



Application Handbook



B.C. SHAKE & SHINGLE ASSOCIATION



Product Description

Western Red Cedar is scientifically classified as a “Durable” species in the United Kingdom and because of this durability it is widely favoured by architects and engineers seeking an aesthetically pleasing, light weight alternative to traditional roof and wall tiles. For over a century Western Red Cedar Shakes and Shingles have proven to be a superior material for roof and wall cladding which is durable, warm and resistant to extremes of wind and weather. In an environmentally conscious world they are clearly the Natural Choice!

Installed Weights:

Type	Weight per kg/m ²
#1 400mm shingles	9.7
#1 600mm shingles	20.8
Premium Grade 600mm Medium Shakes	18.2
Premium Grade 600mm Heavy Shakes	27.0

Material for this manual has been compiled from various authorities in Canada and specialists in the United Kingdom. Minor variations from the application principles may occur between regional specialists but in no instance should these compromise the integrity of the roof or walls provided by the details in this manual.

Shakes

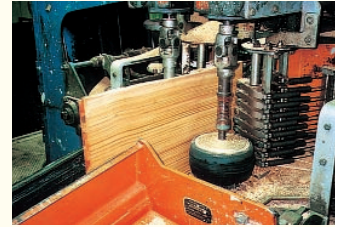
1. Hand split and Resawn Shakes

Cedar blocks of appropriate length are split by a hydraulically powered knife, called a cuber, into straight boards, or blanks. Then the blank is fed into a bandsaw, which saws the blank from corner to corner, producing 2 tapered shakes, each with a natural split face and sawn back. Shakes are produced in 2 lengths, 455mm and 610mm, and 2 grades, Number 1, which allows 20% flat grain content, and Premium Grade, which is 100% vertical grain. Shakes are available in Heavy (19mm), Medium (13mm), and Jumbo (25mm) butt thickness.



2. Tapersplit and Straight Split

Tapersplit shakes are produced largely by hand, using a sharp bladed steel knife, or fro, and a wooden hammer, or mallet. Alternating the cut from opposing ends of the block produces a natural taper, which is unique to cedar. Splitting from the same end of the block with each cut yields a straight split shake. These split shakes are available in two lengths, 455mm and 610mm, and variable thickness of 13 to 16mm.



3. Tapersawn Shakes

Tapersawn shakes have the appearance of the smooth faced shingle, but the extra thickness of the shake, allowing for the same installation procedures and exposures of the shake, provided felt underlayment paper is used as is for shakes. Produced by sawing both faces on shingle or taper saw machines, the taper is achieved by the mechanical angle setting of the machinery relative to the saw blade for each cut.



Shingles

Sawn on both sides, relatively smooth face and back, and produced in lengths of 405, 455, and 610mm. The Number 1 Grade Shingle is the premium grade for roofs and sidewalls. The lesser grades of 2, 3, and 4 allow for mixed grain, knots, and other defects.

Rebutted and Rejointed Shingles

Shingles which have been remanufactured by retrimming, to produce perfectly square butts and sides. Uses include applications where tightly fitting or parallel joints between shingles are desired. Available with unsanded, smooth sanded or “natural grooved” striated faces, and natural colour or factory primed in a variety of colours. Packaged in boxes with coverage of 4.6 square metres at exposure of 190mm.



Designer (Fancy Butt) Shingles

These shingles add flair and design innovation to walls, with a selection of 9 different butt profiles. Produced from # 1 Grade Shingles, all clear edge grain heartwood. Uniform width of 127mm and length of 425mm. A 96 piece carton will cover 2.3 sq metres at exposure of 190mm.



Treatments

Preservative:

Western Red Cedar Shakes and Shingles readily accept pressure preservative treatment. This treatment solution has been proven safe and effective in further preserving shakes and shingles against decay and insect attack. Preservative treatment is highly recommended in areas of high humidity, tree proximity, and rainfall. Additional warranty coverage is issued with pressure preservative treated shakes and shingles.

Fire Treatment:

Permanent fire protection is given to Western Red Cedar Shakes and Shingles by means of retardant chemical pressure impregnation. Fire Treated Cedar Shakes and Shingles may be specified where U.K. Building Regulations call for AA classification.

Maintenance:

Shingles and shakes are generally maintenance free but to increase the longevity, debris accumulating on the roof should be swept off with a stiff broom or wire brush. Installation of a 100mm zinc strip exposed at the ridge will also aid in preventing moss growth.

GENERAL ROOF DESIGN DETAILS

Battens

Shingles shall be applied over softwood lumber battens of 25 x 38mm minimum dimension over rafter minimum dimension of 75 x 38mm, with maximum rafter centres of 600mm. Larger battens of 25 x 50mm are required for 100 x 51mm rafters with rafter spacing of up to 812mm (Figure 1). Shakes require minimum batten dimension of 19 x 50mm. Wider battens are recommended for alpine regions where snow load is a factor. Solid sheathing is acceptable for use under preservative or fire treated shingles or shakes. Solid sheathing is usually wafer-board panels or plywood which provides a smooth base for roofing (Figure 2).

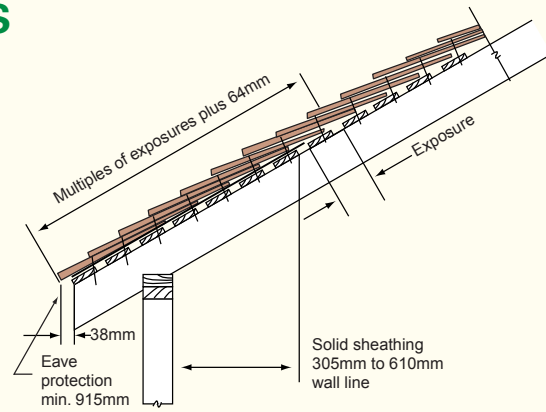


Figure 1: Shingles Applied Over 25 x 38mm Minimum Battens

Shingles

Space sheathing 25 x 38mm minimum battens to coincide with the weather exposure (Table 2, page 16) of the shingles. Thus, if the shingles are to be laid at 140mm to the weather, the battens would also be spaced at 140mm on centre, measured from 38mm past the fascia board. A one metre strip of roofing felt paper may be installed at the eave edge for additional protection. Shingles must be doubled or tripled at eaves. Spacing between adjacent shingles (joints) should be a minimum of 6mm and maximum of 9mm. Joints in any one course should be separated not less than 38mm from joints in adjacent courses; and in any three courses, no two joints should be in direct alignment (Figure 3). Extend shingles over gable moulding 38mm.

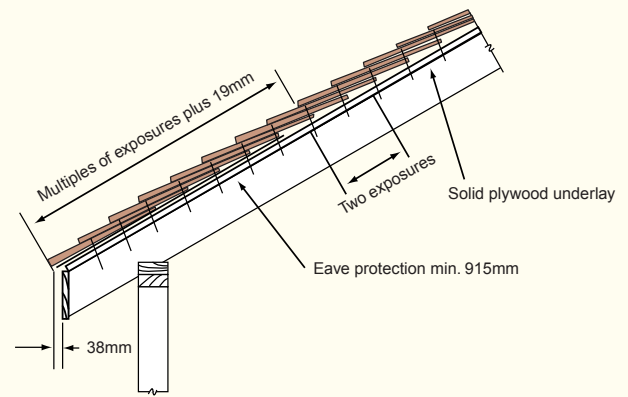


Figure 2: Treated Shingles Applied Over Solid Sheathing

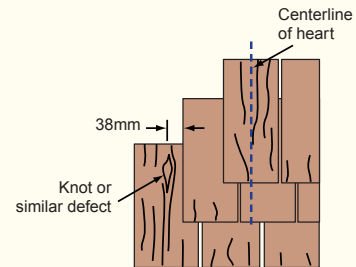


Figure 3: Joint Alignment For Shingles and Shakes

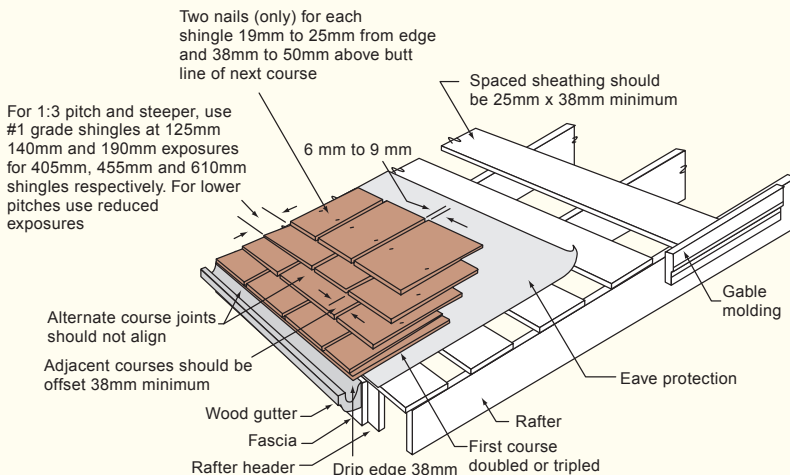


Fig. 4: Shingle Application

Shakes

In shake application, battens of 25 x 50mm minimum are spaced on centres equal to the weather exposure (Table 4, page 16) at which the shakes are to be laid, measured from 38mm past the fascia board. Maximum weather exposure for 455mm shakes is 190mm, and for 610mm shakes is 255 mm.

Breathable membrane interlay at the eave and between the shake courses is required whether battens or solid sheathing is used. The felt interlay, complying with BS747:4016/5250/5534, acts as a baffle that prevents wind driven snow or other foreign material from entering the attic cavity during extreme weather conditions. The interlays also increase the roof's insulating value. The first row of 1 metre felt interlay is placed at the eave line, then the first double course of shingles or shakes is applied, overhanging the fascia by 40mm. The next row of .5 metre felt paper is placed so that its lower edge is at a distance of twice the weather exposure from the butt. Installing the felt paper any lower will expose it at the gaps between shakes and detract from the roof's performance. The top of the felt paper should be tacked to a batten. When succeeding rows of felt paper are then installed at the actual weather exposure distance, the bottoms of the felt paper rows will act as convenient placement guides for the butt lines of succeeding rows of shakes (Figure 5). The tips must be tucked under the second row or felt paper as application proceeds up the roof. Shakes, like shingles, are normally applied in straight, single courses. The split face is always installed to the weather, the sawn face to the deck. The starter course may be one or two layers of cedar shingles or shakes, overlaid with the desired shake. Spacing between adjacent shakes should be a minimum of 9mm and maximum of 16mm. Joints between shakes should be offset 38mm over adjacent courses (Figure 5).

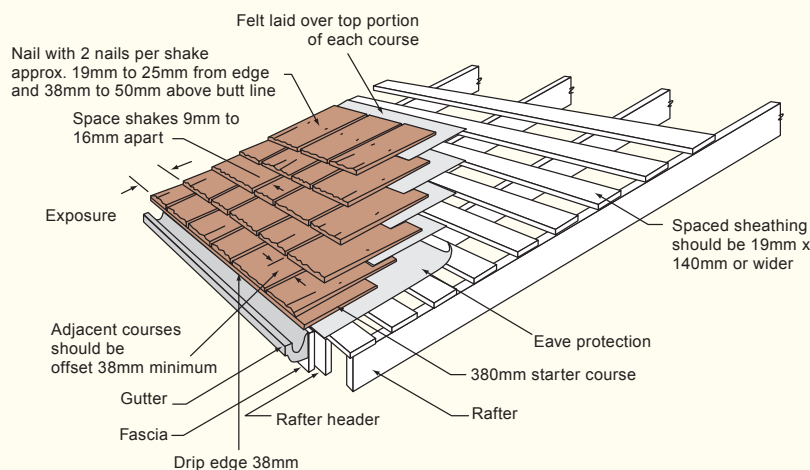


Fig. 5 Shake Application

MANSARD ROOF DETAILS

The mansard is particularly well suited to renovation work on pitched roof houses because the upper story can be enlarged without adding extra height to the structure. The conversion of a pitched roof bungalow to a mansard provides a floor area on the upper floor that can be identical to the main floor area.

The low downward slope of the mansard roof line acts visually to reduce the scale of a building and helps to eliminate a boxy appearance. This technique is used frequently on large commercial projects, particularly those near residential neighborhoods. It is also a common solution to the problem of avoiding a monotonous appearance on flat-roofed frame apartment buildings.

Properly used, a mansard roof can strengthen the design without substantially increasing construction costs. If raised up above the level of a built-up roof, the mansard can screen out roof penetrations or mechanical equipment.

The variety of mansard roofs is practically infinite. One of the most widely used (and misused) roof designs, its proportions and scale are very important and care should be taken to avoid a mansard roof line that is either too skimpy or too generous.

Two of the most widely used roofing materials on the mansard roof are Western Red Cedar shingles and shakes. Cedar shakes, with their heavier texture and solid appearance, are perhaps more frequently specified for mansards although shingles are also used, particularly when a lighter scale is desired. The light weight and ease of application of shingles and shakes contribute substantially to economical construction. They can be installed over light framing—usually spaced battens—thus affording a considerable saving in both materials and labor as opposed to cladding that requires a solid base. This cost saving factor, combined with their excellent insulating qualities and attractive appearance, contributes to the increasing popularity of shingle and shake mansard roofs.

Construction details for typical mansard roofs are shown in Figure 6.

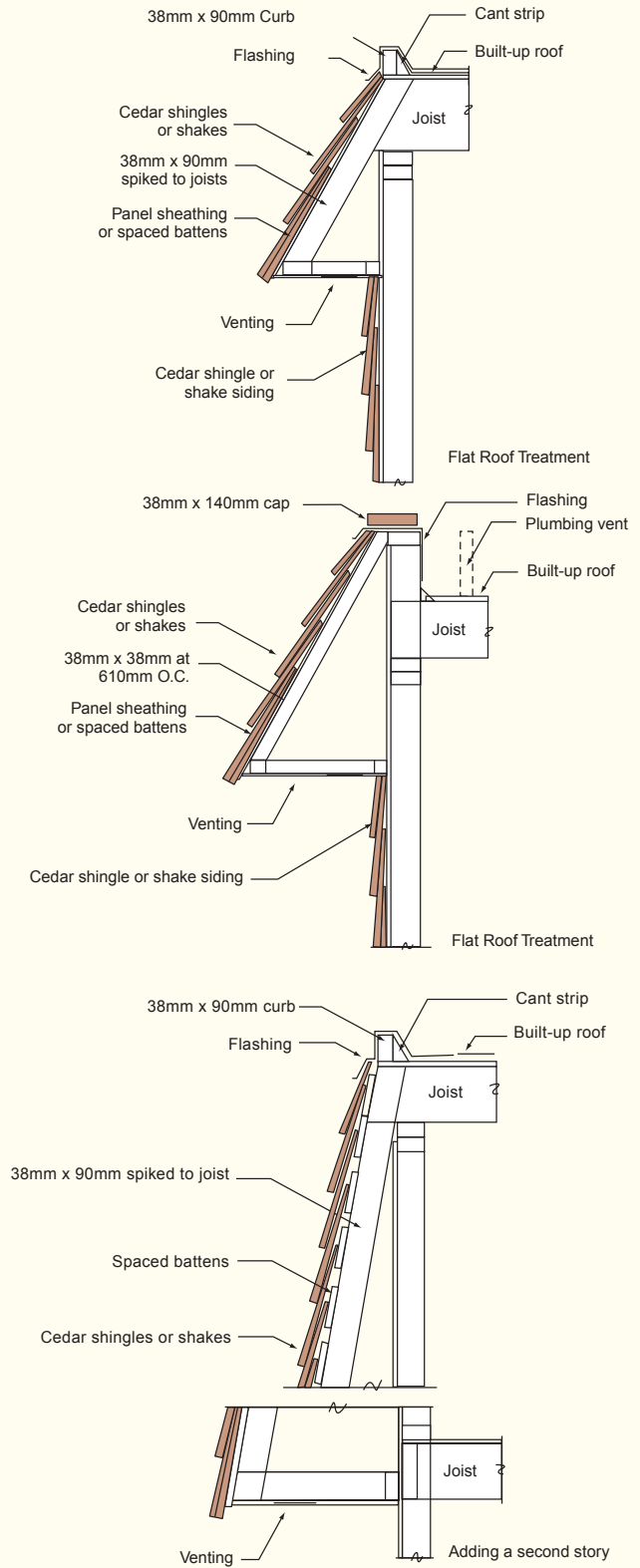


Fig. 6: Shingle and Shake Mansard Roofs

LOW SLOPE ROOF DETAILS

The minimum roof slope on which shakes and shingles are recommended is 19 degrees. It is possible, however, to apply shingles or shakes successfully to solid sheathed roofs of lower slope providing a special method of application is followed (Figure 7). The prescribed method provides a double roof on which the shingles or shakes are applied to a lattice-like framework embedded in a bituminous surface coating.

A conventional hot-mop (or suitable roll-type) asphalt roof should be applied over the roof deck. With the final hot-mop application 38mm x 90mm spacers of Western Red Cedar or preservative treated lumber are embedded in the bituminous coating. These spacers are installed over the rafters at 610mm O.C. and extend from eave to ridge.

Next, 19mm x 90mm or 19mm x 140mm nailing strips, spaced according to the weather exposure selected for the shingles or shakes, should be nailed across the spacers to form a lattice-like nailing base. For example, if 610mm shakes are to be installed at a weather exposure of 255mm, the nailing strips would also be spaced at 255mm on centers.

Finally, the shingles or shakes are applied in the normal manner with a starter course at the eave and felt interlays between each course of shakes (Figure 7).

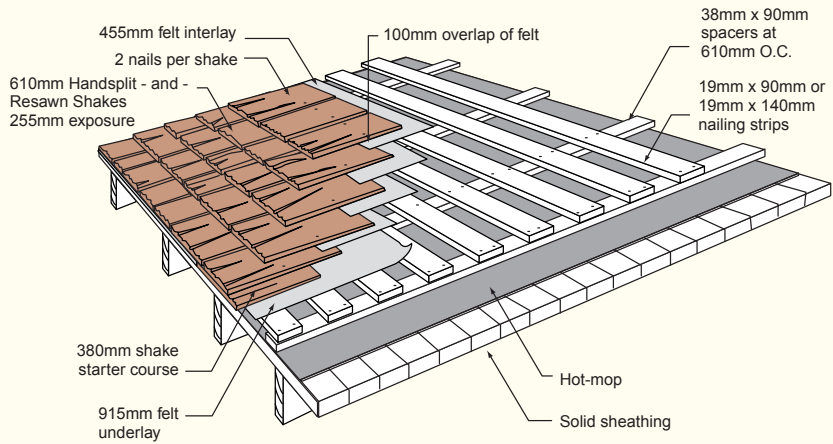


Fig 7: Application of Shakes to Low Slope Roofs

HIP AND RIDGE DETAILS

Intersecting roof surfaces at hips and ridges should be capped to ensure a weathertight joint. Site-made or factory assembled hip and ridge units may be used, but both types must have alternate overlaps and concealed nailing (Figure 8). Weather exposures should be the same as the field of the roof. Nails must be longer than those used on the field of the roof and of sufficient length to penetrate 13mm into or completely through the sheathing.

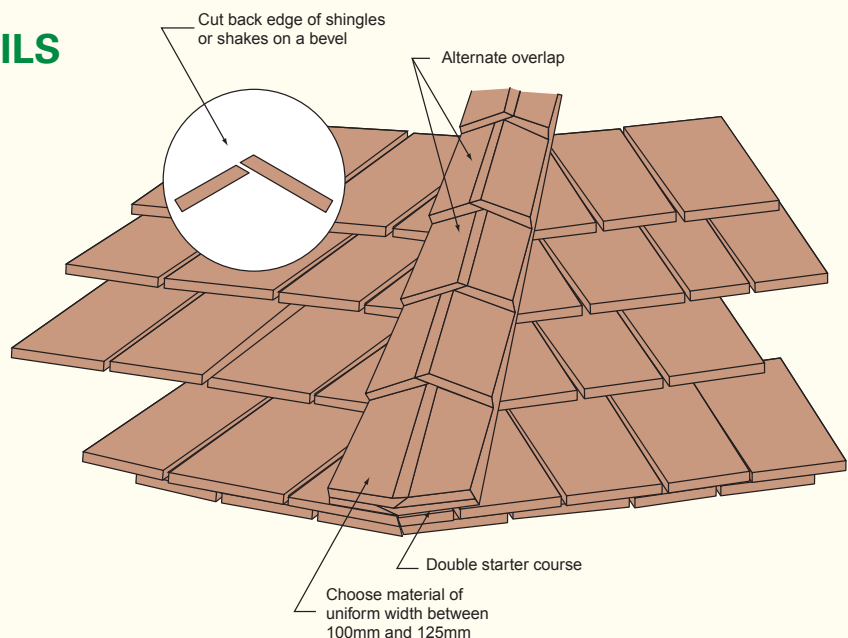


Fig 8: Hip and Ridge Application

ROOF JUNCTURE DETAILS

Correct construction of roof junctures is vital to ensure weathertightness. In the following cases, where metal flashing is employed, it should be no less than 26 gauge galvanized steel (or acceptable equivalent). It should be painted on both sides with a good metal or bituminous paint. Flashing materials should be painted after bending to maintain the integrity of the coating.

Convex Juncture

On this type of juncture (Figure 9) metal flashings should be installed to cover the top 100mm of the wall and the bottom 200mm of the roof slope before the final course of shingles or shakes is nailed to the top of the wall. A narrow band of shingles or shakes—or a strip of wood molding—should be applied horizontally after the final wall course is installed. A double or triple starter course is then applied at the eave, with a 38mm overhang of the wall surface. The roof can then be completed in the normal manner.

Concave Juncture

Metal flashings for the concave juncture (Figure 10) are similar to those for the convex type. They should be installed to cover the top of the roof slope and the bottom 100mm of the wall before the final course of shingles or shakes is installed. The final roof course should be installed so that the tips fit as snugly as possible against the wall at the juncture. A double starter course should be applied at the start of the wall surface and the remaining wall courses applied in the recommended manner.

Apex Juncture

On this roof juncture (Figure 11) metal flashing should cover the top 200mm of the roof and the top 100mm of the wall. It should be installed before the final course of shingles or shakes is applied to the wall. The recommended sequence of application is to apply shingles or shakes first to the wall, then to the roof. The overhanging roof material is then trimmed flush with the wall. Finally, specially prepared ridge units are applied over the wall-roof juncture so that in each matching pair the roof piece overlaps the wall piece each time.

Swept or Bell Eave

When shingles or shakes are to be applied to a swept or bell eave where the curvature is excessive, it may be necessary to soak them for a period (usually overnight) or steam them prior to installation. A double starter course is employed in the usual manner. Exposure is determined by the slope of the roof and the type of shingle or shake selected.

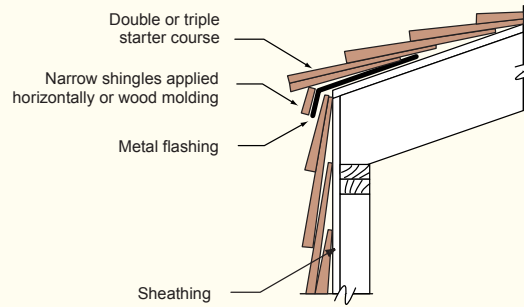


Fig. 9: Convex Roof Juncture

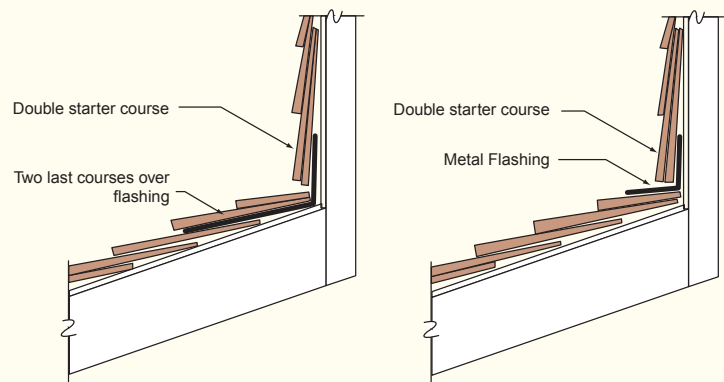


Fig. 10: Concave Roof Juncture

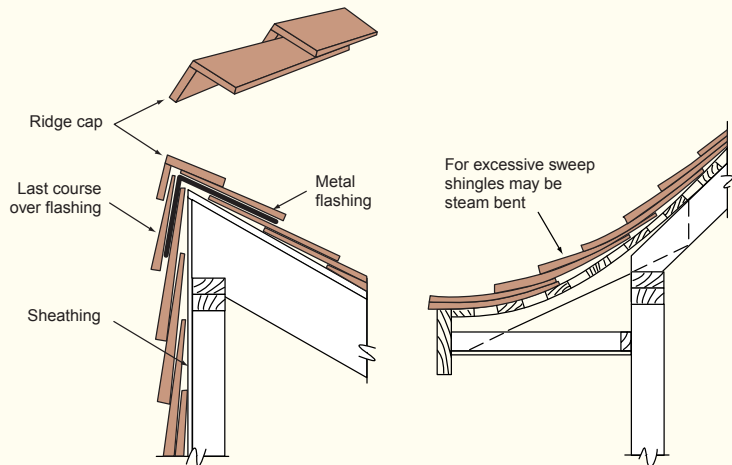


Fig. 11: Apex Roof Juncture and Swept or Bell Eave

ROOF VALLEY FLASHING DETAILS

Most roof leaks can occur where water is channelled off the roof or where the roof abuts a vertical wall or chimney. At these points, metal valleys and flashings are used to assist the shingles or shakes in keeping the structure sound and dry.

Structural members that protrude through a roof should also be flashed at all intersecting angles to prevent leakage. Step flashing should extend under the shingles or shakes and up the vertical surface and should be covered by a second layer of flashing (counterflashing).

Flashing should be pre-painted both sides using a good metal or bituminous paint. Flashing strips which must be bent to sharp angles should be painted after bending. Metal flashing with baked-on enamel coating is available in some areas. Different flashing metals are available in different areas depending on climatic variations. It is good practice to use metals that have proven their reliability under the specific conditions to be encountered. It is important that metal flashing have the same longevity as Western Red Cedar.

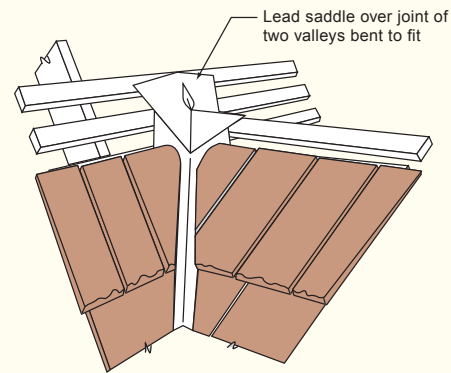
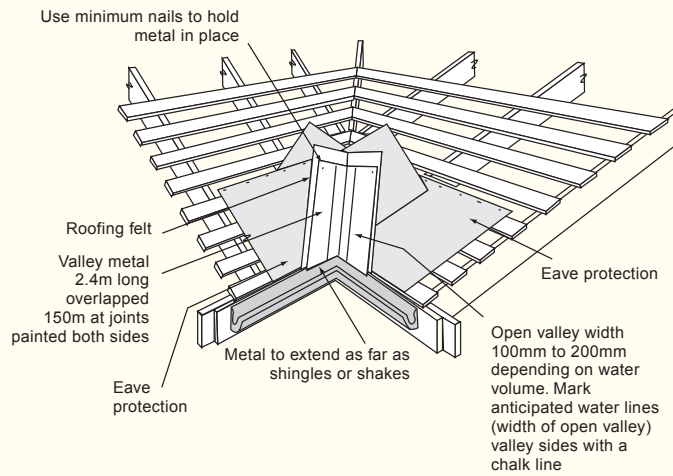
Valleys—Shingles

For roofs with slopes of 1:1 or greater, valley flashing should extend not less than 178 mm on each side of the valley centerline. For roof slopes less than 1:1, flashing should extend not less than 255mm each side. Valley flashing should be center-crimped, painted galvanized steel or aluminum. Valley metal should be underlaid with No. 15 (minimum) roofing felt, but is optional when spaced sheathing is used. Shingles should not be applied with their grain parallel to the valley centerline and those extending into the valley should be cut at the correct angle (Figure 12). Joints between shingles must not break into the valley.

Valleys—Shake

On shake roofs it is recommended that a strip of No. 15 (minimum) roofing felt be installed over the sheathing and under the metal valley. This is optional when spaced sheathing is used.

Metal valleys should be center crimped, painted galvanized steel or aluminum and have a minimum total width of 510mm. In some areas, however, flashing width requirements may differ and local building codes should be consulted. Shakes should not be applied with their grain parallel to the valley centerline and those extending into the valley should be cut at the correct angle (Figure 12). Joints between shakes must not break into the valley.



Typical saddle flashing

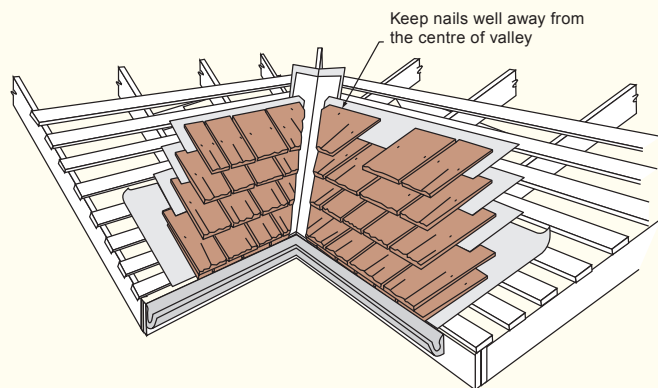


Fig. 12: Flashing Details for Shingle and Shake Valleys

ROOF PROJECTION FLASHING DETAILS

Recommend construction details for applying metal flashings around typical roof projections such as chimneys and vent pipes (Figure 13).

For roofs and walls, the use of stainless steel, phosphor, or silicone bronze nails is recommended.
 Standard shingle nails are 31mm x 1.8mm stainless steel annular ring shanked.
 Standard shake nails are 50mm x 2mm stainless steel annular ring shanked.
 Nails shall be driven flush but not so that the nail head crushes the wood. They shall be placed approximately 19mm to 25mm from the edges of the shingles or shakes and 38mm to 50mm above the butt line of the following course. Each shingle or shake shall be secured with two nails.

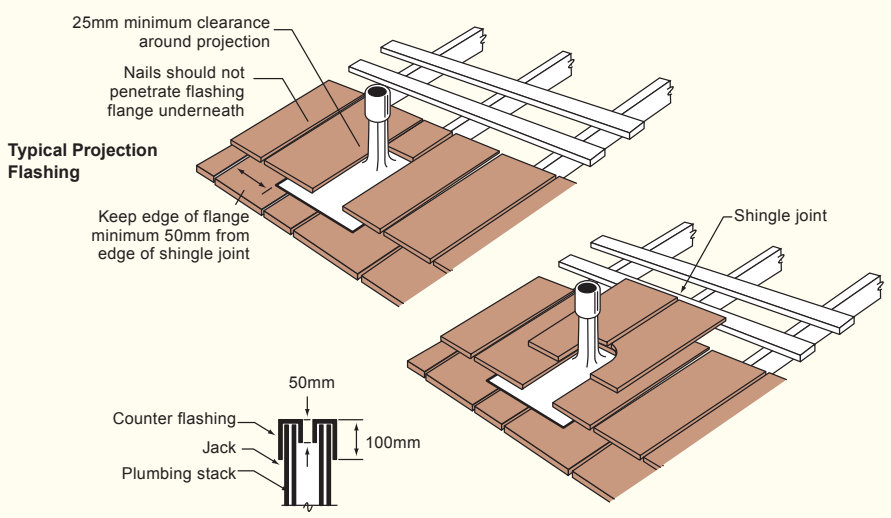
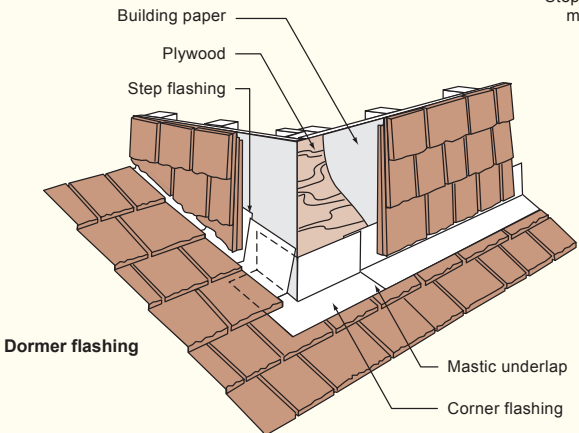
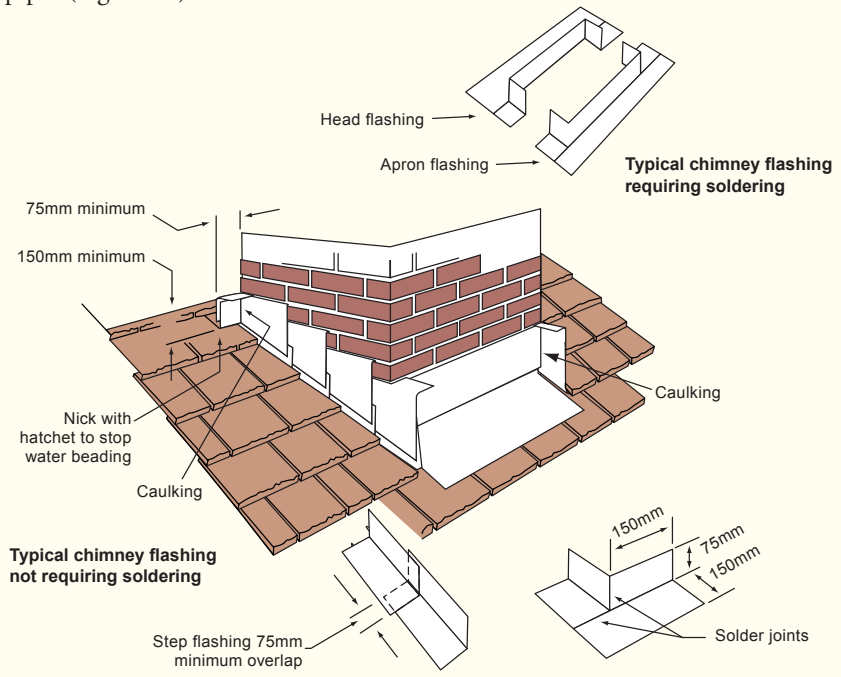


Fig. 13: Flashing Details for Typical Roof Projections

VENTILATION DETAILS

The importance of good attic ventilation beneath the roof cannot be over-emphasized. Such movement of air will prevent or inhibit condensation of moisture on the undersurface of the shingles or shakes, or on the roof decks. Vents should be provided at the soffits (eaves) as well as at gable ends (screened to prevent ingress of insects), with cross-ventilation desirable. A rule of thumb for adequate ventilation is that the ratio of total net free ventilation area to the area of the attic should be not less than 1:150, with compensation made for screens over vent apertures. Attic fans may be beneficial, these supplying additional movement of air in attic spaces.

Several examples of construction techniques which provide roof ventilation are shown in Figure 14.

VAPOUR BARRIER GUIDELINES

The decision on whether to use a separate vapour barrier must be made by the designer, based on the type of building, its end use, and its geographic location. A separate vapour barrier is sometimes omitted on a sandwich-type roof deck when the weather-shedding skin is not a membrane-type impervious to the transmission of water vapour. Although some types of rigid insulation have the properties of a vapour barrier, a layer of roofing felt is often placed between the deck and the insulation as an air check. Many specifiers still prefer to use a separate vapour barrier because it prevents vapour from condensing in the insulation, which reduces the overall efficiency.

Where a vapour barrier is used, care must be taken to ensure that the dew point is well to the outside of the vapour barrier in order to prevent condensation on the deck. Ideally, the vapour barrier should be as close as possible to the warm side of the roof, and the thickness of the insulation should be increased as the deck thickness increases to maintain the correct location of the dew point. In unevenly heated buildings such as churches and halls, or buildings such as swimming pools where an unusually high level of moisture is generated, the excess humidity may have to be removed by mechanical means to prevent condensation on the deck. In air-conditioned buildings, use of the cold weather roof system allows a constant flow of air between the insulation and the roofing, helping to reduce the energy required for cooling.

Full details on the cold weather roof system are given on page 14.

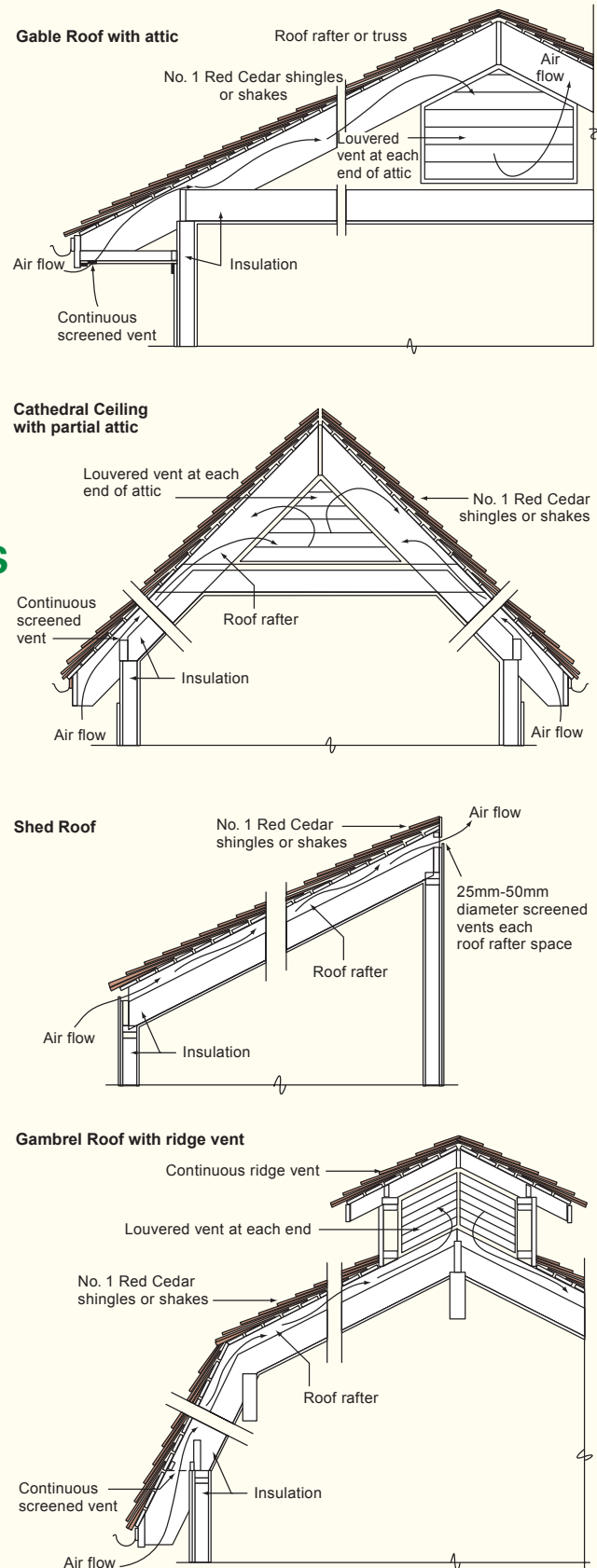


Fig. 14: Ventilation Details

SPECIALTY ROOF DECK DETAILS

Wood Deck

Wood decks form an ideal base over which to apply cedar shingles or shakes, since they can be attached in the conventional manner.

Where a layer of insulation, normally one of the rigid types, is to be included, the problem of how to fasten shingles or shakes is created. The use of abnormally long nails driven through the shingles, the insulation, and into the deck below is generally unsatisfactory, and horizontal strapping will be required to overcome the fastening difficulties (Figure 15). When strapping is used, fewer nails penetrate through the insulation to the deck, and greater thermal efficiency is achieved by reducing the number of conductors. In addition, the lengths of the nails may be chosen to prevent the points from protruding through the deck where they may mar the inside face.

If ice-damming is a potential problem or if reverse condensation is likely to occur, such as may be encountered in an ice arena, the cold weather roof system should be used in conjunction with horizontal strapping, and ventilation must be provided at the eaves and at the peak. In buildings such as ski cabins that may be subjected to heavy snow loads, it is usually necessary to fasten wood members (typically 38mm x 90mm on edge) from ridge to eave on the roof deck and place the rigid insulation between. Strapping is then applied across the top of these members, giving a ventilated air space and avoiding compression of insulation (Figure 16).

The need for strapping can often be completely eliminated by the use of a false plywood deck, immediately over the insulation, to which the shingles or shakes are directly fastened (Figure 17). Exterior-grade sheathing panels are ideal for this purpose, since they provide a strong, smooth surface. However, under certain conditions of pitch and loading, there may be a tendency for the entire roof above the decking to creep downwards, bending the nail fastenings and compressing the insulation, thereby reducing its efficiency. In such cases, it is often desirable to install the vertical members as previously described.

Nails

If the shingles or shakes are nailed directly through rigid insulation, a number of problems may be encountered. For instance, the longer nails have thicker shanks which tend to split the shingles or shakes. In addition, movement of the shingles or shakes as they go through natural expansion and contraction cycles caused by wetting and drying, have a tendency to enlarge the holes in the insulation, thereby reducing its efficiency. For this reason, the use of strapping or false plywood deck is again recommended.

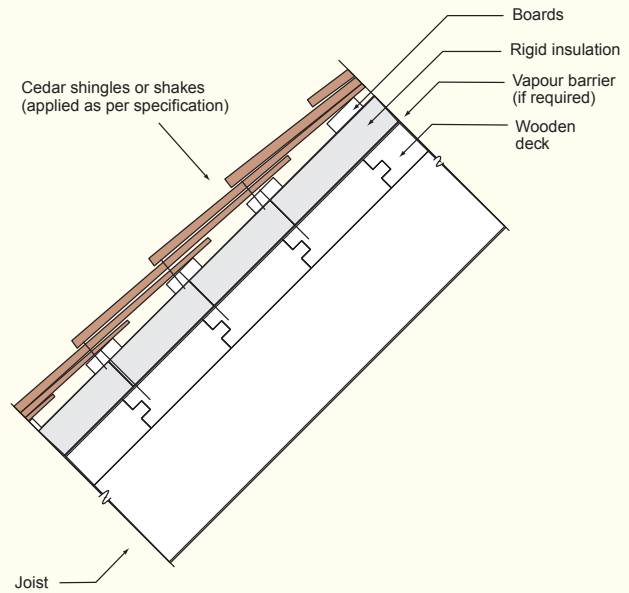


Fig. 15: Specialty Roof Deck – Strapping over Insulation

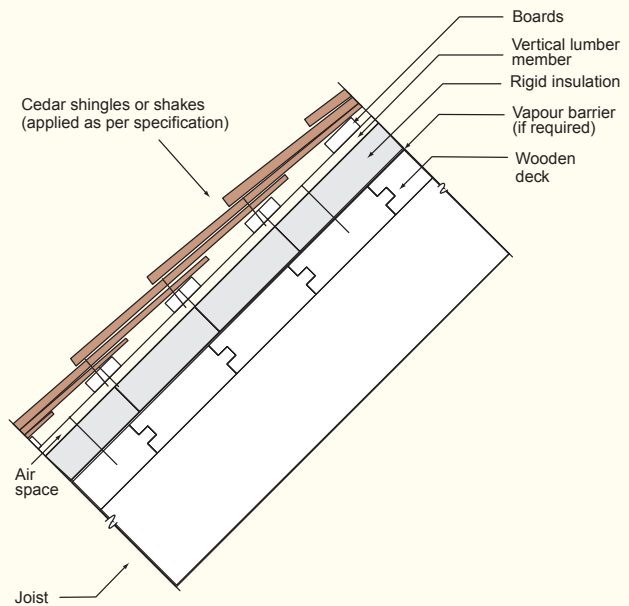


Fig. 16: Specialty Roof Deck – Vented Roof

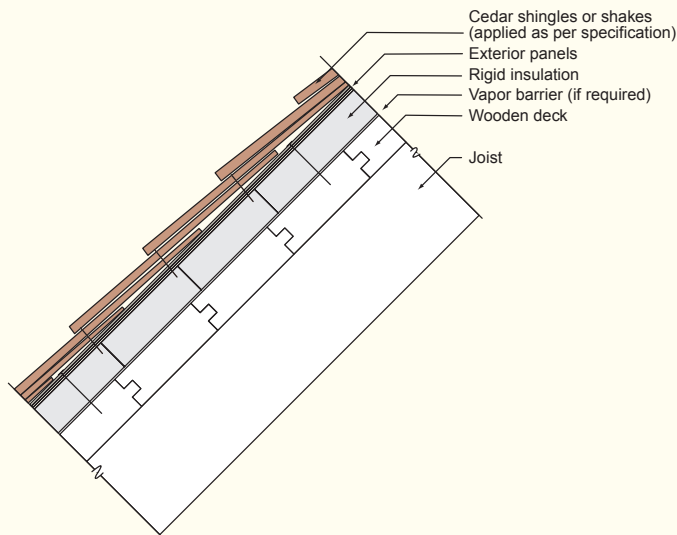


Fig. 17: Specialty Roof Deck – Panels over Insulation

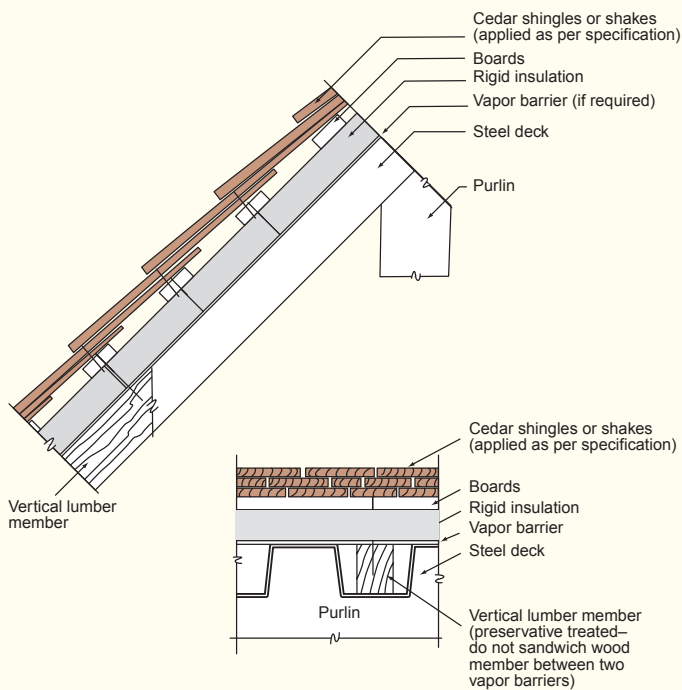


Fig. 18: Specialty Roof Deck – Steel Roof

Rigid Insulation

Numerous types of rigid insulation are now in use, and may be made from expanded polystyrene beads, rigid urethane laminate, low density fiberboard, or from fast-setting liquids poured on-site. They vary in thickness up to more than 50mm and in length and width depending upon the manufacturer. All these types are efficient insulators and are usually of sufficient density to hold the weight of a normal roof covering without the need for lumber bridging.

Metal Deck

The covering of metal decks with shingles or shakes presents a rather unique problem. These decks are often used for economic reasons, but they generally require a finish roofing capable of shedding the weather. In addition, aesthetic considerations often require that the deck itself be covered with a material such as Western Red Cedar shingles or shakes to provide a pleasing finish. When a metal deck is to be covered, consideration should be given to the use and placing of vapour barriers. If insulation is placed on top of a metal deck, the entire roofing system must be taken into account. For example, wood members must not be sandwiched between two vapour barriers. If this is unavoidable, the wood member should be preservative treated before installation. In some cases, the seams in a metal deck can be sealed to create an effective vapour barrier. Boards or a panel deck must be used as a nailing base for the shingles or shakes, supported by vertical lumber members fixed to the deck. This can be achieved in a number of ways:

1. On a corrugated deck, vertical lengths of lumber are fastened to the deck and horizontal boards or panels are applied across the vertical pieces. If insulation is required, it is best placed on top of the vertical members, held in place by the nails fastening the boards or panels to the members (Figure 18).
2. On a sheet deck, or where the corrugations are very shallow, it may be necessary to use angle clips to attach the vertical members to the deck. The clips should be nailed to the lumber and bolted or screwed to the deck. Boards or panels are then applied as before.

If there is a likelihood of excessive moisture buildup, as may be encountered in ice arenas, the cold weather roof principle can be employed, supplemented by mechanically produced air flow if necessary.

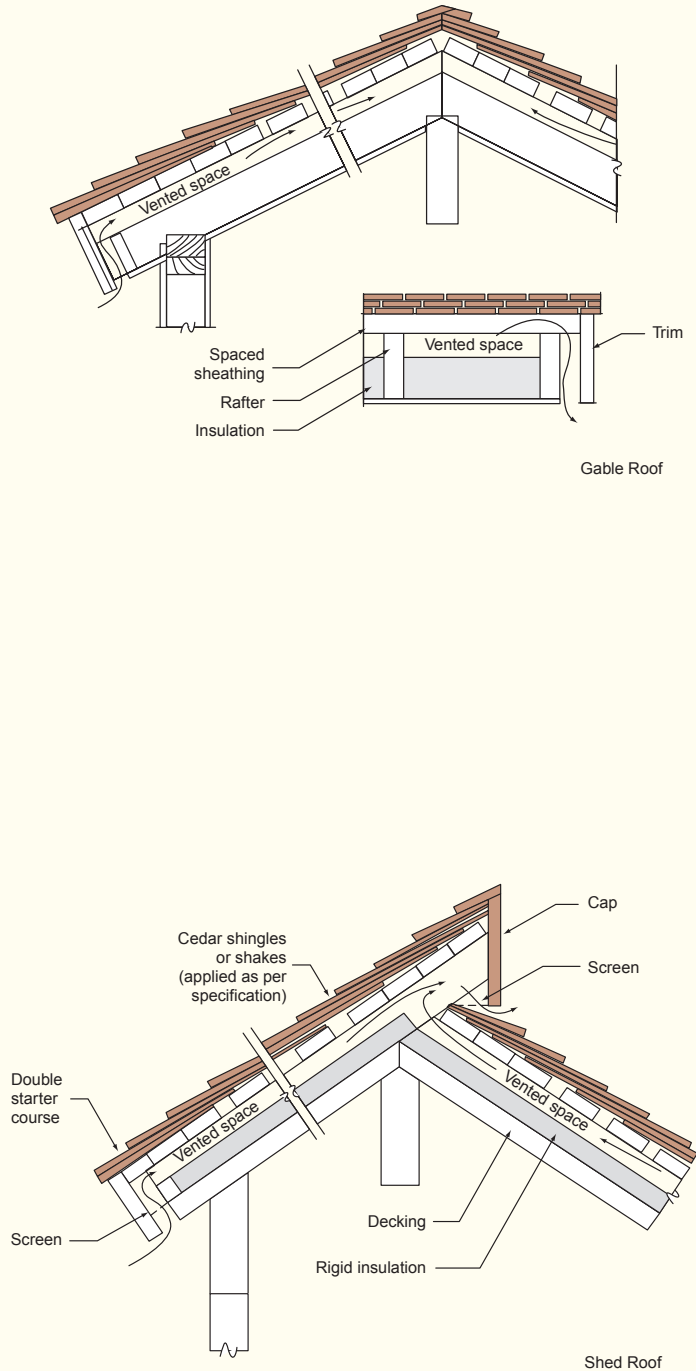
COLD WEATHER ROOF SYSTEM DETAILS

Western Red Cedar shingles and shakes are an excellent roofing material for cold weather areas that experience heavy snowfall and severe temperature extremes. A natural wood product, they offer the advantages of durability, superior wind resistance, and good thermal and acoustical properties. As with any other roofing material, however, their best performance depends upon proper design, sound construction practice, and correct installation.

In cold weather areas and particularly in mountain regions that experience very heavy snowfall, the cold weather roof—or vented roof system—is recommended (Figure 19). The principle of this system is to allow a constant flow of cold air above the insulation but below the roofing material. With other roofing systems, ice build-up along the eaves can be a problem. Heat escapes from the insulation and melts snow which runs down the roof to the cold overhangs where it freezes, causing water to back up and sometimes penetrate the roof systems. A properly installed, vented cold weather roof eliminates this problem. Venting space should be sufficient to allow a free flow of air from eave to rooftop.

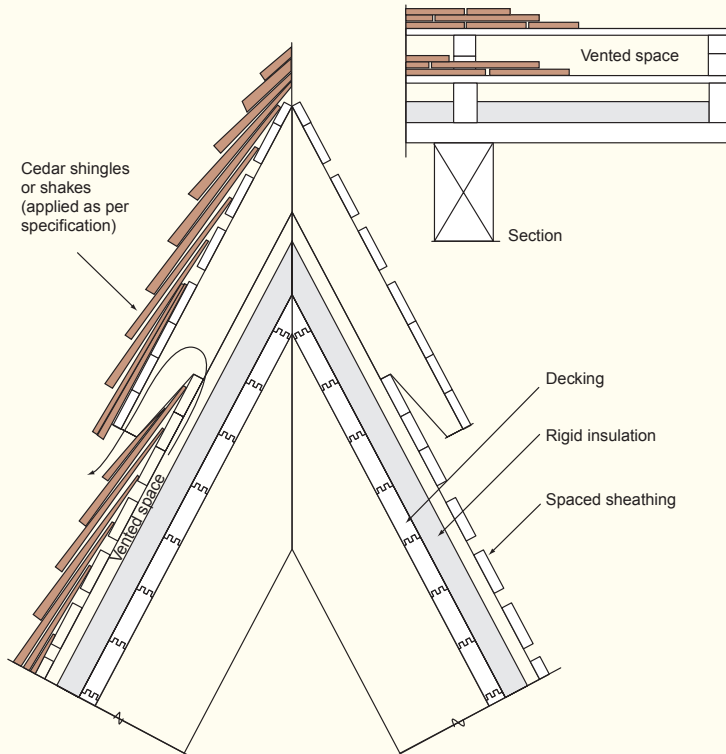
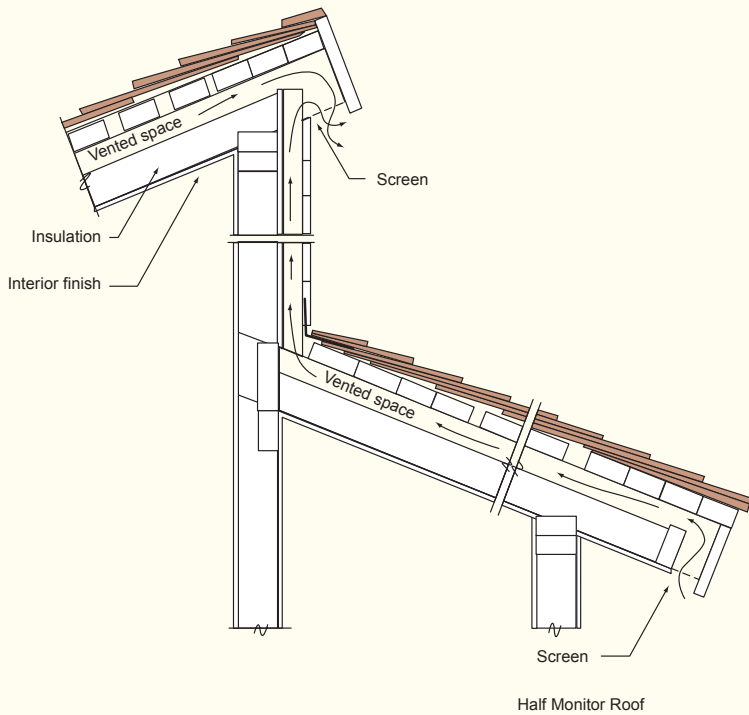
There are a number of important considerations that influence roof performance in areas of heavy snowfall, particularly mountain regions.

Design, of course, is very important. The steeper the roof the better the performance. Chimneys should be located at the ridge or gable ends away from possible snow pressure on the slopes. Plumbing pipes should be located on inside walls and should be extended between the rafters and vented at the ridge. If this is not practical then plumbing vent pipes should be galvanized iron, well anchored inside the roof. (Plastic vent pipes extending through the roof may be dislodged by sliding snow.)



Cold Weather Roof Systems

Fig. 19: Cold Weather Roof Systems



Wide overhangs at the eaves should be avoided as they provide large cold areas for snow and ice build-up. A strip of metal along the eaves helps shed ice quickly. Sliding ice and snow are constant hazards and should be given primary consideration in the total building design. Outside doors should not be located at the bottom of a roof slope. Entrances and all pedestrian traffic areas are better situated beneath the gable ends of the roof.

In regions of heavy snowfall, shingles and shakes should be laid as a three-ply roof and installed by competent tradesmen according to the recommendations given in the pertinent sections of this manual.

Starter course for shingle roofs should be three layers. For shake roofs, superior construction at the eave is achieved by using two layers of shingles and one of shakes. Shingle or shake side lap should be increased to 50mm. The entire roof must be laid with the same precautions as those taken for any other type of wood shingle or shake roof, with eave protection and an interlay felt between shakes.

Care in cold weather roof design and installation will result in a sound roof system giving many years service during severe extremes of winter temperatures and snowfall.

GENERAL WALL DESIGN DETAILS

Cedar shakes and shingles' beautiful appearance, superior insulative value, adaptability to diverse design forms, and low maintenance make them the Natural Choice for exterior and interior wall applications.

Exterior Walls

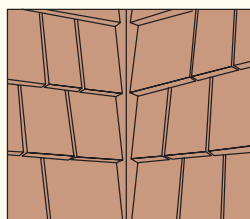
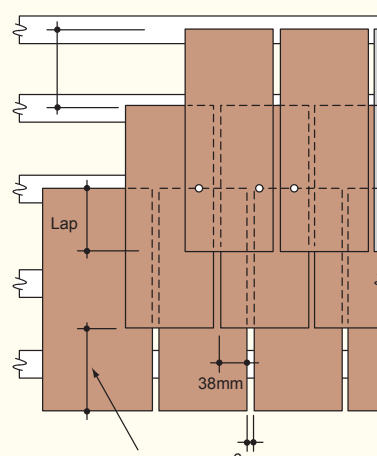
Prepare the walls by removing or pounding nails or protruding objects flush. Solid sheathing or spaced battens are recommended for wall installation. Apply BS747:4016/5250/5534 breathable felt paper, overlapping 50mm horizontally, 150mm vertically, and 100mm around inside and outside corners. Metal flashing installed over the paper at the inside corners protects the felt paper from tearing.

Next, the installation of vertical corner boards eliminates the requirements of mitering and lacing at outside and inside corners. Western Red Cedar boards of 19 x 100mm, and 19 x 81mm, nailed together form outside corner units. Square boards of 38 x 38mm are nailed to the inside corners. Mitering and lacing details are pictured for optional installation information.

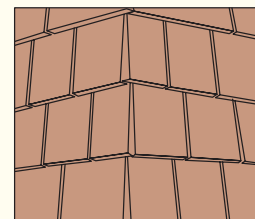
Silicon Bronze annular ring nails or stainless steel nails 31mm x 1.8mm for shingles, and 50mm x 2mm for shakes are recommended. Apply two nails only per shingle or shake, 25mm above the exposure line and 25mm in from the sides. Double the first course at the base of the wall, on a line 25mm below the top of the foundation. The outer course is applied 12mm lower than the inner course as a drip course to help shed water. As the wall is already covered with felt paper, no further interlayment of felt paper is required for shingles or shakes. Wall exposure for shingles and shakes should be no more than 40% of their length, to provide full coverage in the spaces between them. The use of a straight edge board nailed lightly to the wall with the top edge at the butt line, keeps courses straight and level. Shingles and shakes will expand and contract slightly once installed, and should be spaced a few millimetres apart to accommodate.

Interior Walls

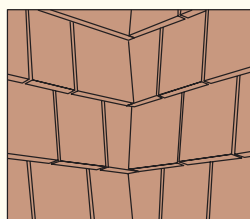
Shingles and shakes may be fastened onto nailable surfaces such as plywood or battens. Calculate the number of rows from floor to ceiling, based on the exposure of no more than 40% of the shingle or shake length. Minor exposure adjustment may be made to achieve equal length exposure at the top course. Install the battens according to the exposure, with the batten centre at the nailing point of 25mm above the exposure distance. Double the first course to conceal the wall. A straight edge tacked to the wall will keep the courses straight and the exposure consistent. Glue or use finishing nails for the top course. Alternately overlap at the outside corner to give a laced effect, then trim flush with a block plane. Install a western red cedar 38mm x 38mm batten at inside corners for ease of application. Alternately, trim to lace alternate courses into the corners.



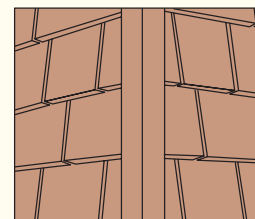
Shingles butted against square wood strip on inside corner, Flashing behind



Laced outside corners



Laced inside corner with 38mm x 38mm batten, Flashing behind



Shingles butted against corner boards

Designer (Fancy Butt) Shingles

Many interesting and pleasing design alternatives can be achieved with the use of Designer Shingles. Butt profiles of square, round, arrow, fish scale, half cove, diamond, diagonal, hexagonal, and octagonal can be combined to accommodate imaginative profiles. Application methods are the same as normal shingles, however, with the exact width dimension of all designer shingles, care must be taken to centre each shingle over the two shingles below, to produce a balanced appearance. For interior application, the normal gap left between shingles may be closed up.



Finish Coatings

Western Red Cedar Shingles and Shakes may be left uncoated, and will age naturally on exterior and interior walls, or finish coating may be applied.

The wall is ready for finish coating immediately after installation. For interior or exterior finishing, use oil based clear coat, semi-transparent, or semi-solid stains. Water based stains and common latex paints are not recommended, as natural tannins in the cedar will react and send unsightly extractive bleeding blotches onto the surface.

For exterior finishing, highest quality 100% acrylic latex paint may be chosen, provided a top quality oil based stain blocking primer is applied as undercoating.



Coverage and Exposure Tables

1 Square = 9.2 square metres or 100 square feet

Shingle Coverage Table 1

LENGTH AND THICKNESS	Approximate coverage of one square (4 bundles) of shingles based on following weather exposures								
	90mm	100mm	115mm	125mm	140mm	150mm	165mm	180mm	190mm
405mm x 5/50mm	6.7	7.4	8.5	9.3	–	–	–	–	–
455mm x 5/55mm	–	6.7	7.6	8.3	9.3*	–	–	–	–
610mm x 4/50mm	–	–	–	–	6.9	7.3	8.1	8.8	9.3*

NOTE. *Maximum exposure recommended to roofs.

Shingle Exposure Table 2

PITCH	Maximum exposure recommended for roofs								
	Length (mm)								
	No 1 Blue Label			No 2 Red Label			No 3 Black Label		
	405mm	455mm	610mm	405mm	455mm	610mm	405mm	455mm	610mm
14° to 19°	95	108	146	90	100	140	75	90	125
19° and steeper	125	140	190	100	115	165	90	100	140

Shake Coverage Table 3

SHAKE TYPE, LENGTH AND THICKNESS	Approximate coverage (in sq. m) of one square, when shakes are applied with 13 mm spacing, at following weather exposures, in inches (d):				
	125mm	140mm	190mm	215mm	255mm
455mm x 13mm Handsplit-and-Resawn Mediums (a)	–	5.1	6.9	–	–
455mm x 19mm Handsplit-and-Resawn Heavies (a)	–	5.1	6.9	–	–
455mm x 16mm Tapersawn	–	5.1	6.9	–	–
610mm x 9mm Handsplit	4.6	–	6.9	–	–
610mm x 13mm Handsplit and Resawn Mediums	–	–	6.9	7.8	9.3
610mm x 19mm Handsplit and-Resawn Heavies	–	–	6.9	7.8	9.3
610mm x 16mm Tapersawn	–	–	6.9	7.8	9.3
610mm x 13mm Tapersplit	–	–	6.9	7.8	9.3
455mm x 9mm Straight-Split	–	6.0	8.3	7.8	–
610mm x 9mm Straight-Split	–	–	6.9	7.8	9.3
380mm Starter-Finish course	Use supplementary with shakes applied not over 255mm weather exposure.				

(a) 5 bundles will cover 9.2 sqm roof area when used as starter-finish course at 255mm weather exposure; 7 bundles will cover 9.2 sqm roof area at 190mm weather exposure; see footnote (d).
 (b) Maximum recommended weather exposure for 3-ply roof construction
 (c) Maximum recommended weather exposure for 2-ply roof construction
 (d) All coverage based on 13mm spacing between shakes
 (e) Maximum recommended weather exposure

Shake Exposure Table 4

PITCH	Maximum exposure recommended for roofs	
	Length (mm)	
	455mm	610mm
19° and steeper	190mm	255mm (a)

(a) 610 x 9 mm handsplit shakes limited to 125mm maximum weather exposure.

Formula for calculating at reduced exposures:

square footage
 \div reduced coverage
 = total material required

Example:

You are estimating a roof that measures 296 sq. metres.

You have decided to put 405 mm shingles (No. 1 Blue Label or No. 2 Red Label) at 100mm exposure.

The above coverage table (Table 1) tells you that a 4-bundle square at 100mm exposure covers 7.4 square m.

$296 \div 7.4 = 40$ squares of material

Weights Table

Installed Weights Shingles kg/m ²	125 gauge	95 gauge
	Untreated	6.14
Preservative treated	12.28	16.09
Fire retardant treated	7.02	9.25

Installed Weights Shakes kg/m ²	250 gauge	190 gauge
	Untreated	7.1
Preservative treated	10.93	14.39
Fire retardant treated	8.2	10.8





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