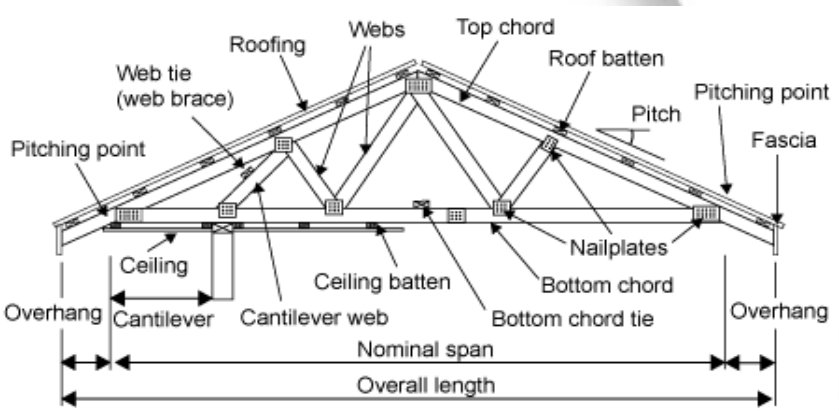
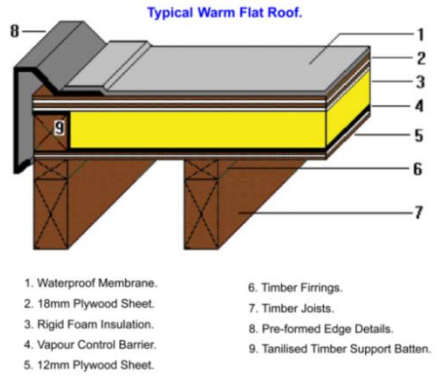




Flat Roofs –Definition & Types

Definition of Roofs Slopes

Flat Roof

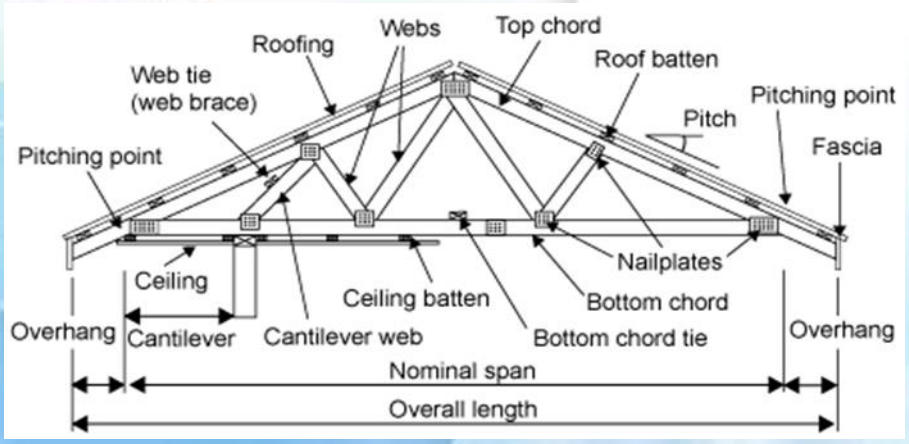
- A flat roof is defined by having a roof pitch below 1.5 degrees or a Fall of 1 in 40 and can comprise of different products



Pitched Roof

- A pitched roof is defined by having a roof pitch above 1.5 degrees or above Fall of 1 in 40. Construction materials will differ depending on the pitch of the roof.
  - Standing seam roofs such as copper or zinc can be used over 1.5 degrees in pitch
  - Traditional tile/slate roofs pitches start at 22 degrees but some manufacturers can reduce this to 12.5- 15 degrees.





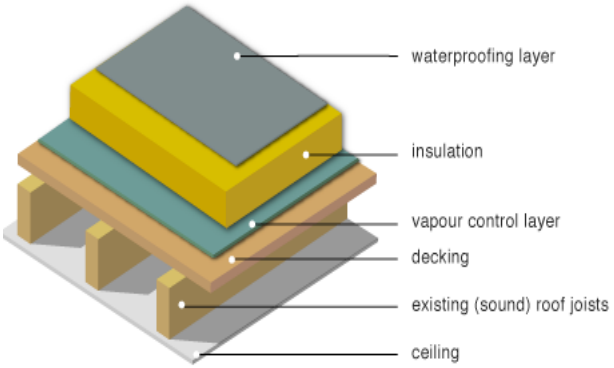
Types of Flat Roofs

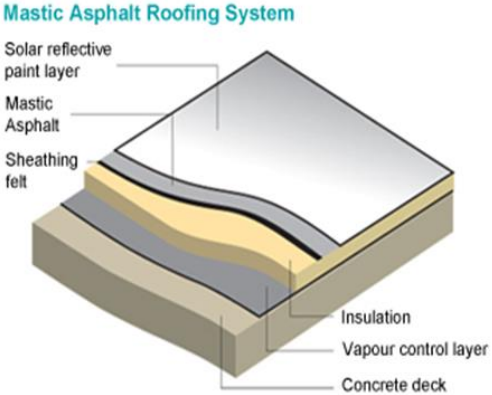
- **Bitumen Roofing**
- Liquid Membrane
- Single Ply Roofing
- Green Roofs

Bitumen Roofing

Common Trade Names

- Built up Roofing
- Bitumen Membranes
- Material Felt
- Mastic Asphalt





Typical Construction

- Waterproofing Layers (1-2 layers depending on system)
- Insulation with Vapour Barrier (this Barrier stops condensation). The insulation location can vary depending on the system.
- The Roof Structure can be either timber or concrete and should be designed to accommodate the loading required by the roof type and its usage (i.e. Balcony/Sundeck)

Costs excluding structure €62-72 per m²

Guarantees and Certification

All new flat roof materials should have certificate by supplier and the roof material should have a IAB(Irish Agrement Board) or BBA (British Board of Agrement). This should guarantee the roof material for over 15-20 years and workmanship to 15 years.

Types of Flat Roofs

- Bitumen Roofing
- **Liquid Membance**
- Single Ply Roofing
- Green Roofs

Liquid Membrane

Common Trade Names

- EPDM Liquid Roofing
- Rubber Membrane
- Cold Applied Roof

Typical Construction

- Waterproofing Layers (1-2 layers depending on system)
- Insulation with Vapour Barrier (this Barrier stops condensation). The insulation location can vary depending on the system.
- The Roof Structure can be either timber/concrete or steel structural deck and should be designed to accommodate the loading required by the roof type and its usage (i.e. Balcony/Sundeck)

Costs excluding structure €105-120 per m²

Guarantees and Certification

All new flat roofs should have certificate by supplier and the roof material should have a IAB(Irish Agrement Board) or BBA (British Board of Agrement). This should guarantee the roof material between 10-20 years.

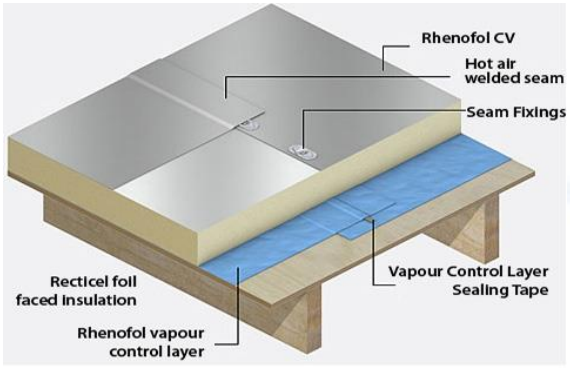
Types of Flat Roofs

- Bitumen Roofing
- Liquid Membance
- **Single Ply Roofing**
- Green Roofs

Single Ply Roofing

Common Trade Names

- PVC Roofing
- TPO Roofing
- EPDM Roofing
- Neoprene Roofing



Typical Construction

Single ply membranes are strong, flexible sheets composed predominately of synthetic polymer. Thickness is in the range 1.1mm to 2mm. Some products are homogeneous, others reinforced with glass fibre or polyester, depending upon the application.

Costs excluding structure €48-55 per m²

Guarantees and Certification

All new flat roofs should have certificate by supplier and the roof material should have a IAB(Irish Agrement Board) or BBA (British Board of Agrement). This should guarantee the roof material for 10-15 years.

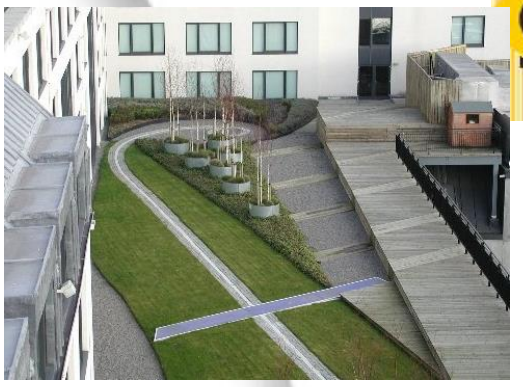
Types of Flat Roofs

- Bitumen Roofing
- Liquid Membance
- Single Ply Roofing
- **Green Roofs**

Green Roofs

Common Trade Names

- Green Roof
- Living Roof
- Sedum Roof
- Intensive Living Roof
- Bio-Diverse Roof



Typical Construction

The basic build up of a green roof is three layered: drainage, filter and vegetation layer. The waterproofing can be from the three previous roofing materials.

Costs excluding structure €120-200 per m² depending on range of planting

Guarantees and Certification

All new flat roofs should have certificate by supplier and the roof material should have a IAB(Irish Agrement Board) or BBA (British Board of Agrement). This should guarantee the roof material for over 15 years.

Advantages and Disadvantages of Flat Roofs

Advantages

- Cost

One of the most significant benefits of a flat roof is that it is less expensive to install than a pitched roof. Rafters and engineered trusses must be installed to support a pitched roof, while a flat roof usually requires only basic support beams. As a result, less labour and materials are necessary, so you can save considerable money.

- More Usable Space

While a pitched roof can provide attic space that a flat roof cannot, the area is not usually suitable for use as a room. With a flat roof, you may opt to have your interior ceiling extended to the point where the roof begins, creating additional usable space in your home. In addition, you may have extra support added to the flat roof so it can house a deck or patio, creating additional space for outdoor entertaining.

Disadvantages

- High Maintenance

The major drawback to a flat roof is that it typically requires more maintenance than a pitched roof. Because it is not sloped, the roof does not drain naturally so water can easily accumulate. If water puddles on the surface, it can soak into the roof through its seams and cause structural damage. You must check your roof on a regular basis to ensure that it is free of water and clean up any debris that has settled on the roof as well so the drainage system does not become clogged.

- Shorter Lifespan

A flat roof typically does not last as long as a pitched roof. Its lifespan is affected by the maintenance measures that are taken, but -- depending on the material from which it is made -- a flat roof may have a lifespan as short as 10 years. Make sure that you address the issue of materials with your roofing professional to determine the most durable option for a flat roof.

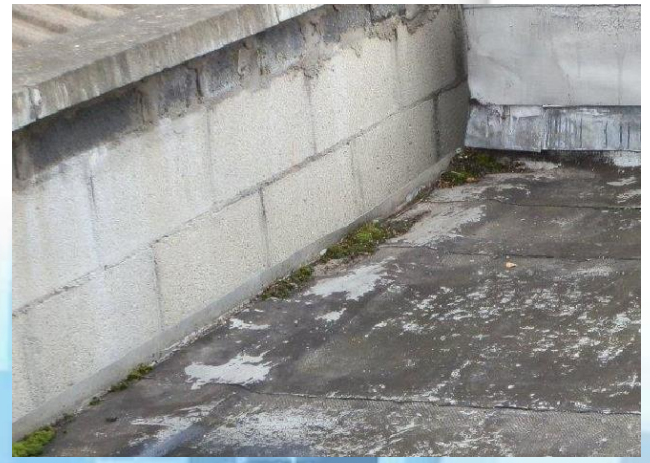
- Absorbs Heat

All parts of a flat roof are continually exposed to the sun, so the roof absorbs heat all day long. In warmer climates, the heat absorption may cause your home to become uncomfortably warm. You may also have a problem in milder climates during hot summer months. However, in a cooler climate, you may find the additional heat provided by a flat roof to be beneficial, particularly during the winter.

Case Study – Failure of Flat Roof

- The insured complained of water damage to the ceiling of a converted garage.

- The flat roof was surveyed and was found to have the following faults
  - Lack of Maintenance (Moss buildup at outlet)
  - Lack of Flashing detail at Boundary wall
  - Water Pooling due to insufficient falls in roof
  - Cracking in roof sheets



Case Study – Incorrect choice of Construction Materials

- The insured complained of water damage to the ceiling of a newly built extension which appeared as stains at the eaves of the extension.

- The extension was surveyed and the pitch of the roof was found to be below the recommended pitch for concrete tiles. A flat roof or a standing seam roof would be recommended in this location.

- There was also workmanship issues with no roof flashings used and incorrect lapping with roof tiles.

Condron Concrete Works

Technical Data of Concrete Slate Tile

Size	420mm X 330mm
Pitch	22 ½° minimum
Headlap	100mm
Gauge maximum	320mm
Covering Capacity at 320mm Gauge	10 ½ Tiles per m²
Surface	Smooth
Weight (approx) per 1,000 tiles	5 tonnes
Batten size for rafters not exceeding 450mm c/c	44mm X 35mm
Batten size for rafters not exceeding 650mm c/c	44mm X 35mm

Colours Available:

Black, Grey, Brown, New Brown, Red, Marigold, Terracotta, Red Streaky, Marigold Streaky, Brown Streaky, Terracotta Streaky.

Accessories Available:

Eave	Standard Tile.
Ridge	Universal Angle Ridge, and High Pitch Angle Ridge.
Hip	Universal Angle Ridge, and High Pitch Angle Ridge.
Verge	Full Tile, Half Tile, and Half Cloak Verge Tile Left and Rig
Nails	50mm X 9g A/Alloy.
Bedding	Coloured Pigments as required.

NOTE: Reference should be made to ICP2.1982 for Slating and Tiling and any new Irish code of practices in the future. Condron Concrete Roof Tiles comply with I.S.3:1972 "Concrete Roofing Tiles" & EN490.