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 !

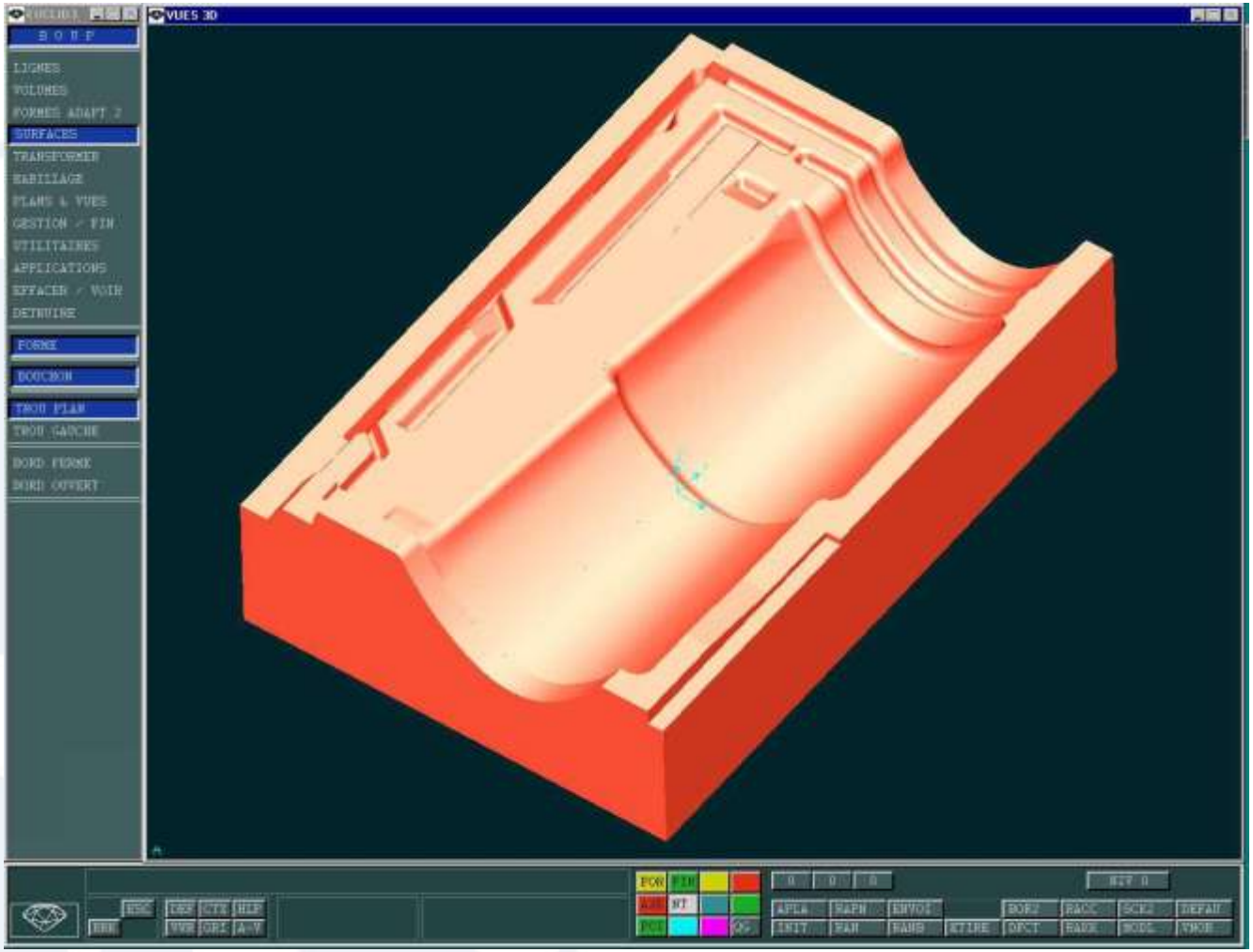
Why Clay Roofing tiles?

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 a**nd **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

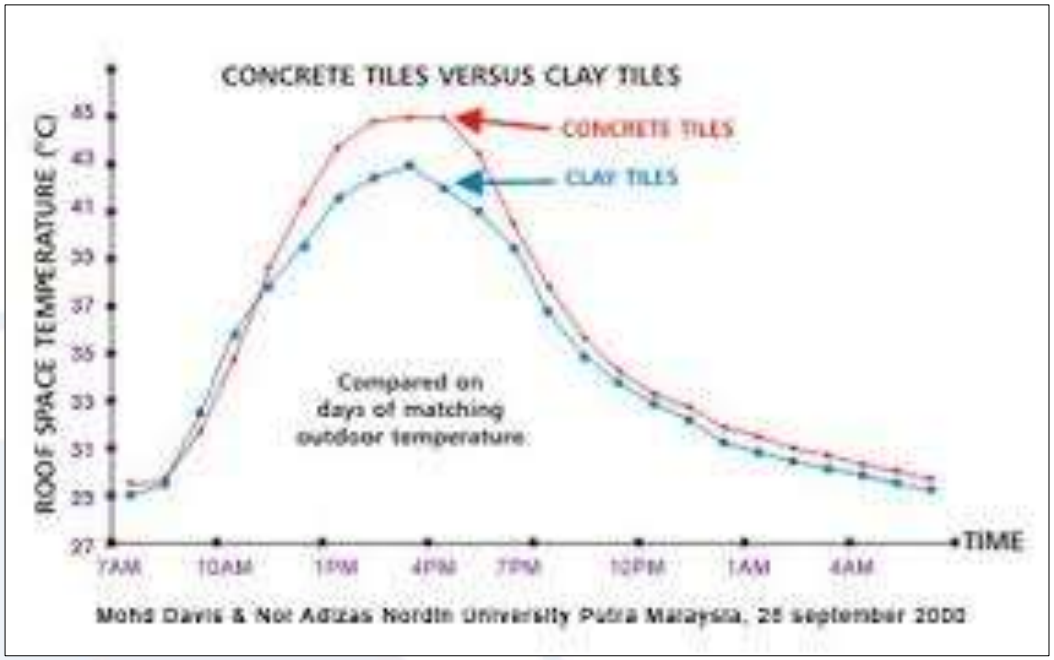
Clay Roof Tiles : Durable.

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

Why Clay Roofing tiles?



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 ever-lasting cooling properties enhancing your Comfort of Living

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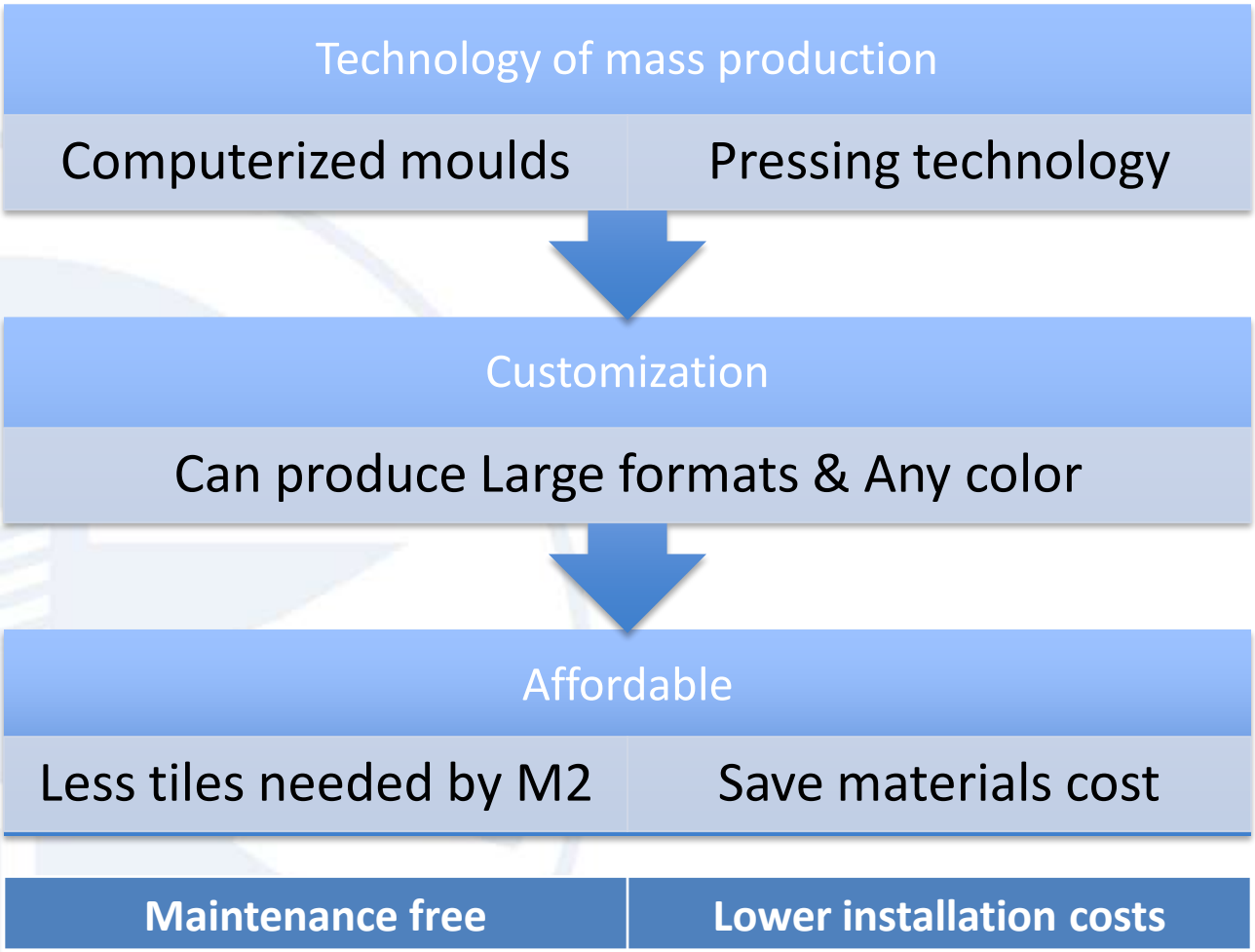
Concrete Roof Tiles
29.4°C

Clay Roof Tiles
25.6°C

Clay Tiles + Insulator
23.8°C

Clay Roof Tiles : Energy efficiency. Best-in-class **Solar Reflectance Index (SRI)** performance, in particular with White Glazed finished tiles

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



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 1

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

Difference Between Clay Roof Tiles Vs. Concrete Roof Tiles 2

	Clay Roofing Tiles	Concrete Roofing Tiles
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

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

Difference Between Clay Roof Tiles Vs. Shingles Roof Tiles 1

	Clay Roofing Tiles	Shingles
Materials	Made from Earth, 100% natural Product !	Petroleum based product, not a environmental friendly roofing materials
Color Permanence	Color embedded, Permanent & long lasting	Extreme heat can cause shingles loose color
Resistance to heat	Excellent Heat Insulator	Poor Heat Insulator. Shingles absorb heat from sun and transfer it into house
Product Life Cycle	Durable & can last more than 50 years to century	Last 30 years. Surface will deteriorated after years of expose to hot weather

Difference Between Clay Roof Tiles Vs. Shingles Roof Tiles

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

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Family of Clay Roofing Tiles Available In Malaysia

COLOUR / FINISHES : Glaze, Satin (Semi Glazed), Tropical Tones & Natural

GLAZED

SATIN / SEMI GLAZED

TROPICAL TONE

NATURAL TONE

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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

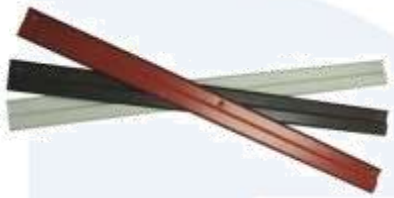
- Durable
- Fast and easy installation
- Adheres strongly on all material
- Can be painted to match tile
- Self sealing if punctured

Vs

Mortar

- Very messy and ugly
- Will crack after weathering and caused leakage

DRY FLASHING MATERIALS and Flash Strip …



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

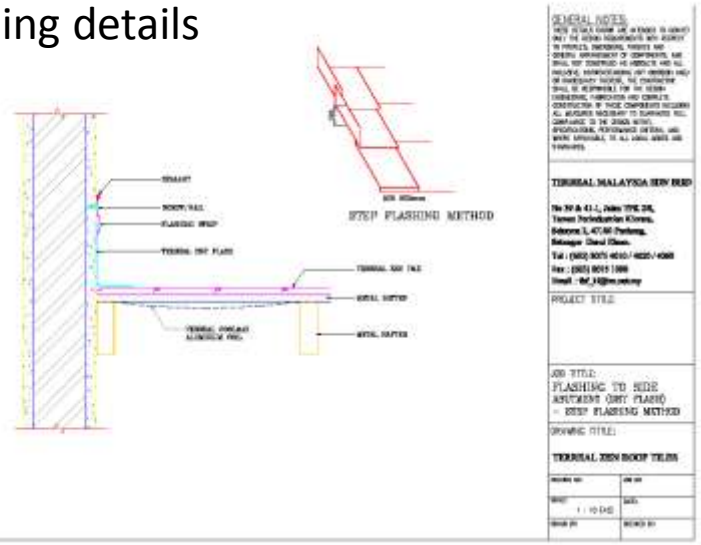
DRY FLASH AT ABUTMENT & PARTY WALL

Vs

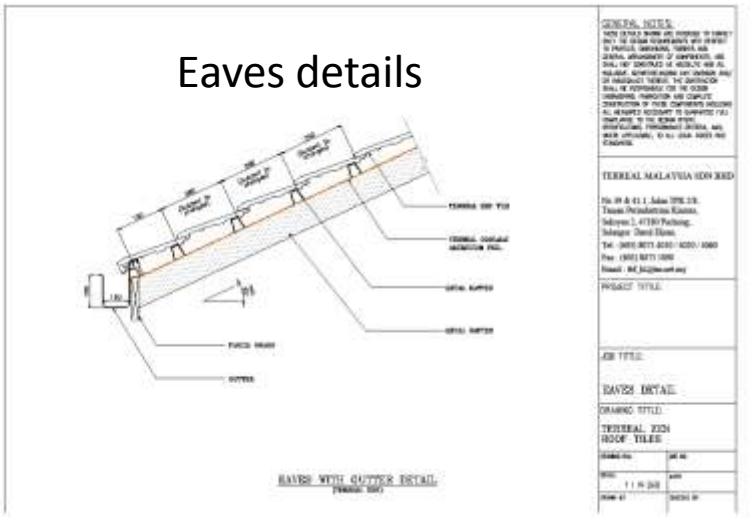
ZINC FLASHING AT ABUTMENT

Clay Roof Tiles : Technical Expert to support installation & training

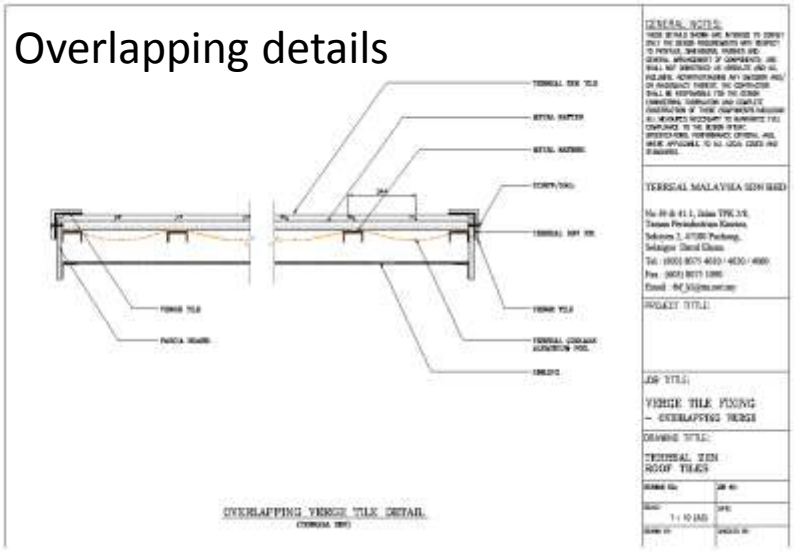
Flashing details



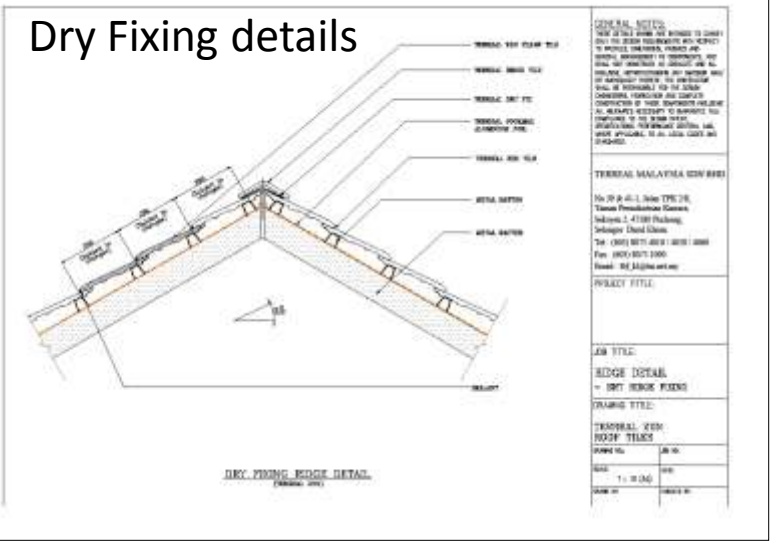
Eaves details



Overlapping details



Dry Fixing details



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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

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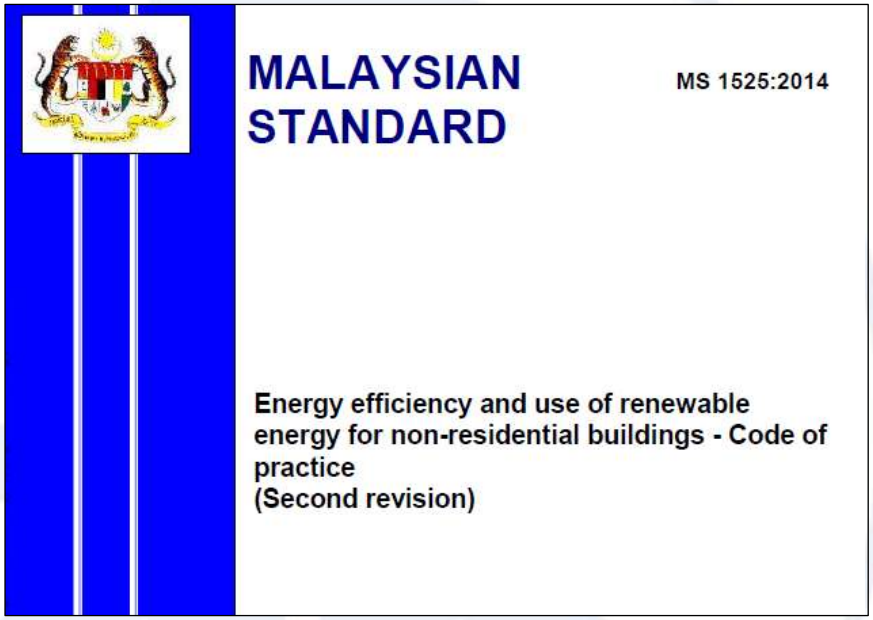
Others Related Roofing Components, reflective Insulation are compliant to

- **MS 1525:2014** Malaysia Standard – Energy Efficiency and Use of Renewable Energy
- **MS 2095:2014** Malaysia Standard – Radiant Barrier and Reflective Insulation Building Material



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ROOF CARE AND MAINTENANCE

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 !**

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Clay Roofing Tiles

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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.