

Metrotile Roofing System

is approved by Norwegian Building Research Institute with properties, field of application and conditions as stated in this document.

1. Holder of the approval

METROTILE EUROPE nv
Heersterveldweg 15-I.Z. Oost
3700 Tongeren BELGIUM
Tel.: +32 12241801 Fax:+32 12241802
www.metrotile.be

2. Manufacturer

METROTILE EUROPE nv, Tongeren Belgium

3. Product description

Metrotile Roofing System are steel tiles manufactured from 0,45 mm and 0,9 mm sheet steel galvanized with a doublesided aluminium zink alloy (AZ 185) and coated with a primer on both sides. In addition the upper face is coated with a pigmented acrylic coating (base coat), coloured stone granules, and finally a clear acrylic coating (top coat). The lower face is coated with a polyester varnish. The steel tiles cover an area of approx. 0.45 m² except for MetroShingle which covers an area of approx. 0,3 m². Dimension and shape of the roofing system types are given in table 1 and in figure 1.

Table 1
Dimension and shape of Metrotile Roofing System tiles

Property	Product type			
	MetroBond/ MetroBond 900	Metro Roman	MetroShake/ MetroShake 900	Metro Shingle
Steel thickness (mm)	0,45 (± 0,5 %) / 0,9 (± 0,5 %)	0,45 (± 0,5 %)	0,45 (± 0,5 %) / 0,9 (± 0,5 %)	0,45 (± 0,5 %)
Length (mm)	1330 (-2/+4)	1280 (-2/+4)	1330 (-2/+4)	1330 (-2/+4)
Cover-length (mm)	1270 (± 0,5 %)	1222 (± 0,5 %)	1257 (± 0,5 %)	1330 (± 0,5 %)
Width (mm)	415 (± 2)	415 (± 2)	415 (± 2)	265 (± 2)
Cover-width (mm)	368	368	368	235
Shape	8 tile-shape	8 tile-shape	slate-shape	shingle-shape
Upstand (mm)	28	28	≤ 28	≤ 10
Side overlap (mm)	60	60	60	75

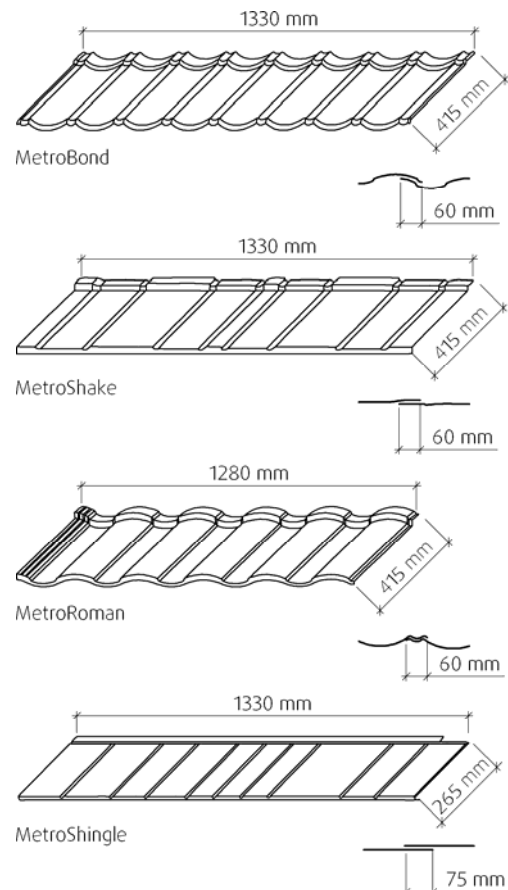


Fig. 1.
Standard types of roofing sheets

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

4. Field of application

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

5. Properties

Strength and rigidity

The roofing steel tiles have been type tested for a uniformly distributed load equal to 16 kN/m². Permanent deformation occurred at about 10 kN/m², but no failure was observed. The steel tiles 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.

MetroShingle are fastened on top of the tiles. This product should therefore not be used in areas with a local wind suction increasing 2700 Pa.

Safety in case of fire

The roofing steel tiles satisfy the requirement for class B_{ROOF}(t2) according to EN 13501-5 2004.

Durability

Metrotile Roofing System has documented sufficient corrosion protection. The cut edges are coated with acrylic coating at the factory. However, in general roofing based on steel sheeting may be subject to corrosion damage over time in locations with particularly corrosive atmospheres.

Environmental declaration

No environmental declaration is worked out for Metrotile Roofing System. The product does not contain any substances on the observation list of dangerous substances published by the national Norwegian environmental authorities.

Waste handling / recycling

The product may be sent to ordinary public waste deposit site after the end of its working life, alternatively recycled.

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 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 of down to approx. 10°. On sites exposed to particularly harsh weather, the roofing underlay should never have any loose overlap joints.

Installation

Metrotile Roofing System must always be fitted on top of a roofing underlay or sub-roof and installed from top to bottom, except for MetroShingle which has to be installed from bottom to top and from right to left.

For MetroBond, MetroShake and MetroRoman, the steel tiles shall be fastened with 50 mm hot galvanized ring shank nails with a diameter of 2,8 mm. To avoid puncturing the underlayer, the length of the nails used for MetroShingle 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 368 mm. Exception is MetroShingle, where the distance shall be c/c 235 mm as illustrated in Figure 2. The steel tiles shall be fastened at the front edge. MetroShingle shall be nailed on top of the profile. Four nails shall be used in each steel tile as illustrated in Figure 3. The fastening method requires the battens to be positioned at precise intervals. Battens of at least 30 mm x 48 mm are recommended.

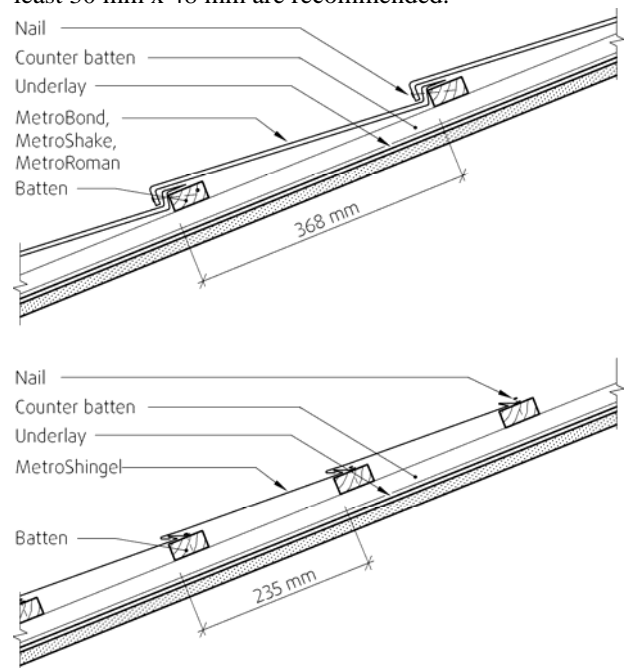


Fig. 2

The roofing sheets are laid on roof battens and counter battens. MetroBond, MetroShake and MetroRoman shall be fastened at the front edge. MetroShingle shall be fastened at the top of the tile.

Both when walking on the roofing and fastening the tiles with nails 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 steel tiles 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 roof surface must have sufficient ventilation. Particular care must be taken to assure 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 Sheet 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 undulation directly above the roofing batten.

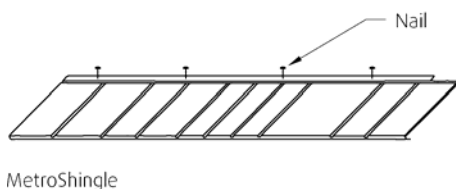
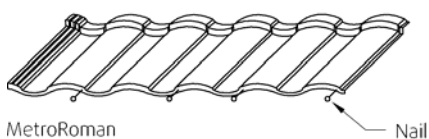
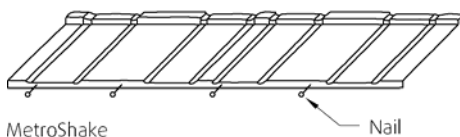
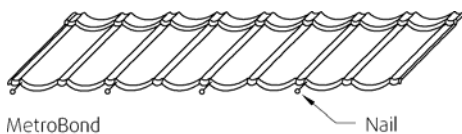


Fig. 3.
Nailing of the sheets

7. Factory production control

Supervising production control is carried out by SECO in Belgium in accordance with contract between METROTILE EUROPE nv and Norwegian Building Research Institute.

The manufacturer has a certified quality system certified by BVQI in compliance with EN-ISO 9001-2000, certificate No 134697.

8. Basis for the approval

The approval is based on "Euro-Agrément final work programme March 2006" and type testing carried out at NBI and other institutes. The results are documented in the following reports:

- Byggforsk report O-20776, dated 21.08.2006 (laboratory testing)
- SP report F518844, dated 18.11.2005 (reaction to fire)

Material properties and laboratory performance tests, such as driving rain, are documented in following reports from BBRI:

- DE 651XC617, dated 21.12.2000
- DE 651XC617, dated 09.02.2001
- DE 651XD195, dated 29.11.2001
- DE 651XD504, dated 12.04.2002
- DE 651XE538, dated 26.01.2005
- DE 651XE538, dated 14.06.2005

9. Marking

Metrotile Roofing System is marked on the reverse side of each roofing steel tile with the ATG number (Belgian certificate) and date of manufacture. It may also be marked with the approval mark for NBI Technical Approval No. 2458.



Approval mark

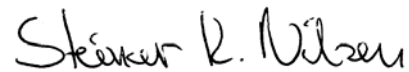
10. Liability

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

11. Technical management

Project manager for this approval is Noralf Bakken, Norwegian Building Research Institute, dep. Materials and construction, - Trondheim.

Norwegian Building Research Institute

A handwritten signature in black ink that reads "Steinar K. Nilsen". The signature is written in a cursive, slightly slanted style.

Steinar K. Nilsen
Product Approval Manager