

SINTEF Building and Infrastructure confirms that

Metrotile Roofing System

has been found to be fit for use in Norway and to meet the provisions regarding product documentation given in the regulation relating to the marketing of products for construction works (DOK) and regulations on technical requirements for building works (TEK), with the properties, fields of application and conditions for use as stated in this document

1. Holder of the approval

Metrotile Europe NV
 Michielenweg 3
 3700 Tongeren
 Belgium
www.metrotile.eu

2. Product description

Metrotile Roofing System are steel tiles manufactured from 0,45 mm cold rolled steel sheets in different standard dimensions. The sheets are described as metal roofing tiles and are designed as shown in fig.1 and fig.2.

Metrotile Roofing System is supplied in different colours. The different surface treatments are shown in table 1.

In addition to standard steel tiles, different types of accessories are delivered in the same material, such as ridge fittings, gable steel tiles, gutters etc., plus special fixing nails.

Table 1.
 Surface treatment for Metrotile products

Product	Type treatment	Hot dip galv-	Polyester	Acryl varnish	Stone granules	Acryl varnish
		anizing 20µm Aluzinc®	varnish primer	coloured	crushed / coloured	clear
Metrotile Bond	Upper face	X	X	X	X	X
	Lower face	X	X	-	-	-
Metrotile Roman	Upper face	X	X	X	X	X
	Lower face	X	X	-	-	-
Metrotile IShake	Upper face	X	X	X	X	X
	Lower face	X	X	-	-	-
Metrotile Woodshake	Upper face	X	X	X	X	X
	Lower face	X	X	-	-	-
Metrotile Classic	Upper face	X	X	X	X	X
	Lower face	X	X	-	-	-
Metrotile Viksen	Upper face	X	X	X	X	X
	Lower face	X	X	-	-	-
Metrotile Shingle	Upper face	X	X	X	X	X
	Lower face	X	X	-	-	-

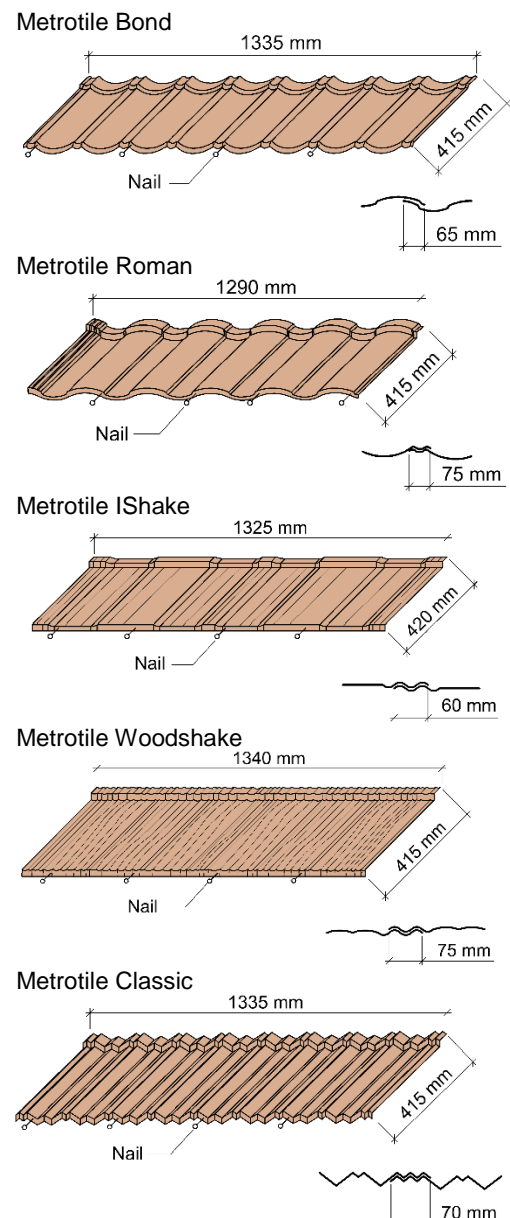


Fig. 1
 Standard types of metal sheet tiles with belonging overlap and nail positions.

Table 2 Weight, geometric information and product properties for the different Metrotile products

Property	Metrotile														Unit	Tolerance
	Bond		Roman		IShake		Woodshake		Classic		Viksen		Shingle			
	DoP ¹⁾	Control limit ²⁾	DoP ¹⁾	Control limit ²⁾	DoP ¹⁾	Control limit ²⁾	DoP ¹⁾	Control limit ²⁾	DoP ¹⁾	Control limit ²⁾	DoP ¹⁾	Control limit ²⁾	DoP ¹⁾	Control limit ²⁾		
Steel thickness	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,45	0,41	0,41	0,45	0,45	mm	±0,5 %
max. length	1335	1335	1290	1290	1325	1325	1340	1340	1335	1335	1345	1345	1345	1345	mm	±3
Cover length	1270	1270	1215	1215	1265	1265	1265	1265	1265	1265	1265	1265	1245	1245	mm	±0,5 %
max width	415	415	415	415	420	420	415	415	415	415	430	430	300	300	mm	±2
Cover width	370	370	370	370	370	370	370	370	370	370	370	370	252	252	mm	-
Batten distance	370	370	370	370	370	370	370	370	370	370	370	370	252	252	mm	-
Upstand	23	23	28	28	25	25	22	22	24	24	15	15	10	10	mm	-
Overlap	65	65	75	75	60	60	75	75	70	70	80	80	100	100	mm	-
Weight / plate	3,18	3,18	3,19	3,19	3,11	3,11	3,22	3,22	3,21	3,21	2,98	2,98	2,43	2,43	kg/plate	-
Weight / m ²	-	6,42	-	6,68	-	7,13	-	6,47	-	6,44	-	6,47	-	6,43	kg/m ²	-
Snow load resistance	-	X ³⁾	-	X ³⁾	-	X ³⁾	-	X ³⁾	-	X ³⁾	-	X ³⁾	-	X ³⁾	-	-

¹⁾ The manufacturers Declaration of performance, DoP

²⁾ Control limit shows values, product has to satisfy during internal factory production control and audit testing.

³⁾ Product is suitable for use in all snow load zones in Norway

3. Fields of application

All product types can be used as roofing on ventilated, pitched roofs where the roofing steel tiles are laid on timber battens and counter battens.

4. Properties

General

Weight, geometric information and product properties for the different Metrotile products are shown in table 2.

Load-carrying capacity

Based on testing, Metrotile Roofing System can be assumed to have adequate strength at all relevant snow loads. However, the stiffness of the steel tiles is limited. This means that visible deformations may occur at snow loads above 10 kN/m².

Tests with static concentrated loads show that permanent deformation occurs at loads of just over 1 kN (approx. 10 cm x 10 cm load area) when the load is not placed at the bottom of the section waves.

Metrotile Shingle are fastened from the top of the tiles. This product should therefore not be used in areas where the design load of wind gusts causes wind suction exceed 2,7 kN/m².

Safety in case of fire

Metrotile Roofing System satisfy class B_{ROOF} (t2) according EN 13501-5 for external fire exposure of roofs.

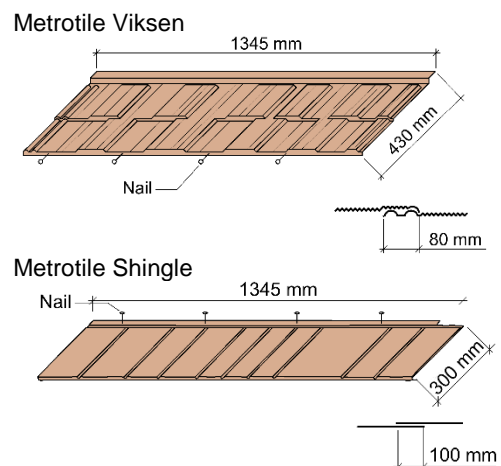


Fig. 2 Standard types metal sheet tiles with related overlap and nail positions.

Durability

Metrotile Roofing System has documented sufficient corrosion protection on all surfaces and edges coated with the different surface treatments in the factory. The cut edges, made on site should, if possible, be positioned under another tile or the edges should be treated with corrosion protection. In general roofing based on steel sheeting may be subject to corrosion damage over time in locations with particularly corrosive atmospheres.

5. Environmental aspects

Substances hazardous to health and environment

The product contains no hazardous substances with priority in quantities that pose any increased risk for human health and environment. Chemicals with priority include CMR, PBT or vPvB substances.

Effect on soil, surface water and ground water

The leaching properties of the product are evaluated to have no negative effects on soil or water.

Waste treatment/recycling

The product shall be sorted as metall. The product shall be delivered to an authorized waste treatment plant for material recovery.

Environmental declaration

No environmental declaration (EPD) has been worked out for the product.

6. Special conditions for use and installation

Design considerations

Metrotile Roofing System can be used over a roofing underlay on roofs with a slope down to 18°. If the roofing underlay consists of a load-bearing sub-roof and a continuous waterproof layer such as an asphalt underlay with bonded joints, the steel tiles may be laid on roofs with a slope down to approx. 10°. The roofing underlay should never have any loose overlap joints.

Metrotile Roofing System must always be fitted on top of a roofing underlay or sub-roof and installed from the ridge to the eave, except for Metrotile Shingle which should be installed from eave to ridge and from right to left.

Metrotile Roofing System shall be fastened with 50 mm hot galvanized ring shank nails with a diameter of 2,8 mm. The nails are delivered as a part of the roofing system. To avoid puncturing the underlayer, the length of the nails used for Metrotile Shingle must not exceed the thickness of the battens.

The roofing steel tiles must be placed on battens which are positioned at a distance of c/c 370 mm. Exception is Metrotile Shingle, where the distance shall be c/c 252 mm as illustrated in Fig. 3 and 4.

Both when walking on the roofing and when fastening the tiles, care must be taken to ensure that the roofing steel tiles are not damaged during installation. See the manufacturer's special installation guideline. Special repair kits are available for mending damages to the surface coating.

Cutting of Metrotile Roofing system must be carried out using a guillotine, sheet metal shears, or a special saw with hardened metal blade. Grinders or high-speed saws that generate high temperatures in the cut should be avoided. Cut edges should be coated with corrosion-protective paint.

The steel tiles shall be fastened with four nails at the front edge as shown in fig. 1, 2 and 3. Metrotile Shingle shall be nailed on top of the profile as shown in fig. 2 and 4. The fastening method requires the battens to be positioned in precise distances. Battens of at least 30 mm x 48 mm are recommended.

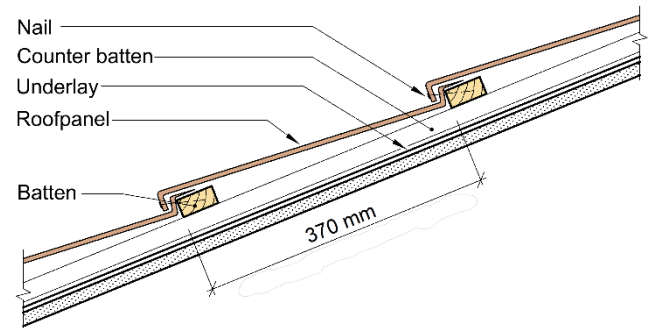


Fig. 3
Roofing tiles Bond, Roman, IShake, Woodshake, Classic, Viksen laid on counter battens and roof battens and fixed with nails at the front edge.

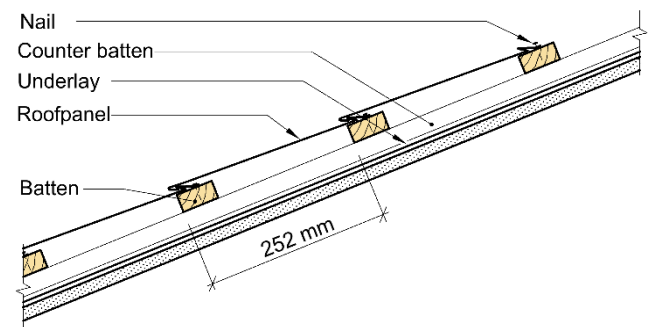


Fig. 3
Roofing tiles Shingle laid on counter battens and roof battens and fixed with nails from the top into the battens.

The roof surface must have sufficient ventilation. Care must be taken to ensure sufficient air supply below the tiles at the eaves, cf. the manufacturer's installation guideline.

Where snow-guards are required, these must be specially designed for the profiling of Metrotile Roofing System.

In general, the roofing steel tiles should be installed in accordance with the principles given in the Building Research Design Sheets 544.101 and 544.103, including connections to other parts of the building structure. The need for a snow-guard may be assumed to be the same as for roofing made of bituminous roofing membrane or shingles, and coarse concrete tiles. See Building Research Design Sheets 525.931.

Traffic on the roof

Deformation of sheets due to overloading may cause damages to the corrosion protection. Roofing with Metrotile Roofing System should therefore be supplemented with specially designed roof ladder or roof bridge where access to the roof is required for maintenance purposes. Walking on the roofing sheets must only be done with caution, and the foot should be positioned in the valley of the profiles directly above the roofing batten.

Transport and storage

Metrotile Roofing System parts are packed on pallets and covered with shrinking foil. It is prohibited to position pallets on top of each other.

7. Factory production control

The product is produced by Metrotile Europe NV, Michielenweg 3, 3700 Tongeren, Belgium.

The holder of the approval is responsible for the factory production control in order to ensure that the product is produced in accordance with the preconditions applying to this approval.

The manufacturing of the product is subject to continuous surveillance of the factory production control in accordance with the contract regarding SINTEF Technical Approval.

Metrotile urope NV has a quality management system what is certified by Bureau Veritas (BVQI) according EN ISO 9001, certificate 134697.

8. Basis for the approval

The approval is based on following reports:

- "Euro-Agrément final work programme March 2006"
- Norges byggforskningsinstitutt, report O-20776, dated 21.08.2006 (Laboratory testing)
- Norges byggforskningsinstitutt, report 3D037353, dated 2.12.2011 (leaching test)
- SP Sveriges Provnings- och Forskningsinstitut, report F518844, dated 18.11.2005 (fire testing)
- BBRI, report DE 651XC617, dated 21.12.2000
- BBRI, report DE 651XC617, dated 09.02.2001
- BBRI, report DE 651XD195, dated 29.11.2001
- BBRI, report DE 651XD504, dated 12.04.2002
- BBRI, report DE 651XE538, dated 26.01.2005
- BBRI, report DE 651XC538, dated 14.06.2005

9. Marking

Metrotile Roofing System is marked on the reverse side of each roofing steel tile with product name and production time. Further shall tiles be marked with the begium approval (ATG) number 2469 or 3041. The product is CE marked in accordance with EN 14782. The approval mark for SINTEF Technical Approval No. 2458 may also be used.



Approval mark

10. Liability

The holder/manufacturer has sole product responsibility according to existing law. Claims resulting from the use of the product cannot be brought against SINTEF beyond the provisions of Norwegian Standard NS 8402

for SINTEF Building and Infrastructure

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Approval Manager