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Agrément Certificate
07/4470
Product Sheet 1

METROTILE ROOFING SYSTEM

METROTILE BOND 450 AND METROTILE BOND 900

This Agrément Certificate Product Sheet⁽¹⁾ relates to Metrotile Bond 450 and Metrotile Bond 900, preformed aggregate-coated steel tilesheets for use on conventional steel or timber roof structures with a minimum pitch of 10°.

(1) Hereinafter referred to as 'Certificate'.

CERTIFICATION INCLUDES:

- factors relating to compliance with Building Regulations where applicable
- factors relating to additional non-regulatory information where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



KEY FACTORS ASSESSED

Weathertightness — the products, used with a suitable underlay, have satisfactory resistance to the passage of rain and snow (see section 6).

Strength and stability — the products have satisfactory resistance to the effects of wind loading likely to be met in service (see section 7).

Properties in relation to fire — the products are unrestricted under the national Building Regulations (see section 9).

Durability — under normal conditions the products will have a service life in excess of 40 years (see section 11).

The BBA has awarded this Certificate to the company named above for the products described herein. These products have been assessed by the BBA as being fit for their intended use provided they are installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Simon Wroe
Head of Approvals — Materials

Greg Cooper
Chief Executive

Date of First issue: 18 October 2012

Originally certificated on 14 September 2007

The BBA is a UKAS accredited certification body — Number 113. The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at www.bbacerts.co.uk

Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.

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Regulations

In the opinion of the BBA, Metrotile Bond 450 and Metrotile Bond 900, if installed, used and maintained in accordance with this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations (the presence of a UK map indicates that the subject is related to the Building Regulations in the region or regions of the UK depicted):



The Building Regulations 2010 (England and Wales)

Requirement:	B3(2)	Internal fire spread (structure)
Requirement:	B4(2)	External fire spread
Comment:		The products are unrestricted under these Requirements. See section 9 of this Certificate.
Requirement:	C2(b)	Resistance to moisture
Comment:		The products can contribute to meeting this Requirement. See section 6 of this Certificate.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The products are acceptable. See sections 11.1, 11.2 and the <i>Installation</i> part of this Certificate.



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The products are acceptable. See sections 10.2, 11.1, 11.2 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards – construction
Standard:	2.1	Compartmentation
Standard:	2.2	Separation
Comment:		The products can contribute to satisfying these Standards, with reference to clauses 2.1.5 ⁽²⁾ , 2.2.7 ⁽²⁾ and 2.2.10 ⁽¹⁾ . See section 9 of this Certificate.
Standard:	2.8	Spread from neighbouring buildings
Comment:		The products are unrestricted by this Standard, with reference to clause 2.8 ⁽¹⁾⁽²⁾ . See section 9 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The products can contribute to satisfying this Standard, with reference to clauses 3.10.1 ⁽¹⁾⁽²⁾ and 3.10.8 ⁽¹⁾⁽²⁾ . See section 6 of this Certificate.
Standard:	7.1(a)	Statement of sustainability
Comment:		The products can contribute to meeting the relevant Requirements of Regulation 9, Standards 1 to 6 and therefore will contribute to a construction meeting a bronze level of sustainability as defined in this Standard.
Regulation:	12	Building standards – conversions
Comment:		All comments given for these products under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ . (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012

Regulation:	23(a)(i)(iii)(b)(i)	Fitness of materials and workmanship
Comment:		The products are acceptable. See sections 11.1, 11.2 and the <i>Installation</i> part of this Certificate.
Regulation:	28(b)	Resistance to moisture and weather
Comment:		The products can contribute to satisfying the requirements of this Regulation. See section 6 of this Certificate.
Regulation:	35(2)	Internal fire spread – Structure
Regulation:	36(b)	External fire spread
Comment:		The products are unrestricted under these Regulations. See section 9 of this Certificate.

Construction (Design and Management) Regulations 2007

Construction (Design and Management) Regulations (Northern Ireland) 2007

Information in this Certificate may assist the client, CDM co-ordinator, designer and contractors to address their obligations under these Regulations.

See sections: 1 *Description* (1.2), 3 *Delivery and site handling* (3.1), and 14 *Procedure* (14.6) of this Certificate.

Additional Information

NHBC Standards 2011

NHBC accepts the use of Metrotile Bond 450 and Metrotile Bond 900, when installed, used and maintained in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 7.2 *Pitched roofs*.

CE marking

The Certificate holder has taken the responsibility of CE marking the products in accordance with harmonised European Standard BS EN 14782 : 2006. An asterisk (*) appearing in this Certificate indicates that data shown is given in the manufacturer's Declaration of Performance.

Technical Specification

1 Description

1.1 Metrotile Bond 450 and Metrotile Bond 900 are pressed from epoxy or acrylic-primed, aluminium-zinc alloy coated sheet to a shape simulating eight conventional tiles with profiled interlocking upper and lower edges (see Figure 1). The tiles have a mineral-filled acrylic coating followed by stone granules and a clear acrylic glaze coat (see Figure 2).

Figure 1 Metrotile Bond tiles and nailing points

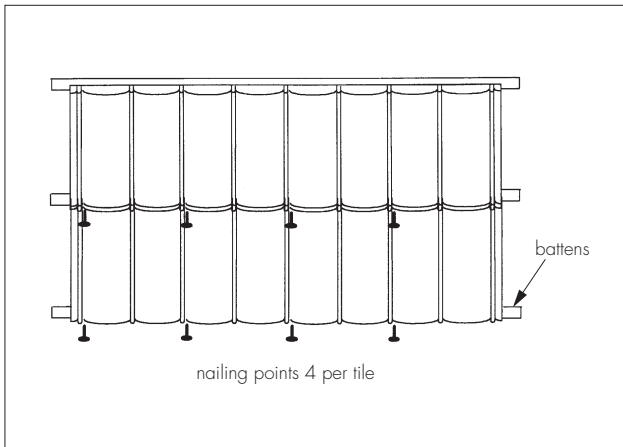
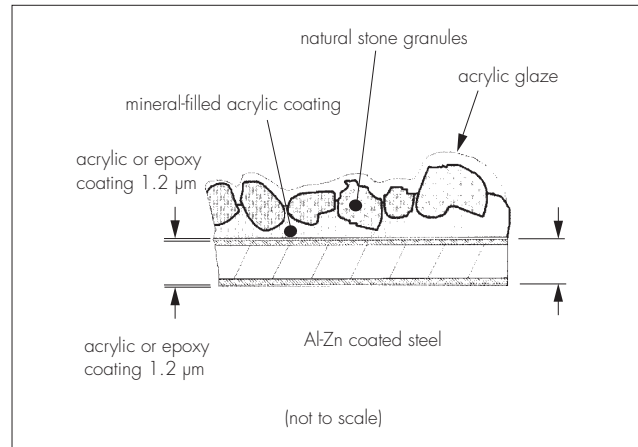


Figure 2 Section through tile



1.2 The tiles have the dimensions given in Table 1.

Table 1 Dimensions

Characteristic (unit)	Tile type	
	Metrotile Bond 450	Metrotile Bond 900
Thickness of sheet (mm)	0.45	0.90
Length of sheet (mm)	1330	1330
Cover length (mm)	1270	1270
Width of sheet (mm)	415	415
Cover width	370	368
Upstand (mm)	28	28
Side lap (mm)	60	60
Weight of tile (kg)	2.8	4.6
Weight of tiled roof (kg·m ⁻²)	6.2	9.9
Coverage per tile (m ²)	0.46	0.46

1.3 The tiles are available in six standard colours:

- terracotta
- charcoal
- bronze
- green
- brindle
- red.

1.4 Accessories⁽¹⁾ with the granulated finish, produced by pressing and coated to the same specification as described in section 1.1, are:

- ridge/hip cap — to cover 1150 mm
- standard barge cover — to cover 1150 mm
- side flashing — to cover 1150 mm
- barrel cap/vee ridge — to cover 370 mm.

(1) Additional flashings with matching decorative surfaces are available to order.

1.5 The Certificate holder can supply a guillotine and a tile-bending machine. Other accessories include:

- flat-headed tile-fixing nails 50 mm long by 2.8 mm diameter, serrated or annular grooved and painted. Galvanized steel is normally used, except in coastal areas where stainless steel should be used
- finishing kit of pigmented, acrylic-based emulsion and matching granules for use on vertically driven nail heads and to restore damaged areas.

1.6 Other accessories available, but not covered by this Certificate, include:

- complete roof ventilation systems
- gas flue ridge terminals
- clear polycarbonate vision tiles.

2 Manufacture

2.1 The products are manufactured from steel sheet which has a hot-dip AZ (aluminium-zinc at 55 : 45) coating of 185 g·m⁻² to BS EN 10346 : 2009. The steel coils are slit, guillotined and pressed. The pressed blanks are coated on both sides with an epoxy or acrylic primer and finished with a mineral-filled acrylic coating followed by stone granules and a clear acrylic glaze coat.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The products are manufactured in Belgium by Metrotile Europe and marketed in the UK by the Certificate holder.

2.4 The management system of Metrotile Europe has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by Bureau Veritas Quality International (Certificate 134697).

3 Delivery and site handling

3.1 Tiles are delivered to site on timber pallets 1370 mm long by 1080 mm wide. The maximum number of tiles per pallet is 400 for 0.45 mm thick tilesheets and 280 for 0.9 mm thick tilesheets, giving a total weight of approximately 1300 kg.

3.2 During transport the edges and corners of tiles must be protected to prevent damage.

3.3 On site the pallets should be stored on a firm, dry base away from the possibility of damage, covered to prevent water ingress, and as close as possible to the building where they are to be installed.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Metrotile Bond 450 and Metrotile Bond 900.

Design Considerations

4 Use

4.1 Metrotile Bond 450 and Metrotile Bond 900 are suitable for use, in conjunction with a suitable roof tile underlay material, as a weatherproof and decorative covering on a conventional timber or steel structure with a minimum pitch of 10°.

4.2 On roof constructions with pitches from 10° to 12°, the tiles should be installed on simple structures only (ie without features such as hips, valleys, rooflights or skew roofs).

4.3 Metrotile Bond 900 has a greater resistance to impact damage and is especially suitable for areas where exposure to vandalism is possible.

4.4 To prevent electro-chemical corrosion, direct contact with copper or its alloys should be avoided and copper roofs should not drain onto the installation.

5 Practicability of installation

The tiles should only be installed by roofers/tilers trained and approved by the Certificate holder.

6 Weathertightness



The tiles, used with a suitable underlay, have satisfactory resistance to the passage of rain and snow.

7 Strength and stability

7.1 The tiles have satisfactory resistance to the effects of wind suction likely to be met in service.

7.2 The tiles weigh considerably less than conventional roofing materials, and the roof substructure should be securely attached to the structure of the building to prevent wind uplift under adverse conditions.

8 Resistance to damage

8.1 The tiles will not be deformed by normal maintenance traffic.

8.2 The tiles may be deformed by impact. The 0.9 mm thick tilesheets are more resistant to impact damage than 0.45 mm thick tilesheets and should be used in situations where greater resistance is required eg in areas subject to vandalism. Damaged products can be replaced but care should be taken to prevent damage to adjacent tiles.

9 Properties in relation to fire



When tested to BS 476-3 : 2004, samples of the products achieved an EXT.S.AA fire rating. The product has also achieved a B_{ROOF(t4)}* classification to BS EN 13501-5 : 2005.

10 Maintenance

10.1 For maintenance work, roof ladders or crawling boards should be used, but care is still required to prevent damage. It is recommended that soft-soled shoes are worn.



10.2 Small areas where the coating has been damaged should be re-coated using the finishing kit.

11 Durability



11.1 The acrylic and aluminium-zinc alloy coatings will protect the steel substrate against corrosion and will give the products a life in excess of 40 years.

11.2 Localised maintenance treatment may be necessary within 30 years to restore the appearance where chippings may have been lost or the coating eroded.

12 Re-use and recyclability

The products contain steel, which can be recycled.

Installation

13 General

13.1 The standard of installation of Metrotile Bond 450 and Metrotile Bond 900 should comply with the requirements of BS 8000-6 : 1990.

13.2 The tilesheets can be installed at all temperatures likely to be met in roofing works. However, at temperatures below -10°C extra care is required, particularly when driving nails and cutting and bending tiles.

13.3 The roof construction must be adequate to resist the loadings detailed in BS EN 1991-1-1 : 2002 and BS EN 1991-1-4 : 2005 and their National Annexes, or BS 6399-1 : 1996 and BS 6399-2 : 1997. The roof construction should be in accordance with the relevant requirements of BS 5534 : 2003 + A1 : 2010.

13.4 The minimum batten sizes permitted depend on the rafter spacing, as detailed in Table 2.

Table 2 Batten sizes and rafter or roof truss centres

Minimum batten size (mm)	Rafter spacing (mm)
50 x 25	450
50 x 40	600
50 x 40	900
50 x 50	1200

13.5 The roof space and batten space must be adequately ventilated in accordance with BS 5250 : 2011.

13.6 Where timber boarding is laid on the rafters, a timber counter batten should be installed in accordance with BS 5534 : 2003 + A1 : 2010.

13.7 The underlay must be to BS 8747 : 2007 Annex B, Type 1F or 5U, or be covered by an Agrément Certificate and installed in accordance with that Certificate.

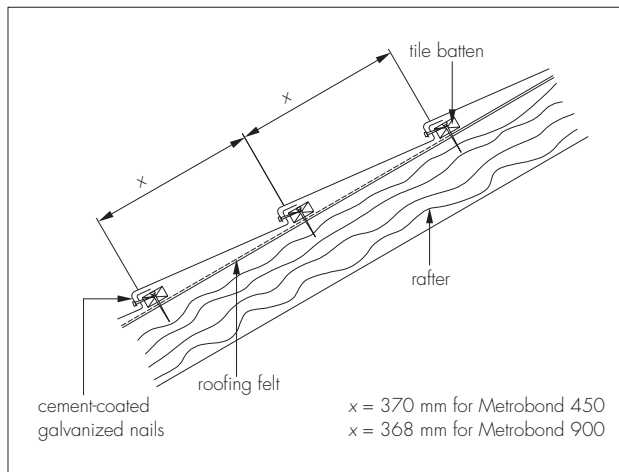
14 Procedure

14.1 Rafters must be securely tied to the building structure with, for example, galvanized steel straps complying with BS EN 1996-1-1 : 2005, BS EN 1996-2 : 2006 or PD 6697 : 2010.

14.2 Where the rafters/trusses are spaced at 900 mm or 1200 mm centres, polypropylene or nylon tape is nailed across the rafters to support the underlay.

14.3 Battens are secured over the underlay and roof trusses and fixed at the spacings given in Figure 3. The fixings used to secure the battens to the rafters must be adequate to resist predicted wind loads.

Figure 3 Spacing and fixing details



14.4 The tiles are laid onto the battens with the front flange of the upper tilesheet overlapping the rear upstand of the lower. Adjacent tiles are overlapped with side laps of 64 mm (Metrotile Bond 450) or 65 mm (Metrotile Bond 900) (one corrugation) (see Figures 4 and 5).

Figure 4 Overlap details

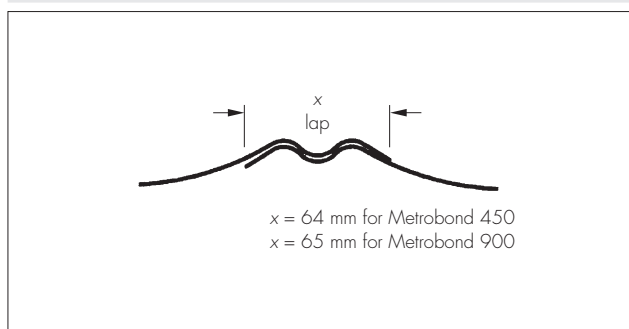
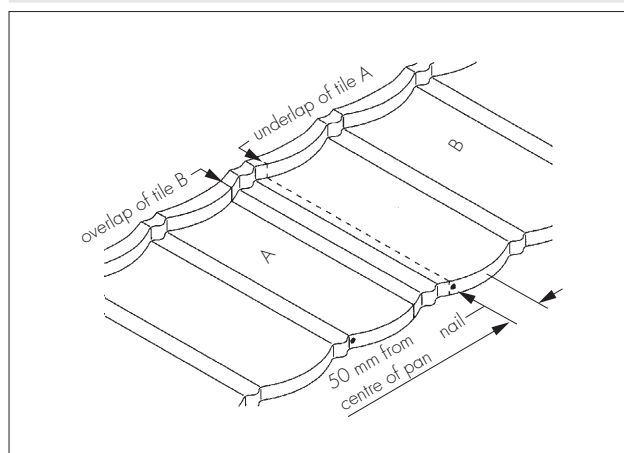


Figure 5 Overlap and nailing points



14.5 Fixing is achieved by nailing through the front downturned flange into the side of the batten at the rate of four nails per tilesheet (see Figures 1, 3 and 5). It is recommended that the Metrotile Bond 900 nail positions are pre-punched to aid nail penetration through the thicker steel.

14.6 Tiles are preferably cut and formed with a guillotine and a tile-bending machine, but small quantities may be cut with tin snips or sheet metal cutters, and bent by hand.

14.7 The accessories are cut, formed and installed as necessary to complete the installation.

Technical Investigations

15 Tests

Tests were carried out and the results assessed, to determine:

- resistance to chipping
- resistance to artificial weathering
- strength of tilesheets
- corrosion resistance
- resistance to wind uplift
- resistance to loading.
- ease of forming
- durability of tilesheets
- resistance to rain penetration
- watertightness
- resistance to thermal shock

16 Investigations

16.1 An assessment was made of fire tests to BS 476-3 : 2004 and BS EN 13501-5 : 2005.

16.2 Visits were made to sites in progress to assess the practicability of installation and ease of repair.

Bibliography

- BS 476-3 : 2004 *Fire tests on building materials and structures — Classification and method of test for external fire exposure to roofs*
- BS 5250 : 2011 *Code of practice for control of condensation in buildings*
- BS 5534 : 2003 + A1 : 2010 *Code of practice for slating and tiling (including shingles)*
- BS 6399-1 : 1996 *Loading for buildings — Code of practice for dead and imposed loads*
- BS 6399-2 : 1997 *Loading for buildings — Code of practice for wind loads*
- BS 8000-6 : 1990 *Workmanship on building sites — Code of practice for slating and tiling of roofs and cladding*
- BS 8747 : 2007 *Reinforced bitumen membranes (RBMs) for roofing — Guide to selection and specification*
- BS EN 1991-1-1 : 2002 *Eurocode 1: Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
- NA to BS EN 1991-1-1 : 2002 *UK National Annex to Eurocode 1: Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
- BS EN 1991-1-4 : 2005 *Eurocode 1: Actions on structures — General actions — Wind actions*
- NA to BS EN 1991-1-4 : 2005 *UK National Annex to Eurocode 1: Actions on structures — General actions — Wind actions*
- BS EN 1996-1-1 : 2005 *Eurocode 6: Design of masonry structures — General rules for reinforced and unreinforced masonry structures*
- BS EN 1996-2 : 2006 *Eurocode 6: Design of masonry structures — Design considerations, selection of materials and execution of masonry*
- BS EN 10346 : 2009 *Continuously hot-dip coated steel flat products — Technical delivery conditions*
- BS EN 13501-5 : 2005 *Fire classification of construction products and building elements — Part 5: Classification using data from external fire exposure to roof tests*
- BS EN 14782 : 2006 *Self-supporting metal sheet for roofing, external cladding and internal lining — Product specification and requirements*
- BS EN ISO 9001 : 2008 *Quality management systems — Requirements*
- PD 6697 : 2010 *Recommendations for the design of masonry structures to BS EN 1991-1-1 and BS EN 1996-2*

17 Conditions

17.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page — no other company, firm, organisation or person may hold or claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document — it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

17.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

17.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

17.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

17.5 In issuing this Certificate, the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

17.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.