

# Milano

*Timeless style, longer life*

## *Installation Guide*

ROOF FRAMING INFORMATION

BATTEN INSTALLATION

TILE INSTALLATION

ACCESSORY INSTALLATION

ESTIMATING DATA

GENERAL INFORMATION

## ROOF FRAMING INFORMATION

It is the responsibility of roofers, building contractors and architects to ensure that local standards, by-laws and regulations are satisfied. It is essential that all installation is carried out in the manner prescribed in this Milano Tile Installation Guide.

Milano Tile Roofing with a suitable underlay, can be installed on any pitch from 12 degrees to vertical mansards. Cost savings may be obtained if rafter lengths are designed to accommodate an exact number of tile courses. Where this is not possible, cutting of the top tile course will be necessary. Rafters or roof trusses can be set at various centres depending on the type of construction and local regulations. In most situations the following batten sizes are recommended.

Recommended Rafter or Truss Centres	Batten Size
Up to 900 mm	50 x 40 mm
1200 mm	50 x 50 mm
1500 mm	50 x 65 mm on edge
1800 mm	50 x 75 mm on edge

### 1.1 RIDGE

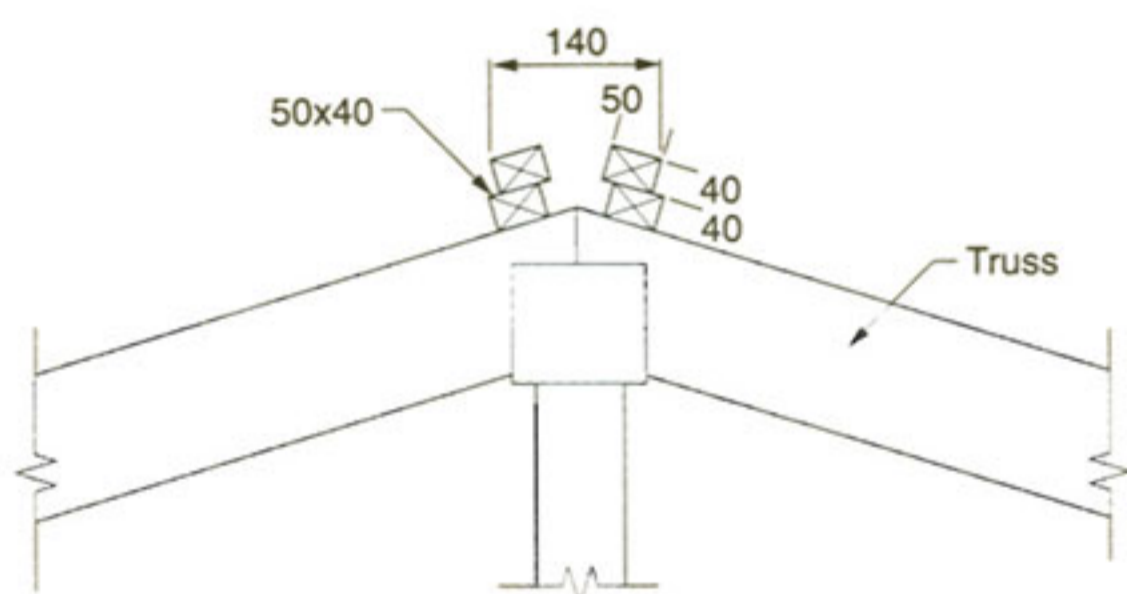


Fig 1.1.1

Rafters or trusses should be lined up before the roofer starts work (this is the builder's responsibility). Fig 1.1.1 shows a truss with battens installed on a truss frame with the batten edges set at 140 mm apart. This setup dimension must be accurate as a profiled Milano Ridge Flashing will be installed against the edge of the top batten, which will have a Barrel 150 installed over the pair of flashings.

### 1.2 BARGES

Install the barge board 40 mm above the rafter where the trim is used. Tolerances should be a minimum of 25 mm to a maximum of 60 mm above the rafter. (Fig 1.2.1).

Note that the edge of the tile is bent up under the trim to ensure complete weather security.

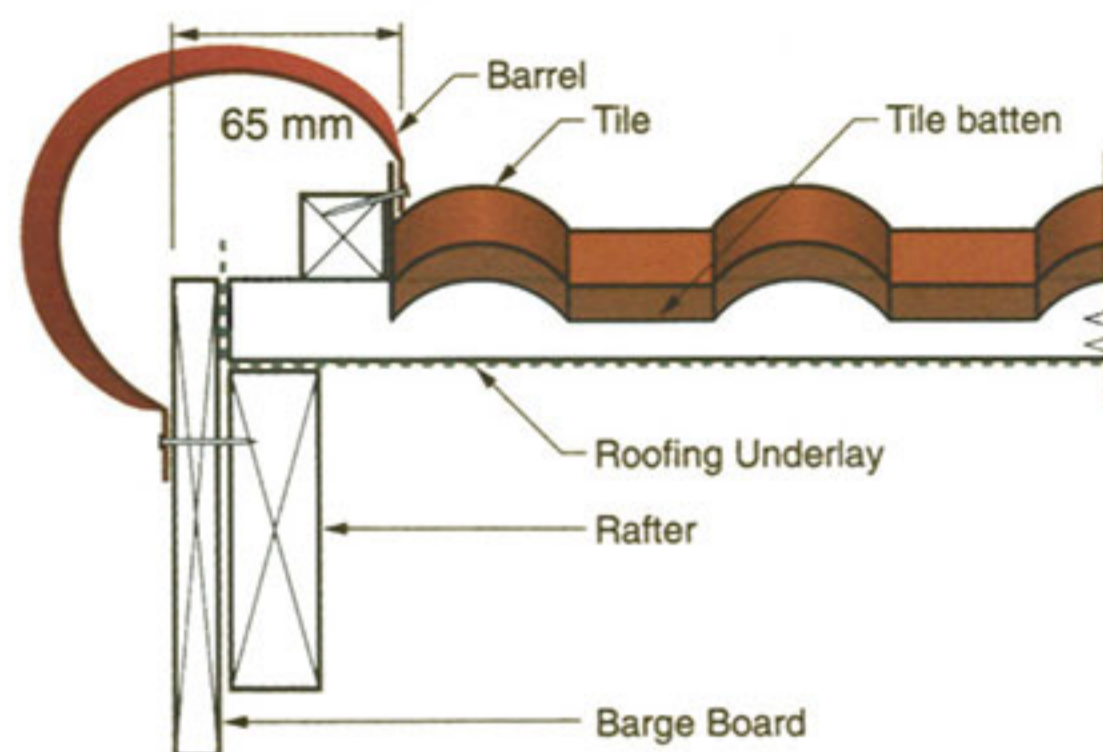
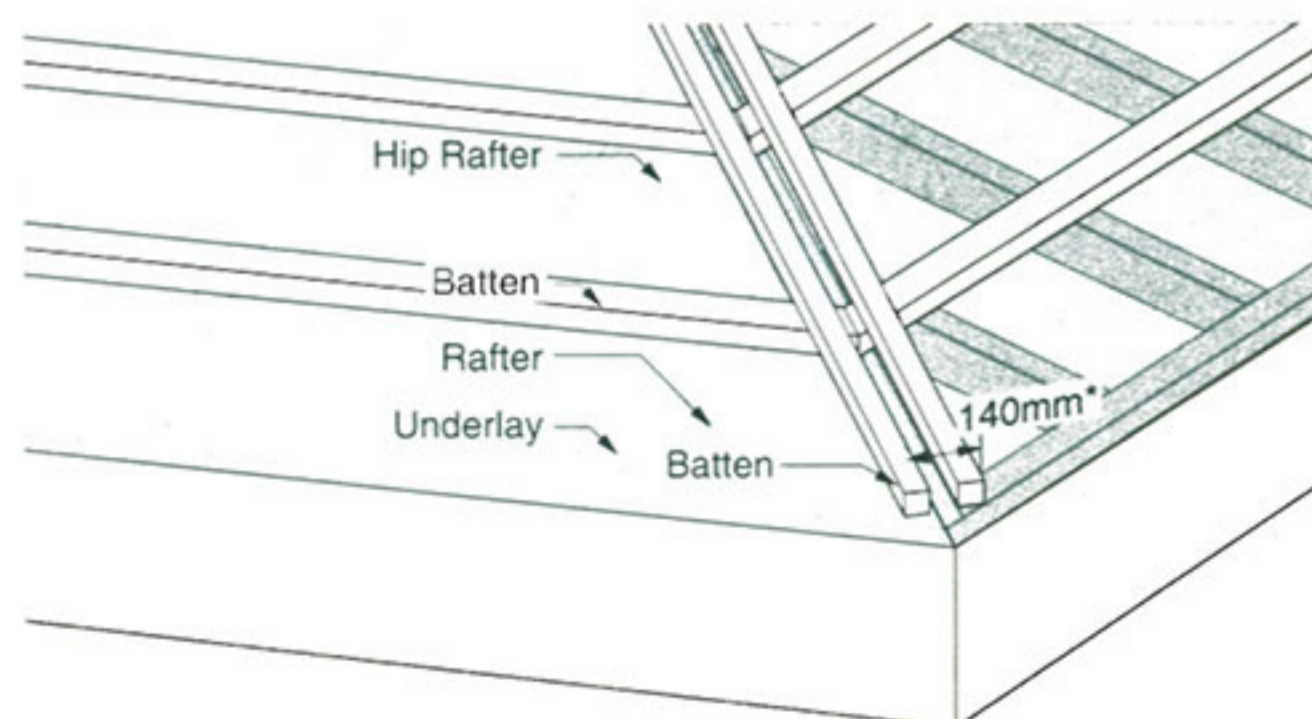


Fig 1.2.1

### 1.3 HIP

Rafters or trusses should be lined up before the roofer starts work (this is the builder's responsibility). Fig 1.3.1 shows a hip with battens installed for Barrel 150. If a hip board is present battens may be installed alongside the hip board ensuring that the batten edges are 140 mm apart, this allows for the barrel to be installed over the tile that will be bent up against the batten.



\* May vary depending on pitch of roof

Fig 1.3.1

## 1.4 FASCIA

At eaves, install fascia at batten height above the rafters (Fig 1.4.1).

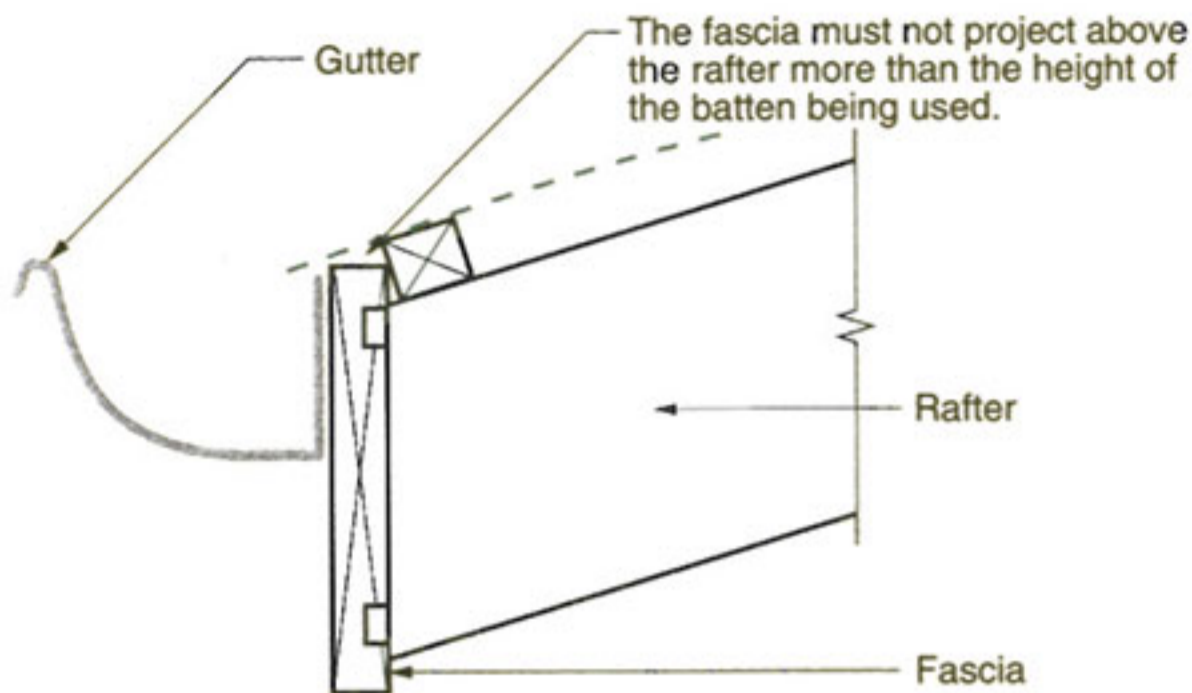


Fig 1.4.1

Where a rainwater collection system is not used and the tile overhangs the fascia, secure a 50 x 25 mm dressed batten to the front edge before the tiles are laid. (Fig 1.4.2).

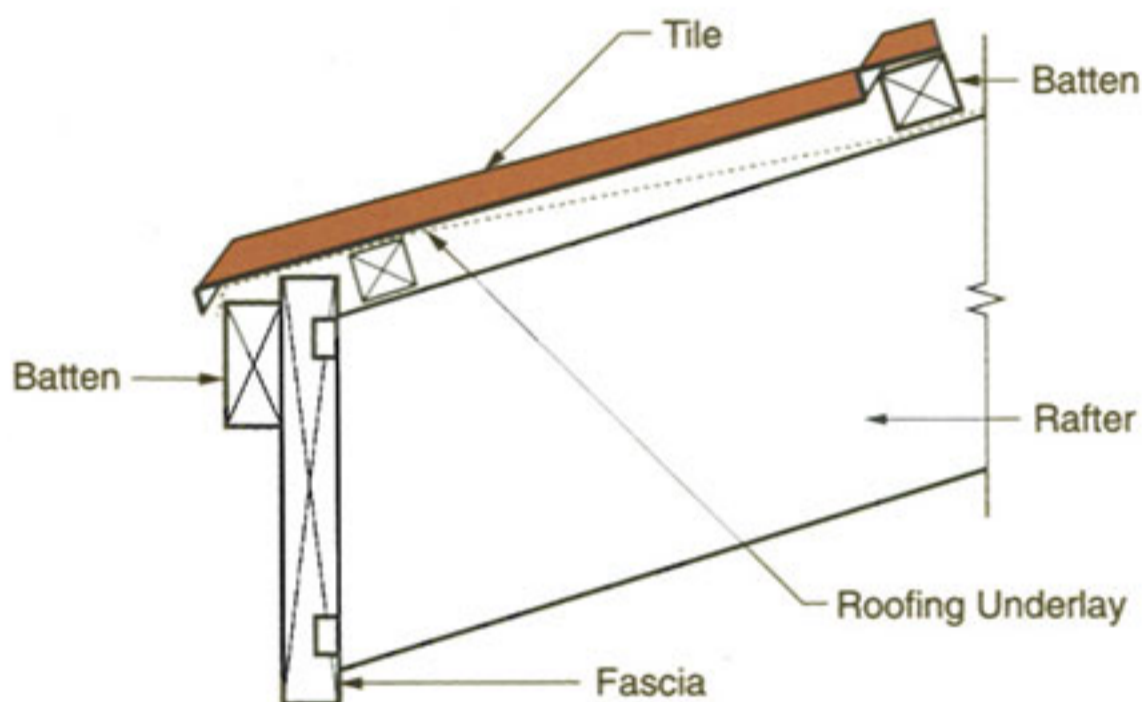


Fig 1.4.2

## PREFABRICATED TRUSSES

150 x 25 mm valley boards are cut and installed between the trusses/rafters so that they can be nailed flush with the top of the rafters.

The valley boards must extend a minimum of 25 mm past the edge of the valley so that they can be used to support and fasten the tile battens to.

Never nail inside the valley. (Figs 1.5.1 and 1.5.2).

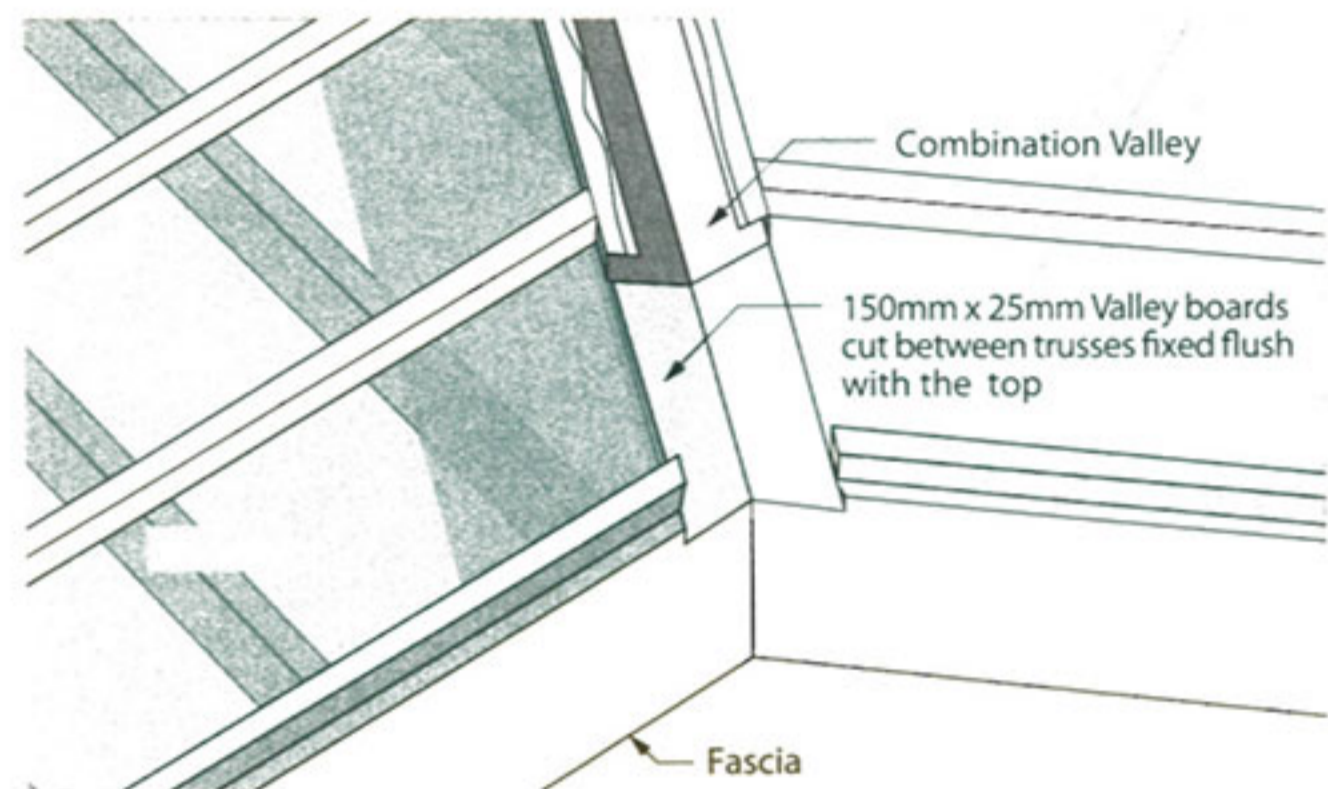


Fig 1.5.1

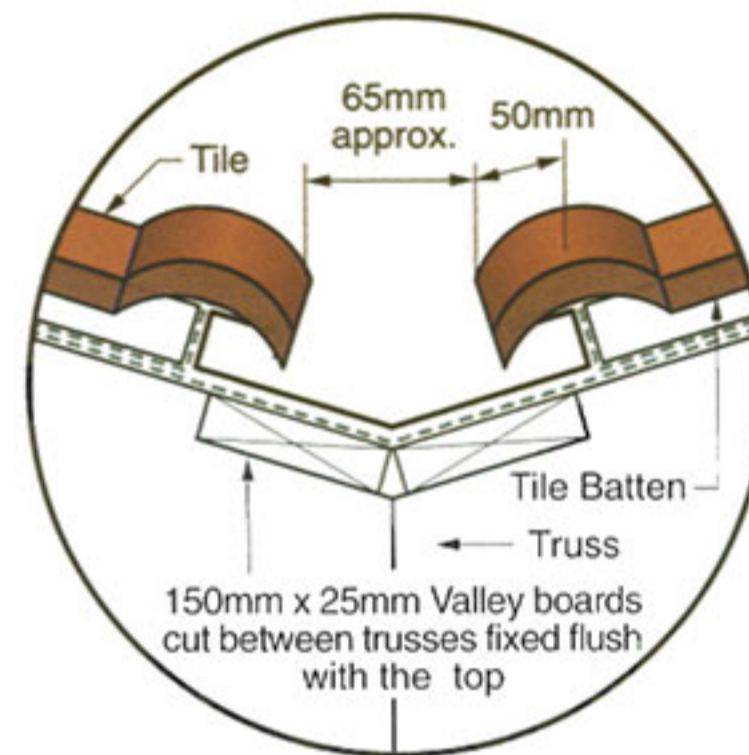


Fig 1.5.2

## 1.5 VALLEYS

The following section provides details by which the valley lining may be installed. Local building regulations and site conditions may dictate the final valley size and valley support method used.

## BATTEN INSTALLATION

### 2.1 BATTEN SETTING OUT

The most critical factor in the laying out of the Milano Tile is accurate setting out of the battens (Fig 2.1.1). If this is not adhered to, the tiles will not fit correctly. The batten spacing for Milano Tile is 368 mm.

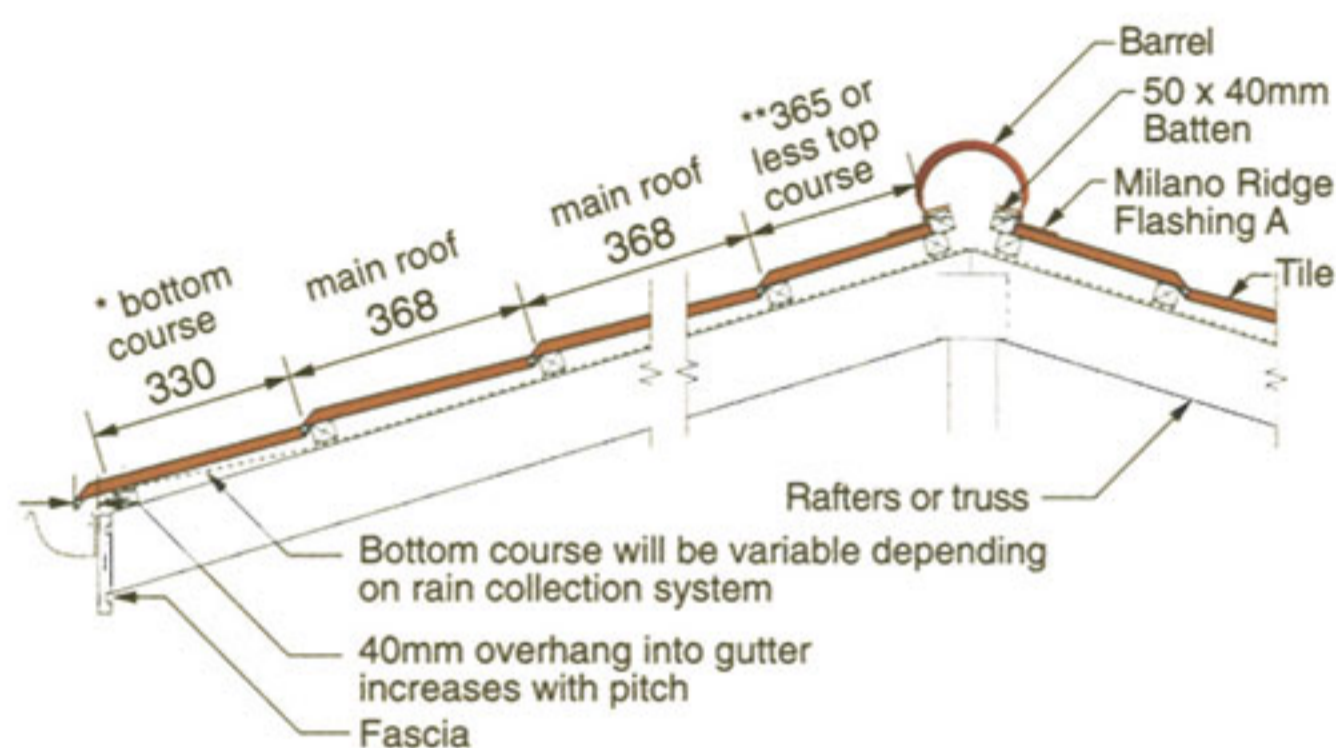


FIG 2.1.1

### 2.2 BATTEN INSTALLATION PROCEDURE

All measurements should be made from the front (lower face) of the battens. This is the surface where Milano Tiles will be fixed to the batten.

#### TIMBER BATTENS – WITH RAINWATER SYSTEM

Install the first batten just behind the fascia board (refer Fig 1.4.1). To install the second batten measure up 330 mm from the outside edge of the fascia board. Tack a nail in place and repeat at the other end of the section of roof, and then run a string line between the points. On each remaining rafter tack a nail at the string line. (Fig 2.2.1).

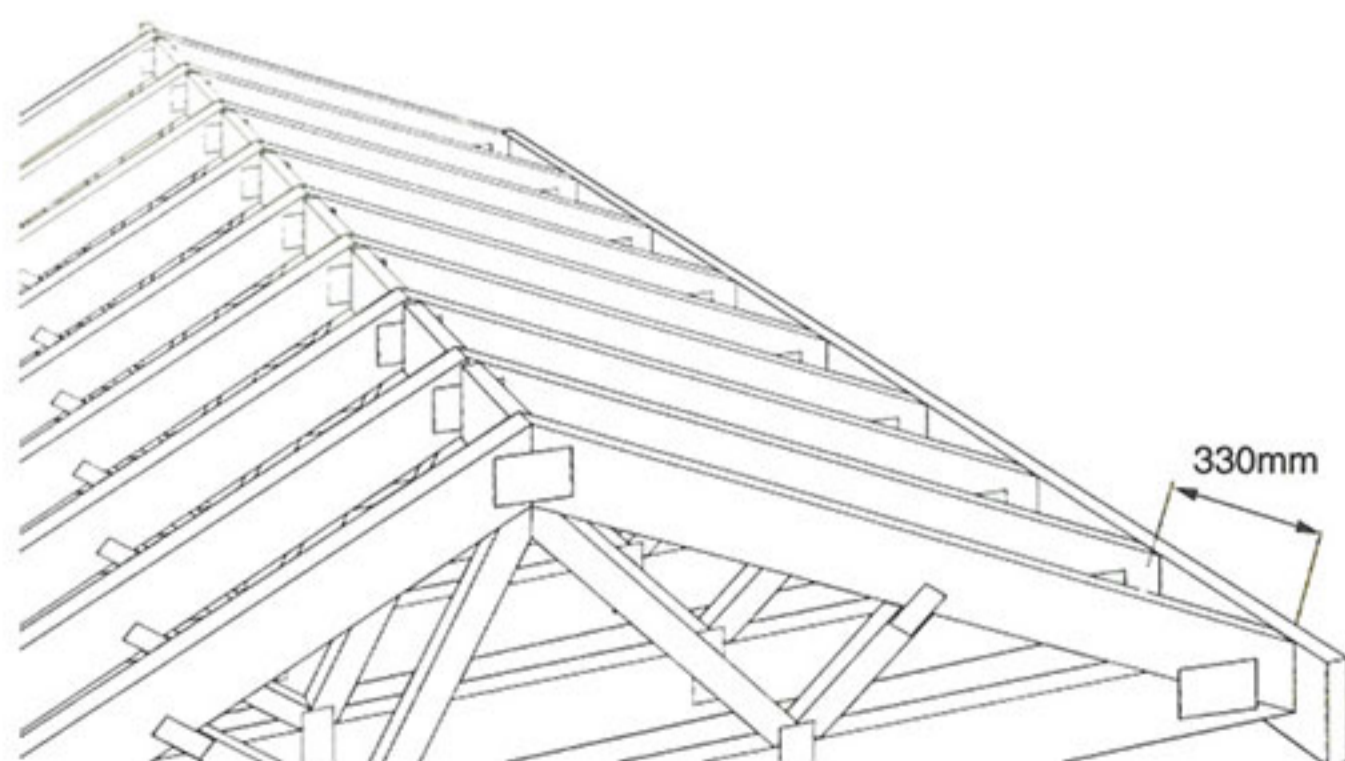


Fig 2.2.1

Using the measuring rod (pre-notched at 368 mm for Milano Tiles) hook it over the nail so that it lines up the rafter. Tack a batten nail in each slot as markers for the battens. (Fig 2.2.2).

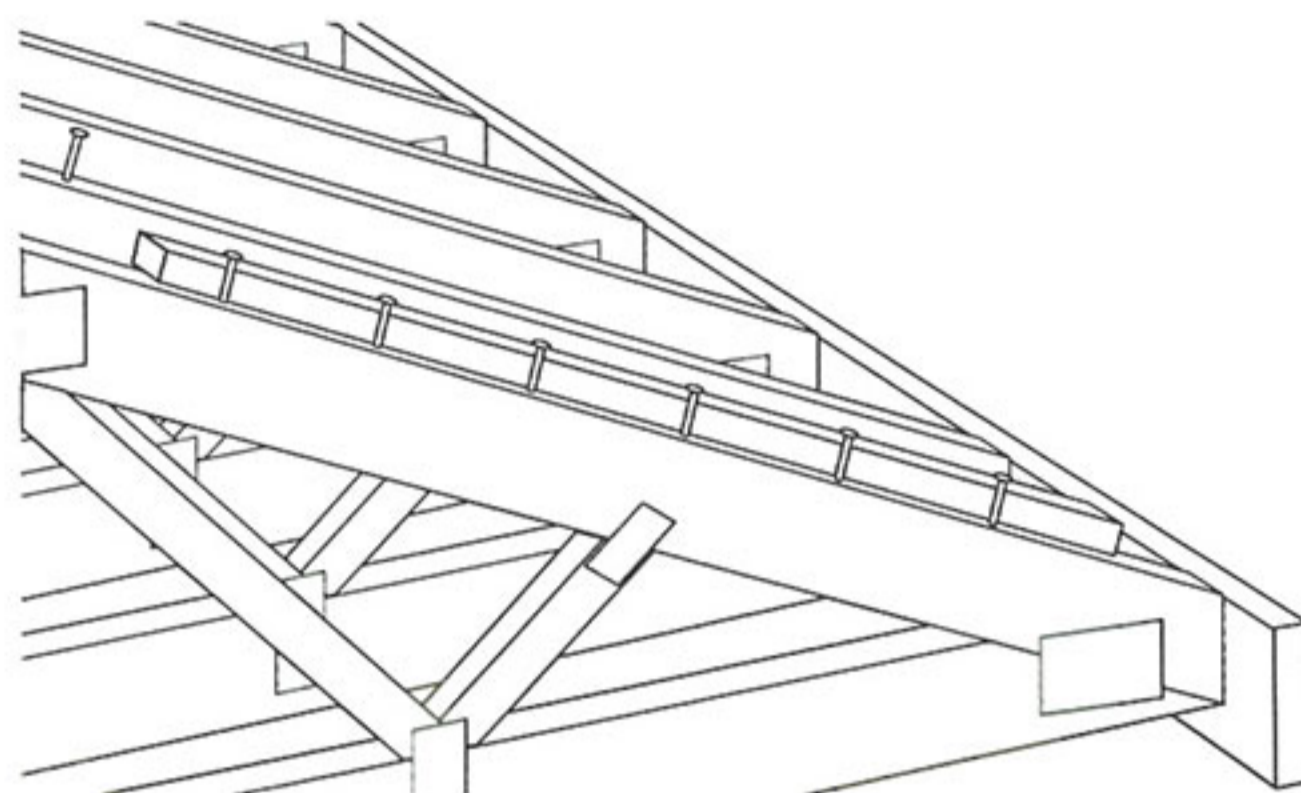


Fig 2.2.2

### OBSTACLES IN A ROOF PLANE

When you encounter an obstacle in the roof, e.g. a dormer window, run another string line over it using existing pin out nails, then work down the other side with the measuring rod. If needed take a measurement from a top pin out nail to the apex of the truss and transfer it to the opposite end of a ridge, run a string line between these top nails and work down the roof with the pin out rod to complete the pin out process.

#### TIMBER BATTENS – NO RAINWATER SYSTEM

Nail a dressed 50 x 25 mm batten to the front of the fascia board (refer Fig 1.4.2). The tile will be fixed to this batten. The next batten up the rafter will then be laid 368mm from the front of this batten. Subsequent battens will be installed every 368 mm up the rafter measuring from the front of each batten.

#### FITTING UNDERLAY BEFORE THE BATTENS ARE NAILED

Pin out marker nails will help hold the underlay in place. Unfixed battens laid every 3 courses can be used to help roll out the underlay. Then place battens over the underlay and nail in place to secure it firmly. Lay the underlay from the eave to the ridge horizontally the full length of the roof. A minimum horizontal overlap of 75 mm is required.

Load all the battens on to the roof and lay them in rows across the rafter, against the marking nails. Ensure joints are staggered (Fig 2.2.3) and cut the battens to length so that they butt together on top of a rafter. Bevel cut battens where they meet on a hip rafter. Hold the batten firmly against the pin out nail and nail through each batten into the rafter. Once installed, pull out the pin out nail and use it to fix the next batten.

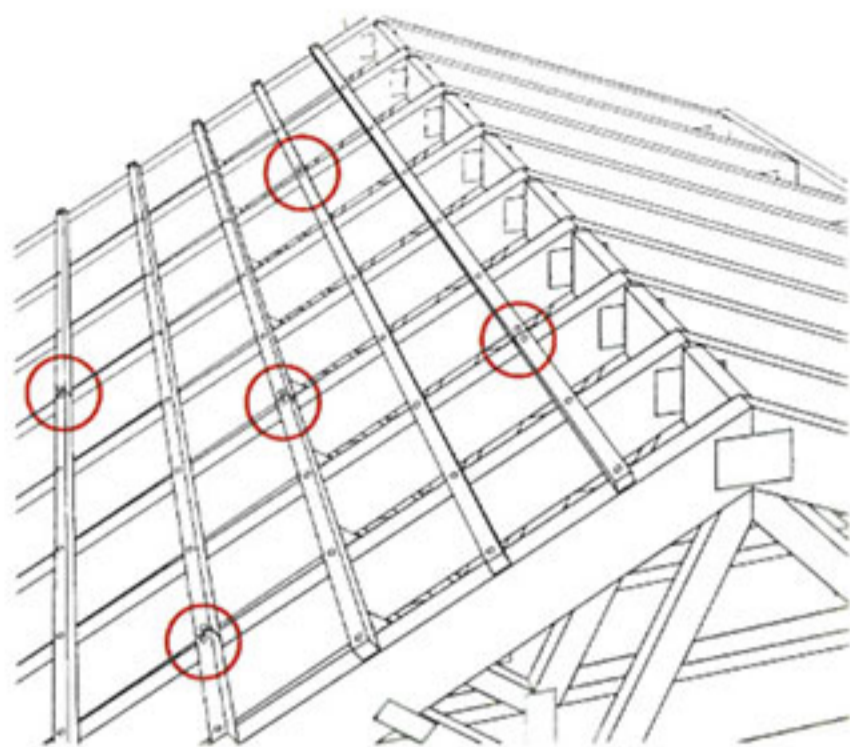


Fig 2.2.3

## TILE INSTALLATION

### 3.1 MILANO TILE LAYING

Tiles can be interlocked either right over left, or left over right, but should be laid with the laps facing away from prevailing winds or from discharging rainwater pipes or valleys that may spill out onto the roof. Where possible, the tiles should also be laid with the laps facing away from the normal line of sight.

Tiles are laid by lifting both tiles in the course above and sliding the next course under the nose of the tiles already in place (Fig 3.1.1, Fig 3.1.2).

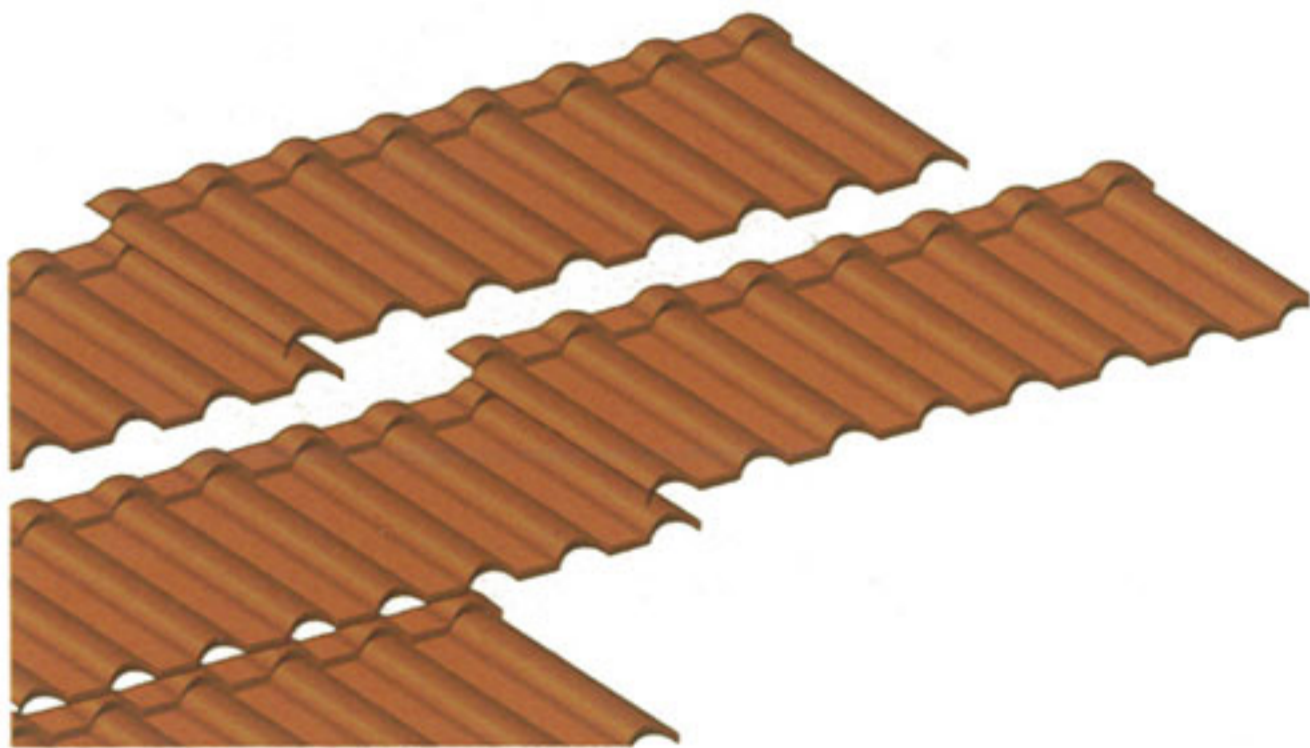


Fig 3.1.1



Fig 3.1.2

### 3.2 NAILING / FASTENING

The correct position for nailing tile battens is shown below (Fig 3.2.1). Tiles are secured by nailing through the front down turned flanges into the side of the batten. Nails should be approximately 10 mm to the side of the section of tile that rises (Fig 3.2.2). This ensures good holding of the tile and ample penetration of the nail at the same time restricting nail penetration to a maximum of two thicknesses. Milano Tiles need to be nailed at the front and back of each tile where the tiles lap, place weight on the nose of the tile being nailed so that the lap is held firmly down. Nails should then be placed at every second module along the nose of the tile.

NOTE: In areas prone to cyclones and hurricanes, installation must meet local standards and bylaws and nailing should be at 7 points per tile.

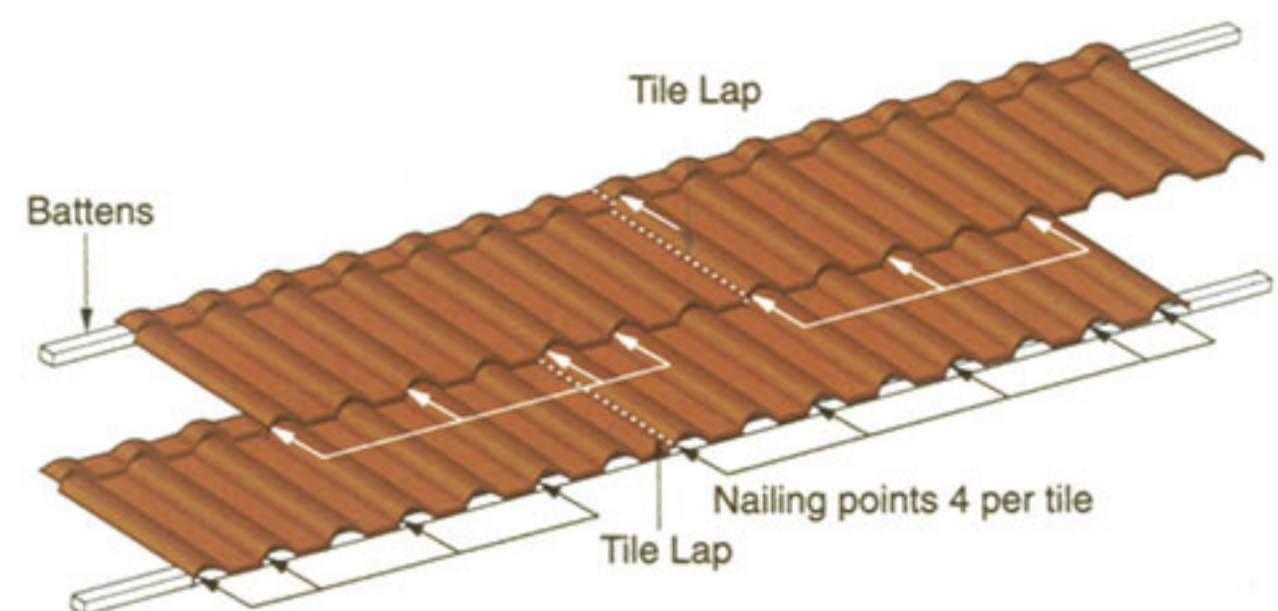


Fig 3.2.1

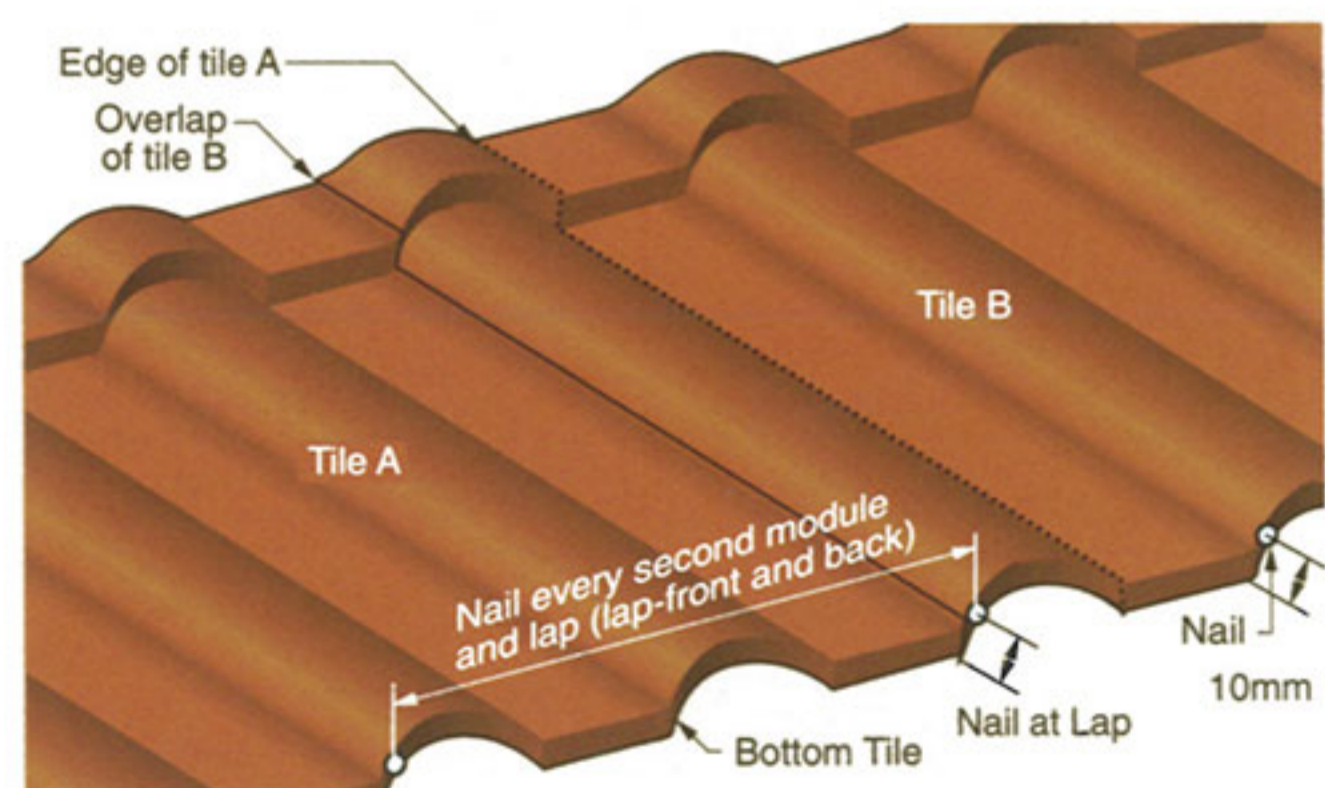


Fig 3.2.2

### 3.3 NAILING / FASTENING TECHNIQUE

The person nailing should stand on the tile being installed facing the fascia and nailing as shown. Gun nailers using AHI Roofing specified nails can also be used to securely fasten the tiles (Fig 3.3.1).

## EAVE TILES

These are nailed through the top, locating the nail approx 20 mm up the side of the curved section of the profile. This is outside where water will run during rain fall.

Installation tip: Using the short tile bender flatten the nose and back upstand of the tile before cutting where the tiles are to be cut. The flat sections are much easier to cut than those that still have the step.

## 3.4 GABLE ROOF PROCEDURE

Lay the second to top course of tiles from gable end to gable end, turning the edge of the end tiles up against the barge battens. Tack these tiles temporarily in position through the flat of the back edge sitting on the batten. Starting from the course already laid, lay the tiles two courses at a time from end to end making sure that the tile laps are staggered. The person laying the tiles should be two courses ahead of the person nailing.

## 3.5 HIP ROOF PROCEDURE

On the second to top course, lay the top corner of the first tile 150mm from the hip batten. Continue to lay tiles towards the outer hip until the last full tile will fit.

Secure these tiles by tacking through the back flange. Lay subsequent courses two at a time, both starting about the same distance from the hip batten. The modular format of the tile will dictate where the tiles will be laid.

CARE should be taken to line up the tile profile down the roof. To reduce waste, use part tiles to complete rows within approximately 150 mm of hip batten.

This allows each end of a full tile to be cut and bent to fill the gaps.



Fig 3.3.1

## 3.6 TILE INSTALLATION - RIDGES

Measure the distance (A) from the last tile to the ridge batten (Fig 3.6.1). Mark the tile to be cut (Fig 3.6.2).

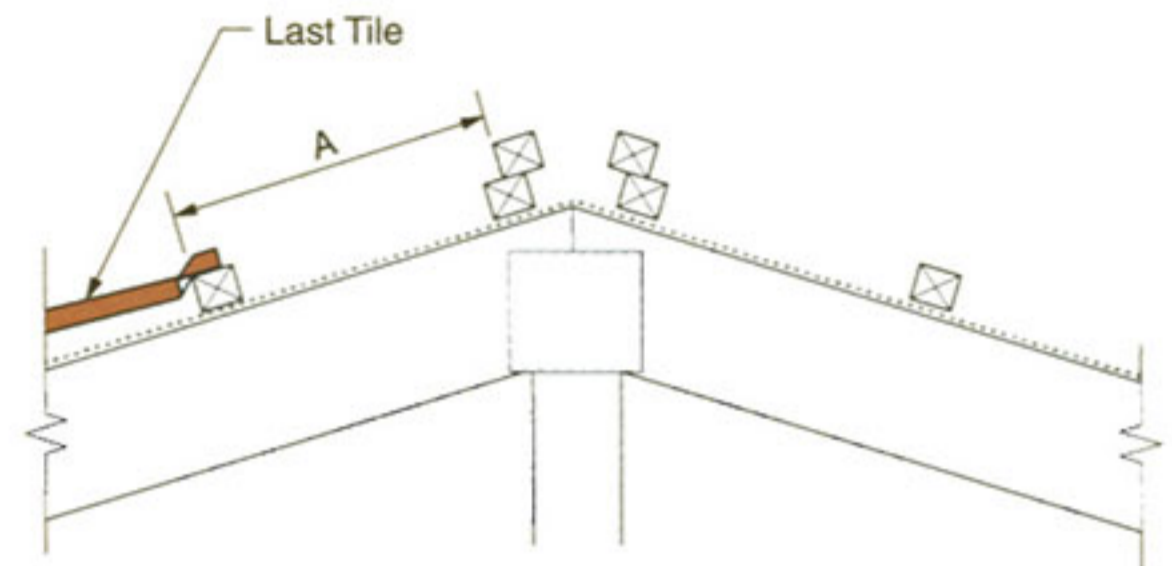


Fig 3.6.1



Fig 3.6.2

Cut along the marked cutting line using the guillotine or hand shears. The flat on the back of the tile then needs to be turned up approximately 25 mm (Fig 3.6.3). This brings the tile shape back to its shaped profile and provides a barrier to any wind driven rain.

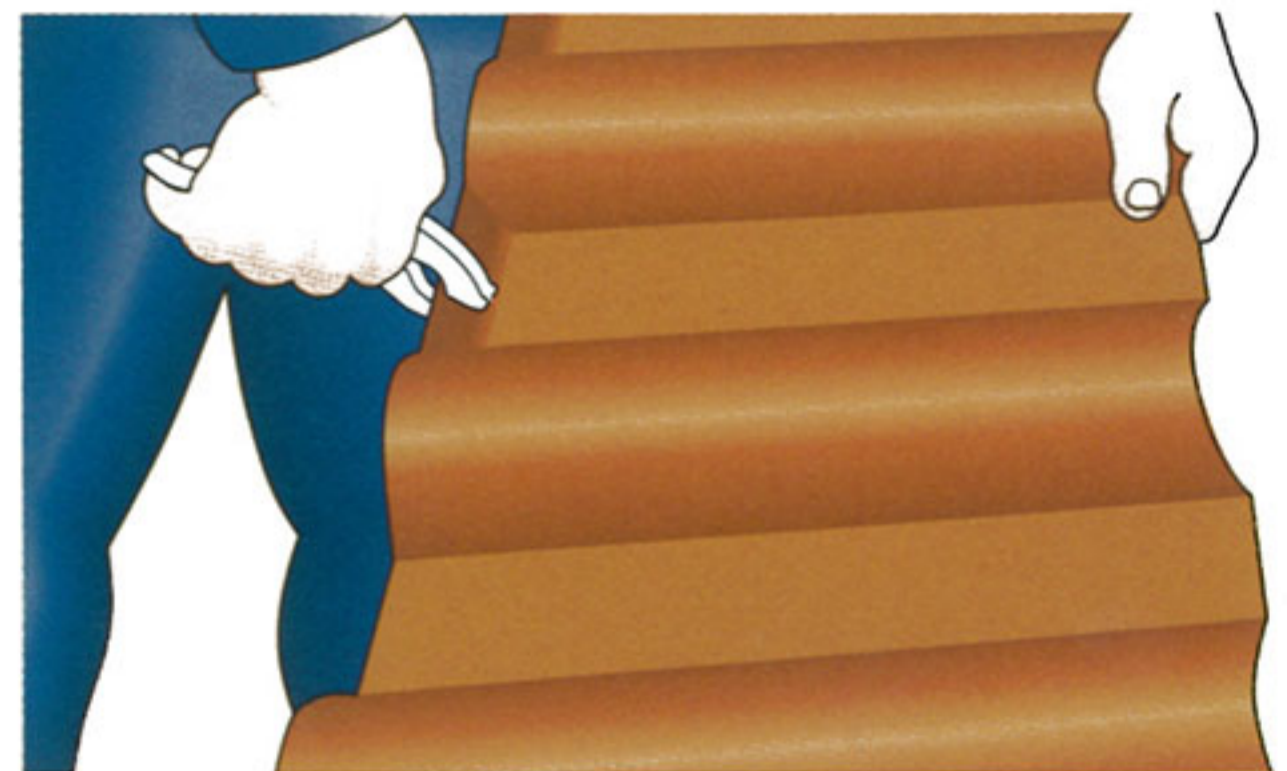


Fig 3.6.3

Sit the back of the cut tile on top of the lower batten. (Fig 3.6.4). Fasten the nose and back with nails.

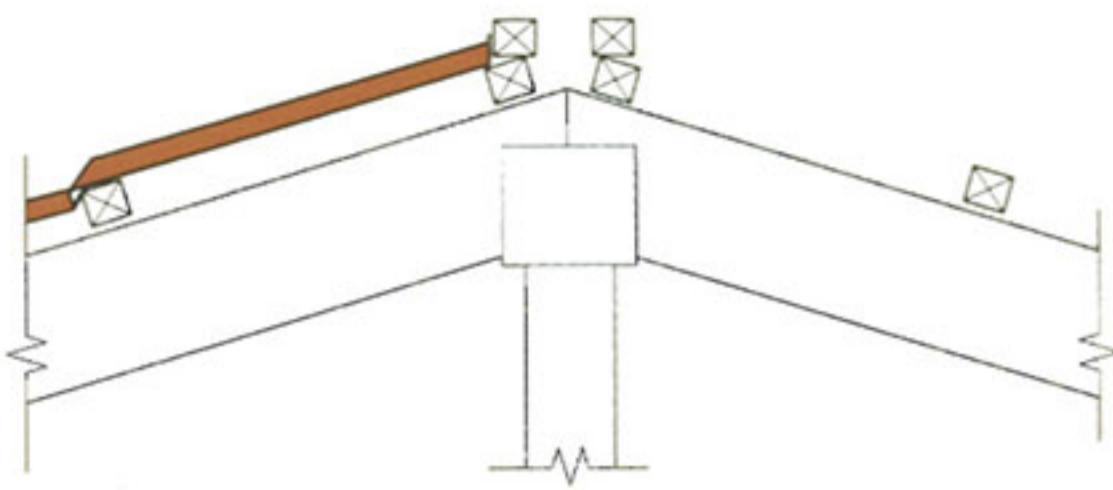


Fig 3.6.4

### 3.7 TILE INSTALLATION - HIPS

Measurements are made on the roof, but tiles are normally marked, cut, bent and stacked on the ground. Note the following steps:

The basic measurement is taken from the edge of the last curved section of the last tile, to the hip batten (Fig 3.7.1). The measurement must be taken along the line of the front edge of the batten.

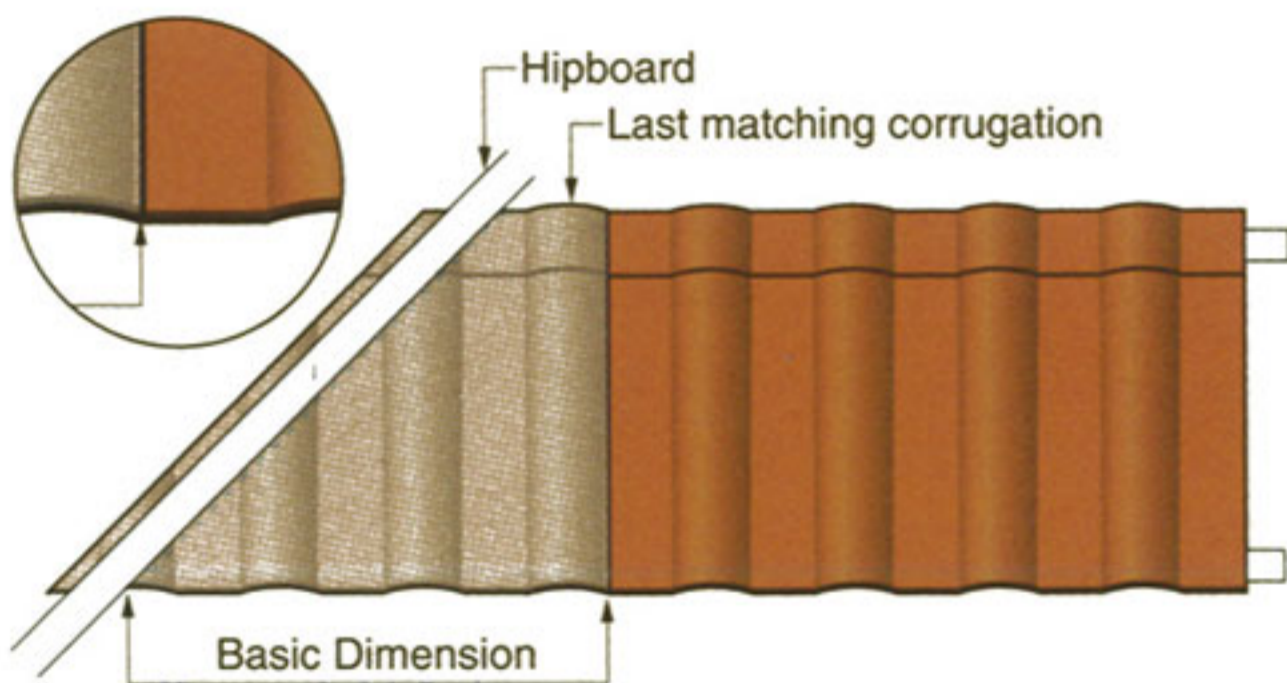


Fig 3.7.1

Measure and mark on the tiles with chalk or similar the required measurements taken from the roof, ensuring the MATCHING curved section of the overlapping tile to be cut is taken as the measure starting point (Fig 3.7.1). This forms the BENDING line (Fig 3.7.2). Add to the bending line measurement, the height of the ridge board projection above the tile line (40 mm). Mark on the tiles with chalk or similar. This forms the cutting line (Fig 3.7.2). Make measurements along the front and back of the tile being prepared using a bevel to transfer the angle.

Each tile should supply two cut pieces leaving minimum wastage (Fig 3.7.2).

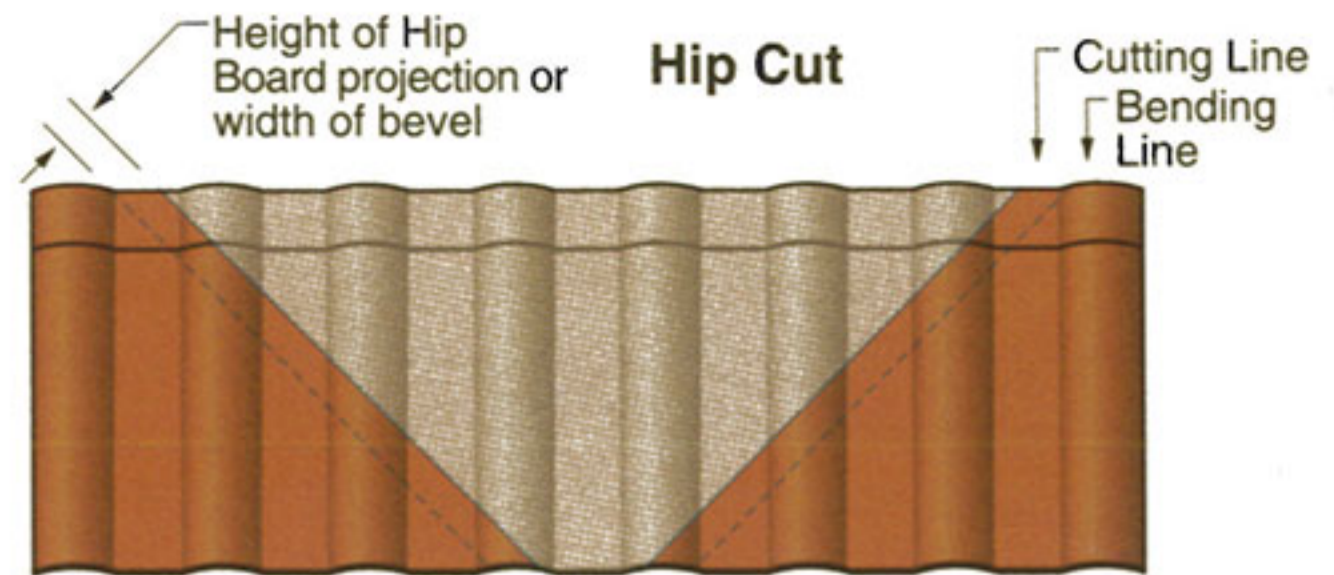


Fig 3.7.2

NOTE: As measurements are taken from the face edge of the batten, measurement markings on the tiles should be along the same line on the tile. On the Milano tile this is approximately 10 mm back from the front nose. Cut and bend the tiles according to the measurements determined above. Flattening the nose and headlap before cutting the tile will make the cutting easier. Cut and bend one tile and position it on the roof to ensure that you have the correct angle and dimensions.

Install all cut tiles by nailing through the turn-up into the hip batten, plus one or more nails through the front edge into the battens, starting from the bottom course.

### 3.8 TILE INSTALLATION - VALLEYS

Valley tile measurements are made in a similar way as hips and the bend line is transferred to the tile (Fig 3.8.1). The cut line differs in that the line is 30mm wide at the back of the tile and 40 mm at the front. The tiles are cut and then bent down using the short tile bender.

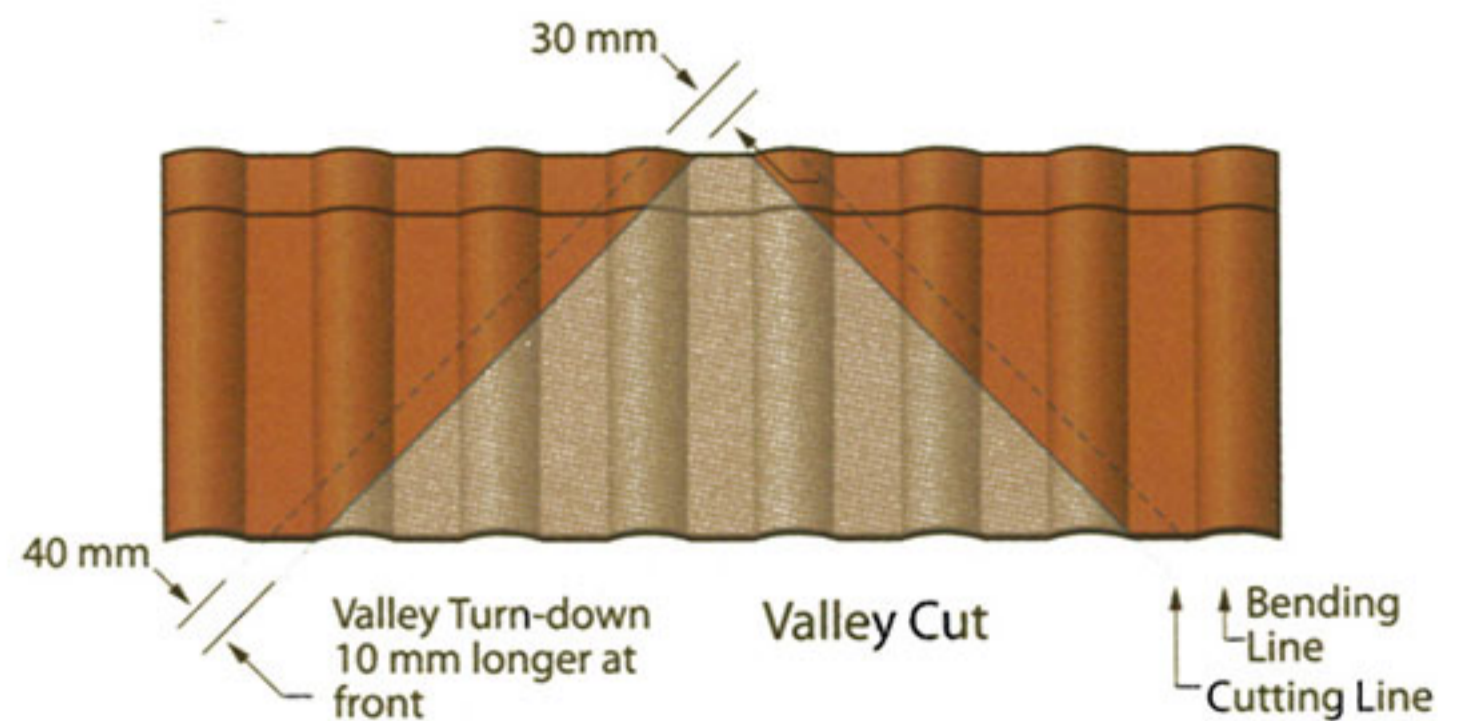


Fig 3.8.1

Note: As measurements are taken from the face edge of the batten, measurement lines on the tiles should also be on this line.

Cut and bend all tiles according to the method described above. Install cut and bent tiles from the eaves up by nailing through the turn-up in to the hip batten plus one or more nails into the front edge of the tile as per other tiles on the roof.

## ACCESSORY INSTALLATION BARREL 150 ACCESSORIES

### 4.1 BARGES, GABLES

These Barrel 150s will require reshaping before fitting to ensure a neat weather-tight finish. A 30 mm section along the edge should be flattened to fit snugly along the barge batten (Fig 4.1.1). Start with the lowest Barrel 150 flush with the end of battens and proceed up the barge keeping the Barrel 150 straight. Nail through each barrel into the barge board on the outside and into the barge batten on the inside (Fig 4.1.2).

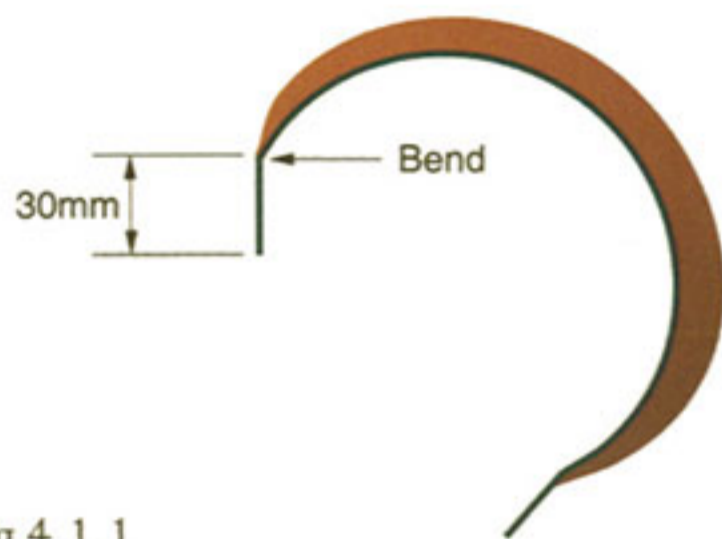


Fig 4.1.1

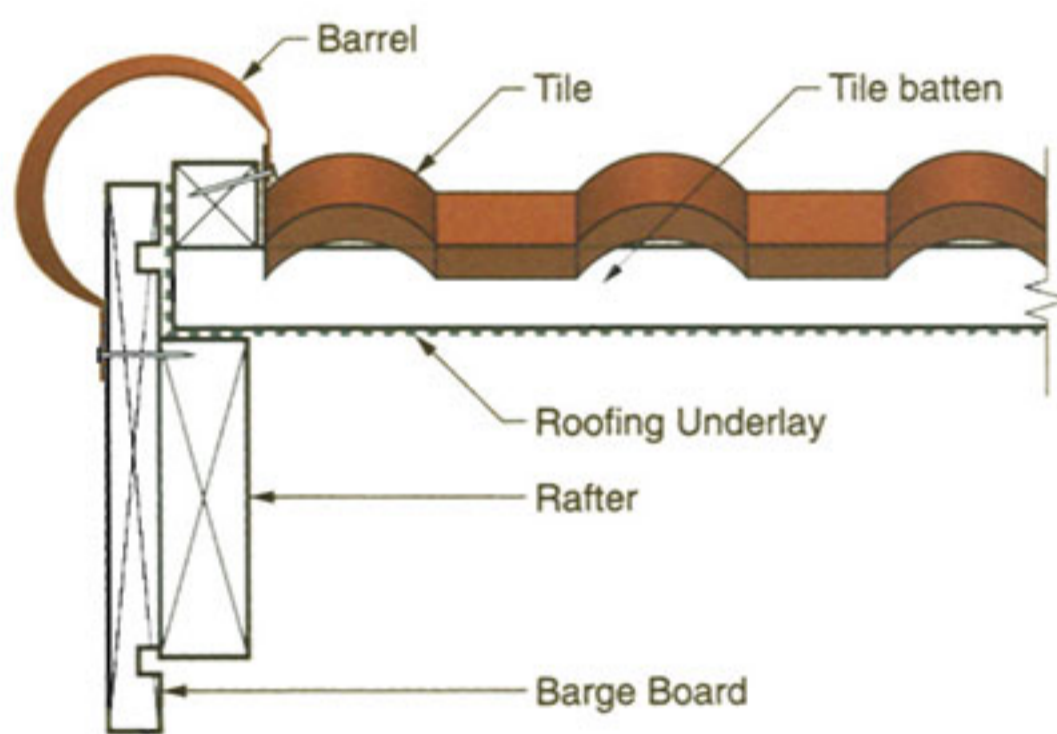


Fig 4.1.2

Finish junctions of barge and ridge, scribing accessories to fit – seal the joint and rivet together. (Figs 4.1.3).

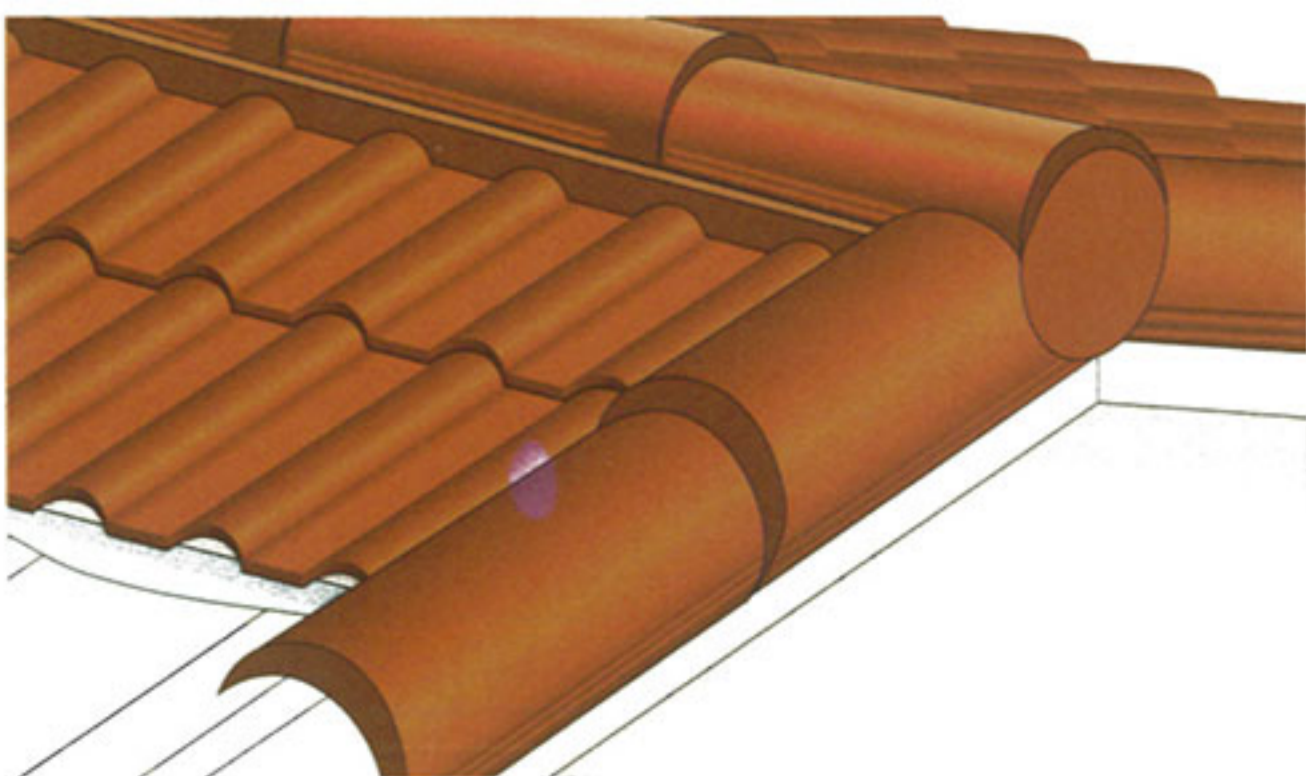


Fig 4.1.3

### 4.2 HIP INSTALLATION

Barrels are usually bent slightly to take the curve out of the last 30 mm on each side. The flattening is carried out with the small tile bender before they are installed. This flat area then sits neatly against the bent tiles.

The lower end of the Barrel 150 should be closed off by fitting a Barrel End 150 which is bent or cut to suit, at the end of the batten or rain water collection system.

Starting from the bottom, place the first Barrel 150 (with end cap) accessory over the turned up tiles with the end flush with the end of the hip. Set the subsequent barrels progressively up the hip ensuring that they are straight. Nail through each barrel near the laps (holes provided) and into battens on the hip.

Finish junctions of hip and ridge scribing accessories to fit – seal the joint and rivet together.

### 4.3 RIDGES

Install the Milano Ridge Flashing A along both sides of the length of the ridge. The battens should have been positioned so that once the Milano Ridge Flashing is placed the barrels sit neatly over the upstand on the Flashing (Fig 4.3.1). Tack the Milano Ridge Flashing through the front face of the top batten, the barrel nails will hold it in place. The Milano Ridge Flashing should sit neatly into the profile of the Milano tile below – leaving a minimal gap where they contact.

Commence by scribing the first Barrel over the hip or barge Barrel and continue laying the Barrels along the ridge, ensuring that these are seated straight and firmly down on the step in the Milano Ridge Flashing. Nail through the sides of the barrel (a hole has been punched in the barrel.)

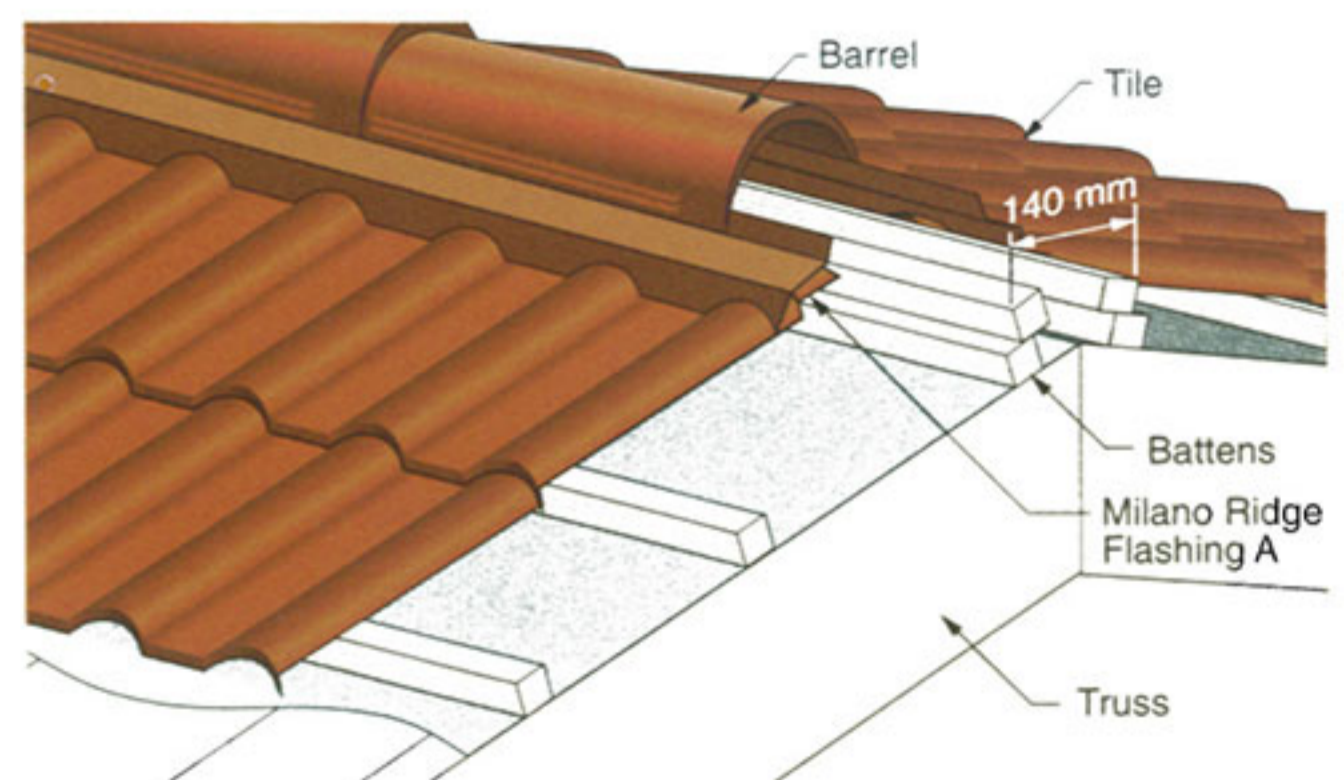


Fig 4.3.1



## 4.4 FLASHINGS

Great care is needed where the roof surface joins a vertical wall such as the case in two storey or split level homes, or where dormer windows protrude from a steep pitch roof. It is essential to bend the ends of all tile courses up under the flashing (Fig 4.4.1 & Fig 4.4.2 Side Flashing and Fig 4.4.3 Apron Flashing).

Measure the gap (allowing for overlap) from the last tile to the vertical surface. This gives the bending line. Add 40 mm for the cutting line. Cut and bend up the tile. Secure the upturned tiles in place with the upturn against the wall. Do not secure the tile to the wall. Nail the side flashing to the wall ensuring that the flashing is hard down and straight.



Fig 4.4.1

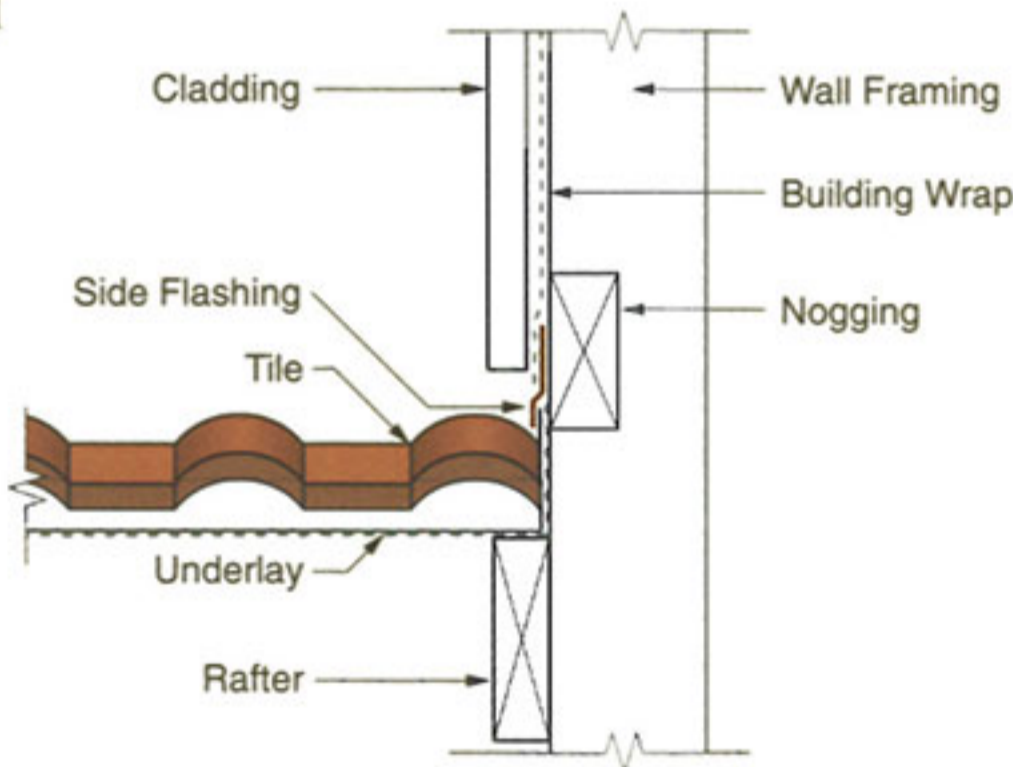


Fig 4.4.2

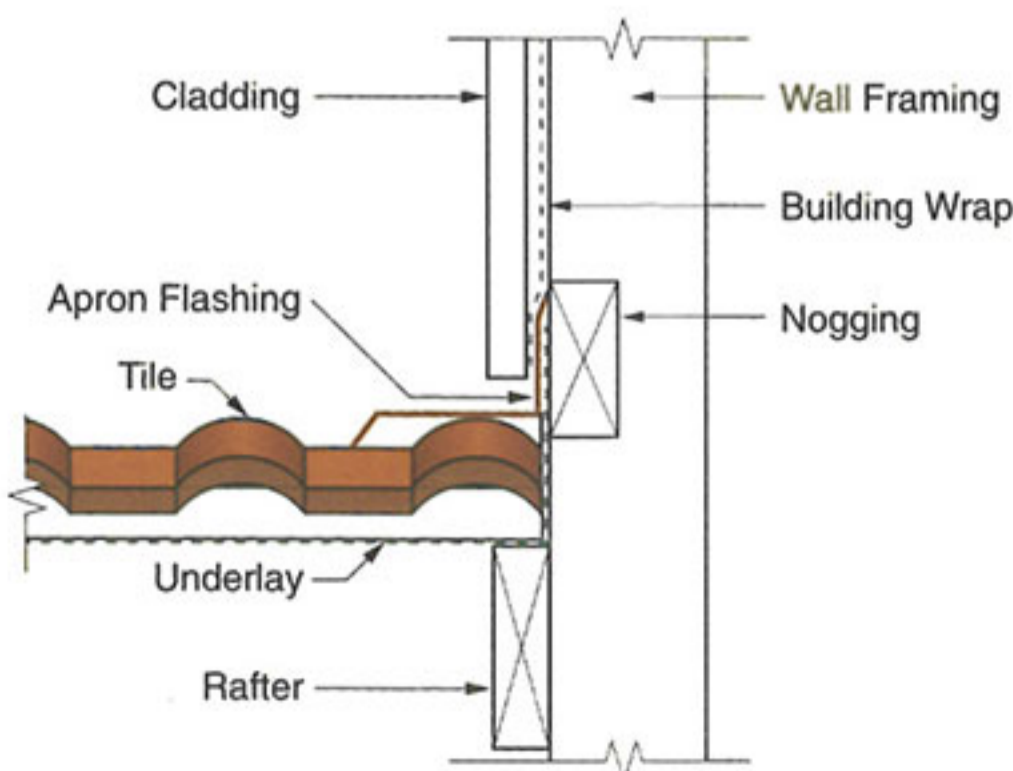


Fig 4.4.3

Alternatively, a secret gutter is sometimes specified. In this case, the end of the shingle battens stop short of the vertical studs by 45 mm in order to accommodate the gutter. The gutter is positioned before the roof is installed (Fig 4.4.4). Flashings for brick veneer (Fig 4.4.5) require a purpose made flashing.

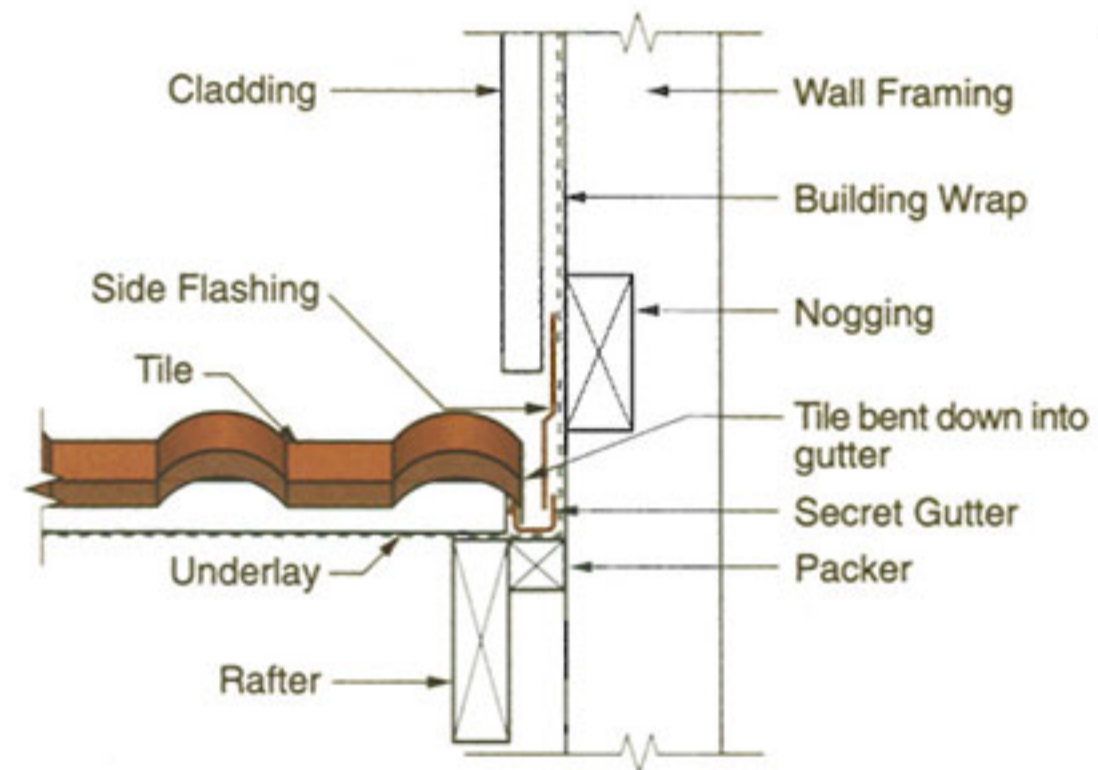


Fig 4.4.4

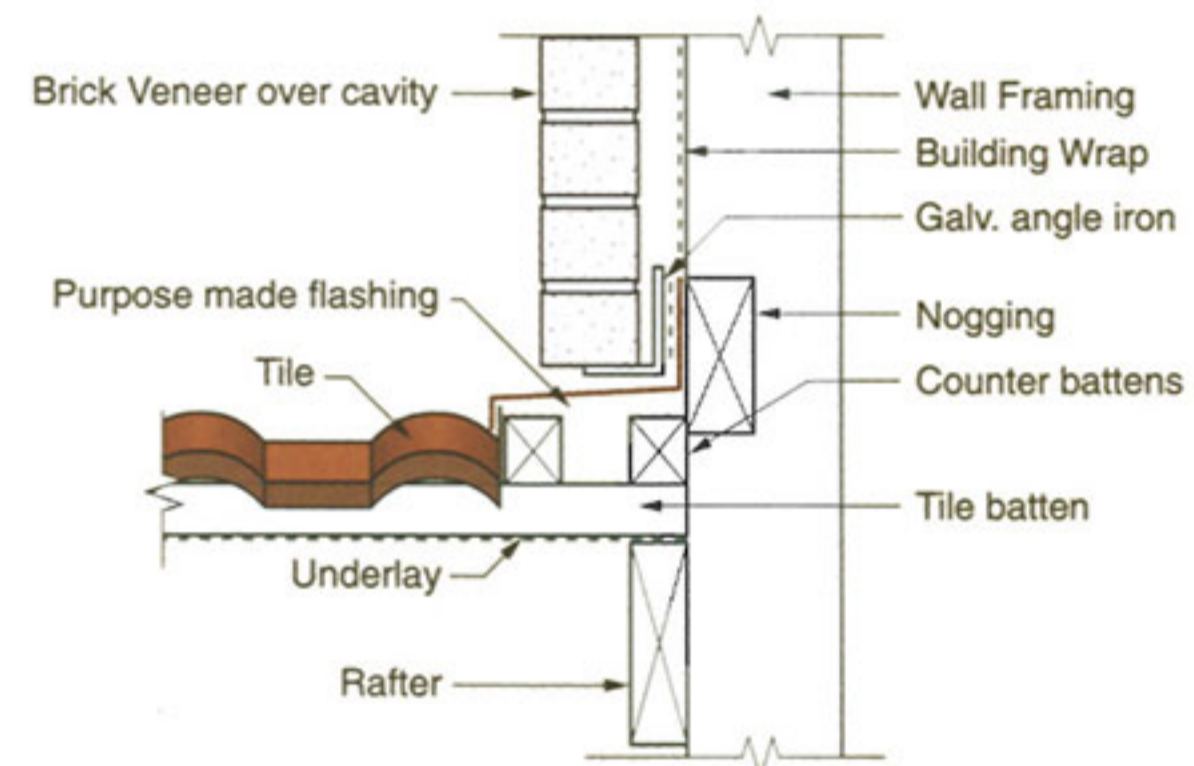


Fig 4.4.5

Where the roof wall junction runs horizontal the tile is cut and the lower sections of the tile are bent up as for a ridge tile (refer Fig 3.6.3). A profiled Milano Wall Flashing is placed over the Milano Tile and fastened to the nogging behind (Fig 4.4.6).

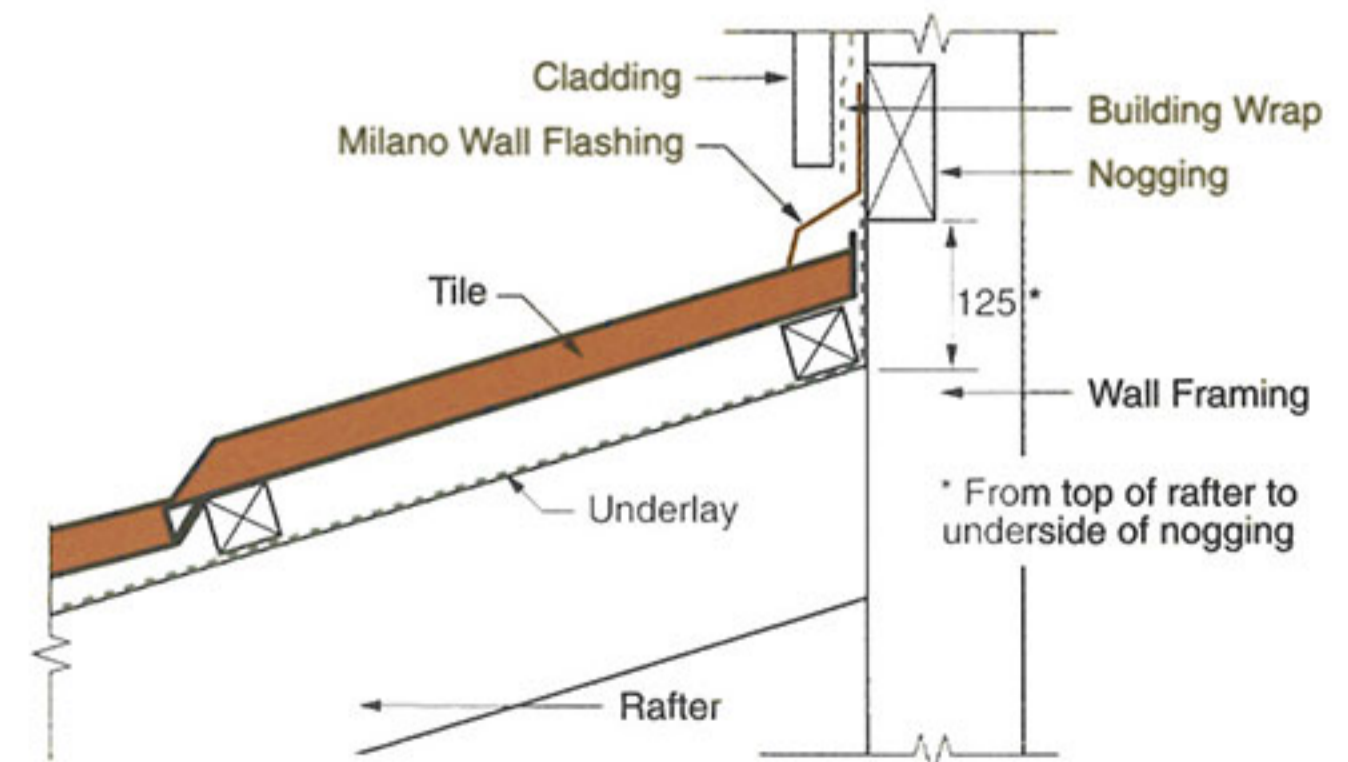


Fig 4.4.6

## 4.5 MANSARDS

Where standard accessories are not suitable custom flashings can be made on site using general purpose apron flashings. These can be neatly bent to conform to the shape of the mansard top.

## 4.6 NAIL HEADS

Touch up all nail heads using the touch up kit if required.

# ESTIMATING DATA

## 5.1 STRAIGHT GABLE ROOF

- Determine the rafter length (Fig 5.1.1) and calculate the number of courses of tiles from Table 5.1. Always ensure that fractional tiles are counted as whole tiles as these will have to be cut at the ridge board.
- Determine the overall length of the roof (Fig 5.1.2) and refer to Table 5.1 for the number of tiles required. Ensure that fractional tiles are counted as whole tiles.
- Multiply tiles (a) x tiles (b) = (c)
- Multiply result (c) x 2 when estimating for both sides of the roof.

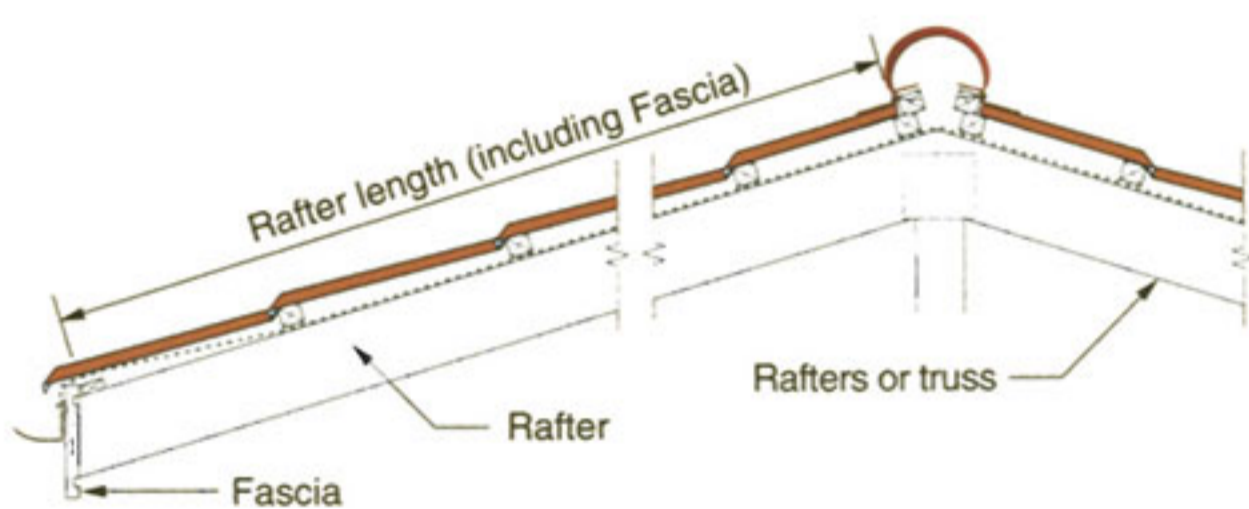


Fig 5.1.1

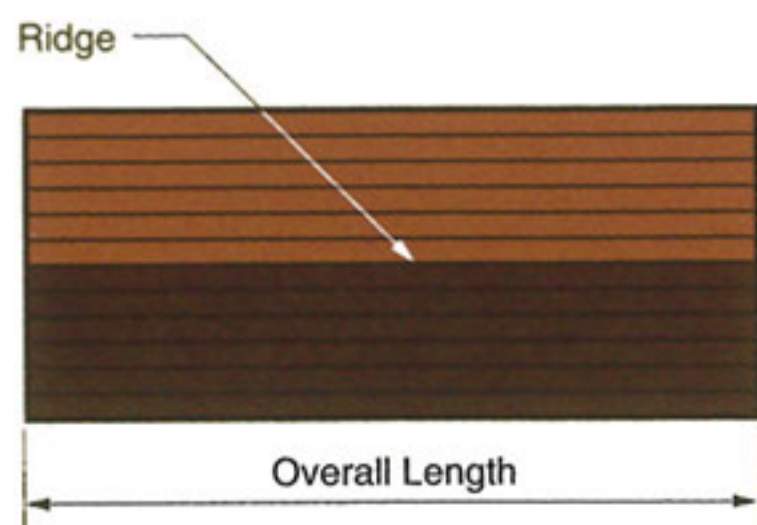


Fig 5.1.2

## 5.2 HIP AND VALLEY ROOFS

- HIP ROOFS:** Treat the roof initially as a straight gable. Find the overall length (Fig 5.2.1) and refer to Table 5.1 to calculate the number of tiles required for the coverage. Multiply the result by the number of courses of tiles needed to cover the rafter length. Multiply again by two when calculating both sides of the roof. Find the total hip length and using the formula shown in (iii), calculate the tiles required for the hips. Add this to the tiles required for the body of the roof.
- HIP AND VALLEY ROOFS:** First take the section with the longest rafters (section A Fig 5.2.2). From Table 5.1 calculate the requirements for that section and then for the remaining sections (sections B and C in Fig 5.2.2). Find the total length of hips and valleys and using the formula outlined in (iii), calculate the additional tiles required for hips and valleys to obtain the total tile requirement.
- Additional tiles for hips and valleys may be estimated using the following formula: Additional tile quantity = Total hip and valley length in linear metres x wastage factor (where the wastage factor = 1.32 shingles per linear metre).

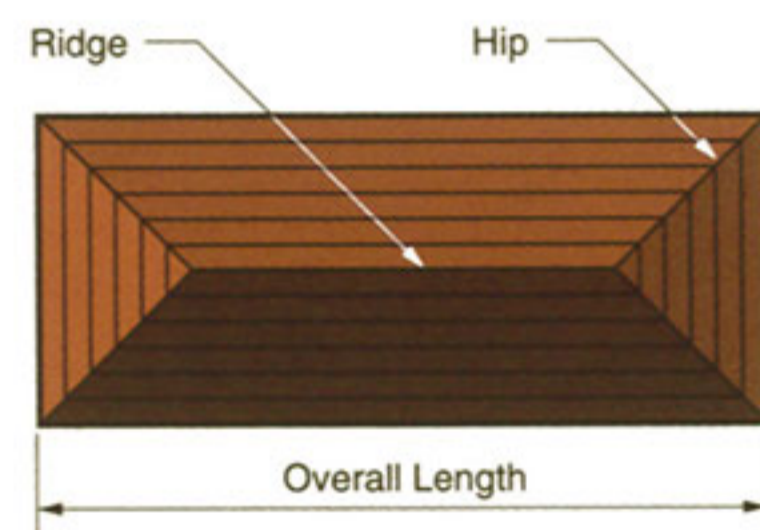


Fig 5.2.1

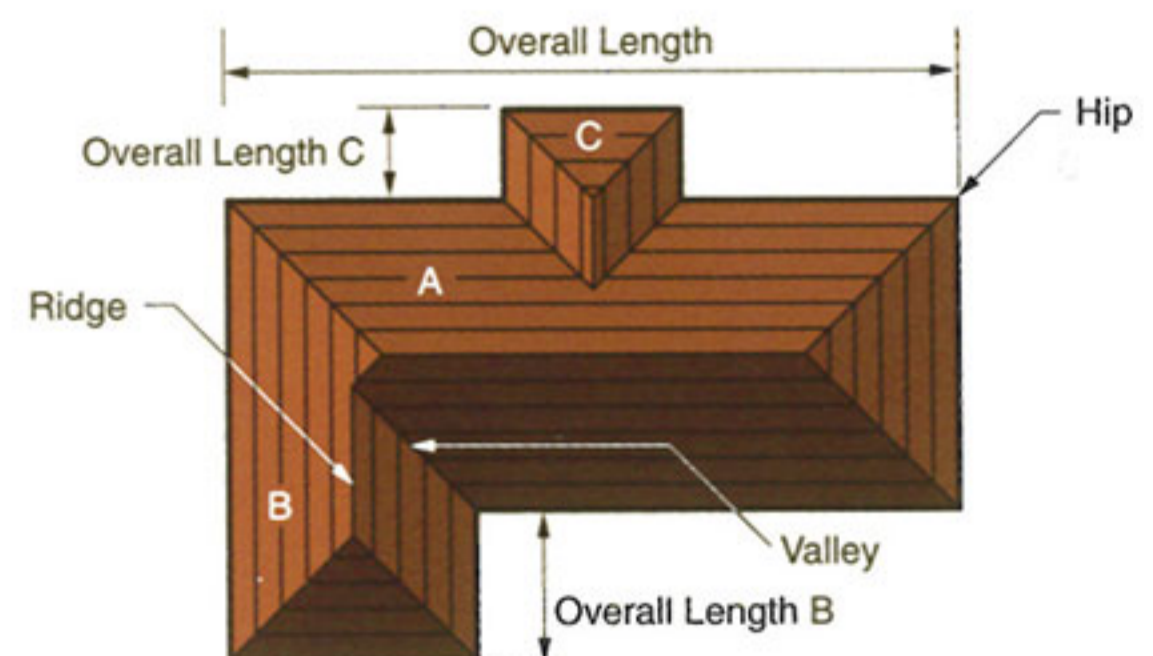


Fig 5.2.2



TABLE 5.1

RAFTER LENGTH *		OVERALL RAFTER LENGTH	
TO SUIT FULL COURSE OF TILES IN METRES	NUMBER OF BARGE COURSES	ROOF LENGTH IN METRES	NUMBER OF TILES
.330m	1	1.335m	1
.698m	2	2.550m	2
1.066m	3	3.765m	3
1.434m	4	4.980m	4
1.802m	5	6.195m	5
2.170m	6	7.410m	6
2.538m	7	8.625m	7
2.906m	8	9.840m	8
3.274m	9	11.055m	9
3.642m	10	12.270m	10
4.010m	11	13.485m	11
4.378m	12	14.700m	12
4.746m	13	15.915m	13
5.114m	14	17.130m	14
5.482m	15	18.345m	15
5.850m	16	19.560m	16
6.218m	17	20.775m	17
6.586m	18	21.990m	18
6.954m	19	23.205m	19
7.322m	20	24.420m	20
7.690m	21	25.635m	21
8.058m	22	26.850m	22
8.426m	23	28.065m	23
8.794m	24	29.280m	24
9.162m	25	30.495m	25
9.530m	26	31.710m	26
9.898m	27	32.925m	27
10.266m	28	34.140m	28
10.700m	29	35.355m	29
11.070m	30	36.570m	30

\* To be used for estimating purposes only. Tile course quantities for rafter lengths allow for 25mm tile overhang into eaves gutter. For steep pitch roofs and some gutter systems this figure may have to be increased.

## 5.3 ESTIMATING ACCESSORIES

When calculating accessory requirements a small allowance should be included to compensate for wastage.

### Barrel 150s:

Determine the total length of ridges, hips and barge boards to be covered. Divide by the linear cover of each unit (i.e. 0.37m) to calculate the number of Barrel 150s required.

### Side Flashings (2000 mm):

Determine the total length of all pitched roof to wall junctions to be covered. Divide by the lineal cover of each unit (i.e. 1.9 m) to calculate the number of Side Flashings required.

### Milano Ridge Flashings:

Determine the total length of the ridges to be covered. Divide by the lineal cover of each unit (i.e. 1.215 m) multiply it by 2 (each side of the ridge needs a flashing) to calculate the number of Milano Ridge Flashings required.

### Milano Wall Flashings:

Determine the total length of Horizontal Roof/Wall junction to be covered. Divide by the lineal cover of each unit (i.e. 1.215m) to calculate the number of Milano Wall Flashings required.

## 5.4 ESTIMATING BATTENS FOR NEW ROOF

Provide 3 linear metres of battens per square metre of roof.

NOTE: Where laying over solid decking provide 2.7 linear metres of battens per square metre of roof.

## 5.5 ESTIMATING BATTENS FOR OVERLAY RE-ROOFING

Provide 5 linear metres of battens per square metre of roof.

## 5.6 ESTIMATING NAIL QUANTITIES

Provide 1 kilogram of nails per 22 square metres of roof.

## 6.1 LIST OF COMPONENTS

All dimensions and weights given are nominal.

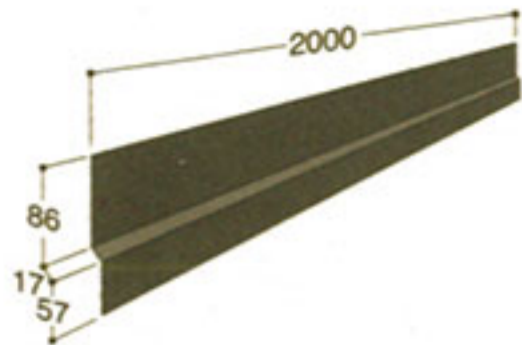
### MILANO TILE

Overall Length	1335 mm
Length of Cover	1215 mm
Width of Cover	368 mm
Upstand	22 mm
Roof cover/Shingle	0.45 m <sup>2</sup>
Coverage	2.2 tile / m <sup>2</sup>
Weight/unit	2.9 kg



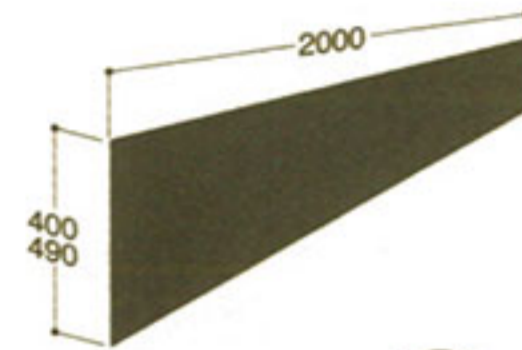
### SIDE FLASHING

Overall Length	2000 mm
Length of Cover	1900 mm
Upturn	86 mm
Width	17 mm
Downturn	57 mm
Weight/unit	1.4 kg



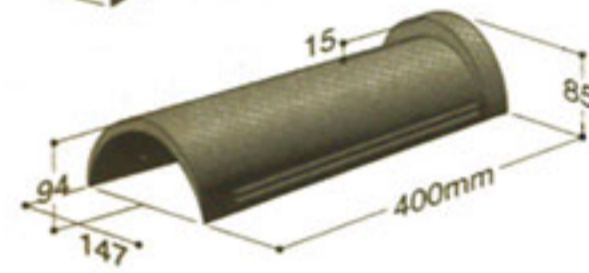
### FLAT SHEET

Overall Length	2000 mm
Width	400/490 mm
Weight/unit	3.9/4.8 kg



### BARREL 150

Overall Length	400 mm
Length of Cover	370 mm
Weight/unit	0.6 kg



### BARREL END 150

Diameter	150 mm
Weight/unit	0.1 kg



### MILANO RIDGE FLASHING A

Overall Length	1308 mm
Length of Cover	1215 mm
Weight/unit	1.0 kg



### MILANO WALL FLASHING

Overall Length	1308 mm
Length of Cover	1215 mm
Weight/unit	1.4 kg



## 6.2 PACKING

Tiles are packed on wooden pallets of base dimensions 1400 x 1100mm. The maximum height of a pallet is 820mm of Milano Textured Tiles. 350 Milano Textured Tiles are stacked on each pallet with a maximum weight of 1100kg.

## 6.3 STORAGE AND HANDLING

If stored outside, a waterproof cover must be placed over the tiles to keep them dry and prevent damage.

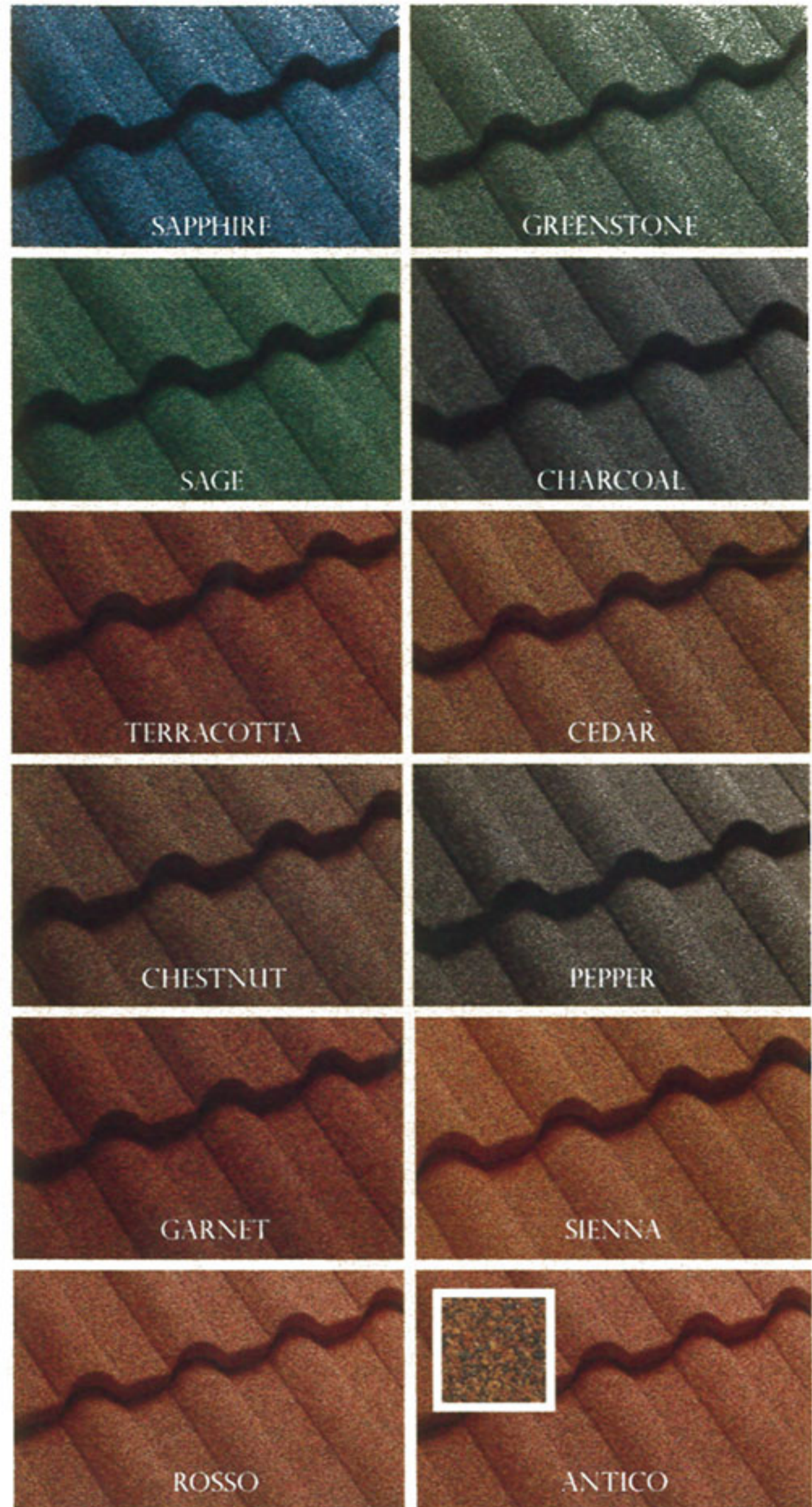
Care should be taken when handling the tiles to avoid damage to the surface. Where minor damage does occur, the touch up kit should be used to repair the surface.

## SPECIAL FLASHINGS

Quotations are available on request for special flashings, accessories and flat sheet coated products.

## TOUCH UP KIT

Touch up kits are available to repair surface damage if incurred during installation.



Every effort has been made to accurately reproduce colours, but for technical reasons connected with colour reproduction, printed colours may differ from actual product colours. Please refer to actual colour samples before purchasing.

**Decra**<sup>®</sup>  
MILANO

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