Flat Roofs
Flat roofs

Roof surfaces pitched at 10° or less are classified as flat roofs. This type of construction should be avoided, where possible, due to maintenance costs and the high risk of leaking. Good detailing is required to prevent condensation occurring.
The disadvantages of flat roofs are:

- They are poor insulators.
- Their life expectancy is low due to the materials used and construction details employed.
- They are not aesthetic and look unfinished.
Construction:
Timber flat roofs consist of joists, 44mm thick, spaced at 400mm centers. The fall is achieved by using firing pieces. The roof joists generally bridge the shortest span and the boarding (decking) is fixed in the direction of the fall.
Firing pieces used to achieve the required fall in flat roofs.
Exterior grade plywood, OSS, or tongued and grooved boarding is generally used. Treat the timber with preservative. Three layers of felt are used to weatherproof the roof. These are laid so that the joints are broken in each layer. They are bonded using hot bitumen adhesive. Overlaps should be a minimum of 50mm.

Continuous coverings on flat roofs are more prone to movement than tiles or slate used on pitched roofs.
Timber flat roofs are subject to moisture. Movement and concrete flat roofs are subject to drying shrinkage. Asphalt is not recommended on timber flat roofs because it is unable to accept movement.

The recommended fall for flat roofs is 1 in 40. This ensures that water is effectively removed and that pounding doesn't occur.

Ensure that insulation used is dry because it becomes ineffective and may deteriorate when wet.
• To prolong the life of the roof, white stone chippings are sometimes placed on the covering. This protects the covering from extremes of expansion and contraction.

• Condensation is a particular problem for flat roofs. It is necessary to cross ventilate the spaces between joists in timber flat roof. The following flat roof design highlights the ventilation requirements.
COLD DECK ROOF

In this type of construction the insulation is placed between the ceiling joists at ceiling level. Heat loss through the ceiling is therefore restricted and this keeps the cavity, roof deck, and covering at a low temperature, especially during winter.
Weather-proofing

50mm min.

ventilation void

Deck

Insulation

Vapour check

Cold deck construction

D O Dowd
Ventilation of this roof design is very important if condensation is to be avoided. Use foil-backed plasterboard for the ceiling and fix a vapour barrier (500 gauge polythene) to the bottom of the joists to control moisture build up in the insulation.
Avoid this construction

Cold deck construction

Counter battens

Chippings

Weatherproofing

50mm min. ventilation space

deking

Tapered firing pieces

Vapour check

Insulation

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Cold deck

Firing piece

Insulation

Plasterboard

Vapour barrier

Counter battens nailed to top of firing pieces to achieve full air flow from eaves to eaves.
Flat roof abutment detail cold Deck.

- Board out from wall to allow for ventilation.
- Lead over flashing.
- Tilting fillet.
- Proprietary abutment ventilator.
Flat roof
verge detail
cold deck
Tilting fillet
Roof covering
Decking
Batten to support
Soffit and retain
Insulation.
Drip batten
Facia
Soffit strip
ventilator
Wall plate
Vapour check
Insulation
50mm air space
Firing piece
D O Dowd
Built up roofing on timber roof decking

Firing piece

Min 50mm air space

Insulation

Vapour barrier

Joist

Eaves ventilation

Flat roof eaves detail
Lead over flashing
WARM DECK ROOF

In this type of construction the insulation is placed below the waterproof covering and on top of the roof deck and vapour barrier. This means that the deck is maintained at warm temperatures during the winter.
Bonding or mechanical fixings are used to secure the insulation to the decking. The waterproof covering is bonded to the top of the insulation. This is the preferred design for flat roofs as higher levels of thermal insulation are achievable and condensation is less of a problem.
Warm deck roof

Weatherproofing

Solar protection

Insulation

Deck

Vapour barrier

No ventilation required

Firing piece

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Warm deck roof

Chippings

Weatherproofing

Insulation

Vapour barrier

Decking

Tapered firing pieces

No ventilation Required in this space
INVERTED WARM DECK ROOF

In this design the insulation is placed on top of the weatherproofing material. This allows for the complete roof construction to be kept at warm temperatures during the winter.
A further advantage is that the roof covering will be kept at moderate temperatures during the summer. The insulation used must have low moisture absorption properties.
Vapour barriers are not required with this type of roof.
Inverted warm deck roof

- Paving slab
- Insulation
- Deck
- weatherproofing
- Firing piece

No ventilation required
Inverted warm deck roof

Ballast
Insulation
weatherproofing
Decking

No ventilation required in this space.
Securing flat roofs

Holding down straps (30 x 5mm in cross section) at least 1m long are placed at between 1.2m and 2m centres. Fix the straps to the masonry using masonry nails or wood screws into plugs.

Use a minimum number of three fixings on each strap, one of which should be at least 150mm from the bottom of the strap.
30mm x 5mm galvanised twist strap.