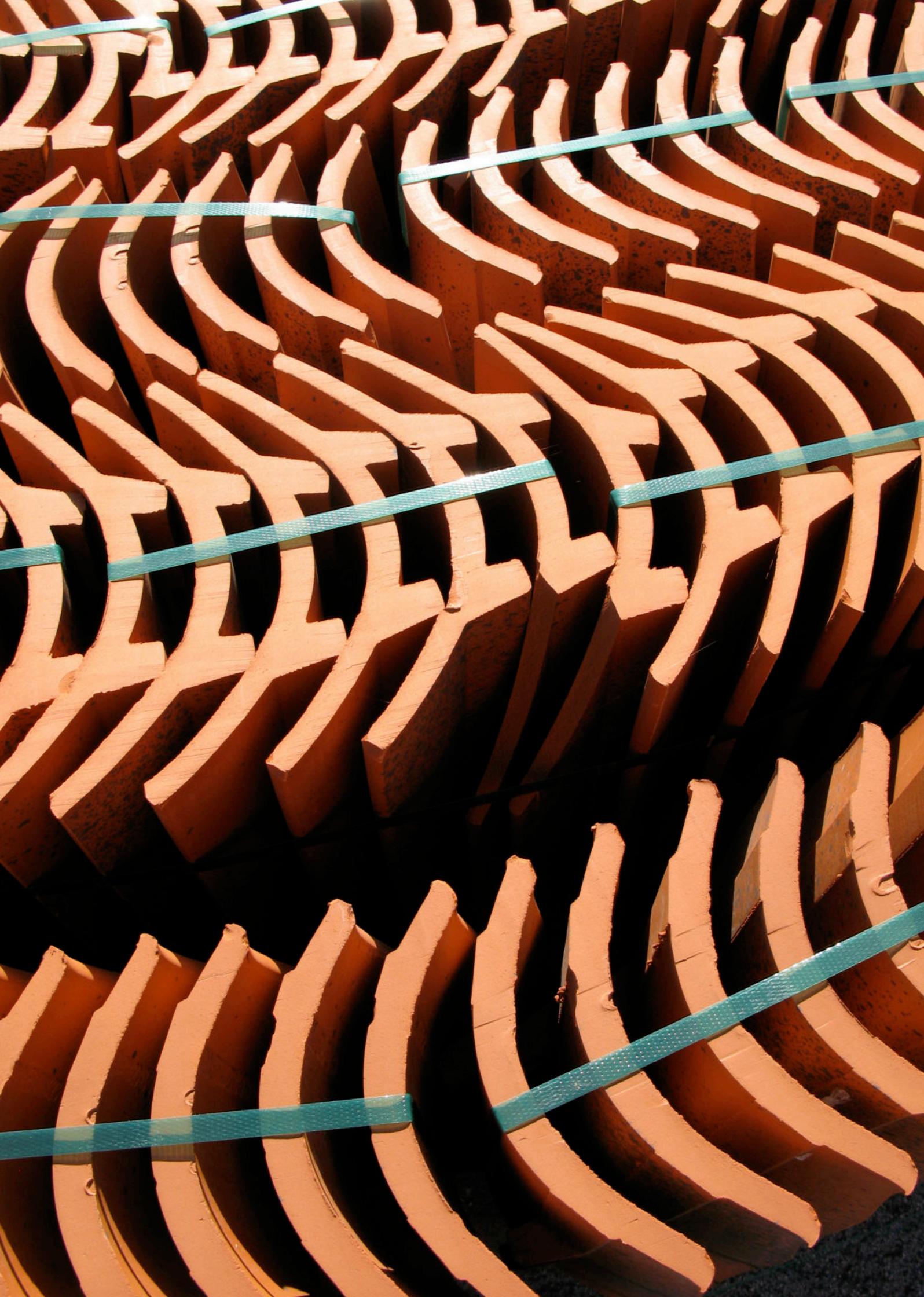


5.2 CURVED ROOF TILE

This tile is used in the construction of new homes, due to the beauty and wide variety of colours available. It is also used to restore beautiful historic roofs that have been enhanced by natural weathering over time.

Renewal of a beautiful tradition.

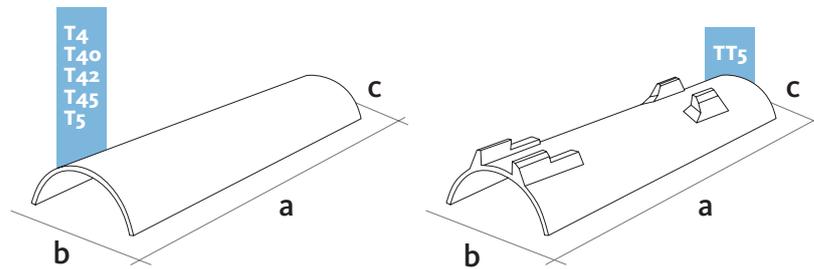




Curved roof tile

The curved tile, also called Channel or Mediterranean tile, has a characteristic cylindrical or conical upper plane. They are roofing elements in the form of a gutter. Their design allows variable overlapping between pieces. Their edges may be parallel or conical.

The curved tile has two functions: as the channel (pan) tile, it collects rain water, channeling it to the edges of the building; as the cover tile, it fills the gap between the channels.



Technical Characteristics

	T5	T45	T4	T40	TT5
Dimensions*	A 500 mm / 19.68"	A 450 mm / 17.71"	A 396 mm / 15.6"	A 400 mm / 15.75"	A 495 mm / 19.49"
	B 220 mm / 8.66"	B 220 mm / 8.66"	B 182 mm / 7.16"	B 160 mm / 5.9"	B 220 mm / 8.66"
	C 163 mm / 6.42"	C 160 mm / 6.3"	C 127 mm / 5"	C 112 mm / 4.33"	C 170 mm / 6.7"
Pieces per m ²	Depending on overlapping	22.7	28	34	9
Pieces per lm.		2.7	3	4	2,4
Weight per piece	2.55 kg / 5.62 lbs	2 kg / 4.4 lbs	1.6 kg / 3.53 lbs	1.25 kg / 2.75 lbs	2.8 kg / 6.17 lbs
Units per pallet	275	300	660	840	175
Weight per pallet	701 kg 1.545,4 lbs	600 kg 1.322,8 lbs	1.056 kg 2.328,1 lbs	1.050 kg 2.314,9 lbs	490 kg 1.080,3 lbs

* The Tile dimensions indicated in this chart, allow a tolerance of approximately ±2%.

** Depending on overlapping: 70 mm / 2.75" (18 pieces / m²); 100 mm / 3.93" (18,9 pieces / m²); 150 mm / 5.9" (20 pieces / m²).

Colours and Textures

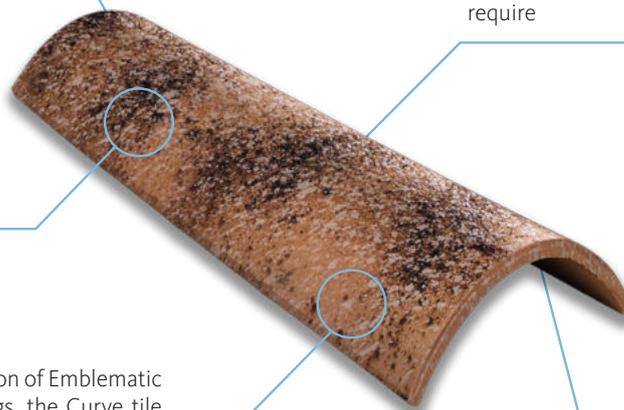
A variety of colours and textures allow accurate imitation of aged tiles with the guarantee of modern tiles

High Water Impermeability

A selection of quality clays together with high temperature cooking/baking grant the tile very low water absorption

Higher Resistance

The composition of the clay and its perfect design, allow higher flexion than the standards require



Great Versatility

For both the Renovation / Restoration of Emblematic buildings as for the newer Buildings, the Curve tile offers a high quality finish and fine touch

Easy Installation

It combines the Curve's Elegance, Technique and perfect Design. Its round edges allow a perfect fit, tile upon tile and better handling



* (Valid for T5)



** (Valid for T4 and T5)



NOTE: during the manufacturing process, handling or transport, small friction can occur on the glazed decorated roof tiles, due to the contact of support of some tiles on others. Such friction doesn't affect the structure of the tile or its quality. It's only perceptible on the hand and, therefore, comply with the guarantee of Cerámica La Escandella.

Accessories

CURVED ROOF TILE



To avoid breaking of the roof tiles and accessories It's necessary pierce the pre-hole with a screw stroke (∅ max. 4mm / 0.16"), before stick or drill the piece directly.

Chimney and support*

Q66



Chimney support Curved 50 roof tile

Q54



Chimney / pipe cover

Q22



Ventilation tile Curved 40 Mission

Q23



Ventilation tile Curved 50 Mission

Ventilation

Q52



Wedge Curved 40 Mission

Under Ridge

Q58



Only End cap Curved 50

Q68



Tapón Curva 50

Q83



End cap round ridge

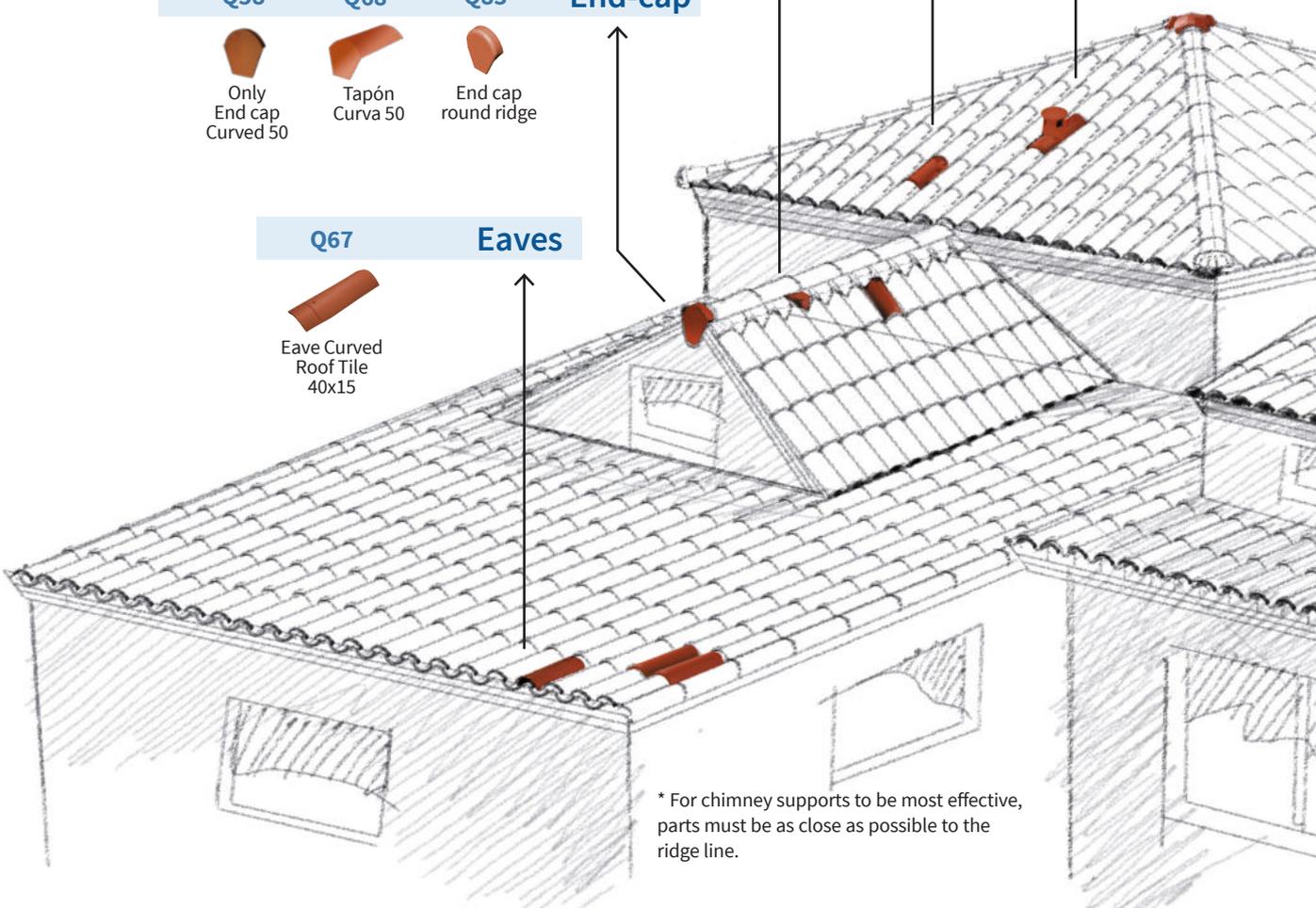
End-cap

Q67

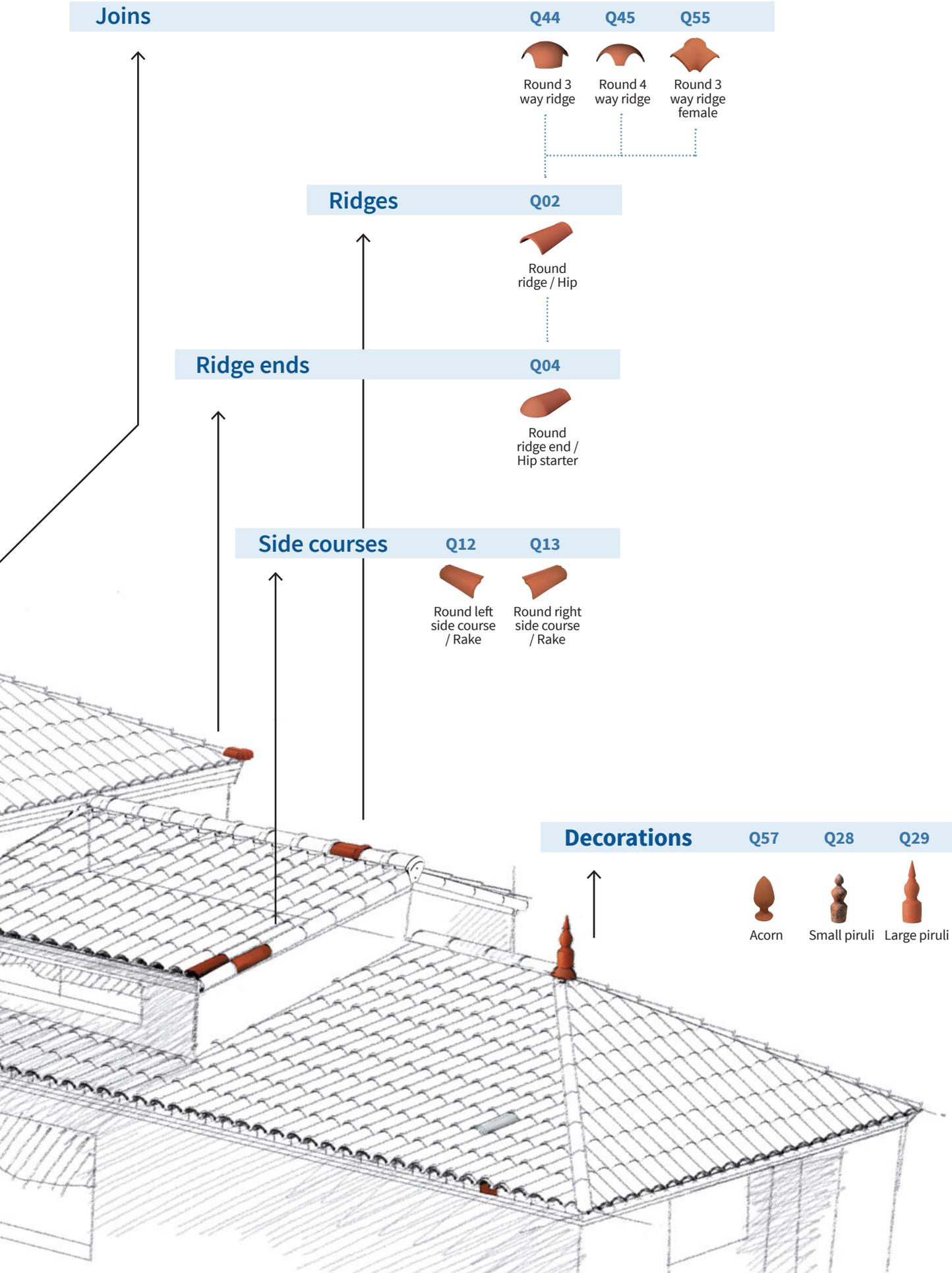


Eave Curved Roof Tile 40x15

Eaves

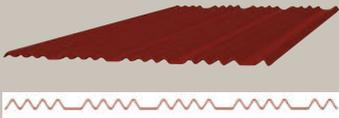
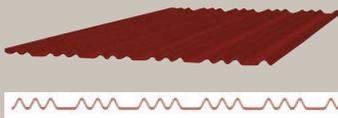


* For chimney supports to be most effective, parts must be as close as possible to the ridge line.



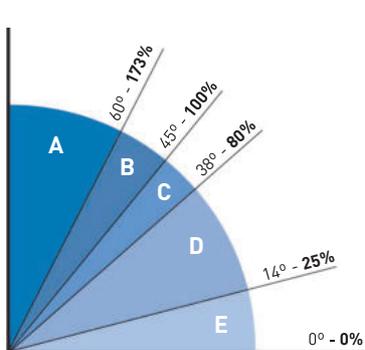
5.2.1.1 Underlayment support

The fibercement panels or sheets act as a support for the tiles, carrying out the function of a secondary cover which guarantees that the roof is watertight in case the slope or other requirements are not met.

UNDERLAYMENT SUPPORT - CURVED AND MIXES PROFILE			UNDERLAYMENT SUPPORT - GRANONDA PROFILE	
T50	T45	T4	T40	
M0220 M0201	Tapering from 18 to 22 cm		M0204 M0205 M0206 M0207 M0208	Tapering from 12 to 16 cm
				
UNDERROOFING SYSTEM - ONDULINE BT 150 PLUS			UNDERROOFING SYSTEM - ONDULINE BT 200	
T50	T45	T4	T40	
CAM76	Tapering from 18,5 to 22 cm		CAM75	Tapering from 14 to 18 cm
				

5.2.1.1 Fixation Systems

The manner in which roof tiles are installed makes them a highly effective water shedding assembly that affords years of service and protection. The effectiveness of a tile roof system as a weather resistant assembly however depends on the proper installation of all the tile roof components, and installing them properly is critical to the performance of the installed system.



- A:** 60° - 173%
- B:** 45° - 100%
- C:** 38° - 80%
- D:** 14° - 25%
- E:** 0° - 0%

- A:** Every tile should be securely fastened (Nailed, screwed, clipped...) [60° / 203/4:12].
- B:** As a minimum, each tile in every five proportion, should be secured with (10 gauge) non-corrosive ring shank nails or screws [45° / 12:12].
- C:** Each tile hangs on the batten (held by the nib) [38° / 10:12].
- D:** Each tile hangs on the batten, held by the nib. When mortar is used, back bed and face point with color matched mortar. Clean off all excess mortar from the face of the tiles. For Foam Adhesive, refer to local building codes.
- E:** La Escandella recommended minimum slope requirements is 30% [4:12].

NOTE: The locking function is performed by the metal clamps / hooks. Polyurethane foam acts only as a positioner. Any fastening done with screws, nails, clips etc., must be sealed in order to prevent water entering. All fasteners must be non-corroding.

Hooks and clips:

CAM27 | Round ridge tile hook for Q02 ridge

CAM15 | Metal Clip For curved tile 50 (14 cm)

CAM61 | Metal Clip For curved tile 50 (17 cm)

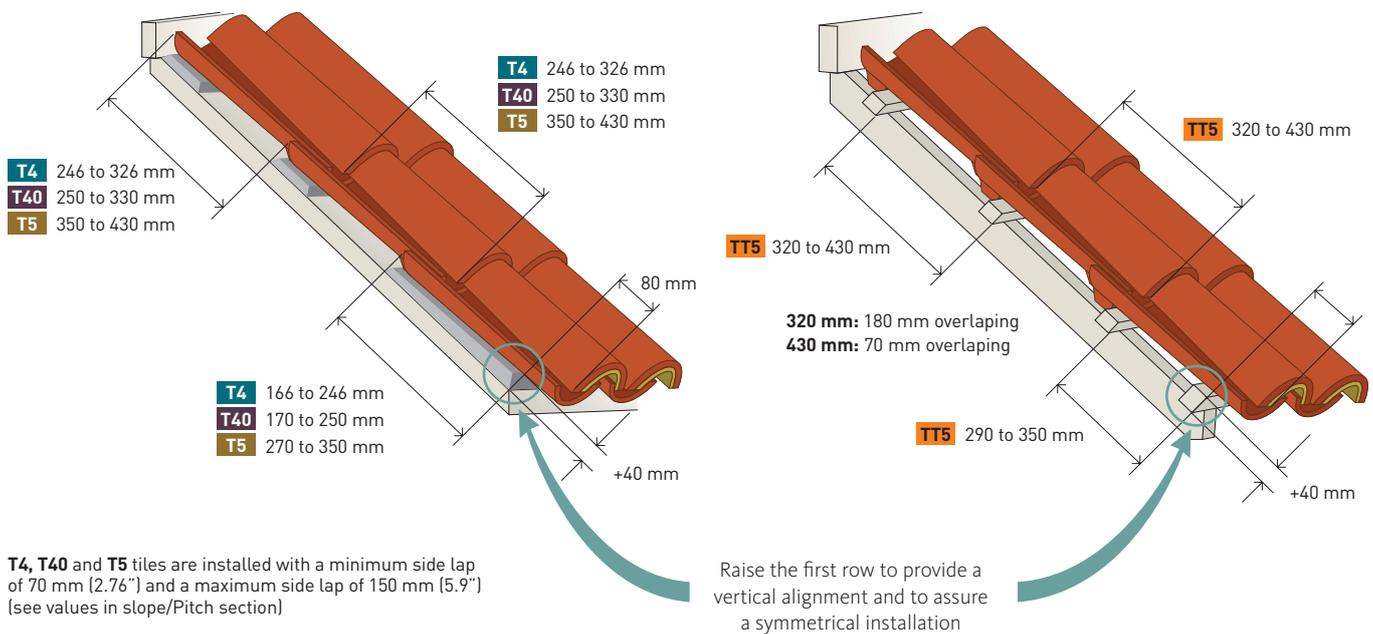
CAM25 | Metal Clip For curved tile 40 (7,2 cm)

CAM74 | Eave metal clip for curved roof tile (28,5 cm largo)



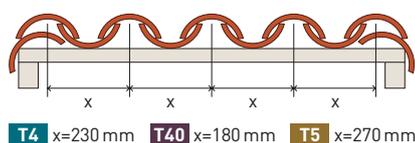
5.2.1.1 Laid method

LONGITUDINAL FIT

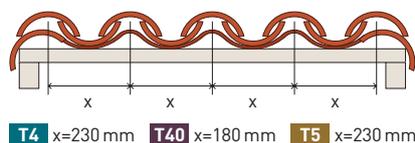


TRANSVERSAL FIT

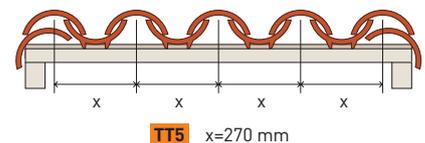
Mortar fixing of clay roofing tiles



Fibre cement corrugated sheets fixing - Escandella (pre-engineered roof system)



Teton (Barrel nose) tile fixing



Installation of Curved Tile 50 on vertical batten (parallel with the maximum slope line)

The battens are placed at a distance of 240-270mm (between the inside and outside edges of the batten) and the half-way point between them is marked, 120-135mm. The line is marked on the supporting layer and the tile that will go from the channel is nailed to the continuous support, leaving the desired gap. In these conditions the distance from centre to centre between the tiles will be 240-270mm.

Pre-perforated tiles can be used for fixation to the covering, using wooden battens and continuous support for this.

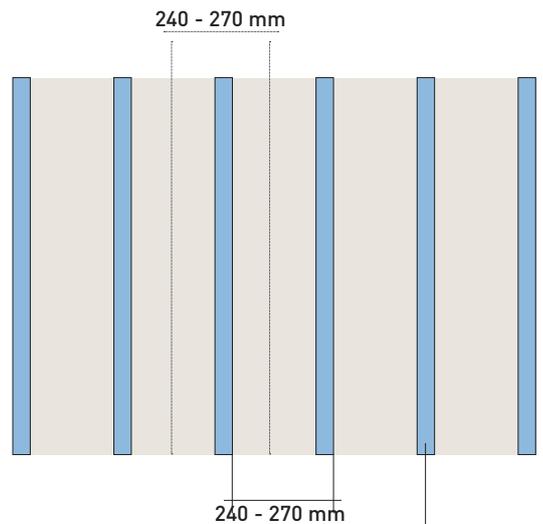
140 mm



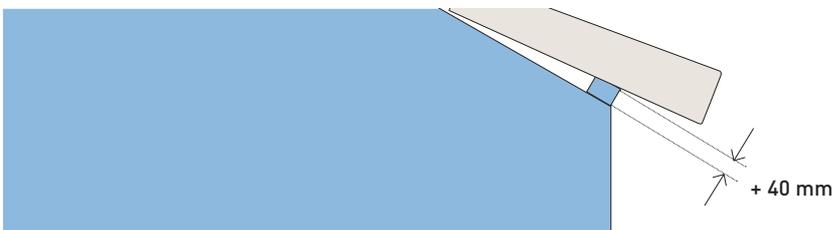
The gap between the tiles will be 20-50mm



To improve the fastening of the tile it can be screwed on and clipped, however, the clip imposes a limit of an overlap of 140mm.



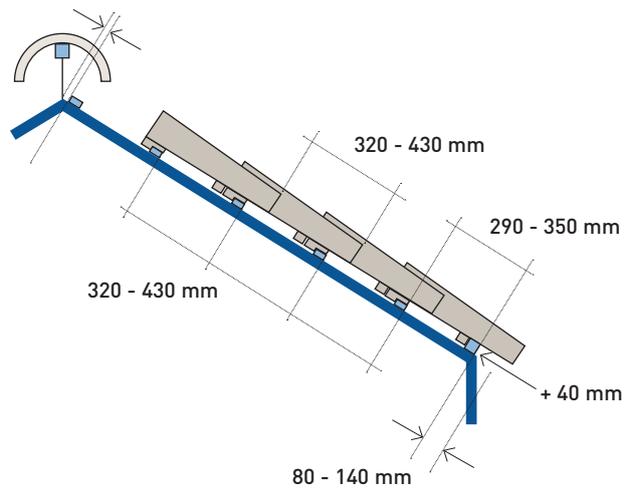
The batten used for the calculation is 40mm wide



For the line of the eaves a batten must be laid or the tile must be raised to maintain the slope of the roof.

Installation of Curved Tile 50 with Teton (Barrel nose) tile

The Teton tile is always laid on battens, which the flange (or nose) sits on, enabling better and faster fixing.



For transversal laying, spacing to ensure that the T5 pan tile meets the measurements defined in the norms of the destination country is accounted for.

Installation of Curved Tile 50 with corrugated sheeting

For the curved tile 50 a 230mm ridge width will be used. The minimum required overlap is always 70mm.

When using corrugated sheeting, it will not be necessary to lay the cut curved tile under the first eave tiles, since it makes a difference in the closure of the tiles.



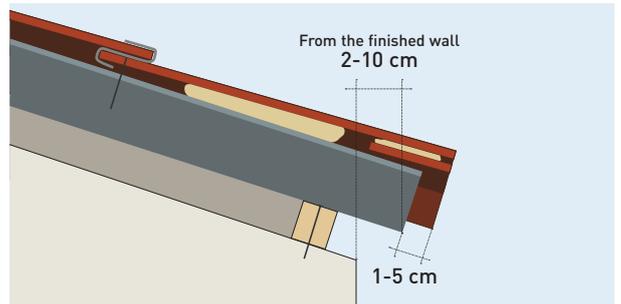
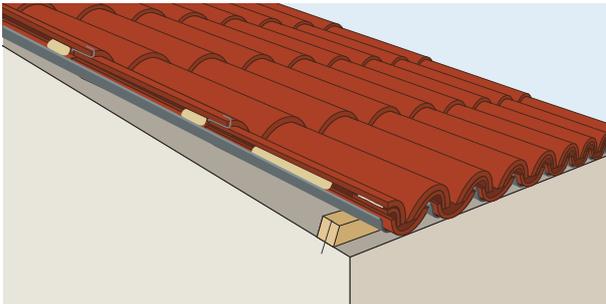
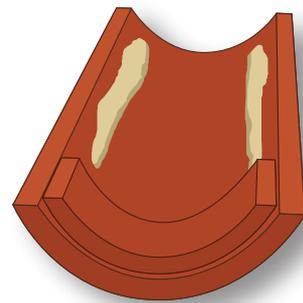
5.2.2 INSTALLATION DETAILS

5.2.2.1 Eave

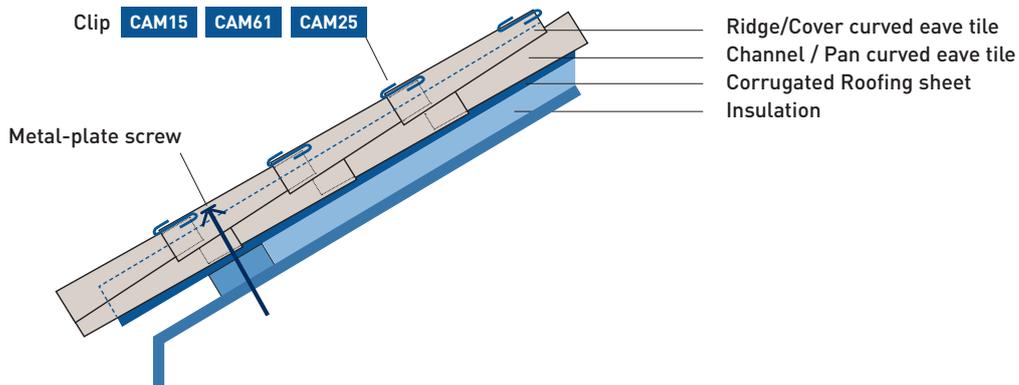
The first thing to be considered when laying the eaves is that both the sheeting and the cap tile must overhang by a minimum of 5cm.

The canal tiles will be laid the whole length of the eaves, and fastened with polyurethane foam.

Subsequently, the cover tiles will be laid, buttressing the wide end with a small piece of the narrow end, to prevent slumping.



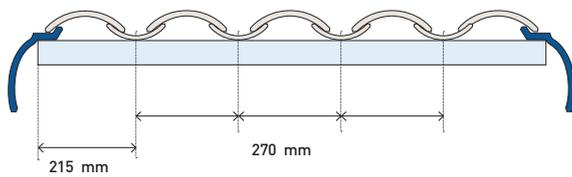
Note: or the 40x15 Curved Tile the Q67 should be used, or Curved Tile eaves.



5.2.2.2 Side courses

T5

Round Side Course Q12 - Q13



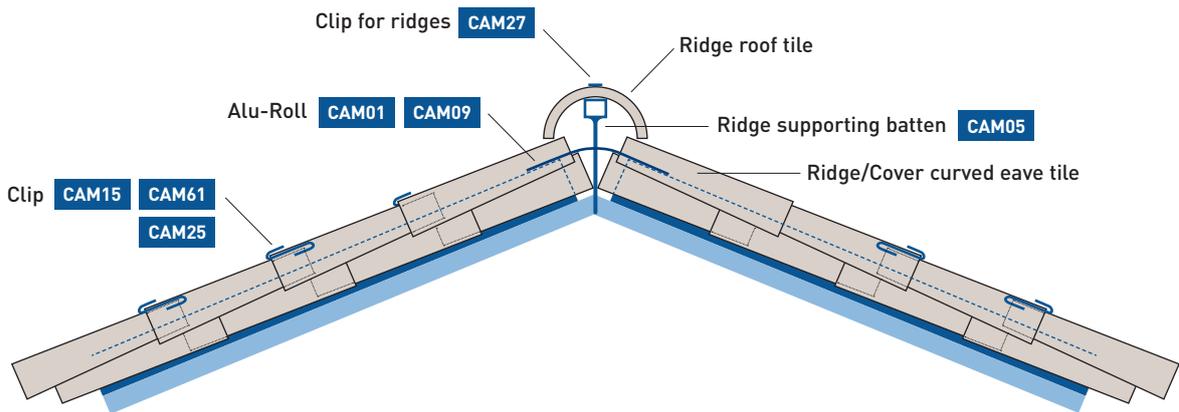
The back tile which lies in the line of the curved lateral end tile will sit slightly lower than the rest of the curved tiles on the ridge line.

5.2.2.3 Ridge

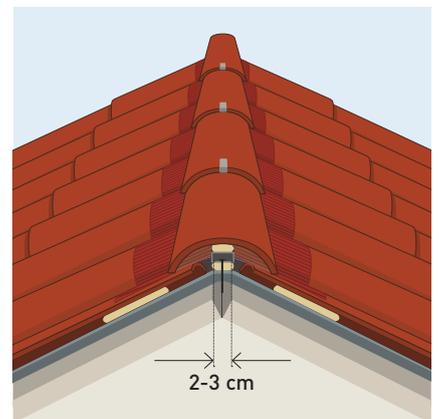
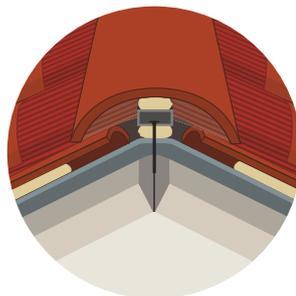
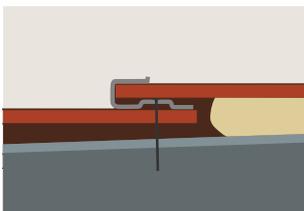
When laying the roof the ridge tiles must be laid facing away from the dominant winds and rain.

All the curved tiles of the final horizontal row must be fixed, either on the battens or directly to the sheeting with polyurethane foam.

A waterproof ridge band CAM01 is laid over the ridge channel tiles. This will be covered by the ridge tiles of the final course, which will be fixed with screws and foam.

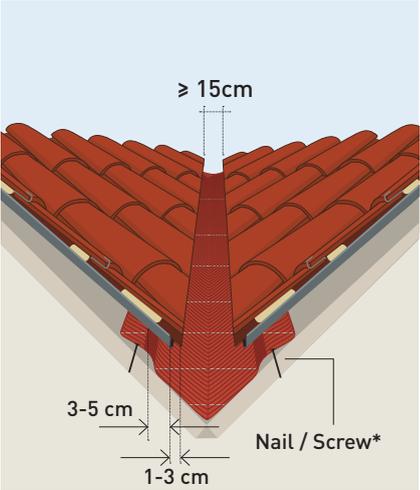


The ridge tiles will be fixed to the sheet, together with the clip that fastens one tile to the next, using self-drilling screws and a line of foam.

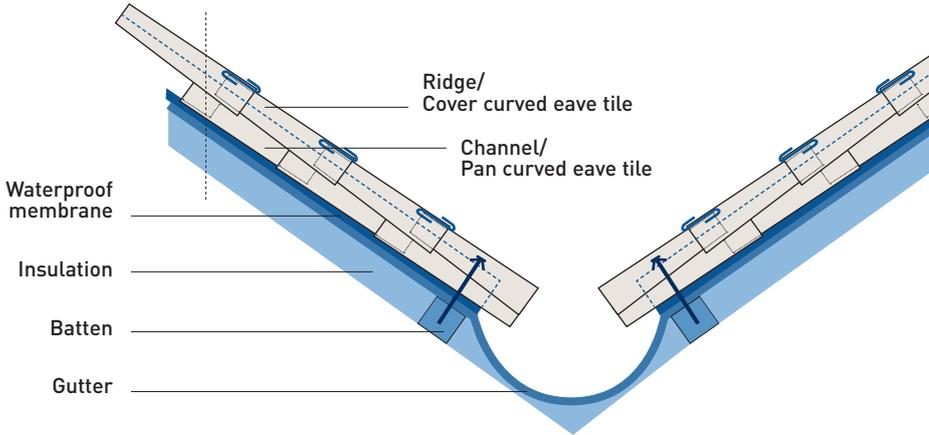


5.2.2.4 Valley

The roof parts, fibercement panels + tiles, must overhang the valley by at least 5cm.

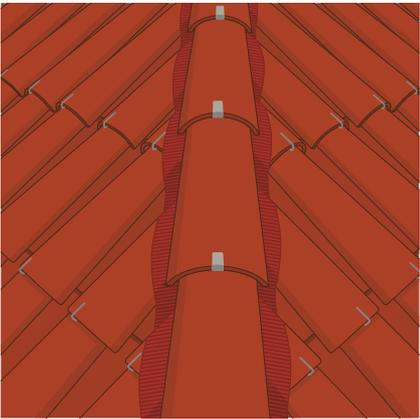


*Nail (concrete frame or joists)
 Screw (wood)
 Screw (metal joists)



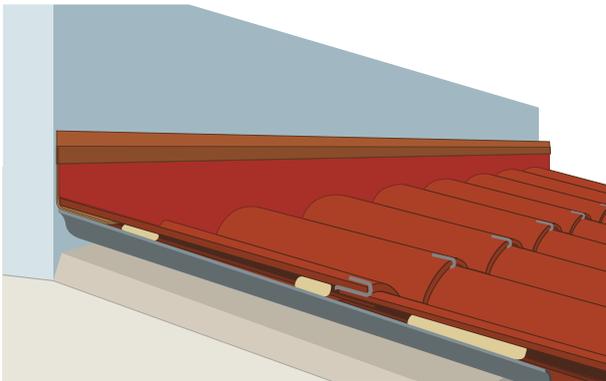
5.2.2.5 Hip

Installation follows the same specifications as the ridge.



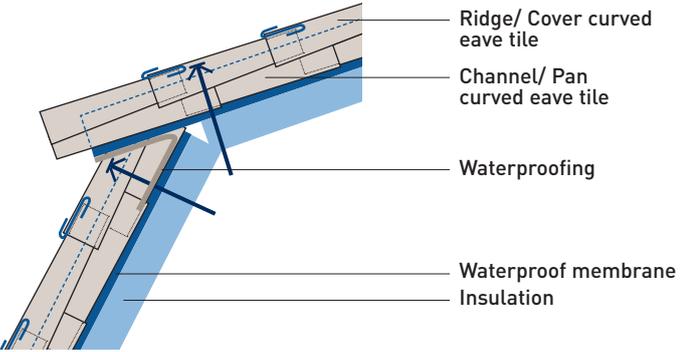
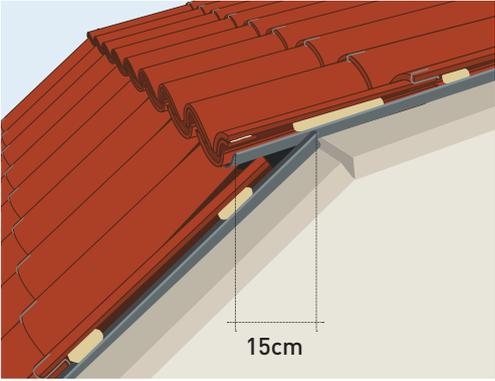
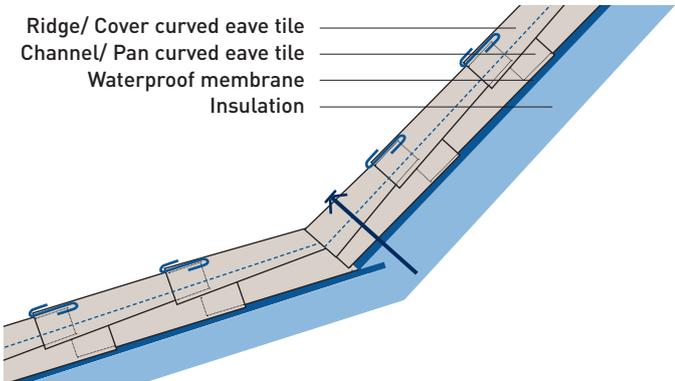
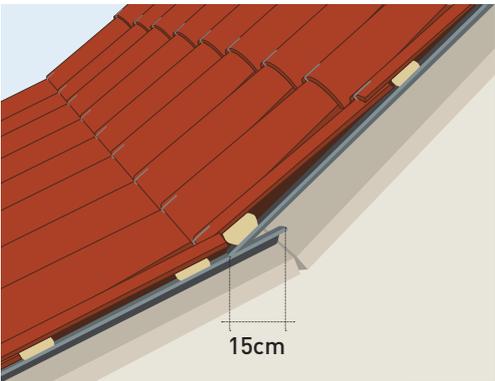
5.2.2.6 Vertical Walls

Where gables intersect with vertical walls, a protective element will be placed, which will be sealed to the vertical wall with rubber, to ensure it is watertight.



5.2.2.7 Pitch change

When there is a change of slope on the field, the overhang between the fibre cement panels must be respected, to ensure the zone is watertight.



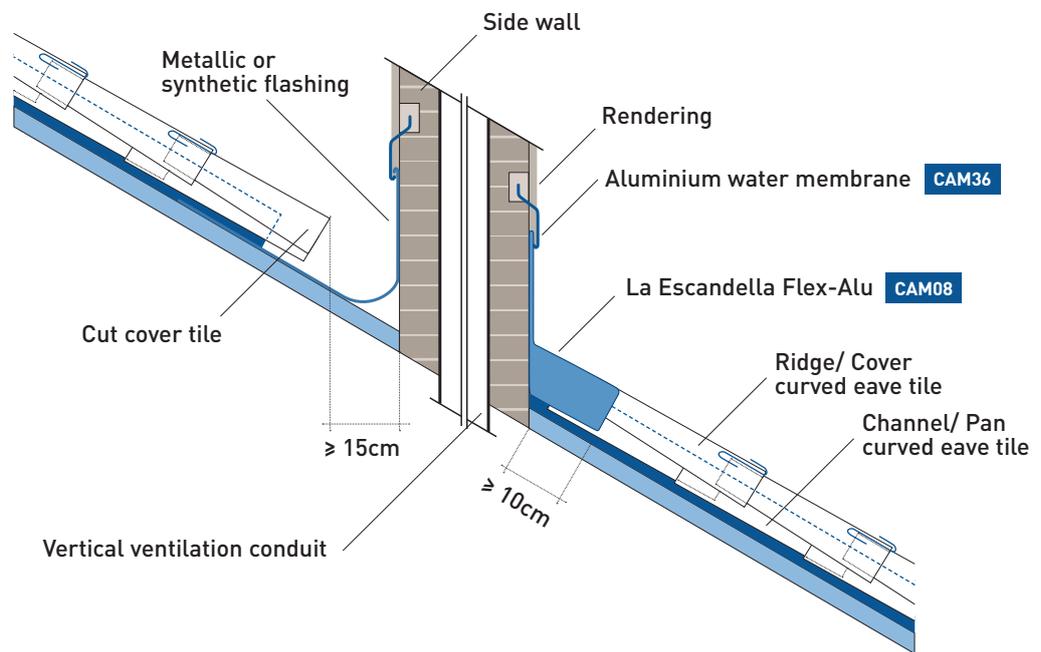
5.2.2.7 Chimneys and ventilation ducts

With chimneys and / or ventilation conduits, there are three intersections, which must correctly channel water and prevent its infiltration. For this a flexible waterproofing membrane connection system (Flex-Alu) will be used, like for metal flashing which resolves the problem of drainage for the join with the conduit.

Where the field joins at the upper side of a vertical conduit, the solution is to place a gutter made of an impermeable or metallic membrane which will collect the water that arrives at this intersection, channelling it to the sides.

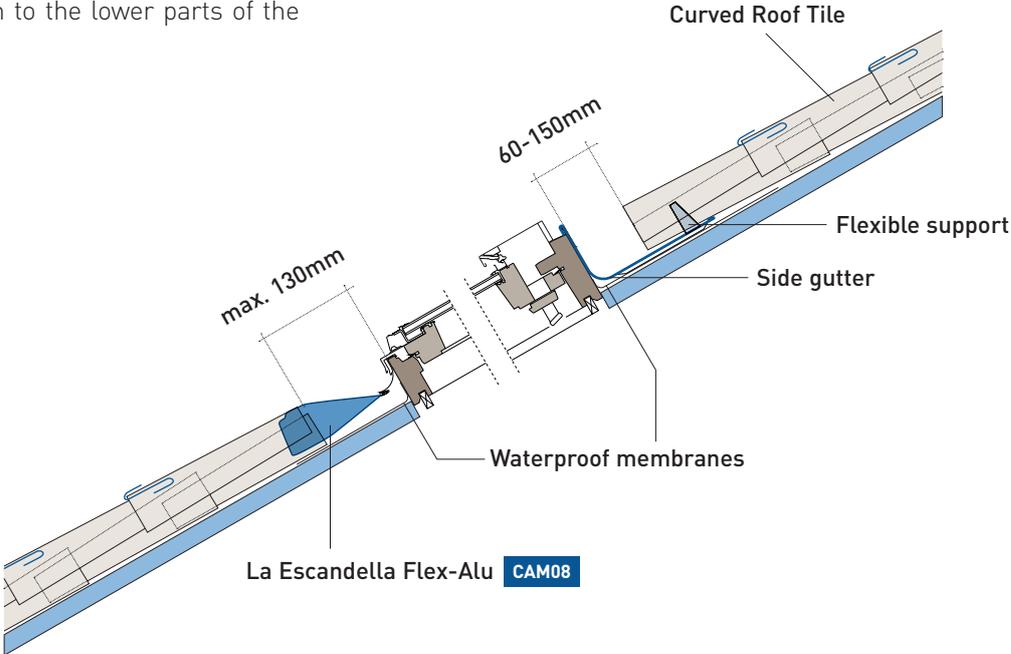
The lower join with the chimney or conduit will be treated like any horizontal upper join.

Lateral joins will be treated like joins parallel to the maximum slope line.

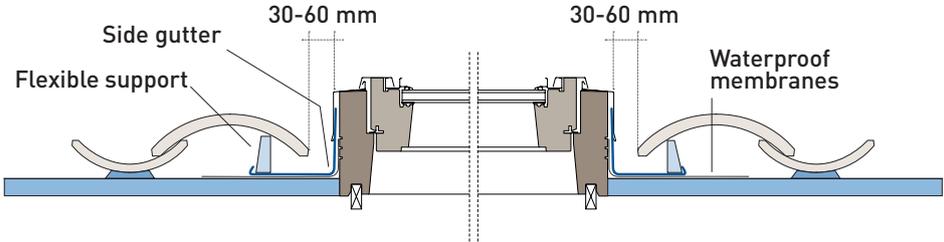


5.2.2.8 Roof's window and skylights

The perimeter zones of the field in contact with dormer or skylight frames will be made watertight so as to channel the water down to the lower parts of the gable.

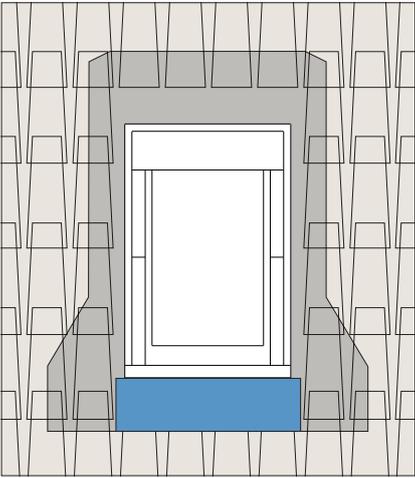


LONGITUDINAL SECTION



TRANSVERSAL SECTION

BIRD VIEW



Summary of accessories by format

H-Selection roof tiles

	Ridges and Wedges					Ridge ends				Side courses	Half tile	Others
	Normal	Round	Pyramid	Atica	Angular	Normal	Round	Atica	Angular			
SELECTUM	Q01*K 	Q02*K 				Q03*K 	Q04*K 			Q133*K 	Q130*K 	Q136*K 
										Q134*K 		Q08*K 
												Q138*K 
INNOVA	Q01*K 	Q02*K 	Q145*K 	Q090*K 	Q120*K 	Q03*K 	Q04*K 	Q109*K 	Q122*K 	Q115*K 	Q119*K 	
			Q110*K 							Q116*K 		
VIENNA	Q01*K 	Q02*K 	Q145*K 	Q090*K 	Q120*K 	Q03*K 	Q04*K 	Q109*K 	Q122*K 	Q115*K 		
			Q110*K 							Q116*K 		
PLANUM		Q02*K 	Q145*K 	Q090*K 	Q120*K 		Q04*K 	Q109*K 	Q122*K 	Q88*K 	Q85*K 	
			Q110*K 							Q89*K 		
VISUM3		Q02*K 	Q145*K 	Q090*K 	Q120*K 		Q04*K 	Q109*K 	Q122*K 	Q99*K 	Q100*K 	
			Q110*K 							Q107*K 	Q102*K 	
										Q101*K 		

End - cap				Joins				Ventilation	Chimney support	Chimney/ cover	
Normal	Round	Pyramid	Angular	Round	Pyramid	Atica	Angular				
Q05*K	Q83*K			Q44*K	Q55*K			Q131*K	Q132*K	Q135*K	
											
				Q45*K							
											
Q05*K	Q83*K	Q147*K	Q124*K	Q44*K	Q55*K	Q146*K	Q111*K	Q123*K	Q117*K	Q118*K	Q121*K
											
				Q45*K							
											
Q05*K	Q83*K	Q147*K	Q124*K	Q44*K	Q55*K	Q146*K	Q111*K	Q123*K	Q117*K	Q118*K	Q121*K
											
				Q45*K							
											
	Q83*K	Q147*K	Q124*K	Q44*K	Q55*K	Q146*K	Q111*K	Q123*K	Q86*K	Q87*K	Q77*K
											
				Q45*K							
											
	Q83*K	Q147*K	Q124*K	Q44*K	Q55*K	Q146*K	Q111*K	Q123*K	Q96*K		Q97*K
											
				Q45*K							
											

Roofing Components

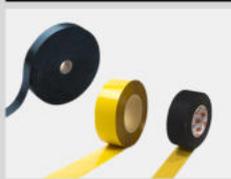
ROOF VAPOUR BARRIER

CAM65 / CAM21 / CAM52 / CAM53
Waterproof membrane



CAM56
Condensation barrier membrane

CAM42 / CAM43 / CAM44
Adhesive tapes



CONNECTION SYSTEMS

CAM08 / CAMF8
Flex-Alu



Width: Several sizes
Colours: Red, paja, brown, black.

CAM36
Aluminium water membrane



Colours: Red, brown, black.

VENTILATION SYSTEMS FOR THE EAVE

CAM13
Gutter-Run In-Sheet Alu



Width: 230mm / 9.05"
Colours: Red.

CAM14 / CAM16 / CAM58
Eaves Ventilation Comb



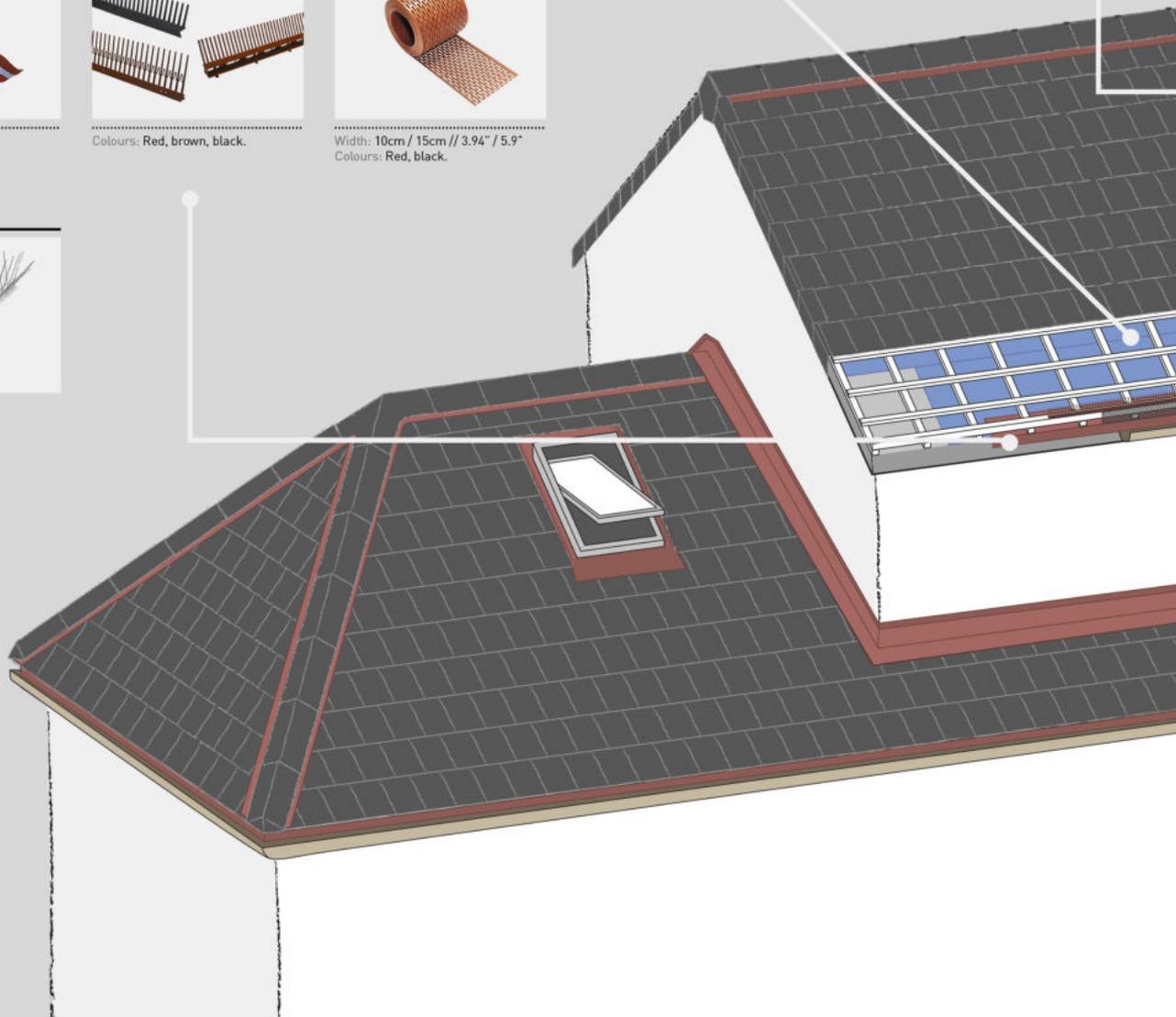
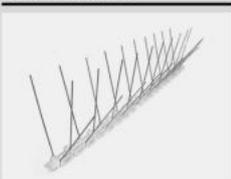
Colours: Red, brown, black.

CAM33 / CAM34 / CAM18 / CAM121
Eave grating



Width: 10cm / 15cm // 3.94" / 5.9"
Colours: Red, black.

CAM38
Metal bird spikes



VENTILATION SYSTEMS FOR RIDGES AND ROOF HIPS

LAYING SYSTEMS

CAM92 / CAM68 / CAM042 /
CAM043 / CAM044 / CAM050
Batten



Materials: Wood / galvanized metal /
steel / galvanized steel

CAM07 / CAM27 / CAM70
Hooks and clips



CAM59 / CAM62 / CAM64 /
CAM61 / CAM15 / CAM25 /
CAM26 / CAM74 / CAM30

CAM01 / CAMF1
Alu-Roll Aluminium



Width: 30/39 cm // 11.8"/15.3"
Colours: Red, paja, brown, black.

CAM09 / CAMF9 / CAMF950
Alu-Roll Membrane



Width: 31/39/31 cm // 11.8"/15.3/11.8"
Colours: Red, brown, black.

CAM05 / CAM010 / CAM51
Batten Brackets



Width: 40/50/40 mm // 1.57"/1.97"/1.57"
Material: Galvanized steel

VENTILATION SYSTEMS FOR THE VALLEYS

CAM18
Alu-Valley Tape



Colours: Red, brown, black.

CAM37
Sealing Wedge

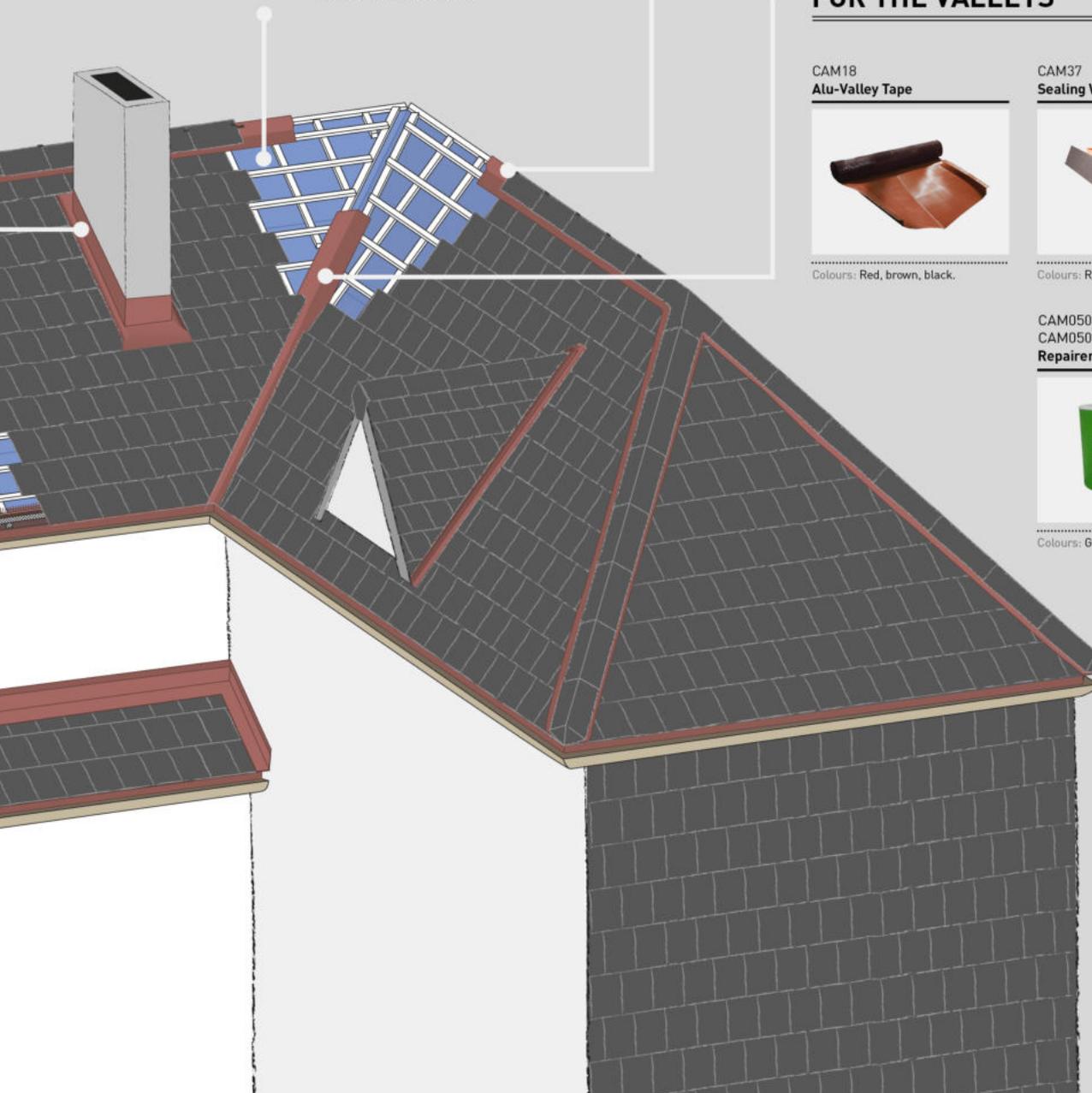


Colours: Red.

CAM0500 / CAM0501 /
CAM0502 / CAM0503
Repairer paint pot



Colours: Galaxy, Slate, Brown, Gray.





6 ROOF MAINTENANCE AND CARE

FREQUENTLY ASKED QUESTIONS: ROOF MAINTENANCE AND CARE

1. WHY IS VENTILATION SO IMPORTANT?

Ventilation (known as micro-ventilation) between the tile and the supports beneath determines the tile's efficiency and the durability of the roof across the years.

The tiles are made from natural clays, giving them a certain porosity that enables them to "breathe" by absorbing and expelling water and holding moisture inside the building. To prevent condensation and dampness that lead to leaking into the home, the tiles must be installed in accordance with the relevant standards. Good ventilation and accessories that help this process are also important.

Ventilation enables air to flow beneath the tiles and allows them to dry. It also reduces the occurrence of moss and fungi, maintaining the appearance of the roof over time. Therefore, the ridge line must never be filled with cement or similar materials. Instead, it must remain open to facilitate air flow and be fitted with protection to stop birds, insects and small rodents from entering.

2. WHY DOES CONDENSATION OCCUR UNDER A ROOF?

Condensation occurs when the temperature falls below the dew point of the surrounding area. This process usually occurs in winter and takes place when there is a difference of more than 2°C between the temperature and the cold surface (in still air). Condensation produces water droplets when the air is concentrated beneath an open roof as the temperature drops.

This condensation can lead to dampness and a subsequent deterioration of the roof due to fungi and other organisms.

It can be prevented by proper roof installation and ventilation, which helps air flow and dries out the dampness that can appear beneath the tiles.

3. ARE WATER LEAKS DUE TO THE TILES?

Tiles are made from natural clay and are therefore porous. This porosity gives the material a degree of permeability, which La Escandella controls using a process of selecting, pressing and firing the clay to remove all potential for leakage caused by the tile. Permeability, along with other characteristics of La Escandella tiles, is measured and audited periodically by various domestic and international institutions, which have awarded La Escandella tiles the most rigorous quality certifications.

As a general rule, a roof usually leaks as a result of poor tile installation (insufficient slope, excessive use of mortar, lack of ventilation, the sealing of special points such as chimneys, joins with walls, etc.), which can affect its water tightness. Each different installation requires close monitoring by a roofing professional.

As per the 'CTE' (Spanish Building Technical Code), the following maintenance steps should be taken:

- **Once a year:** Water outlet and drainage elements should be cleaned (gutters, drains, ...).
- **Every 3 years approximately:** check the preservation of the roof and the Special pieces / Accessories.

4. HOW CAN I PREVENT MILDEW ON MY ROOF?

Mildew, or moss as it is commonly known, is a micro-organism that appears on roofs, often due to the tiles (because of their porosity natural condition) being exposed to certain environmental conditions. These include nearby vegetation, a north-facing roof, an insufficient slope on the roof and pollution, as well as a lack of ventilation and the use of mortar.

It is almost impossible to prevent mildew because of the large range of factors that cause it to appear. However, correct dry installation, particularly avoiding the use of mortar, and the necessary micro-ventilation between the roof and its base are important factors in keeping it at bay.

We also recommend that the roof be cleaned every 3 to 5 years, depending on the home's location and climate. This removes any residues that may have accumulated, which can prevent the tiles from drying and correctly expelling rainwater

5. HOW CAN I PREVENT STAINS AND WHITE MARKINGS ON THE TILES?

White markings on tiles, known as efflorescence, appear on the tile surface due to salts or carbonates resulting from the use of too much water in mortars for installation, as well as excessive moisture and a lack of roof ventilation. The moisture is expelled by the most well-ventilated areas. This water then evaporates, leaving salt deposits which cause white staining on the tiles.

Despite rigorous controls over salt levels in tiles, mortars and the water used with them can cause efflores-

cence. This commonly occurs during installation and can be easily countered by dampening the tiles with water and allowing them to dry (provided installation requirements have been met, particularly in relation to roof ventilation).

Where the problem occurs subsequent to installation, it must always be analysed and treated by specialists who will not only remove the efflorescence but correct the problems causing it. Normally they will clean the area with water, and even vinegar, treating the salts and removing the surface stains. However, it is always advisable that each case be studied individually and a solution prescribed depending on the type of tile, installation and other architectural details.

6. HOW CAN I PREVENT THE TILES FROM DETERIORATING IN VERY SALTY CLIMATES?

In regions prone to adverse weather conditions, particularly those close to the sea, special attention must be paid to roof installation. Good ventilation is even more important in preventing the accumulation of salts or other organisms that can deteriorate the tiles.

Micro-ventilation (between the supports and the tiles) allows the tiles to be properly ventilated, quickly drying any moisture caused by proximity to the sea, by rain, etc. and making the tiles, and ultimately the roof, more durable.

COLOURS

1. CAN I MIX DIFFERENT COLOURED TILES? EXAMPLES.

Of course. As long as the same shape is used, colours can be mixed to create unique, fully customised combinations. You can view a range of combinations in our gallery, which mix up to 3 or 4 colours in the one roof. You can also consult our technical department for advice on the best combinations for your home.

2. WHAT ARE THE ADVANTAGES OF GLAZING COMPARED TO THE POWDERED FINISH?

As well as offering a bright finish, glazing repels water from the surface of the tile, helping colours stay more durable over time. Always taking care that the tiles have been properly installed, making the roof as durable and functional as possible. Good ventilation under the tiles from the eaves to the ridge is required, using ventilation tiles based on the length of the gable.

3. DOES THE COLOUR OF THE TILE AFFECT A HOME'S TEMPERATURE?

Ceramic roofs help with thermal insulation, adding up to +3° in the winter and -3° in the summer. This promotes energy savings in the home.

As with any other material, dark colours will hold more heat. For this reason, lighter colours tend to be used in warmer regions, while redder, darker colours are used where the climate is cooler.

Regardless of climactic conditions, it is worth noting that clay tiles offer a higher degree of thermal insulation than other metal or plastic products or concrete tiles. This superior thermal performance is increased when tiles are correctly installed, particularly in relation to the slope of the roof and under-tile ventilation.

4. ARE THERE SHADE VARIATIONS IN TILES OF THE SAME COLOUR? HOW DO I STOP THESE FROM BEING OBVIOUS?

Tiles are made with different clay combinations and, because clay is a natural material, it can exhibit slight variations in shade after firing. This can be accentuated more in white clays, as they are more susceptible to this phenomenon.

To achieve a more uniform roof colouring, which doesn't show up small variations, we recommend mixing tiles from across the pallet range, given that tiles are not installed according to a set order based on finish.

LA ESCANDELLA ROOF TILES

WHAT DOES THE LA ESCANDELLA GUARANTEE COVER?

Cerámica La Escandella guarantees that its ceramic tiles and accessories are free from manufacturing defects (including frost resistance) with Guarantees depending on the type of product: 35 years for the Mediterranean Range (Curve, Mixed and Flat) and 100 years for The H-Selection Range (Visum3, Planum, Vienna and Innova).

La Escandella Guarantee will be applied/valid only if the following requirements are committed.

- The manufacturer's instructions and the technical code of the country have been complied with and particularly that referring to the ventilation of the deck.

- All tiles and accessories installed have been manufactured by La Escandella and are those recommended by this manufacturer for a proper construction of the deck. Any painted, varnished, hydrofuged tiles subjected to any treatment not carried out by La Escandella, shall not be covered by this guarantee.

- This guarantee does not apply in case of defects which are visible on the delivery of the tiles such as differences in the tonality or damages caused by the transportation. Additionally, due to the nature of the tiles as well as the possible effects of the surrounding environment, La Escandella shall not be responsible for changes in tonality or ageing of the tiles.

- The guarantee entails the free disposal of the material delivered under conditions EXW (Ex work). Neither the costs arisen from the removal of the defective tiles or transportation or installation of new ones, nor indirect damages which may have been caused are included.

Excluded from this guarantee:

1. Water leaks due to a faulty laying of the tiles are excluded from this certification.
2. Any damage caused by movement, distortion, cracking or settling of the walls or foundation of the building.
3. Any damage caused by the impact of objects, fire, earthquakes, flooding... or any force majeure.

The Guarantee is not applied for visible damages during the delivery of the tile as well as differences in the tonality or damages caused during the transport. Due to the natural characteristics of the tiles, as well as the possible effects of the environment, La Escandella is not responsible for possible changes of tonality or aging effects in the tiles.



10-7

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GLOSSARY

FIELD OR SKIRT: each of the sloped planes that form the roof.

MAXIMUM SLOPE LINE: the trajectory described by the free flow of water down a field.

RIGHT OF A FIELD OR SKIRT: the right hand side of the field in the direction of the flow of water. Looking facing the roof from the eaves, it is the right-hand section of the field.

LEFT OF A FIELD OR SKIRT: the left hand side of the field in the direction of the flow of water. Looking facing the roof from the eaves, it is the left-hand section of the field.

EAVES: the overhanging edge of the slope of a roof, thanks to which the water collected by the roof does not fall on the vertical wall.

VALLEY: the line of intersection of two fields of a roof, into which water runs.

HIP: the sloping line created by the intersection of two fields, from which the water is distributed onto these fields.

RIDGE: the horizontal line created by the intersection of two fields (pitched or gable roof), or a field with a vertical slope (mono-pitched roof).

LATERAL SIDE EDGE: the top of the a field that is not protected by any higher-level element.

GABLE: supporting wall delineated by the roof above.

STRUCTURAL FOUNDATION: responsible for giving stability to the whole and defining the layout of the pitches. The material components of the structural foundation must meet appropriate standards.

SUPPORT: the component on which the roof rests and by which it is maintained. It can be continuous or interrupted. When it is continuous it is referred to as deck and be made up of hollow ceramic bricks with a mortar or cement finish, fibre cement panels, various types of sheeting, etc. Discontinuous supports are made up of battens, sheeting, etc.

BRACE: element parallel to the maximum slope of the field, which acts as a support for the straps.

STRAP: element perpendicular to the maximum slope of the field, which acts as a support for the slats. In certain cases it can act as the ridge.

JOIST OR RAFTER: element parallel to the maximum slope of the field, which acts as a support for the battens.

BATTEN: element that acts as a support for the tiles.

FIXING OR FASTENING: the process by which the roof covering is attached to the support. Depending on the slope, fastenings may be tacks, staples, mortar, glue, silicon, etc.

ROOF COVERING: the roof covering is the element that is in direct contact with meteorological elements, and which protects the rest of the components from these. It can be made up of continuous or discontinuous elements, and must be compatible with the frame supporting it and with the slope of the frame. The Clay Roof Tile is the subject covered in this manual.

ACCESSORIES: these are elements used for a perfect installation of the roof, the use of which will depend on the specific characteristics of each case. Accessories include: waterproof membranes, zinc sheeting, thermal insulation, guttering, etc.



La Escandella

ROOFING THE WORLD

C/ Bélgica 1
Pol. Ind. La Escandella
03698 AGOST (Alicante) SPAIN
Tel. +34 965 691 788 · Fax +34 965 691 692



TRADITIONAL



H-SELECTION

Colour Shall be Harmonized but clay tiles are a natural product and some shade variations between individual pieces enhance their beauty and should be expected. All Tiles should be blended regardless of the number of colours supplied. Colours of the tiles shown in this catalogue can not faithfully reflect the colours of the ceramic tiles.

On their products, La Escandella has right to make changes in dimensions, fittings, weight & units per pallet, without previous notice. For more information, please contact your Sales Representative or our Customer Service.

This catalogue, printed in April 2021, replaces the existing ones.

