CI SfB (4-) Nn2

Ondutile

Under Tile and Slate roofing System

One system providing a weatherproof barrier, ventilation and insulation

Onduline®

www.onduline.co.uk

Ondutile

Under Roofing System

Ondutile is a unique roof underlay system utilising Onduline PP corrugated roof sheets below tile, slate or shingle roof coverings to create an independent secondary weatherproof roof.
This enables the primary tiled roof to be used safely below the manufacturer's minimum recommended roof pitch.

Ondutile benefits

Immediate weather protection
Ondutile is quick to install, requires no specialist equipment or trade skills and provides immediate weather protection to the building prior to fixing tiles.

Moisture control
Tile battens positioned above the corrugations allows moisture to efficiently drain to the eaves, which with enhanced ventilation maintains excellent moisture control within the tile batten cavity.

Reduced roof pitch
Allows tiles to be fixed below manufacturer's minimum pitch by providing assured secondary weathering below the primary roof covering.

Thermal insulation
The provision of an Ondutile deck in practice significantly improves the thermal performance of the roof structure.

Sound insulation
The Ondutile system provides a 27% reduction in sound penetration through the roof covering, a considerable benefit for buildings on airport flight paths and inner city locations.

Ventilation
Sheet corrugations supply 17,000mm^2 per linear metre ventilation above the sheet into the tile batten cavity and below into the roof space. Making a significant contribution to the roof ventilation.

Safety
Ondutile forms a tough, non-reflective and safe working environment during roofing works.

Versatility
The Ondutile underlay is flexible enough to be used on existing uneven roof structures and its intrinsic stiffness eliminates the risk of noise generated by lightweight membranes under fluctuations in wind pressure.

Security
In the event of damage to the primary roof covering Ondutile significantly reduces the risk of expensive consequential damage to the building and contents.

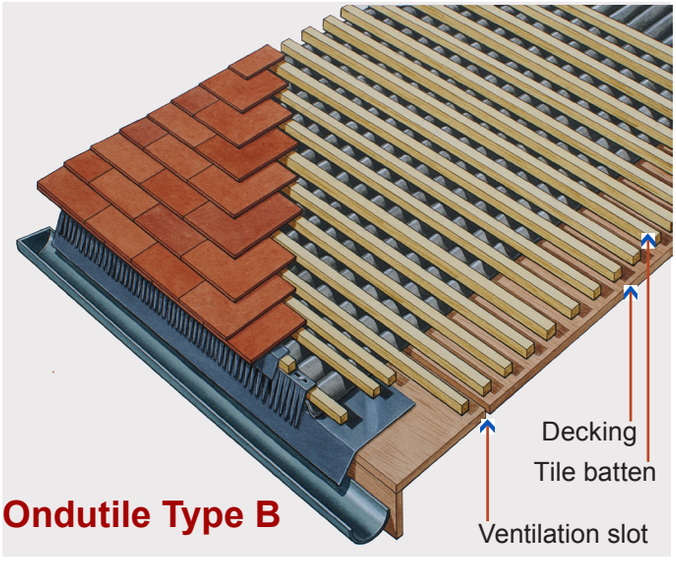
System Specifications

Deciding on the right specification for Ondutile is simple. First note the tile/slate type to be used and match it to the appropriate system specification detailed below, selecting either Type A or Type B. Then check the minimum recommended roof pitch to suit the tile / slate type (Low pitch applications page 3) and finally note the mechanical fixing requirements (mechanical fixings page 4).

Type A - Developed for concrete interlocking tiles, pantiles, fibre cement and natural slates. The system forms a composite structure comprising of support battens nailed to the rafters set at the same gauge/centres as required for the tile battens.

Ondutile Type A

Type B - Developed for small double lap plain tile and small slate types which, due to the closeness of the tile battens, make the alignment of support battens and tile battens impractical. Therefore the cross batten supports are replaced with 18-20mm exterior quality plywood deck fixed to the rafters. Ventilation into the tile batten cavity is provided by means of slots in the decking above the eaves tray line and below the high level abutment.



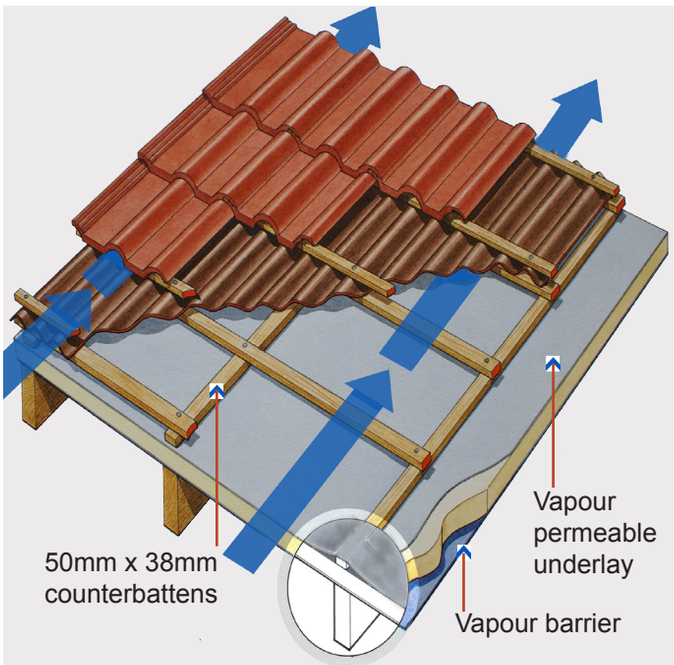
Ondutile Type B

Insulated roof design

The trend of maximising available living space has promoted the growth in insulated pitched roof construction which can be achieved using the Ondutile system, which forms a ventilated cold roof section over the insulated roof section.

Insulated roof construction notes

To minimise the increased risk of roof void condensation, it is essential that rigid board insulation systems are laid in accordance with the manufacturers' instructions and independent third party assessments. This includes fitting an effective water vapour barrier beneath the insulation with all joints sealed at ridge, hips, valley and soil vent pipes. To avoid harmful interstitial condensation formation within the insulated roof section.



Ondutile Insulated pitched roof

The Ondutile roof section is fixed onto 50mm x 38mm counterbattens laid over the rigid insulation boards which are securely fixed through the insulation into the rafters.
Special fixings such as helical fasteners supported by independent approval (WIM LAS/BBA) are normally used. If specified by the insulation manufacturer a vapour permeable membrane should be laid over the counterbattens draining into the eaves gutter.

The Ondutile system is fixed to the counter battens which now replace the rafters as the primary fixing point to the roof structure.
The Ondutile fixings into these counter battens must be either ring shank nails or screws of adequate strength, durability and pull out resistance to satisfy the roof loadings and comply with relevant European and British Standards and Codes of Practice. **The standard Type A or B Ondutile fixing specification can be used from this point.**

Low pitch roof application

The minimum pitches / laps for tiles are normally specified by the manufacturer with reference to BS5534, Part 1 Design 1990. There are design situations, however, when these specifications cannot be attained as illustrated above. Here the window line of the main building restricts the roof pitch of the lower roof extension. In these cases the use of Ondutile allows the same tile to be used as on the main roof to be utilised satisfying both Planning and Building Control requirements.
Accordingly the use of the Ondutile system creates additional floor area and living space Lowering the roof pitch, not your expectations.

Ondutile minimum recommended roof pitches

Interlocking concrete tiles:	**12.5°**
Clay pantiles, natural and fibre cement slates:	**17.5°**
Plain double lap tiles:	**22.5°**

Note: Ondutile will provide a weather tight roof when used below these suggested pitches. However, three significant areas of risk are introduced that will affect the durability and longevity of the roof covering:

1. Increased moisture content in the tile batten cavity that can promote deterioration to tile batten fixings.
2. The higher moisture content of the tile can result in frost damage and spalling of the tile.
3. Increased wind uplift loadings across the roof area.

In consideration of these risks check with your local authority and the tile or slate manufacturer to ensure the material is suitable and will not suffer frost damage (spalling). and seek details of enhanced tile fixings to combat the increased wind uplift loading.
Hybrid Tiles: For details of the recommended minimum roof pitch for hybrid low pitch tile and resin slate types contact our technical department.

Roof ventilation

The increased use of labour saving machines, like tumble dryers and dishwashers etc, has significantly increased the amount of water vapour in dwellings. When this effect is combined with improvements to insulation, double glazing and draft-proofing, a roof void condensation risk may be produced unless adequate ventilation is provided.

Ondutile forms a cold roof section and requires ventilation above and below the Onduline sheet. If decking is used, slots in the decking can be provided at high and low levels to form ventilation channels utilising the corrugations, 17000mm^2 per linear metre ventilation contribution to the total ventilation requirement.

Ventilation requirement to B.S. 5250: 1989
Roof pitches less than 15°
Low level ventilation at eaves should not be less than 25000mm^2 per linear metre. Ondutile requires additional ventilation at soffit.
Roof pitches 15° or more.Low level ventilation at eaves should not be less than 10000mm2 per linear metre Ondutile requires no additional ventilation.
High level ventilation in each case should not be less than 5000mm^2 per linear metre. Ondutile ventilator strip provides a 4mm gap to prevent access by birds or large insects, in areas prone to infestation additional screening maybe required.

Mechanical fixings

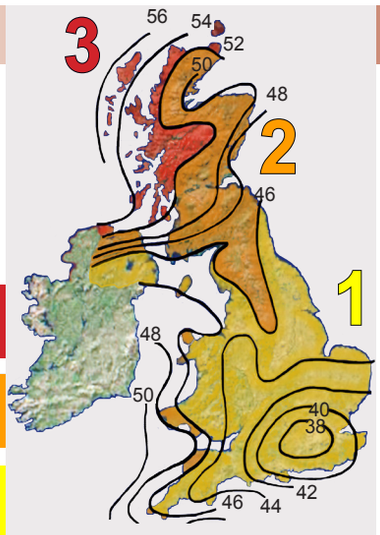
The suggested fixing specification set out in the table below are divided into three geographic areas reflecting the predicted wind loadings acting on the roof in different geographic areas.

Region:

Area 3 Greater than 52 m/s and equal or less than 54 m/s

Area 2 Greater than 46 m/s and equal or less 52 m/s

Area 1 Equal or less than 46m/s (metres per second)



The resulting fixing specification in consideration of these loads is detailed for the Ondutile Type A and B systems as follows:

Ondutile roof type:

Ondutile Type A (support battens) for interlocking tiles, pantiles, fibre cement and most natural slates.

Ondutile Type B (decking) for double lap plain tiles and small slates and for exposed sites.

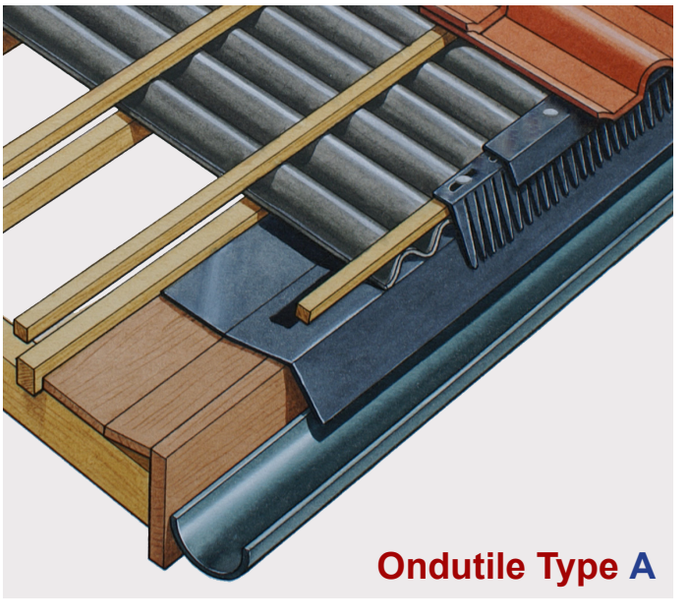
Design notes:
In determining the mechanical fixing specification for Ondutile, as with any roofing system, the wind uplift loading needs to be calculated taking into consideration such factors as the height of the building, the buildings shape and roof pitch, as well as the altitude and topography of the site.

Ondutile nailing specification:
Nail Types to B.S. 1202 Part 1 1974, hot dipped galvanised (smooth shank) and sheradised (ring shank). Care should be taken to ensure that the fixing nail penetrates the support batten centrally.
***Note:** Ondutile Type B: When fixing tile battens to deck the 75mm ring shank nails are supplemented with 85mm ring shank nails over Onduline sheet laps and at the eaves and ridge.

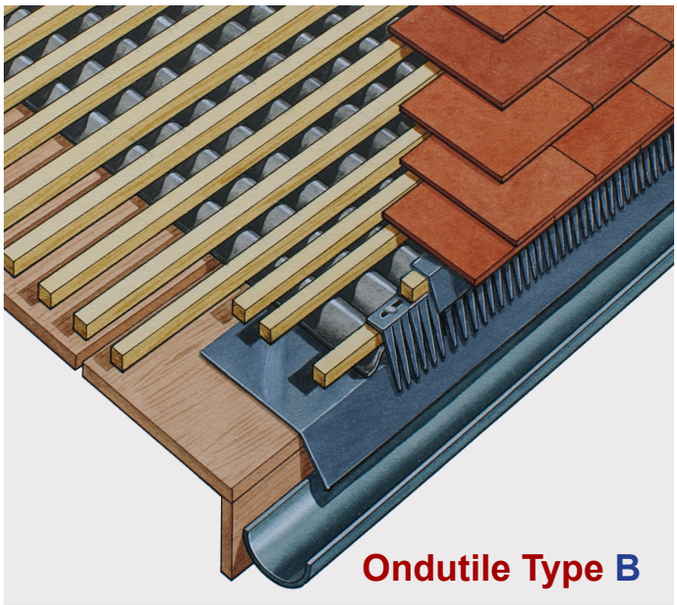
Note: This table indicates the minimum nail specification required for the Ondutile system as used on standard building types in typical urban environments. Non standard structures require detailed calculations as set out in B.S. 6399 Part 2 1997 and B.S. 5534 Part 1 1997).
Altitudes above 300m: A full calculation to BS6399-2 and B.S. 5534 is required as with buildings on exposed locations.

Region		Batten or Decking Size	Rafter Centre 450mm	Rafter Centre 600mm
1	A	Ondutile support batten: 50 x 25mm	75mm x 3.35mm (Smooth)	75mm x 3.35mm (Ring)
		Tiling batten size: 38 x 25mm	85mm x 3.75mm (Smooth)	85mm x 3.75mm (Ring)
	B	Ondutile support decking: 20mm	75mm x 3.35mm (Smooth)	Nail to rafters at 250mm centres
		Tiling batten size : 38 x 25mm	75 - 85mm x 3.35mm (Ring) *	Nail battens at 300mm centres
2	A	Ondutile support batten: 50 x 25mm	75mm x 3.35mm (Ring)	90mm x 3.75mm (Ring)
		Tiling batten size: 38 x 25mm	85mm x 3.75mm (Ring)	Consult specialist fixing supplier*
	B	Ondutile support decking: 20mm	75mm x 3.35mm (Smooth)	Nail to Rafters at 250mm centres
		Tiling batten size: 38 x 25mm	75 / 85mm x 3.35mm (Smooth) *	Nail battens at 300mm centres
3	A	Ondutile support batten: 50 x 25mm	75mm x 3.35mm (Ring)	90mm x 3.75mm (Ring)
		Tiling batten size: 38 x 25mm	85mm x 3.75mm (Ring)	Consult specialist fixing supplier*
	B	Ondutile support decking 20mm	75mm x 3.35mm (Ring) @ 250mm.	Consult specialist fixing supplier*
		Tiling batten size 38 x 25mm	75 / 85mm x 3.75mm (Ring) 250mm	Consult specialist fixing supplier **

Ondutile fixing specification



Eaves fixing for Type A specification. Fig. 1



Eaves fixing for Type B specification. Fig. 2

The inherent flexibility of Onduline allows it to be bent upwards at the eaves to reduce the distance between the two water shed points from the eaves tray and tile. Therefore use a full tile at the fascia to ascertain correct eaves tile rake and fascia height. Allow a maximum 30mm tile overhang from fascia line. Construct eaves detail using tilting fillet or batten support to 12mm plywood base and fix Ondutile eaves tray. This has integral fold lines, which are bent down to form a permanent drip edge into the gutter. Butyl tape can be used to seal the eaves tray laps. Onduline sheets are then laid flush with the fascia line and nailed through the tile batten and overlayed with an Ondutile batten cloaking piece. Use Deep flow gutter to reduce the risk of rainwater over-shooting the gutter.

Fixing Onduline sheets

Lay sheets with a single corrugation side lap and 200mm sheet end lap. Fixings must only penetrate the top of sheet corrugations. Start alternate courses with sheet cut in half vertically to create a broken bond sheet pattern, avoiding 4 ply material build up on end laps will adversely effect the line of the tile battens. Cut Onduline sheets up the line of corrugation by scoring with Stanley knife and folding to seperate. Cut across the width of the sheet using a rotary power saw.

Fixing Tiles and Slates

The Ondutile system is designed to allow tiles and slates to be laid below the manufacturers minimum recommended roof pitch (refer Ondutile minimum roof pitch section on page 3). In all other respects the manufacturers fixing specifications must be adhered too utilising enhanced fixings as required to counter increased wind uplift.

Fix a 20mm decking to rafters in accordance with the relevant British Standards and Codes of Practice, fix the Ondutile eaves tray in position. If ventilation has not been incorporated in the soffit, high and low level ventilation slots in the decking can be formed to enhance ventilation. The Onduline sheets can then be laid at the eaves, position sheets flush with the fascia line. The tile battens are then fixed, allowing a maximum tile overhang of 30mm. Nail tile battens through the top of the corrugation into the decking either side of the rafters, then fix the ventilator comb between the eaves battens and finish by overlaying eaves battens with an Ondutile batten cloaking piece. Use Deep flow gutter to reduce the risk of rainwater over-shooting the gutter.

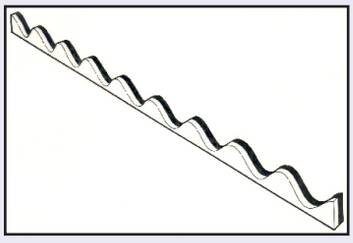
Note: When fixing tile battens to a deck 75mm ring shank nails are supplemented with 85mm ones over Onduline sheet laps and at the eaves and ridge.

Product specification

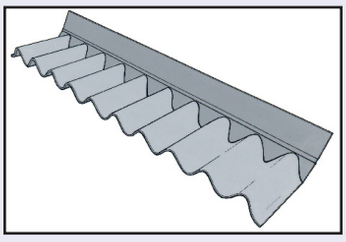
Sheet size: Length (overall)	2.000m
Width (overall)	950mm
Thickness (nominal)	3mm
End lap (Sheet cover 1.800m)	200mm
Side lap: One corrugation	95mm
(**Sheet cover** 1.830 x 0.855m)	
Average sheet coverage:	1.5m^2
Corrugation width:	95mm
Corrugation depth:	38mm
Material weight: (nominal)	3.3kg/m^2
Sheet weight: (nominal)	6.4kg
Colour: Black (*leaflet illustrations differ for clarity*)	
Thermal resistance:	R value 0.04m^{2}K/W
Thermal conductivity:	0.066W/mk

Ondutile Accessories

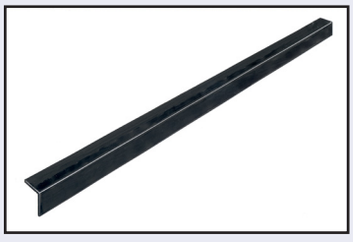
A full range of Ondutile accessories are available. including the essential eaves components as follows:



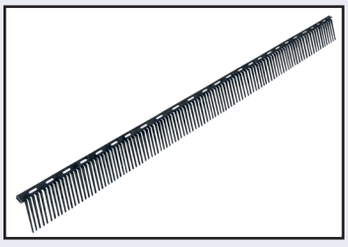
Onduline Corrugation Fillers - Length 855mm



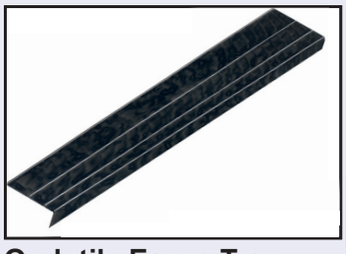
Onduline Apron - Closure Flashing - Length 930mm



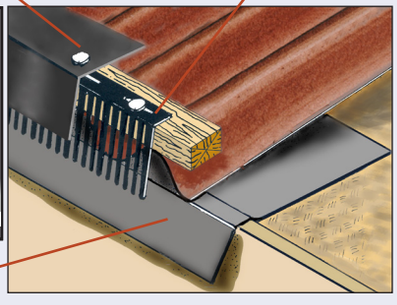
Ondutile Batten Cloak Piece - Length 1.220m



Ondutile Ventilator Comb - Length 1.000m



Ondutile Eaves Tray - Length 1.500m



Ondutile Fixing Details

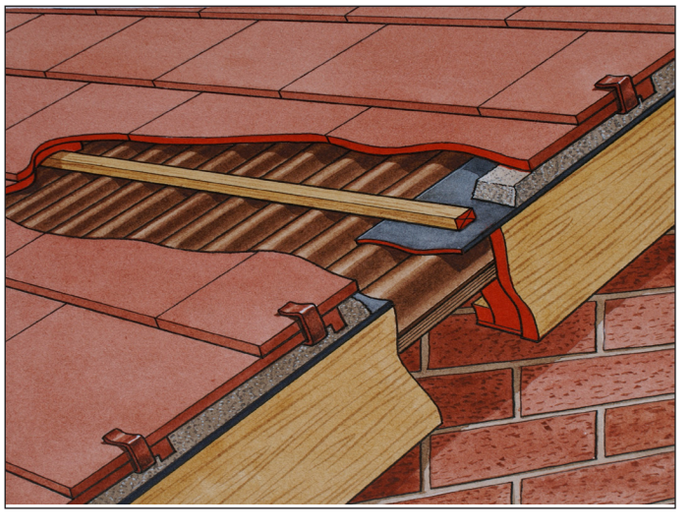


Fig.3 Verge detail

Ondutile can be used with wet or dry verge systems. The wet system, illustrated, utilises a 150mm undercloak and timber barge boards. Ondutile can also be fixed onto brick verges by laying the Onduline sheets and support battens onto the inner block course. The outer brickwork course is then laid level with the top of the Onduline corrugation. A DPC is then dressed from the outer course onto the Onduline sheet. Tile battens and undercloak can now be fixed and the tiles laid in accordance with the manufacturer's instructions.

Fig.4 Side wall abutment

Form Ondutiss or similar improved felt membrane flashing on top of the Onduline sheet providing a 3-corrugation cover onto the Onduline sheets and dress up the wall behind the line of the primary flashing and secure with tile battens. The side wall abutment is then finished with a conventional two part wall abutment flashing in accordance with LDA details.

Fig.5 End wall abutment

Use Ondutiss improved roofing membrane or similar to form a felt apron flashing from the top of the Onduline sheet to form an upstand to the wall behind the line of the primary flashing.
The tile battens and tiles can then be fixed and the primary two-part lead flashing can be applied in accordance with LDA details.
Abutment ventilators can also be used by providing additional support below the Onduline sheet as required, the ventilator can then be laid directly onto the Onduline sheet and fixed in accordance with the manufacturer's instructions after first checking that the unit is suitable for use at a reduced pitch.

Fig.6 Ridge and hip detail

At ridge and hips, lay Ondutiss roofing membrane across the butt joint in the Onduline sheets and dress down a minimum of 300mm either side of ridge. When using ventilation products, the Ondutiss cover can be trimmed to enhance the flow of the ventilation into the tile batten cavity.

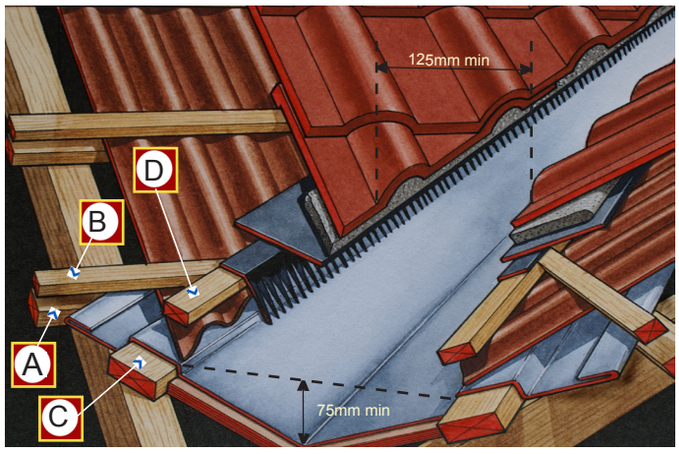


Fig.7 Valley detail for Type A specification

Lay Valley boards allowing for greater width due to the increased depth of finished roof section. Fix trimming battens (C) to support battens (A) up line of valley. Valley lining can then be laid. Cut and fix Onduline sheets, overlay with upper trimming battens (D) and tile battens (B). Fix ventilator comb and undercloak. The tiles can then be cut and laid on a mortar bed in accordance with manufacturer's instructions. On gutters with high velocity rain water run off, eaves filler or plastic woven ventilator mat can be used to seal the lower Onduline corrugation.

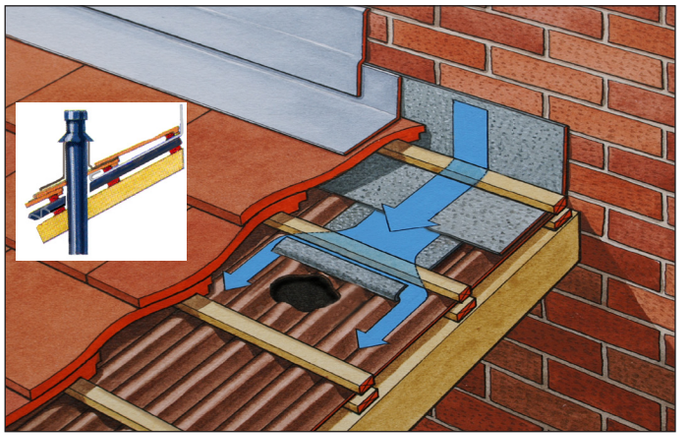


Fig.8 Tile Ventilator or soil vent pipe flashing unit detail

Position ventilator between tile battens and cut neat hole in the Ouduline and decking on plain tile applications, the Ventilator socket can then be fitted. If the unit is close to the ridge / abutment a roofing membrane can be dressed down from under the cover of the abutment cover and welted back to divert rainwater run off to the corrugations either side of the opening. Alternatively if the opening is further down the roof an Onduline apron flashing can be used for this purpose.
It is recommended to check with the manufacturer of the ventilation or pipe flashing unit that it is suitable for use at a reduced pitch.

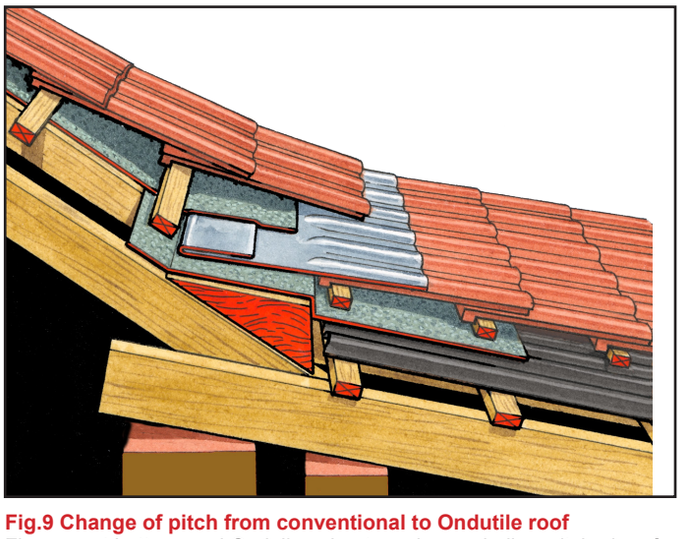


Fig.9 Change of pitch from conventional to Ondutile roof

Fix support battens and Onduline sheets on lower shallow pitched roof. Lay tilting fillet from upper steep pitched roof to finished height of tile course on lower roof (allow space for tile fixing). Overlay Onduline sheet with Ondutiss membrane and dress up over tilting fillet and under felt from upper roof. Fix tiles to lower roof and lay lead apron flashing to LDA specifications. Finally dress felt from upper roof over lead apron. Tiles can then be laid on upper roof.

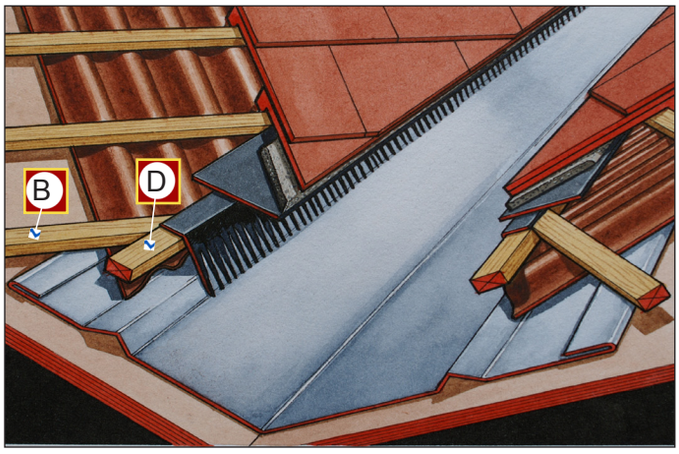


Fig.10 Valley detail for Type B specification

Lay tilting fillet to decking up line of valley. Allow for wider valley width due to increased depth of finished roof section. Valley lining can then be laid. Cut and fix Onduline sheets. Overlay with tile battens (B) and trimming batten (D) up line of valley. Fix ventilator and undercloak. Cut and lay tiles on a mortar bed in accordance with manufacturer's instructions. **For slate or flat profile tiles:** To increase depth of mortar bed to tiles, fix undercloak below trimming/tile battens. Ventilator comb can be replaced by woven plastic ventilation mat laid below Onduline corrugations to provide ventilation whilst preventing insects from accessing the roof space.

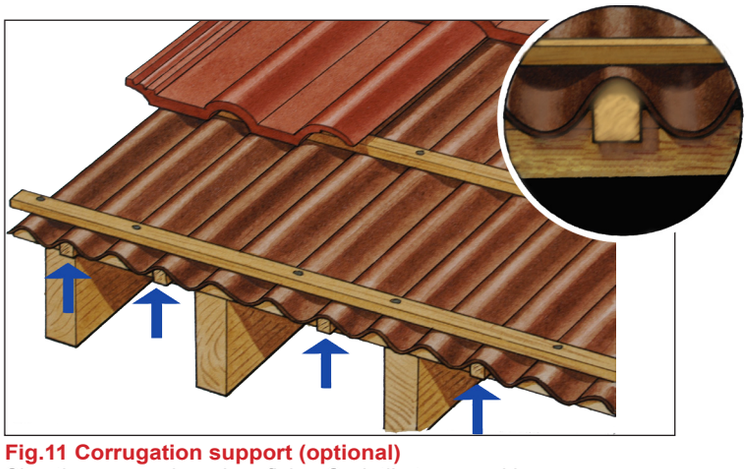


Fig.11 Corrugation support (optional)

Situations can arise when fixing Ondutile to curved bays or on steep roof pitches where additional support is required to the Onduline corrugation. In these cases rounded timber inserts are used bellow the Onduline corrugations on every fifth course. They should not be used as mechanical fixing points as the timber insert section is insufficiant to resist splitting when nailing.

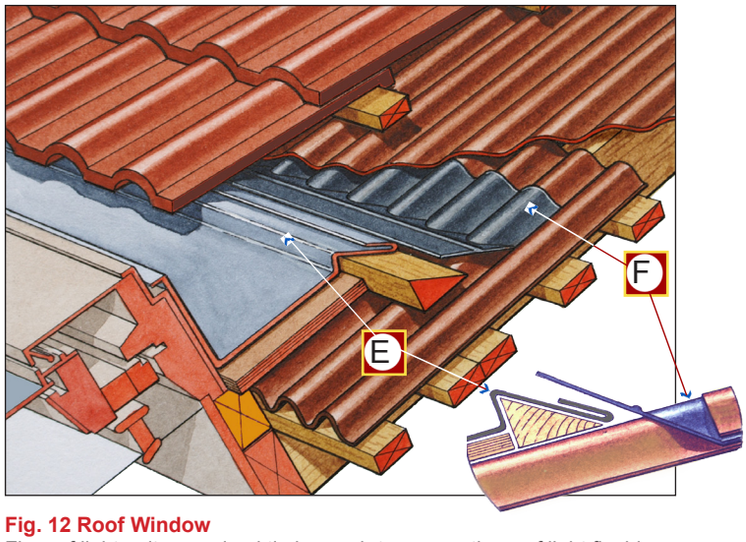


Fig. 12 Roof Window

Fix roof light units on raised timber curb to ensure the roof light flashing kit aligns with the roof tiles. Weather unit to rear by creating a water check 'dam' in the corrugation which is constructed by forming a 300mm lap joint in the Onduline sheet to the rear of the roof light back gutter (E) into which an Onduline Apron / Closure Flashing is inserted (F) which is consolidated by fixing the tile battens . The 'Dam' created directs any water into the corrugations either side of the opening. The roof window must be installed in accordance with manufacturer's instructions.

Supply
The Ondutile Roofing System is available from stock through authorised distributors. A complete list can be obtained on application. For bulk delivery please contact Onduline Building Products Ltd sales office direct.

Application
Onduline roofing systems must be laid in strict accordance with the relevant Fixing Guide or Ondutile and Oversheeting literature and maintained as directed.

Guarantee
The Ondutile system is guaranteed to remain weatherproof for thirty years when fixed in strict accordance with our fixing instructions and maintained as directed. The guarantee is limited to the replacement cost of Onduline material only and does not extend to the primary tile / slate roof covering, labour, related construction or third party costs.

Caution
Covering of roofs can be a hazardous operation. All work must be carried out with due regard to health and safety regulations as set out in HSG33 (Roof work).

Conditions Of Use
As a result of product development, specifications and product dimensions may be changed without prior notice. Ondutile has been developed in consultation with major roof tile manufacturers for use on roofs below their normally recommended minimum pitch.

Warning:
Only the quality standard of Onduline PPHR sheet is suitable for use with the Ondutile system under tile applications in accordance with the BBA certification and Ondutile UK Patent 2233683.
Note: The new 24mm low line Ondutile sheet is being introduced soon.






Designed & produced by TKK Design 2009

Onduline®
Onduline Group

BBA BRITISH BOARD OF AGREMENT CERTIFICATE NO. 96 / 2855

CE
DECLARATION OF CONFORMITY
Manufactured in compliance with European Union Directives
Mandates M022 & M122 in Form of the European Construction Product Directive 89/106/CEE and under clauses of Annexe ZA table ZA.1 of EN534. Corrugated Bitumen Sheets standard

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