

STEEP-SLOPE ROOFING

SECTION 6 - METAL TILE ROOFING

6.1 DECKS

6.1.1 General

- .1 When battens are to be fastened directly to the structural roof decking the decking shall be minimum 13mm (1/2") thick plywood or 11mm (7/16") oriented strand board (O.S.B.) sheathing. The surface of the decking shall conform to a sheathing grade under C.S.A. standards.
- .2 When battens are to be fastened to the rafters or roof trusses the decking shall be minimum 10 mm (3/8") thick plywood or O.S.B.

6.1.2 Strength

- .1 The roof framing and decking shall be designed of sufficient strength so that they will support the anticipated load such as construction loads. Roof decks shall be free of damaged, deteriorated or decayed wood.

6.1.3 Surface

- .1 The surface of all roof decks to which a roofing system is to be applied shall be sufficiently clean and dry so that proper attachment can take place.
- .2 Roofing over existing roofing materials is not permitted; tear off old materials to expose the decking.
- .3 Repair damaged or deteriorated decking with similar material prior to reroofing.

6.1.4 Slope

- .1 For issuance of the Warranty Certificate the following slope and application requirements apply:

3:12 (1:4) and Greater Use an acceptable underlayment below metal tiles.

Less than 3:12 (1:4) to
Minimum 2 ½ :12 (1:4.8) Use an ARCA accepted membrane below
metal tiles

6.2 ROOFING MATERIALS

6.2.1 General

- .1 Materials shall be adequately labeled so that proper identification of the materials may be made.

6.2.2 Protection and Storage

- .1 All roofing materials shall be protected from moisture, which would result in its moisture content being above the manufacturer's published moisture equilibrium for that material.
- .2 Rolls of felt shall be stored on end, covered and out of danger of water penetration.
- .3 Metal roofing tiles shall be protected from damage and surface abrasion during fabrication, shipment and site storage prior to application.

6.2.3 Application Limitations

- .1 No roofing material shall be applied when the weather or the condition of its substrate is such that the required installation procedures could not be followed or which would jeopardize the performance of the roofing system.
- .2 **Cautionary Note:** Due to the variations and complexities of construction, obtain ARCA approval for application variations not specifically identified by ARCA Minimum Requirements.
- .3 Follow the manufacturers written application guidelines, which exceed ARCA Minimum Requirements.
- .4 No Warranty Certificate will be issued where the ground snow load exceeds 3.5 Kpa (75 lbs/ft²).

6.2.4 Metal Tile Panels

- .1 The roofing tiles shall be pressure formed from minimum 26 GA. Aluminum - Zinc alloy coated sheet steel complying with ASTM A792M to Manufacturers' profiles and finished with a factory applied finish.

6.2.5 Nails

- .1 Nails used for roofing shall conform to CSA Standard B111. Nail diameter and head size shall be selected to meet good roofing practices* and the manufacturer's recommendations.
- .2 Nails and other fastening devices used above the underlayment shall be hot dipped galvanized steel.

6.2.5.1 Fastener Length

6.2.5.1.1 Fastening Battens to Truss

- .1 Nails for fastening battens shall be galvanized Ardox nails of sufficient length to penetrate a minimum of 25 mm (1") into the rafter or truss. If using screws to fasten battens they shall be of sufficient lengths to penetrate a minimum distance of 25 mm (1") into the rafter or truss.

6.2.5.1.2 Fastening Tiles to Battens

- .1 The use of nails is not permitted.
- .2 Use color matched manufacturer supplied screws of sufficient length to penetrate a minimum distance of 25 mm (1") into the battens but not long enough to penetrate the underlayment. Follow the manufacturers written application guidelines.

6.2.5.1.3 Fastening Accessories to Members

- .1 For fastening accessories use manufacturer supplied screws of sufficient length to penetrate a minimum of 25 mm (1") into the supporting member or follow manufacturer's written application guidelines.

6.2.5.2 Staples

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- .1 The attachment of metal tiles with staples is not permitted.

6.2.6 Battens

6.2.6.1 Counter Battens

- .1 Counter battens shall be minimum 10 mm x 40 mm (3/8" x 1-1/2") Spruce/Pine/Fir Standard or better meeting the requirements of CSA Standard CAN3-0437.0 or O.S.B. installed parallel to the roof slope over the underlayment and eave protection and fastened to the roof rafters or trusses whenever possible.

6.2.6.2 Tile Battens

- .1 Tile battens shall be minimum 38 mm x 38 mm (1 1/2" x 1 1/2") Spruce/Pine/Fir Standard No. 2 or better, or structurally equal installed perpendicular to the roof slope or steel hat channel battens designed to tile manufacturers' installation requirements.

6.3 FLASHING AT INTERSECTIONS

6.3.1 Materials

- .1 Flashing shall consist of not less than:
 - (a) 0.41 mm (30 ga.) thick Z275 galvanized steel;
 - (b) or approved alternates.

6.3.2 Valley Flashings

- .1 Closed valleys are not permitted with metal tile roofing.
- .2 Open valleys shall be used where sloping metal tiling roofing intersects to form a valley.
- .3 Open valleys shall be flashed with not less than one (1) ply of a self adhering S.B.S. modified bituminous membrane covered with a sheet metal valley flashing formed to provide a minimum of 178mm (7") wide open water channel.

- .4 To a clean dry roof deck, uniformly adhere minimum 914mm (36") wide sections of S.B.S. membrane centered on the valley centerline. Overlap and seal S.B.S. membrane end laps a minimum distance of 150mm (6").
- .5 The sheet metal valley flashing may be formed to the tile manufacturer's recommended profiles and dimensions or formed from 450mm (18") wide sheet metal with brake formed returns along each side minimum 38mm (1½") high located at a minimum distance of 89mm (3½") back from the valley centre line to form a water channel.
- .6 In the direction of the water flow overlap valley flashing end laps a minimum distance of 200mm (8") and fasten to the decking along exterior edges at 400mm (16") centers maximum.
- .7 At the eaves, overhang the valley flashing a minimum distance of 25mm (1") beyond the eave line.
- .8 A sheet metal saddle shall be installed across the tile joint at the intersection of two valley heads.

6.3.3 Wall Flashing

- .1 The horizontal intersection of a wall and a sloping roof shall be flashed with not less than one layer of sheet metal. The metal shall provide not less than 150 mm (6") upstand and 100 mm (4") overlap onto the tiles. The wall flashing shall be galvanized steel formed to fit the tile; or other metals brought to the line of the tile and the space between the flashing and tile sealed.
- .2 Where roof panels are to have field bent terminations, the bent panel edge shall extend a minimum distance of 100mm (4") above the highest point of the roof panel surface at the wall junction.
- .3 Wall or counter flashings shall overlap bent field panel upstands by a minimum distance of 75mm (3").

6.4 CHANNELS, STEP AND WALL FLASHING

- .1 Channels, step and wall flashings shall be used at junctions between the sloping roof and vertical walls, chimneys and skylights in accordance with manufacturer specifications.
- .2 Bituminous flashings shall extend not less than 150 mm (6") up the abutment, and behind the vertical sheathing paper, where installed.
- .3 Where installed, the vertical sheathing paper shall overlap the bituminous flashing not less than 75 mm (3").
- .4 Where a channel or valley does not drain directly into an eaves trough but onto the top of another roof, galvanized steel sheet shall be installed at the lip of the channel and extend not less than 150 mm (6") onto the roof to ensure proper drainage. Support shall be provided beneath the galvanized steel sheet.

6.5 PROTRUSIONS

6.5.1 Vent Pipes

- .1 All penetrations shall be sealed at both the tile and underlayment levels. Vent pipe penetrations shall be curbed or shall be sealed with a neoprene gasket installed over the pipe, fastened to the sheathing, and sealed to the underlayment with caulking. After tile is laid, a galvanized steel flashing shall be installed over the vent pipe and fitted to the profile of the tile with a head lap of not less than 75 mm (3") to the adjacent tiles or a proprietary device providing equivalent protection. The vent flashing shall extend a minimum distance of 200mm (8") above the roof panel surface.

6.5.2 Chimneys and Skylights

6.5.2.1 Back Pan Flashing

- .1 A sheet metal flashing, not less than 450 mm (18") wide, shall be installed across the full width of chimneys and skylights and shall extend not less than 150 mm (6") on either side.
- .2 The flashing shall:
 - (a) extend a minimum distance of 150 mm (6") up a chimney and 100 mm (4") up a skylight;
 - (b) extend up the roof under the tile, not less than the greater of
 - (i) to the first tile batten; and
 - (ii) the height of upstand at the chimney or skylight and be canted at the base a minimum of 100 mm (4");
 - (c) meet the requirements of Article 9.26.4.7 of the National Building Code.

6.5.2.2 Front and Side Flashings

- .1 Chimney and skylight front and side flashings shall be installed in accordance with Clause 6.3.3. and the manufacturers written installation instructions.

6.5.2.3 Circular Chimneys

- .1 A sheet metal flashing shall be installed over the chimney pipe and fitted to the surface of the tile with a head lap of not less than 75 mm (3"). The jackflashing shall extend 200mm (8") above the top surface of the roof panels.

6.6 EAVE & VALLEY PROTECTION AND ANGLE FLASHING

6.6.1 Eave & Valley Protection

- .1 Eave protection shall extend from the roof edge a minimum distance of 900 mm (3') up the roof slope to a line not less than 300 mm (1') inside the inner face of the exterior wall. (See ARCA Technical Bulletin on Ice Dam protection.)
- .2 Valley protection shall extend not less than 450 mm from each side of the valley centre line.

6.6.2 Materials

- .1 Eave and valley protection shall consist of one of the following:
 - (a) No. 15 asphalt-saturated felt laid in two plies lapped 480 mm (19") and cemented together with lap cement
 - (b) No. 25 glass fiber coated base sheet.
 - (c) self-adhering S.B.S. modified bituminous membrane.
 - (d) or approved CSA alternatives.

6.6.3 Drip Edge Flashing

- .1 The installation shall include prefinished or galvanized sheet metal rake and eave drip edge flashings. The deck flange shall extend a minimum distance of 75 mm (3") onto the roof decking and shall be nailed to the rafters prior to the application of the eave protection or tiles. Space the minimum 25 mm (1") wide vertical flange a minimum of 6 mm (1/4") from fascia face.

6.6.4 Eave Batten Closure Flashing

- .1 A galvanized or prefinished batten closure flashing shall continuously protect eave edge beneath tiles. Metal flashing shall cover the vertical face of the starter batten, run down deck slope and shall conceal the drip edge flashing flange. Fasten eave batten closure flashing at each roof rafter location using galvanized roofing nails.

6.7 UNDERLAYMENT

6.7.1 Materials

- .1 The underlayment shall consist of one of the following:
 - (a) No. 15 asphalt saturated plain felt laid in two plies lapped 480 mm. (19")
 - (b) No. 25 glass fibre coated base sheet.
 - (c) CSA No. 25 asphalt saturated plain felt laid in a one-ply application.
 - (d) Self adhesive S.B.S. modified bituminous membranes.

6.7.2 Installation

- .1 The field of the decking shall be completely covered with underlayment prior to the application of the metal tile roofing. Underlay shall be installed parallel to the eaves with head laps of not less than 100 mm (4") and side laps of not less than 150 mm (6").
- .2 The top edge of each strip shall be fastened to hold it in place until the battens are applied.
- .3 The underlay shall overlap the eave protection a minimum distance of 100 mm (4").

6.8 VENTILATION

- .1 Every roof space or attic above an insulated ceiling shall be ventilated with openings to the exterior to provide unobstructed vent area of not less than 1/300 of the insulated ceiling area. Vents may be roof type, eave type, soffit type, gable-end type or any combination thereof, and shall be uniformly distributed on opposite sides of the building. Roof vents shall be equally distributed so that approximately 50 percent of the required vent area is located near the lower part of the roof and approximately 50 percent of the required vent area is near the ridge. For exceptions see Alberta Building Code Section 9.19.1, Venting.
- .2 If vent grilles are required, they shall be equally spaced in the sheathing to allow a free flow of air from each section of the inner roof area. Holes shall be cut in the sheathing between the trusses or rafters and the tile battens. The vent grilles shall be secured to the sheathing and sealed to the underlayment.

6.9 TILING

6.9.1 General

- .1 Tiles and tiling accessories shall meet the manufacturer's requirements. Replace any panel or component which has been damaged and cannot be successfully repaired by straightening or refinishing.

6.9.2 Fastening

6.9.2.1 General

- .1 Tiles shall be securely fastened to the tile batten and shall be positioned as per the manufacturer's recommendations. The roof slope is the main determinant in selecting the correct mechanical fastener for roof tiles. Consideration shall also be given to the type of building and its exposure to local environmental conditions such as snow loads and high wind areas.
- .2 Tiles shall be laid with laps facing away from the direction of the prevailing winds.

6.9.2.2 High Wind Areas

- .1 In high wind areas the fastening of the tiles shall be in accordance with the metal tile manufacturer's written installation instructions for high wind areas.

6.9.3 Laying of Tiles

6.9.3.1 General

- .1 The work shall be performed in accordance with the guidelines set out by the manufacturer's installation instructions. Installers shall be trained and experienced with the installation of metal tile roofing systems. The tiles shall be set out with courses straight and parallel with tiles in each course or in alternate courses kept in alignment so that the roof presents a regular and even appearance.

6.9.3.2 Cutting and Bending of Tiles

- .1 The cutting and bending of tiles at hips, valleys, and abutments shall be clean and straight and provide a regular and even appearance in accordance with tile manufacturers written application instructions. Saw cutting of tiles is not permitted.

6.9.3.3 Tiling of Valleys

- .1 Tiles at the edges of valleys shall be cut and bent down to provide an open valley of not less than 89 mm (3 ½ ") from the centre line of the valley to the field tiles on either side.

6.9.3.4 Hip and Ridge Tiles

- .1 Hip and ridge tiles shall be laid in straight lines, fastened to the hip and ridge battens, and sealed or caulked as per tile manufacturer's recommendations.

6.9.3.5 Rake Trim

- .1 Rake trim caps shall be laid in straight lines, and fastened to the fascia and rake battens in accordance with metal tile manufacturer's written installation instructions. Caulking and sealing shall be in accordance with the manufacturer's recommendations.