Magmatech Ltd
P O Box 59162
London
NW2 9HD
Tel: 07916 155822 Fax: 0870 123 6392
e-mail: ben.williams@magmatech.co.uk
website: www.magmatech.co.uk

BBA APPROVAL INSPECTION TESTING CERTIFICATION
TECHNICAL APPROVALS FOR CONSTRUCTION

Agrément Certificate
09/4697
Product Sheet 1

MAGMATECH LTD

TEPLOTIE WALL TIES

PRODUCT SCOPE AND SUMMARY OF CERTIFICATE

This Certificate relates to TeploTie Wall Ties, composite wall ties comprising pultruded basalt fibres held in a matrix of epoxy resin. The ties are for use in tying conventional masonry cavity walls for new-build constructions.

AGRÉMENT 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

Structural performance — the wall ties can be used in multi-storey buildings. They are comparable to ties of types 1, 2 and 4 as defined in BS 5628-1 : 2005 (see section 5).

Behaviour in relation to fire — the effectiveness of the installed wall ties is assessed as being equivalent to a comparable steel tie (see section 6).

Thermal performance — the products have a thermal conductivity in the longitudinal direction of 0.71 $W \cdot m^{-1} \cdot K^{-1}$ (see section 7).

Durability — the products and fixings will not be adversely affected by mortar or cavity insulation materials (see section 11).

The BBA has awarded this Agrément 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

Date of First issue: 28 October 2009

Brian Chamberlain
Head of Approvals — Engineering

Greg Cooper
Chief Executive

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

Regulations

In the opinion of the BBA, TeploTie Wall Ties, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements of the following Building Regulations:

The Building Regulations 2000 (as amended) (England and Wales)

Requirement:	**A1**	**Loading**
Comment:		Where wall ties are relied upon to contribute to the strength and stability of cavity walls, they will be satisfactory. See section 5.1 of this Certificate.
Requirement:	**B3(1)(2)**	**Internal fire spread (structure)**
Comment:		When used in a masonry cavity wall that contributes to the fire resistant properties of an element required to be fire resistant, the use of the wall ties will not adversely affect the level of fire safety of the wall. See sections 6.1 and 6.2 of this Certificate.
Requirement:	**C2(b)(c)**	**Resistance to moisture**
Comment:		When used in an external cavity wall, the wall ties will not adversely affect the resistance of the wall to the passage of moisture. See section 9 of this Certificate.
Requirement:	**L1(a)(i)**	**Conservation of fuel and power**
Comment:		When calculating the thermal transmittance of insulated masonry cavity walls incorporating the ties, the thermal bridging due to the ties must be taken into account. See section 7 of this Certificate.
Requirement:	**Regulation 7**	**Materials and workmanship**
Comment:		The wall ties are acceptable. See sections 11.1 and 11.2 and the *Installation* part of this Certificate.

The Building (Scotland) Regulations 2004 (as amended)

Regulation:	**8(1)**	**Fitness and durability of materials and workmanship**
Comment:		The products can contribute to a construction meeting this standard. See sections 11.1 and 11.2 and the *Installation* part of this Certificate.
Standard:	1.1 (a)(b)	Structure
Comment:		Where wall ties are relied upon to contribute to the strength and stability of cavity walls, they will be satisfactory. See section 5 of this Certificate.
Standard:	2.3	Structural protection
Comment:		When used in a masonry cavity wall that contributes to the fire resistant properties of an element required to be fire resistant, the use of the wall ties will not adversely affect the level of fire safety of the wall. See sections 6.1 and 6.2 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		When used in a masonry cavity wall, the wall ties will provide an equivalent performance to that of a typical steel tie. See sections 6.1 and 6.2 of this Certificate.
Standard:	3.10	Precipitation
Comment:		The wall ties will not adversely affect the resistance of the wall to the passage of moisture, with reference to clauses 3.10.1[(1)(2)], 3.10.2[(1)(2)], and 3.10.3[(1)(2)]. See section 9 of this Certificate.
Standard:	6.2	Building insulation envelope
Comment:		When calculating the thermal transmittance of insulated masonry cavity walls incorporating the ties, the thermal bridging due to the ties must be taken into account. See section 7 of this Certificate.
Regulation:	**12**	**Building standards – conversions**
Comment:		All comments given for these products under Regulation 9, 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) 2000 (as amended)

Regulation:	**B2**	**Fitness of materials and workmanship**
Comment:		The wall ties are acceptable. See sections 11.1 and 11.2 and the *Installation* part of this Certificate.
Regulation:	**C4**	**Resistance to ground moisture and weather**
Comment:		When used in an external cavity wall, the wall ties wll not adversely affect the resistance of the wall to the passage of moisture. See section 9 of this Certificate.
Regulation:	**D1**	**Stability**
Comment:		Where wall ties are relied upon to contribute to the strength and stability of cavity walls, they will be satisfactory. See section 5.1 of this Certificate.
Regulation:	**E4**	**Internal fire spread — Structure**
Comment:		When used in a masonry cavity wall that contributes to the fire resistant properties of an element required to be fire resistant, the use of the wall ties will not adversely affect the level of fire safety of the wall. See sections 6.1 and 6.2 of this Certificate.
Regulation:	**F2**	**Conservation measures**
Comment:		When calculating the thermal transmittance of insulated masonry cavity walls incorporating the ties, the thermal bridging due to the ties must be taken into account. See section 7 of this Certificate.

Construction (Design and Management) Regulations 2007

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

In the opinion of the BBA, there is no information in this Certificate which relates to the obligations of the client, CDM co-ordinator, designer and contractors under these Regulations.

Non-regulatory Information

NHBC Standards 2008

NHBC accepts the use of TeploTie Wall Ties, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 6.1 *External masonry walls*.

Technical Specification

1 Description

1.1 TeploTie Wall Ties are composite wall ties comprising pultruded basalt fibres set into a matrix of epoxy resin. The ties have a sand finish to help ensure a good bond in the mortar joint and each incorporates a drip to prevent water crossing the cavity (see Figure 1). The ties are available in the sizes given in Table 1 for use in cavity widths from 50 mm to 300 mm.

Figure 1 A typical TeploTie

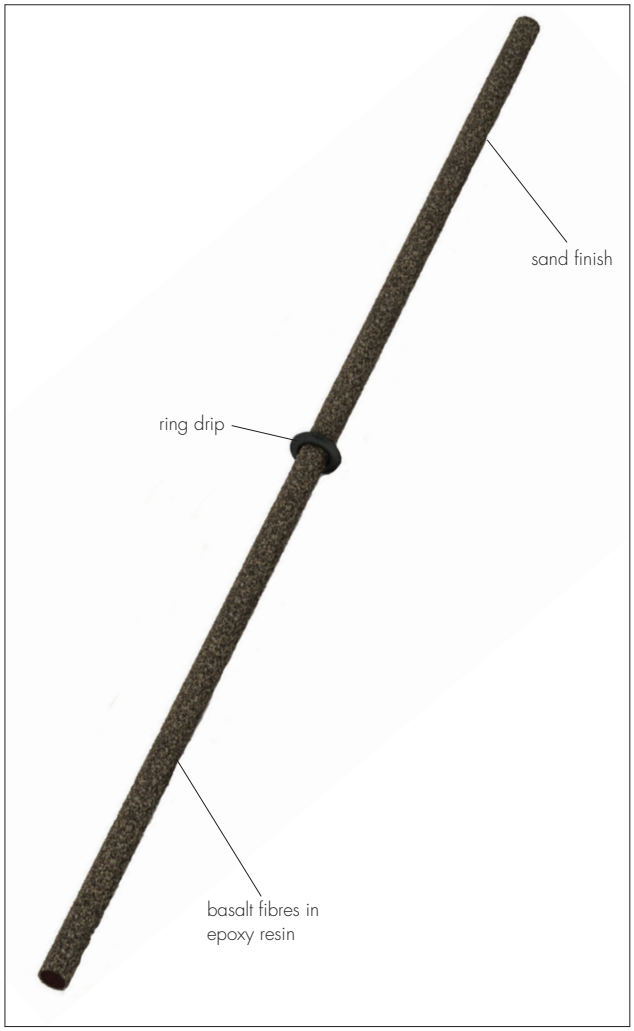

Table 1 Wall tie classification and dimensions

Tie type[1][2]	Tie diameter (mm)	Tie length (mm)	Cavity width (mm)	Maximum storey height[3]
1	7	200	75	18
1	7	225	100	18
1	7	250	125	18
1	7	275	150	18
2	5	200	75	15
2	5	225	100	15
2	5	250	120	15
2	6	275	150	15
2	6	300	175	15
2	6	325	200	15
2	7	350	225	15
2	7	375	250	15
2	7	400	275	15
2	7	425	300	15
4	4	200	75	10
4	4	225	100	10
4	4	250	125	10

(1) Type classification as defined in BS 5628-1 : 2005.

(2) Care should be taken to ensure that the mortar joints are correctly aligned to ensure that the ties adequately fit into each leaf with a slight fall towards the outer leaf. Guidance concerning coursing and the differential movement between leaves should be sought from the Certificate holder.

(3) Based upon an evaluation of test data generally to BS EN 845-1 : 2001 and fire test data (see section 6 of this Certificate).

Note: In accordance with BS EN 845-1 : 2003, the declared minimum mortar joint thickness is 10 mm. If the ties are to be used in mortar joints with a thickness greater than 10 mm, guidance should be sought from the Certificate holder.

1.2 Quality control of the ties includes checks on incoming materials and regular visual and dimensional checks during manufacture.

2 Delivery and site handling

TeploTies are delivered to site in bundles of 50 packed in cardboard boxes. Each box bears the product identification and the BBA logo incorporating the number of this Certificate.

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on TeploTie Wall Ties.

Design Considerations

3 General

3.1 The ties are suitable to tie new masonry walls with the heights and cavity widths given in Table 1.

3.2 The ties must be used in accordance with the requirements of BS 5628-3 : 2005 and BS DD 140-2 : 1987.

3.3 The ties incorporate a drip to prevent water transfer across the ties (see section 9 of this Certificate and Figure 1).

3.4 It is not normal practice for the ties to be installed across cavities (or residual cavities) less than 50 mm wide. Where this does occur, it is important to ensure that requirements relating to weathertightness are met.

3.5 Masonry walls incorporating the ties must be constructed in accordance with one or more of the following technical specifications:

(1) BS 5628-1 : 2005 and 5628-3 : 2005.

(2) The national Building Regulations:

England and Wales — Approved Document A1/2, Section 1C

Scotland — Technical Standards, Small Buildings Guide, Part C

Northern Ireland — Technical Booklet D.

3.6 For walls in which both leaves are at least 90 mm thick, ties should be used at a minimum density of 2.5 per square metre (900 mm horizontal by 450 mm vertical centres). For estimating purposes, the use of five wall ties per square metre is appropriate.

3.7 For walls in which either leaf is no greater than 90 mm thick, ties should be at a minimum density of 4.9 per square metre (450 mm horizontal by 450 mm vertical centres).

3.8 Ties should be evenly distributed over the wall area, except around openings, and should preferably be staggered.

3.9 At the vertical edges of an opening, unreturned or unbonded edges, and vertical expansion joints, additional ties should be used at a rate of one per 300 mm height, located not more than 225 mm from the edge.

4 Practicability of installation

The products are designed to be installed by a competent general builder, or a contractor, experienced with this type of product. They can be built easily into brickwork or blockwork during construction.

5 Structural performance

5.1 According to tests carried out generally in accordance with BS EN 845-1 : 2001, the applications in which the ties are suitable is given in Table 2.

Table 2 Suitable applications

Tie type	Masonry type
1[1]	Heavy duty
2	General purpose
4	Light duty

(1) See section 6.

5.2 In tension the ties fail by straightening or pull out from the masonry; in compression by buckling.

5.3 The shear performance of the wall ties when tested generally in accordance with BS EN 846-7 : 2000 is given in Table 3. The thinnest and thickest diameter ties were tested to give an idea of the performance across the full range of ties supplied.

Table 3 Shear performance of the wall ties

Tie diameter (mm)	Mean load at 1 mm deflection (N)	Minimum load at 1 mm deflection (N)	Mean ultimate failure load (N)	Minimum failure load (N)
4	293	215	585	440
7	528	286	1580	1216

6 Behaviour in relation to fire

6.1 The effectiveness of the installed ties in fire is assessed as being equivalent to that of typical steel ties. Guidance on the fire resistance of cavity walls is given in BS 5628-3 : 2001.

6.2 From a report of a fire test it is indicated that, where applicable, the products are suitable for use in 18 m high buildings requiring a 60-minute fire resistance period.

7 Thermal performance

The U value of a completed wall will depend on the selected insulation thickness, the insulating value of the substrate masonry and its internal finish. Calculations of thermal transmittance (U value), including corrections for wall ties if required, should be carried out in accordance with BS EN ISO 6946 : 2007 and BRE report (BR 443 : 2006) *Conventions for U-value calculations* using a thermal conductivity of 0.71 $W \cdot m^{-1} \cdot K^{-1}$ for the wall ties.

8 Condensation risk

Walls should be designed to limit the risk of interstitial and surface condensation. Guidance may be obtained from BS 5250 : 2002 and BRE report (BR 262 : 2002) *Thermal insulation : avoiding risks*.

9 Weathertightness

The water shedding details of the ties are effective in preventing the transfer of water across the ties to the inner leaf. The drip should be located so that it is in the centre of the wall cavity or residual cavity between the insulation and the external leaf of the wall.

10 Maintenance

As the ties are contained within the walls, maintenance is not required.

11 Durability

11.1 The profiles and fixings will not be adversely affected by mortar (including those incorporating conventional mortar admixtures) or cavity insulation materials.

11.2 The ties should have a service life of not less than 60 years. Their durability will not be impaired by contact with conventional cavity insulation materials or mortar admixtures.

Installation

12 General

TeploTie Wall Ties should be installed in accordance with the requirements of BS 5628-3 : 2005 and the Certificate holder's instructions.

13 Procedure

13.1 The wall ties should be sandwiched between mortar(1) (the ties should be pressed down and buried in mortar, ensuring that the ties are covered within the mortar joint) in a horizontal bed joint to a minimum embedment length of 50 mm (design embedment 62.5 mm), taking care that the drip is at or close to the centre of the cavity (or residual cavity) and the ties are placed horizontally or with a slight fall towards the outer leaf, and at right angles to the walls. Installed ties should be clear of mortar droppings to allow the drip to function and prevent water from crossing to the inner leaf of masonry.

(1) See note to Table 1 concerning mortar joint thickness.

13.2 In partially-filled cavity applications:

- insulation should be cut/notched as necessary to fit closely around the ties (and abut the adjacent board, slab or batt)
- insulation retaining clips must be pushed up against the insulation to hold it securely in place against the inner leaf
- the drip must be located in the centre of the residual cavity.

13.3 The first run of ties is to be laid as near as possible to, though not directly on, the damp-proof course.

Technical Investigations

14 Tests

Tests were carried out to establish:

- tensile performance of the wall tie to mortar bond
- compressive performance of the wall tie to mortar bond
- performance in shear
- tensile strength
- durability.

15 Other investigations

15.1 Test reports generally in accordance with BS EN 845-1 : 2001 were reviewed in connection with the structural performance of the wall ties.

15.2 Calculations were made and examined in conjunction with the results of the load–deflection tests referred to above, to establish structural performance.

15.3 Existing information relating to the suitability of the corrosion protection and compatibility of materials in contact was examined.

15.4 Data relating to the effects of the product on the weathertightness of cavity walls were examined.

15.5 An assessment was made of the behaviour of the system in fire.

15.6 The manufacturing process was examined, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

Bibliography

BS 5250 : 2002 *Code of practice for control of condensation in buildings*

BS 5628-1 : 2005 *Code of practice for the use of masonry — Structural use of unreinforced masonry*
BS 5628-3 : 2005 *Code of practice for the use of masonry — Materials and components, design and workmanship*

BS DD 140-2 : 1987 *Wall ties — Recommendations for design of wall ties*

BS EN 845-1 : 2001 *Specification for ancillary components for masonry — Ties, tension straps, hangers and brackets*

BS EN 846-7 : 2000 *Methods of test for ancillary components for masonry — Determination of shear load capacity and load displacement characteristics of shear ties and slip ties (couplet test for mortar joint connection).*

BS EN ISO 6946 : 2007 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

16 Conditions

16.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is granted only to the company, firm or person named on the front page — no other company, firm or person may hold or claim any entitlement to this Certificate
- 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.

16.2 Publications and documents referred to in this Certificate are those that the BBA deems to be relevant at the date of issue or re-issue of this Certificate and include any: Act of Parliament; Statutory Instrument; Directive; Regulation; British, European or International Standard; Code of Practice; manufacturers' instructions; or any other publication or document similar or related to the aforementioned.

16.3 This Certificate will remain valid for an unlimited period provided that the product/system and the manufacture and/or fabrication including all related and relevant 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.

16.4 In granting this Certificate, the BBA is not responsible for:

- 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
- individual installations of the product/system, including the nature, design, methods and workmanship of or related to the installation
- the actual works in which the product/system is installed, used and maintained, including the nature, design, methods and workmanship of such works.

16.5 Any information relating to the manufacture, supply, installation, use and maintenance 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 and maintained. It does not purport in any way to restate the requirements of the Health & Safety at Work etc Act 1974, or of any other statutory, common law or other duty which may exist at the date 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. In granting this Certificate, the BBA does not accept responsibility to any person or body for any loss or damage, including personal injury, arising as a direct or indirect result of the manufacture, supply, installation, use and maintenance of this product/system.

British Board of Agrément
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tel: 01923 665300
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