Getting it Right 3-

Clay Roofing Tiles

by:

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REHDA Institute
Presentation Outline

- Manufacturing Process Flow of Clay Roof Tiles
- Why Clay Roofing Tiles?
- Comparison Between Clay Roofing Tiles vs. Concrete Roof Tiles, Metal Roofing & Asphalt shingles
- Type of Clay Roof Tiles and Finishes
- Installation Guidelines and Usage of Roofing Components
- Clay Roof Tiles Technical Specification & Warranty
- Roof Care & Maintenance
- Q&A
Clay Roofing Tiles Recipe

Earth + Water + Fire = Clay Roofing That Lasts Centuries
Clay Roofing Tiles MANUFACTURING process

Clay Material Preparation

Extraction of Clay from the Quarry and transported to factory to storage as stockpiles in the plant
Clay Roofing Tiles **MANUFACTURING** process

**Grinding & Screening the Clay**

At the start of manufacturing process, clay is collected from the stockpile and loaded into the feed hoppers.

Water, sand & additives are added to the clay and mixed in accordance with the recipe.

Clay mixture is then fed into the clay preparation where it is ground and homogenized.
Clay Roofing Tiles MANUFACTURING process

Extrude and Tile Forming

The prepared clay mix pass through an **extruder** to produce slabs of clay.

Mechanical PRESS

It then loaded on a moulder press & form the precise format.
Clay Roofing Tiles **MANUFACTURING** process

**Drying Process**

Pressed clay roof tiles will then send for drying. Depending on drying method used, it may take 1 – 3 days for the process.

Moisture removed in dryer

**Colour Pigment**

Then, using disk cabins for engobing the tiles before firing
Clay Roofing Tiles **MANUFACTURING** process

**FIRING clay tiles**

It then transfer to firing kiln & may takes 48 – 72 hours depending on type of kiln.

It usually fired by natural gas and achieve a maximum temperature of > **1000°C**

Tiles travel through the various heating stages and cooling on a kiln car which moving on a rails.

During firing, clay roof tiles achieved **strength** and **durability** by the high temperature mineralogical process.
Clay Roofing Tiles **MANUFACTURING** process

**Packaging and Storage**

After UNLOAD the products from kiln cars by ROBOT, roof tiles are **inspected for the quality**

**Strapping machines** to PACK the tiles on pallets and placed in storage area and delivery
Clay Roofing Tiles **MANUFACTURING** process

**Ready for Delivery**

forklifts to LOAD the pallets on trucks or in containers and ready for delivery
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Why Clay Roofing tiles?

Because it is *Beautiful* ...!
Clay Roof Tiles: **Exclusive beauty.** Clay Roofs unveil the beauty of the earth, and offers endless customization possibilities.
Why Clay Roofing tiles?

Clay Roofing Tile is **Green**

Made of earth!

No harmful or endangered raw materials

100% **NATURAL**!
Why Clay Roofing tiles?

*Long lasting aesthetic* to your roof!

*Color* will never fade and will be permanent!
Clay Roof Tiles: Latest Technology for High Performance Roof

Computerized moulds & Pressing technology for best-in-class performance and consistence in **dimension accuracy, water-tightness, strength and security**, as well as perfect finishes.
Clay Roof Tiles: **Product strength, Packaging quality**

Truck loading and container stuffing *expertise* result into no breakage on land / sea transport.
Clay Roof Tiles: Durable.

Engobed clay roof tiles basically can last for decades, with no hidden maintenance costs. Other materials, often painted, will deteriorate much faster and incur heavy maintenance.

Clay Roof Tiles after 25 & 35 years

Others Roofing materials after 15 years
Clay roof provides good thermal insulation & better comfort. 3°C cooler compared to Concrete roof

Cooler home environment for better comfort

Reduce the need of air – conditioning

Save energy, save money for long term
Clay Roof Tiles: **Energy efficiency.** A modern and Environment-friendly product, with everlasting cooling properties enhancing your comfort of living.

- **Concrete Roof Tiles**: 29.4°C
- **Clay Roof Tiles**: 25.6°C
- **Clay Tiles + Insulator**: 23.8°C
Clay Roof Tiles: **Cost efficiency.** Technology improvements enabled to produce larger formats, fast and easy to install, that will enable significant savings on materials and installation costs.

- **Technology of mass production**
  - Computerized moulds
  - Pressing technology

- **Customization**
  - Can produce Large formats & Any color

- **Affordable**
  - Less tiles needed by M2
  - Save materials cost

- **Maintenance free**
  - Lower installation costs
Why Clay Roofing tiles?

Clay roof tile is *exclusive & stylish*

It enhances the value of the property

It is *the Secret to beautiful* Homes !!!
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## Difference Between Clay Roof Tiles Vs. Concrete Roof Tiles

<table>
<thead>
<tr>
<th></th>
<th>Clay Roofing Tiles</th>
<th>Concrete Roofing Tiles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials</strong></td>
<td>Made from Earth, 100% natural Product!</td>
<td>Made of Cement &amp; sand!</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td>Pressed, Dried and Fired at &gt; 1000°C</td>
<td>Extruded. Dry by natural air</td>
</tr>
<tr>
<td><strong>Color Permanence</strong></td>
<td>Color embedded, Permanent &amp; long lasting</td>
<td>Paint Coated on surface, Color tone down over years</td>
</tr>
<tr>
<td><strong>Heat Resistance</strong></td>
<td>Excellent Heat Insulator</td>
<td>Average Heat Insulator.</td>
</tr>
<tr>
<td><strong>(Energy Saving)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Product Life Cycle</strong></td>
<td>Durable &amp; can last more than 50 years to century</td>
<td>Life Span 20 to 30 years. Reroofing Often required after this period</td>
</tr>
</tbody>
</table>
### Difference Between Clay Roof Tiles Vs. Concrete Roof Tiles

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<tr>
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<th>Clay Roofing Tiles</th>
<th>Concrete Roofing Tiles</th>
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</table>
| **Fungus Growth** | Glazed & Semi Glazed finished – almost no fungus  
Natural finished – common but washable | Common with moss / algae but not advisable to wash due to product characteristic (Porous) |
| **Roof Profile Features** | Double Interlocking & Double Overlapping System (DIDO) for Excellent water tightness | Overlapping system only |
| **Home Value / Aesthetic** | It looks exclusive and prestige | Common and not stylish, More for affordable home because of cheaper cost |
| **Product Warranty** | 10 Years International Warranty | No Warranty |
### Difference Between Clay Roof Tiles Vs. Metal Roof Tiles

<table>
<thead>
<tr>
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<th>Clay Roofing Tiles</th>
<th>Metal Deck</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Materials</strong></td>
<td>Made from Earth, 100% natural Product!</td>
<td>Made of Metal</td>
</tr>
<tr>
<td><strong>Process</strong></td>
<td>Pressed, Dried and Fired at &gt; 1000°C</td>
<td>Extruded / Casted</td>
</tr>
<tr>
<td><strong>Color Permanence</strong></td>
<td>Color embedded, Permanent &amp; long lasting</td>
<td>Paint Coated on surface, Color tone down over years &amp; depends on surface coating</td>
</tr>
<tr>
<td><strong>Energy Saving</strong></td>
<td>Excellent Heat Insulator</td>
<td>Poor Heat Insulator</td>
</tr>
<tr>
<td><strong>Product Life Cycle</strong></td>
<td>Durable &amp; can last more than 50 years to century</td>
<td>It will be long if not rusted</td>
</tr>
<tr>
<td><strong>Fungus Growth</strong></td>
<td>Glazed &amp; Semi Glazed finished – almost no fungus</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Natural finished – common but washable</td>
<td></td>
</tr>
<tr>
<td><strong>Roof Profile Features</strong></td>
<td>Double Interlocking &amp; Double Overlapping System (DIDO) for Excellent water tightness</td>
<td>No overlapping. Join / clip-lock system.</td>
</tr>
<tr>
<td><strong>Home Value</strong></td>
<td>It looks exclusive and prestige</td>
<td>Looks common, commercial and not stylish</td>
</tr>
<tr>
<td><strong>Product Warranty</strong></td>
<td>10 Years International Warranty</td>
<td>Back to back Warranty from metal coil supplier &amp; surface coating</td>
</tr>
</tbody>
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## Difference Between **Clay** Roof Tiles Vs. **Shingles** Roof Tiles

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<thead>
<tr>
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<th>Shingles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Materials</td>
<td>Made from Earth, 100% natural Product!</td>
<td>Petroleum based product, not a environmentally friendly roofing materials</td>
</tr>
<tr>
<td>Color Permanence</td>
<td>Color embedded, Permanent &amp; long lasting</td>
<td>Extreme heat can cause shingles loose color</td>
</tr>
<tr>
<td>Resistance to heat</td>
<td>Excellent Heat Insulator</td>
<td>Poor Heat Insulator. Shingles absorb heat from sun and transfer it into house</td>
</tr>
<tr>
<td>Product Life Cycle</td>
<td>Durable &amp; can last more than 50 years to century</td>
<td>Last 30 years. Surface will deteriorated after years of expose to hot weather</td>
</tr>
</tbody>
</table>
## Difference Between **Clay Roof Tiles Vs. Shingles Roof Tiles**

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<th>Shingles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fungus Growth</td>
<td>Glazed &amp; Semi Glazed finished – almost no fungus</td>
<td>yes. For rainy season with excess moisture, shingles start to rot</td>
</tr>
<tr>
<td></td>
<td>Natural finished – common but washable</td>
<td></td>
</tr>
<tr>
<td>Roof Profile Features</td>
<td>Double Interlocking &amp; Double Overlapping System (DIDO) for Excellent water tightness</td>
<td>Overlapping each tiles with 30-40% of surface</td>
</tr>
<tr>
<td>Home Value</td>
<td>Exclusive and prestige. Enhance the property value</td>
<td>It looks vintage. Widely use in Northern America because of inexpensive cost</td>
</tr>
<tr>
<td>Product Performance</td>
<td>DIDO system provide water tightness and difficult to lift up</td>
<td>Strong wind can uplift or tear shingles off easily.</td>
</tr>
<tr>
<td>Product Durability</td>
<td>Durable and long lasting against severe temperature</td>
<td>Not resistant to extreme hot weather. Expansions &amp; contraction of the shingles can cause cracking</td>
</tr>
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- Q&A
Family of Clay Roofing Tiles Available In Malaysia
COLOUR / FINISHES: Glaze, Satin (Semi Glazed), Tropical Tones & Natural
Manufacturing Process Flow of Clay Roof Tiles

Why Clay Roofing Tiles?

Comparison Between Clay Roofing Tiles vs. Concrete Roof Tiles, Metal Roofing & Asphalt shingles

Type of Clay Roof Tiles and Finishes

Installation Guidelines and Usage of Roofing Components

Clay Roof Tiles Technical Specification & Warranty

Roof Care & Maintenance

Q&A
Clay Roof Tile: Provide Full range of accessories for Installation

- Complete roofing fitting tiles to cover main potential areas of leakage
  - Ridge
  - Hip and Valley
  - Flashing
  - Socket Lantern
Roofing Components Is required To Minimize the Leakage Issues

- Dry Fix
- Dry Flash
- Reflective Insulation
DRY FIX method for Ridge / Hip / Mono pitch Roof ...

Dry Fixing Membrane for Ridge / Hip Application

Dry Fixing Membrane
- Durable
- Fast and easy installation
- Adheres strongly on all material
- Can be painted to match tile
- Self sealing if punctured

Vs

Mortar
- Very messy and ugly
- Will crack after weathering and caused leakage
Dry Flash is a perfect solution for wall abutment, providing better and neat finishing:

- Highly durable - Full aluminium product
- Easy and fast installation
- UV resistance colour coating
- Butyl adhesive strips- additional security against rain
Clay Roof Tiles: Technical Expert to support installation & training

- Flashing details
- Eaves details
- Overlapping details
- Dry Fixing details
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Clay Roof Tiles Technical Specification & Warranty

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Clay Roofing Tiles are compliant to

- **SS 70:2001** Singapore Standard – Clay Roofing Tiles and Fitting
- Most of Clay Roof Tiles suppliers are ISO9001:2008 certified
- Most Manufacturers have obtained CE marking on their Products for export market
Clay Roofing Tiles: Provide a 10-year warranty on their products
Others Related Roofing Components, reflective Insulation are compliant to

- **MS 2095:2014** Malaysia Standard – Radiant Barrier and Reflective Insulation Building Material
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- Q&A
Clay Roof Tiles are amongst the most durable roof covering available and should provide many years of satisfaction.

Under normal conditions of use, only minimum care and maintenance required, which is normally the responsibility of the owner.

Recommendations for roof care:
- Control growth of fungus and algae
- Keep free of debris, fallen leaves
- Ensure all valleys, gutters, pipes are in clear and good order
- Check condition of chimney stacks, flashing
- Special precautions must be taken to avoid damage to the roof tiles
Curative Treatment for Fungus On Natural Finishing

Biocide treatments.

A very efficient biocide is bleach (a 12% chlorine solution is very efficient). The bleach can effectively clean away fungus without much effort.

Water Repellent Treatment.

This is very effective for natural finished clay roof tiles. Normally water based silicon is used for this purpose. This silicon treatment will seal up the pore of the tiles and provide water repellent properties. The solution has only time-limited effects since the product gets progressively washed away by the rain. It can take one or two years before fungus re-appear.
TIME TO GO GREEN... Save the planet & save money!

Clay Roofing Tiles + Reflective Insulation
Q & A
Q : What is the differences between glazed and satin?
A : Glazed is more shinning and glossy than satin & both have the anti-fungus properties.

Q : How long can the natural tones stand before fungus starts growing?
A : Normally it depends on the situation of the house and humidity level. If there are a lots of tree surrounding the roof which provide a lot of shelters and shade, the fungus can growth faster compared to an open area. The roof pitch and drainage of the roof are also 2 key factors. The steeper the roof the less fungus growth, as the running of water is faster.
Q: What is your minimum pitch?
A: Depend on the area of the house: whether it is a protected area (in a valley for example), a normal area or an open area (near a beach for example) or exposed to strong wind. You can go as low as 19 degree if underlaying material is used. The span of the roof is also a factor, the longer the span the higher the pitch needs to be.

Q: Is it necessary to use complete range of accessories & roofing components?
A: Yes. Complete range of accessories is tailored to each potential leaking area of the roof. Roofing Components is necessary for long lasting roof performance and less maintenance.
Q : Can clay roof tiles be installed on a steel batten?
A : Yes. The steel batten has to be 90º at the hooking side and the tiles are fixed by self tapered screw.

Q : Can you tailor made for special colour?
A : Yes. Custom color is possible but it always conditioned with a minimum quantity (MOQ) and cost will depends on pigment used.

Q : What is the recommended roof pitch?
A : In normal circumstance, the recommended roof pitch is 25 to 35 degrees. However, it subject to roof profile, roof span, exposure to wind and rain of the roof & use or not under laying.

Roof pitch between 25 degrees to 35 degrees will optimise the flow of water and waterproofness of the roof. Furthermore, it allows to visualise the profile from ground level.