

# Installation Guide

Roof Framing Information

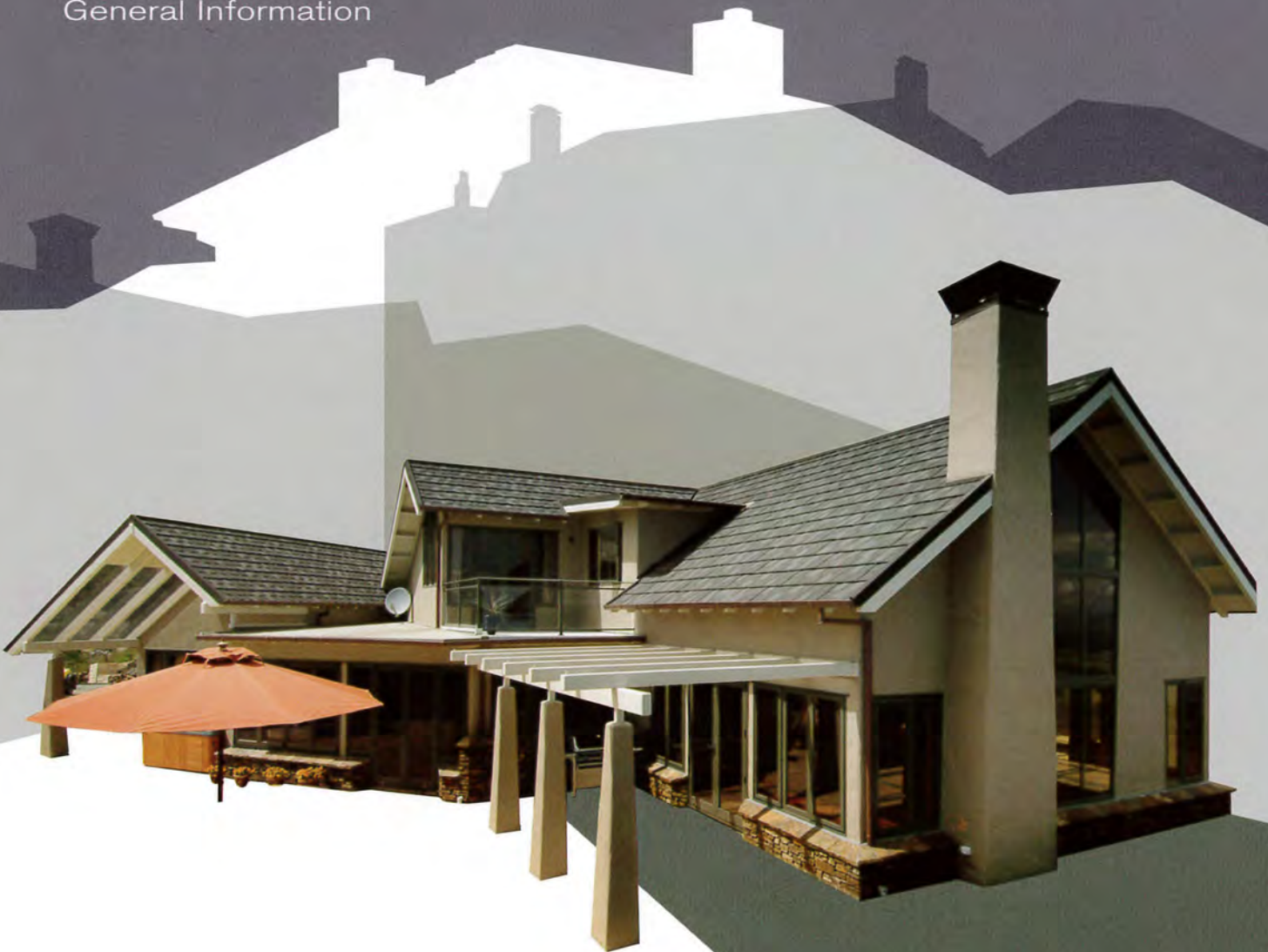
Batten Installation

Shingle 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 Installation Guide.

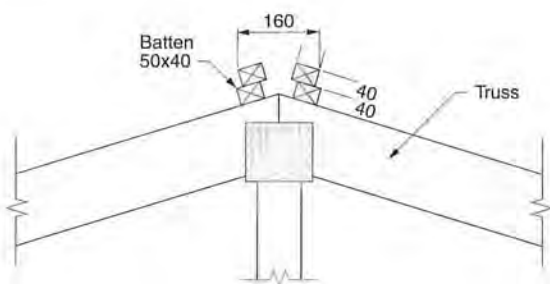
Shingle Roofing can be installed on any pitch from 15° to vertical mansards. Cost savings may be achieved if rafter lengths are designed to accommodate an exact number of shingle courses. Where this is not possible, cutting of the top shingle course will be necessary. Rafters or roof trusses can be set 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 900mm	50 x 40mm
1200mm	50 x 50mm
1500mm	50 x 65mm on edge
1800mm	50 x 75mm on edge

## 1.1 Ridge

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 for trim. If a ridge board is present battens may be installed alongside the ridge board ensuring that the batten edges are no more than 160 mm apart.

FIG 1.1.1

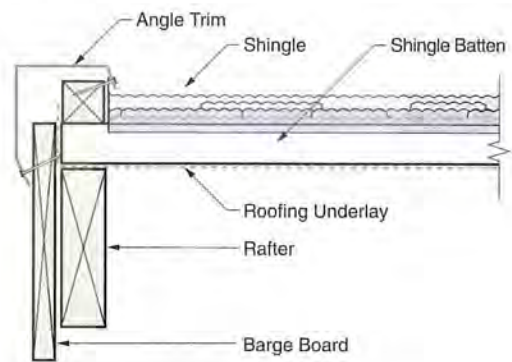


## 1.2 Barges

Install the barge board 40 mm above the rafter where the trim is used. Tolerances should be a minimum of 25 to a maximum of 60 mm above the rafter. (Fig 1.1.2).

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

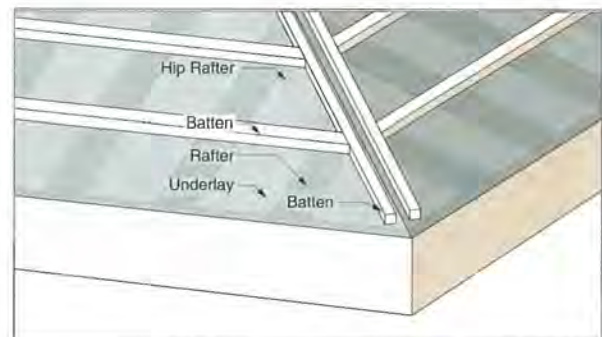
FIG 1.1.2



## 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 Angle Trim. If a hip board is present battens may be installed alongside the hip board ensuring that the batten edges are no more than 160 mm apart.

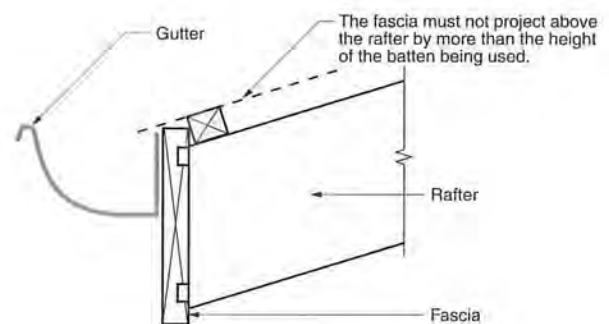
FIG 1.3.1



## 1.4 Fascia

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

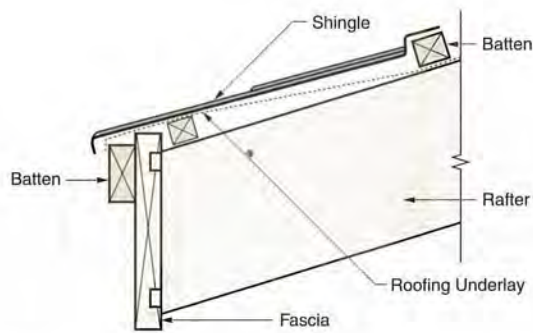
FIG 1.4.1



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

# Roof Framing Installation continued

FIG 1.4.2



## 1.5 Valleys

The following details suggest two ways in which the valley lining may be installed. Local practice, building regulations and site conditions will dictate the final method used.

### Prefabricated Trusses

150 x 25 mm valley boards are cut and installed between the trusses so that they can be nailed flush with the top of the rafters. Never nail inside the valley. (Figs 1.5.1 and 1.5.2).

FIG 1.5.1

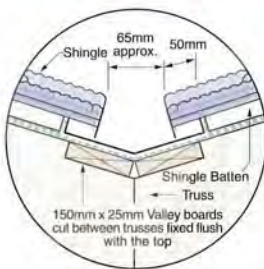
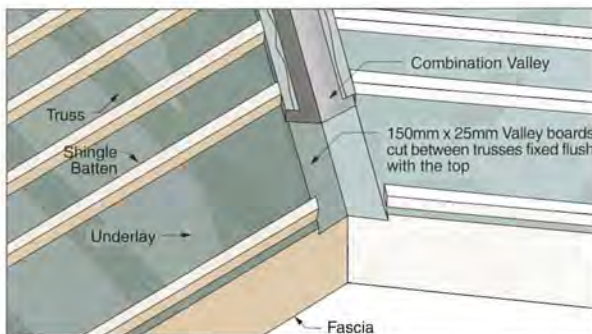


FIG 1.5.2

### Plywood Decking

Valleys should be installed before battens. This will allow battens to be cut close to the edge of the valley. Secure the valley with a clip or by bending a nail over the outer edge. Never nail inside the valley. (Figs 1.5.3 and 1.5.4).

FIG 1.5.3

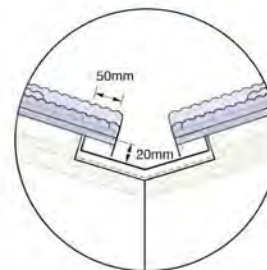
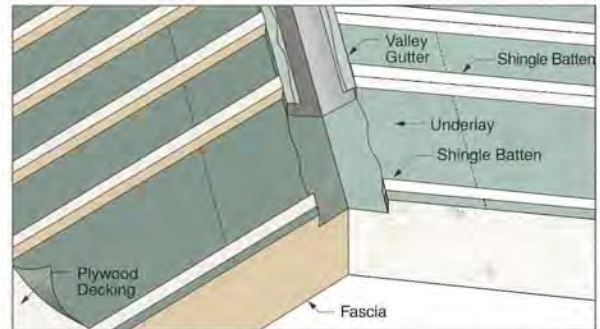


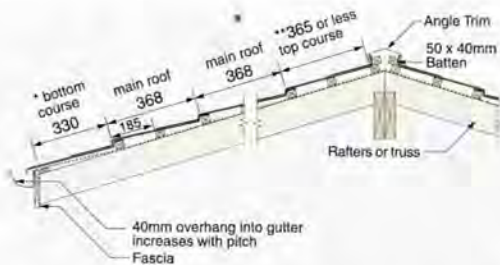
FIG 1.5.4

# Batten Installation

## 2.1 Batten Setting Out

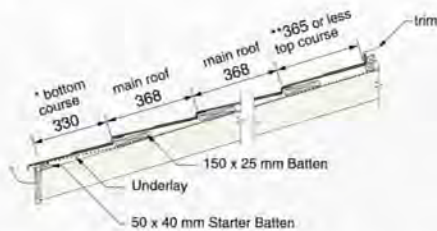
The most critical factor in the laying out of the shingles is accurate setting out of the battens. If this is not adhered to the shingles will not fit correctly. The batten spacing for shingles is 368 mm.

FIG 2.1.1



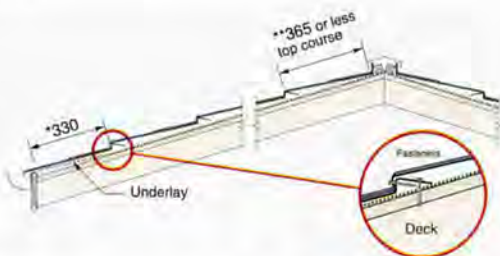
- \* Variable depending on the type of rainwater collection system used.
- \*\* Dimensions will vary depending on rafter length.

FIG 2.1.2



- \* Variable depending on the type of rainwater collection system used.
- \*\* Dimensions will vary depending on rafter length.

FIG 2.1.3



- \* Variable depending on the type of rainwater collection system used.
- \*\* Dimensions will vary depending on rafter length.

## 2.2 Batten Installation Procedure

All measurements should be made from the front of battens. This is the surface where shingles will be fixed to the batten.

### Timber Battens - No Rainwater System

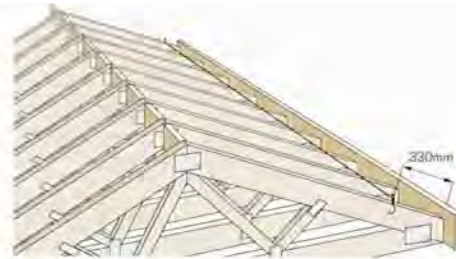
Nail a dressed 50 x 25 mm batten to the front of the fascia board (refer Fig 1.4.2). The shingle will be fixed to this batten. The next batten up the rafter will then be laid 368 mm from the front of this batten. Subsequent battens will be installed every 368 mm up the rafter, measuring from the front of each 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 starter batten. Tack a nail in place and repeat at the other end of the section of roof, then run a string line between the points. On each remaining rafter tack a nail at the string line. (Fig 2.2.2).

\* May be varied to suit rain water goods

FIG 2.2.2



Using the measuring rod (pre-notched at 368 mm for shingles) hook it over the nail so that it lies up the rafter. Tack a batten nail in each slot as markers for the battens. (Fig 2.2.3).

FIG 2.2.3



Two common methods of installation are with an intermediate (centre) batten (Fig 2.1.1) or using a single wide batten (Fig 2.1.2).

A second set of intermediate (centre) battens is installed between the initial location battens. These are located 185 mm from the front of each batten, however the first batten does not require one. (Fig 2.1.1).

### Installation on to decking

Shingles are fastened to the decking using fasteners recommended and supplied by AHI Roofing. (Fig 2.1.3).

### Obstacles in a roof plane

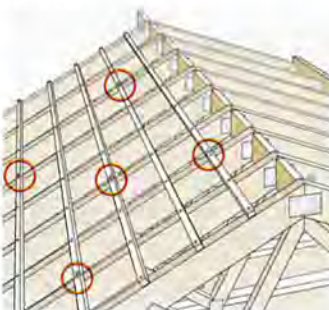
When you encounter an obstacle in the roof, e.g. a dormer window, run another string line over it and work down the other side with the measuring rod.

### 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.

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 2.2.4



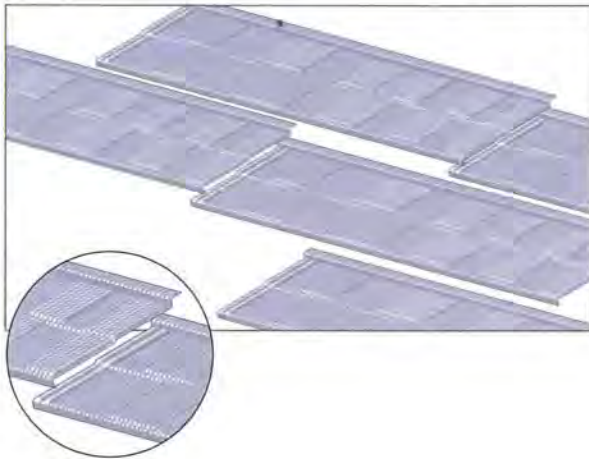
(Fig 2.2.4) and cut the battens to length so that they butt together on top of a rafter. Hold the batten firmly against the marking nail and nail through each batten into the rafter. Once installed, pull out the marking nail and use it to fix the next batten.

# Shingle Installation

## 3.1 Shingle Laying

Shingles only interlock one way; they are laid left to right along the roof. (Fig 3.1.1).

FIG 3.1.1



### Over Battens

Install the second to top course of shingles and nail them in position through the flat of the back edge sitting on the batten.

This holds them in place and allows lower courses of shingles to be laid without having to fasten each one. On low pitched roofs an entire area can be laid without fastening immediately. All shingles should be fastened in place before leaving the job site for any reason. On higher pitched roofs - over 30 degrees - shingles should be fastened two courses above the shingles that are being laid.

### Over plywood decking.

Shingles are installed from the eaves up the roof. Each shingle is fastened with four screws through the head lap of the shingle to the deck. The course above is laid and the shingles are fastened together at the front downturn flanges and back upstand, (Fig 2.1.3).

## 3.2 Nailing /Fastening

The correct position for nailing shingles to battens is shown below (Fig 3.2.1). Shingles are secured by nailing through the front downturn flanges into the side of the batten (Fig 3.3.1). Nails should be spaced approximately 300 mm apart. Care is required at the lap of the shingles to ensure that the nail is placed outside of the hidden water channel (Fig 3.2.2) and at the same time restricting nail penetration to a maximum of two thicknesses of shingle.

NOTE: in areas prone to tropical cyclones, hurricanes or typhoons, installation must meet local standards and by-laws and nailing should be at 7 points per shingle (approximately 160 mm spacing).

FIG 3.2.1

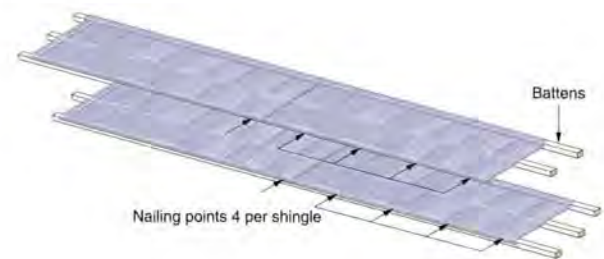
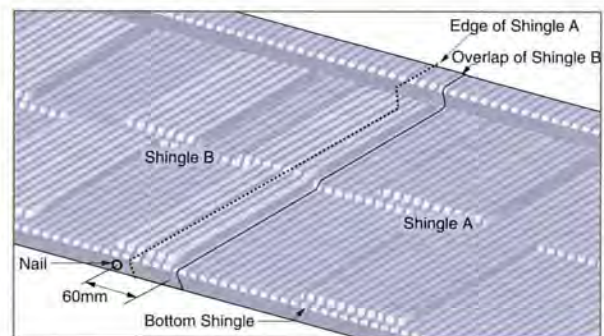


FIG 3.2.2



## 3.3 Nailing/Fastening Technique

The person nailing should stand on the shingle being fastened facing the eave and nailing as shown. (Fig 3.3.1). Gun nailers using AHI Roofing specified nails can also be used to securely fasten shingles.

FIG 3.3.1



## 3.4 Gable Roof Procedure

Lay the second to top course of shingles from gable end to gable end, turning the edge of the end shingles up against the barge battens. Tack these shingles temporarily in position through the flat of the back edge sitting on the batten.

Starting from the course already laid, lay the shingles two courses at a time from end to end. The shingle laps must be staggered down the roof, using different lengths of cut shingles at the starting end, to create the stagger.

The person laying the shingles should be two courses ahead of the person nailing.

# Shingle Installation continued

## 3.5 Hip Roof

On the second to top course, lay a shingle that has been cut and bent to suit the angle of the hip. Tack this in place through the flat of the back edge that is sitting on the batten. Continue to lay towards the other hip until the last full shingle will fit and secure them through the flat of the back edge of the shingles.

Pre-cut and bend shingles for all of the courses of shingles adjacent to the starting end. (Vary the length of the shingles to create a staggered pattern of laying)

Refer to section 3.7 Hip Installation to complete measuring and installing shingles at the finishing end.

## 3.6 Shingle Installation – Ridges

Measure the distance (A) from the last shingle to the ridge board (Fig 3.6.1). Add 40mm to the measurement (turn up allowance) and mark the shingle to be cut (Fig 3.6.2).

FIG 3.6.1

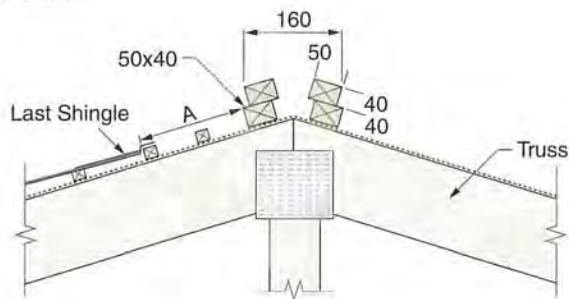


FIG 3.6.2

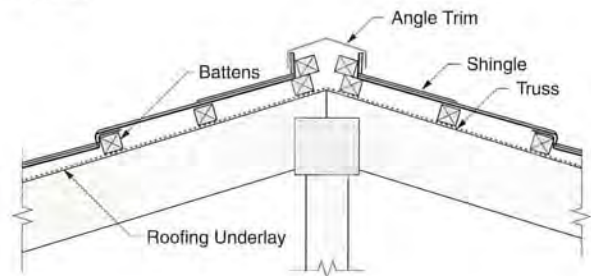


Place the full shingle in the long tile bending attachment which can be bolted to the bender. Line up the marks showing the bend line and bend the shingle upwards. Shingles can be bent in either the bender or, depending on the length, with the long tile bending attachment. Finally, cut along the marked cutting line using the guillotine or hand shears.

NOTE: It is essential to bend the shingle before cutting to avoid shingle distortion.

Install the top course of shingles to the ridge board by nailing each shingle through the up-stand to the batten board in 4 places and nailing the bottom edge as previously described. Ensure that the top course of shingles follows the same pitch as the other courses (Fig 3.6.3).

FIG 3.6.3



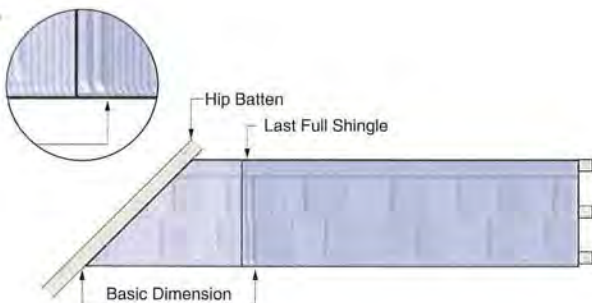
## 3.7 Shingle Installation – Hips

Measurements are made on the roof, but shingles are normally marked, cut, bent and stacked on the ground. The following steps should be followed.

# Shingle Installation continued

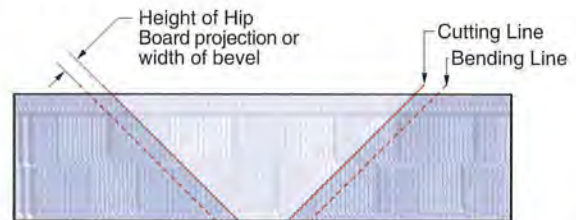
- (i) The first hip shingles can be cut and bent before laying any full shingles. No length measurement of the shingle is required – only the angle of the hip (this is usually the right hand end of the section of roof being worked on).
- (ii) Shingles at the other end of the hip course need to be cut after measuring the gaps left. Take the basic measurement (as shown in Fig 3.7.1) from the water channel to the hip batten along the front edge of the shingle batten. The angle can be taken by measuring both the front and the back of the remaining gap or by using a bevel which is set up against the batten face and the side of the hip batten.

FIG 3.7.1



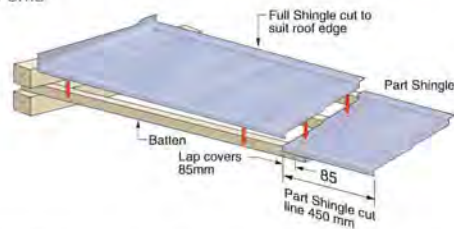
- (iii) Measure and mark on the shingle with chalk or similar. The measurement is done from the edge of the lap on the shingle adding the basic measurement dimension taken from the roof, the angle is marked using the bevel. This is the bend line for the hip shingle. Add 40 mm to the bend line measurement to create the cut line (as shown in Fig 3.7.2).

FIG 3.7.2



- (iv) If a small part shingle (less than a course width) is required then it will be necessary to remove the adjacent full shingle and insert a part shingle – this will allow a full width shingle to be cut and bent to suit. A part shingle is created by cutting the shingle along a line 450 mm from the right hand end of the shingle. This third of a shingle can then be inserted and overlapped with adjacent shingles. (Fig 3.7.3).

FIG 3.7.3



## 3.8 Shingle Installation—Valleys

Valley shingle measurements are made in the same way as hips and the bend line is transferred to the shingle. The cut line differs in that the line is 30 mm wide at the back of the shingle and 40 mm at the front. The shingles are cut and then bent down using the short tile bender.

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

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



# Accessory Installation

## 4.1 Barge Covers

Before installation it is essential that the edge of the end shingle is turned up against the barge batten. The Angle Trims are bent to a 90 degree angle and the edge bent before placement (as shown in Fig 4.1.1). The Angle Trims are then tacked temporarily in place working up the barge board (Fix Angle Trims as shown in Fig 4.1.2). Sight along the barge board to ensure that the Angle Trims are straight and true. Adjust if necessary, then drive the nails home. Note that the nails need to be near the bottom edge of the Angle Trim to ensure that the bottom edge is firmly positioned against the barge board. Pre-punched holes are provided for this purpose. Finish the apex neatly by scribing the Angle Trims together.

FIG 4.1.1

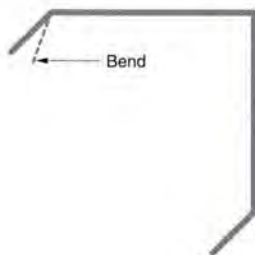
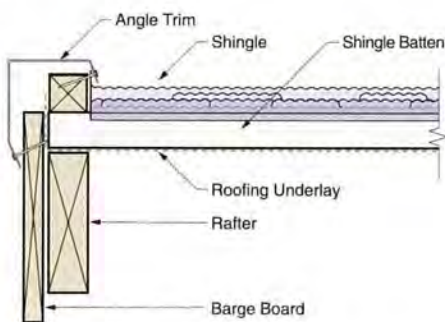


FIG 4.1.2



Finish junctions of barge and ridge, scribing accessories to fit - seal the joint and rivet together. (Figs 4.1.3 and 4.1.4).

FIG 4.1.3

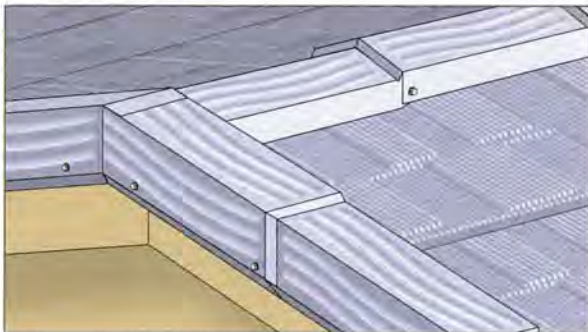
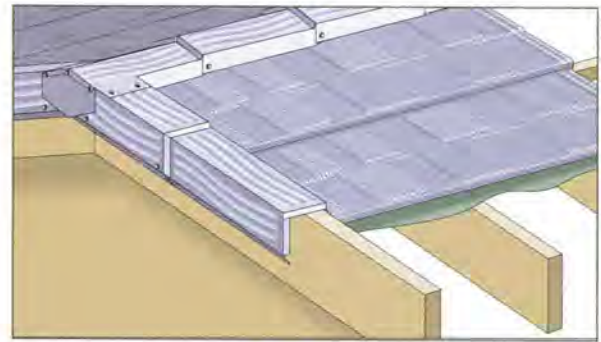


FIG 4.1.4

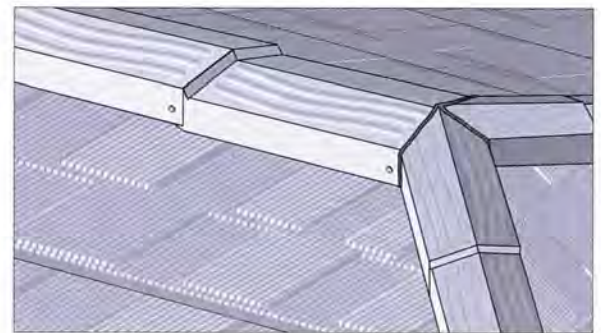


## 4.2 Ridge Hip Installation

Lay the Angle Trims over the ridge and hip battens starting at the eaves. The Angle Trims are then tacked temporarily in place. Have someone sight along the hip or ridge to ensure that the Angle Trims are straight and true. Adjust if necessary, then drive the nails home.

Finish junctions of hip and ridge scribing accessories to fit - seal the joint and rivet together. (Fig 4.2.1).

FIG 4.2.1



## 4.3 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 shingle courses up under the flashing. Measure the gap (allowing for overlap) from the last shingle to the vertical surface; this gives the bending line. Add 40mm for the cutting line. Cut and bend up the shingle. Secure the upturned shingle in place with the upturn against the wall. Do not secure the shingle to the wall. (Refer to Figures 4.3.1, 4.3.2 and 4.3.3). Nail the Side Flashing to the wall ensuring that the flashing is hard down and straight. Alternatively, a hidden gutter is sometimes specified. In this case, the end of the shingle battens stop short of the vertical studs by 45mm in order to accommodate the gutter. The gutter is positioned before the roof is installed (Fig 4.3.4). Flashings for brick veneer and roofs sloping away from the wall are shown in Figures 4.3.5 and 4.3.6.



# Accessory Installation continued

FIG 4.3.1

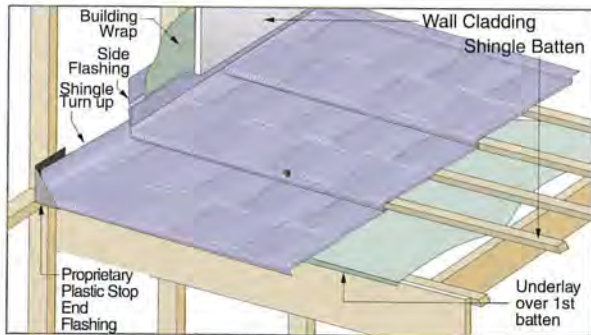


FIG 4.3.2

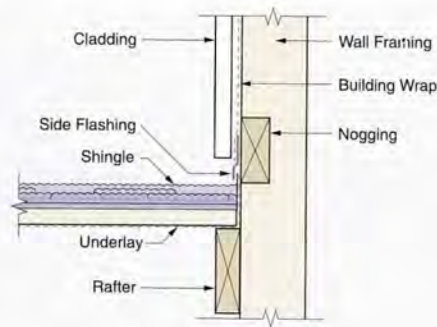


FIG 4.3.3

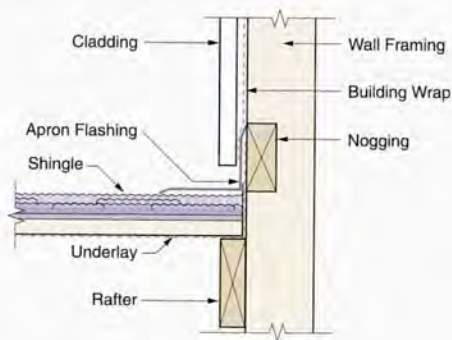


FIG 4.3.4

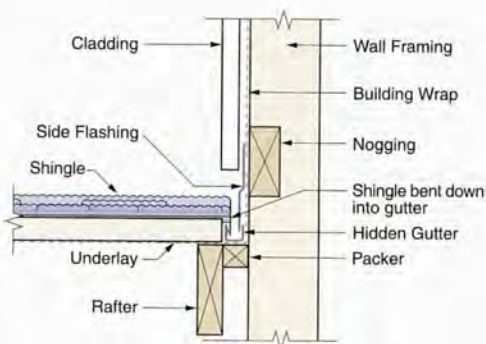


FIG 4.3.5

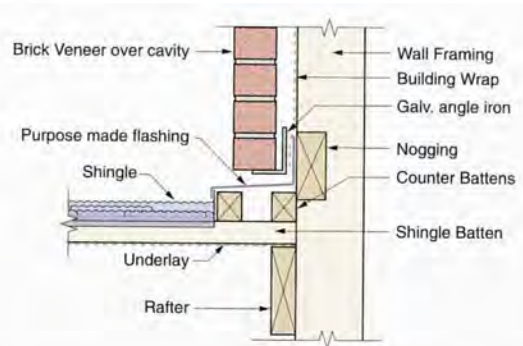
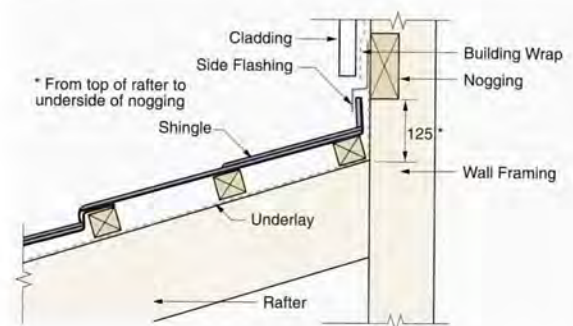


FIG 4.3.6



## 4.4 Mansards

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

## 4.5 Nail Heads

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

# Estimating Data

## 5.1 Straight Gable Roof

- (i) Determine the rafter length (Fig 5.1.1) and calculate the number of courses of shingles from Table 5.2. Always ensure that fractional shingles are counted as whole shingles as these will have to be cut at the ridge batten.
- (ii) Determine the overall length of the roof (Fig 5.1.2) and refer to Table 5.2 for the number of shingles required. Ensure that fractional shingles are counted as whole shingles.
- (iii) Multiply shingles (i) x shingles (ii).
- (iv) Multiply result (iii) x 2 when estimating for both sides of the roof.

FIG 5.1.1

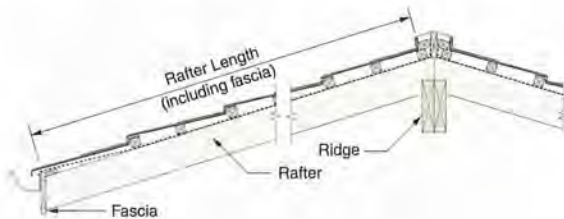
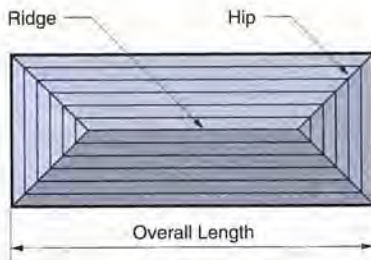


FIG 5.1.2



## 5.2 Hip and Valley Roofs

- (i) **HIP ROOFS:** Treat the roof initially as a straight gable. Find the overall length (Fig 5.1.2) and refer to Table 5.2 to calculate the number of shingles required for the coverage. Multiply the result by the number of courses of shingles 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) below, calculate the shingles required for the hips. Add this to the shingles required for the body of the roof.
- (ii) **HIP AND VALLEY ROOFS:** First take the section with the longest rafters (section A in Fig 5.2.1). From Table 5.2 calculate the requirements for that section and then for the remaining sections (sections B and C in Fig 5.2.1). Find the total length of hips and valleys and using the formula outlined in (iii) below, calculate the additional shingles required for hips and valleys to obtain the total shingle requirement.

- (iii) Additional shingles for hips and valleys may be estimated using the following formula: Additional shingle 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

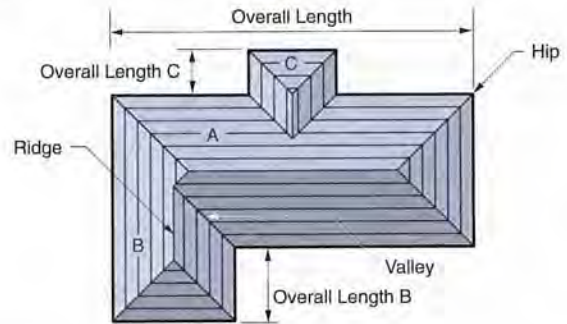


TABLE 5.2

Rafter Length*		Overall Rafter Length	
TO SUIT FULL COURSE OF SHINGLES	NO. OF BARGE COURSES	ROOF LENGTH	NO. OF SHINGLES
m		m	
0.330 m	1	1.365 m	1
0.698 m	2	2.615 m	2
1.066 m	3	3.865 m	3
1.434 m	4	5.115 m	4
1.802 m	5	6.365 m	5
2.170 m	6	7.615 m	6
2.538 m	7	8.865 m	7
2.906 m	8	10.115 m	8
3.274 m	9	11.365 m	9
3.642 m	10	12.615 m	10
4.010 m	11	13.865 m	11
4.378 m	12	15.115 m	12
4.746 m	13	16.365 m	13
5.114 m	14	17.615 m	14
5.482 m	15	18.865 m	15
5.850 m	16	20.115 m	16
6.218 m	17	21.365 m	17
6.586 m	18	22.615 m	18
6.954 m	19	23.865 m	19
7.322 m	20	25.115 m	20
7.690 m	21	26.365 m	21
8.058 m	22	27.615 m	22
8.426 m	23	28.865 m	23
8.794 m	24	30.115 m	24
9.162 m	25	31.365 m	25
9.530 m	26	32.615 m	26
9.898 m	27	33.865 m	27
10.266 m	28	35.115 m	28
10.634 m	29	36.365 m	29
11.002 m	30	37.615 m	30

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

# Estimating Data continued

## 5.3 Estimating Accessories

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

- (i) **ANGLE TRIMS:** Determine the total length of ridges, hips and barge boards, to be covered. Divide by the linear cover of each unit (i.e. 370mm) to calculate the number of Angle Trims required.
- (ii) **SIDE FLASHINGS AND FLAT SHEET FLASHINGS:** Determine the overall length of flashing required. Divide by the linear coverage per flashing unit (ie 1900mm) to calculate the number of flashing units required.

## 5.4 Estimating battens for new roofing

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

NOTE: Where laying over solid decking provide 2.7 linear metre of battens per square metre of roof or only battens for the length of hips, barges and the ridge.



## 5.5 Estimating battens for overlay re-roofing

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



## 5.6 Estimating shingle nail quantities

Provide 1 kilogram of nails per 22 square metres of roof or 10 screws per shingle if they are to be installed directly to the deck.

# General Information

## 6.1 List of components

All dimensions and masses given are nominal.

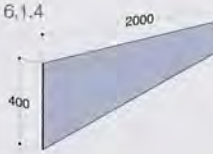
FIG 6.1.1



### SHINGLE

Overall length 1320mm  
 Length of cover 1250mm  
 Width of cover 368mm  
 Upland 16mm  
 Roof cover/shingle 0.46m<sup>2</sup>  
 Coverage 2.2 tiles/m<sup>2</sup>  
 Weight/unit 3.0kg

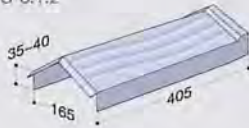
FIG 6.1.4



### FLAT SHEET

Overall length 2000mm  
 Width 400mm  
 Weight/unit 3.9kg

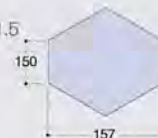
FIG 6.1.2



### ANGLE TRIM

Overall length 405mm  
 Length of cover 370mm  
 Width 165mm  
 Weight/unit 0.5kg

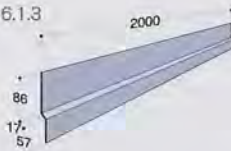
FIG 6.1.5



### ANGLE TRIM END

Weight/unit 0.1kg

FIG 6.1.3



### SIDE FLASHING

Overall length 2000mm  
 Length of cover 1900mm  
 Upland 86mm  
 Width 17mm  
 Downturn 57mm  
 Weight/unit 1.7kg

## 6.2 Packaging

Shingles are packed on wooden pallets of base dimensions 1370 x 1070mm. The maximum height of a pallet of shingles is 1000mm. 300 or 250 shingles are stacked on each pallet.

## 6.3 Storage and handling

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

Care should be taken when handling the shingles 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.

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