CMA 30
STEP-BY-STEP ROOFING GUIDE

CONCRETE MANUFACTURERS ASSOCIATION

Quality cast in concrete

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Introduction

"Affordable Concrete Roofing System"

South Africa faces a housing shortage of massive proportions, and although many different schemes and developments of low cost housing have been attempted, the backlog does not diminish.

The affordable housing market is now offered a high quality roofing system using concrete roof tiles.

This system is known as the CMA Roofing System marketed by CMA Roof Tile Manufacturers, who will ensure that the trusses are manufactured and the roofs erected in accordance with the Agrement South Africa standards and technical requirements.

The following comprehensive step by step approach to the construction of this roofing system has been compiled and is proudly presented by the CMA, to ensure that this installation process is carried out effectively and accurately by contractors who are involved in such housing schemes.

A 40m^2 house was constructed using concrete maxi bricks for two walls and 140mm concrete hollow blocks for the other two walls.

AGREMENT
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PRODUCTS

STAGE 1

Erection of Trusses

Step 1

Fixing Wall Plates

Align wall plate minimum 76 x 38 mm with inside wall and nail into position using 75 mm wire nails every 400 mm along wall plate.

Step 2

Marking Out Truss Spacing

Mark position of all trusses at max centres of 900mm on both timber wall plates.

Adjust position of first and last truss at gable ends to ensure equal spacing at gable walls.

Step 3

Positioning Trusses at Gable Walls

Position first and last truss using temporary support bracing.

Make sure trusses are plumb (vertical).

Step 3 continued

Positioning Trusses at Gable Walls

Make sure trusses protrude equally far on both sides over the wall plate.

Nail trusses to wall plate.

Step 4

Positioning Next Two Trusses

The next two trusses can now be positioned, plumbed and fixed temporarily to the first truss.

To keep the trusses in a vertical position, 38 x 38 battens are fixed on either side of the ridge.

Step 5

Fixing of Diagonal Cross Bracing

Fix diagonal cross bracing to the long webs of the first three trusses to create a rigid unit to which the other trusses can be attached with temporary battens. These temporary battens and bracing must be removed once all permanent battens are fixed.

Step 6

Positioning Remaining Trusses

The remainder of the trusses can now be erected and attached to the three braced trusses.

Battens are used as temporary bracing to ensure trusses are installed vertically.

Step 7

Alignment of Trusses

Span a fish line above the wall plate from the first to the last truss to check alignment.

Adjust if necessary with wooden wedges under the tie beams of the trusses.

Step 7 continued

Alignment of Trusses

Scew nail all trusses with 100 mm nails to the wall plate.

Step 8

Fixing Permanent Bracing

Permanent diagonal bracing must now be installed at one gable end of the roof. Bracing members must be a minimum of 38 x 76 mm.

Bracing members must be nailed to the underside of the trusses with 2 nails at approximately a 45° angle from the apex of the truss to the heel of the truss.

Step 8 continued

Fixing Permanent Bracing

Nailing of bracing members to trusses.

Bracing members must be connected to the wall plate with 3 nails.

Step 9

Anchoring of Trusses

Metal strips or galvanised wires have been built into the wall.

To resist uplift forces, each truss must now be permanently anchored to the wall and wall plate with these metal straps or galvanised wires.

STAGE 2

Laying of Underlay

Step 10

Fixing of Underlay

Underlay must be fixed horizontally over the rafters prior to battening.

Underlay is secured with clout nails to the centre of the rafters.

Step 10 continued

Fixing of Underlay

The horizontal overlap should not be less than 150 mm. Vertical laps must be secured over a rafter, allowing for a 150 mm side overlap.

Step 11

Underlay at Eaves

At open eaves, the underlay can be stopped for aesthetic reasons at the external wall protruding the outside wall face, by 20 mm.

STAGE 3

Fixing of Tiling Battens

Step 12

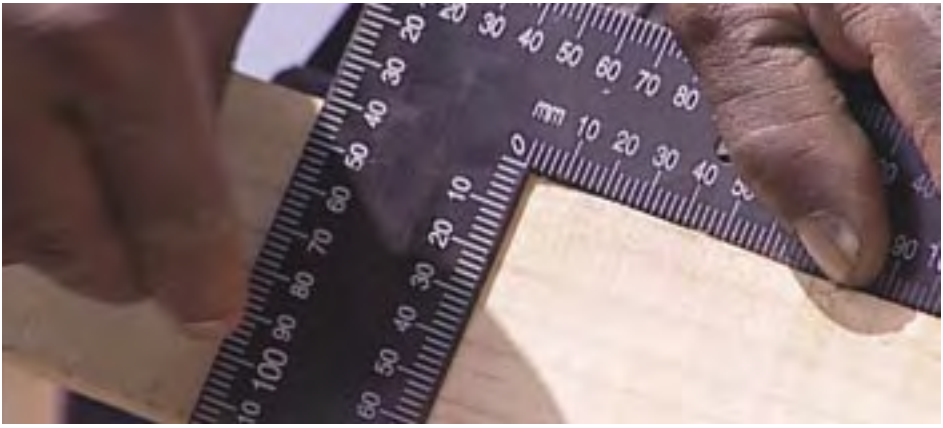
Fixing of Plaster Batten

At a one tile roof overhang at eaves, place the first tiling batten (plaster batten) in line with the outside wall so that it acts as a finishing batten for plastering the outside wall.

Step 13

Cutting of Rafter Ends

Measure 335 mm from the top of the first tiling (plaster) batten down the slope of the rafter and make a mark on the first and the last rafter.



Use a chalk line to mark all rafters and cut off the rafter ends at right angles if no gutters and facia boards are to be used.

Step 14

Fixing of Tilting Batten

Fix a 38 x 50 mm tilting batten placed on edge flush with the ends of the rafter.

Step 15

Fixing of Top Batten

Place the top tiling batten maximum 25 mm away from the apex (top end) of the trusses and nail into position.

Step 16

Spacing of Battens

Measure the distance from the top tiling batten to the top of the plaster batten. Divide equally by the number of courses required to establish the correct batten centres which should be between 320 and 345 mm.

Mark the batten centres at each end of the first and last truss.

Step 17

Marking of Batten Spacing

Use a chalk line to mark the batten centres.

Step 18

Fixing of Battens

Fix battens with 75mm long nails according to chalk lines. Battens must span over at least 3 trusses and the joints must be staggered.

Allow for sufficient overhang at gable ends for trimming.

Step 19

Establishing Verge Overhang

Establish verge overhang at gables by setting out a full course of tiles at the eaves and the ridge.

Adjust tiles to ensure that an equal roof overhang is achieved at both gable ends with full tiles.

Step 20

Cutting of Batten Ends

Mark the correct roof overhang with a chalk line from the top batten to the plaster batten.

Cut off the end of the tiling battens, but do not cut the bottom tilting batten.

Step 21

Fixing Verge Counter Battens

Nail the verge counter batten to the ends of the tiling battens at both gable ends.

Nail the bottom end to the tilting batten.

Step 22

Cutting of Tilting Batten

The tilting batten must extend 20 mm past the verge counter batten.

Now cut the tilting batten.

STAGE 4

Fixing of Roof Tiles

Step 23

Alignment of Tiles

Mark every third course of tiling with a chalk line to ensure perfect vertical alignment of tiles.

Tiling should always be done from the right to left working from bottom to top in width of three tiles as set out at the eaves and ridges. This is the only way to keep the tiles in a straight line ensuring perfect alignment at the gable ends.

Step 24

Fixing Requirements of Tiles

The minimum fixing requirement in unexposed areas is that every tile at the roof overhang and under the ridge must be nailed.

Clout nails must penetrate the batten by at least 25mm (75mm long nails for Double Roman tiles).

Step 25

Fixing of Rake Tiles

Mark the front of the first rake tile and cut to line up with the eaves course of tiling. The first rake tile must butt up against the second course of tiles.

Thereafter, each following rake tile will fit easily always butting against the next course of tiling above.

Step 25 continued

Fixing of Rake Tiles

Rake tiles must be fixed with serrated nails.

The top rake tiles are mitered on site. Once mitred, top rake tiles form a neat junction on the roof and are bedded with the ridge tiles.

Step 26

Setting out of Ridge Tiles

Taper ridge tiles have a variable overlap and require no cutting. The Ridge tiles must always be set out along the full length of the ridge adjusting the overlap before bedding.

Step 27

Placing DPC Under Ridge Tiles

Before bedding, a 150 mm wide DPC must be installed under the ridge tiles.

Step 28

Mixing of Bedding Mortar

The bedding mortar for bedding of the ridge tiles, consists of 3 parts of clean plaster sand and one part of cement.

The mortar must be thoroughly mixed and suitably tinted to the colour of the tiles.

Step 29

Fixing and Finishing of Ridge Tiles

Ridge tiles are edge bedded into a continuous bed of mortar which is placed on top of the top course of tiles.

The excess mortar must be cut off and neatly pointed at right angles to the tiling and wet brushed for a neat finish.

Step 30

Fix Agrément Approval Plate to Roof Eaves

CMA Roofing System

Tested and approved fit for purpose when constructed as specified in accordance with

CERTIFICATE 2003 / 302

AGRÉMENT SOUTH AFRICA

innovative construction product assessments

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