

Ancon Building Products

President Way
President Park
Sheffield S4 7UR
Tel: 0114 275 5224 Fax: 0114 276 8543
e-mail: info@ancon.co.uk
website: www.ancon.co.uk

**Agreement
Certificate
No 99/3659**
Fourth issue*

Designated by Government
to issue
European Technical
Approvals

STAIFIX RANGE OF CAVITY WALL TIES

Chainage pour murs à double paroi
Wandanker für zweischalige Wände

Product



- THIS CERTIFICATE REPLACES CERTIFICATE No 96/3290 AND RELATES TO THE STAIFIX RANGE OF CAVITY WALL TIES, FOR TYING CAVITY WALLS.
- The wall ties are manufactured from stainless steel and are available in a range of sizes for various cavity widths.

These Front Sheets must be read in conjunction with the accompanying Detail Sheet, which provides information specific to particular ties.

Regulations — Detail Sheet 1

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



The Secretary of State has agreed with the British Board of Agrément the aspects of performance to be used by the BBA in assessing the compliance of wall ties with the Building Regulations. In the opinion of the BBA, the Staifix Range of Cavity Wall Ties, if used in accordance with the provisions of this Certificate, will meet or contribute to meeting the relevant requirements.

Requirement: A1

Comment:

Loading

Where the products are relied on for their contribution to the strength and stability of cavity walls in relation to wind loading, they will be satisfactory. See the tinted area in the *Structural performance* section of the accompanying Detail Sheet.

Requirement: B3(1)

Comment:

Internal fire spread (structure)

When used in a masonry cavity wall, the products will provide an equivalent performance to that of conventional wire ties to BS 1243 : 1978. See the tinted areas in the *Behaviour in relation to fire* section of these Front Sheets.

Requirement:	C2(b)(c)	Resistance to moisture
Comment:		When used in an external cavity wall, the products will not adversely affect the resistance of the wall to the passage of moisture. See the tinted area in the <i>Weathertightness</i> section of these Front Sheets.
Requirement:	E1	Protection against sound from other parts of the building and adjoining buildings
Comment:		The HRT4 tie can be incorporated in a separating cavity wall meeting this requirement. See the tinted area (4.1) in the <i>Sound transmission</i> section of the accompanying Detail Sheet.
Requirement:	L1(a)(i)	Conservation of fuel and power
Comment:		When calculating the thermal transmittance of insulated masonry cavity walls, the thermal bridging due to the ties may need to be taken into account. See the relevant tinted area (9.1) in the <i>Thermal transmittance</i> section of these Front Sheets.
Requirement:	Regulation 7	Materials and workmanship
Comment:		The products are acceptable. See the tinted area in the <i>Durability</i> section of these Front Sheets and the <i>Installation</i> part of the accompanying Detail Sheet.

2 The Building (Scotland) Regulations 2004 (as amended)



In the opinion of the BBA, the Staifix Range of Cavity Wall Ties, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Regulations and related Mandatory listed below.

Regulation:	8(1)(2)	Fitness and durability of materials and workmanship
Comment:		The products can contribute to a construction meeting this Standard. See the tinted area in the <i>Maintenance</i> and <i>Durability</i> sections of these Front Sheets and the <i>Installation</i> part of the accompanying Detail Sheet.
Regulation:	9	Building standards – construction
Standard:	1.1(a)(b)	Structure
Comment:		Where the products are relied on to contribute to the strength and stability of cavity walls in relation to wind loading, they will be satisfactory, with reference to clause I.D.17. See the tinted area in the <i>Structural performance</i> section of the accompanying Detail Sheet.
Standard:	2.2	Separation
Standard:	2.3	Structural protection
Standard:	2.4	Cavities
Comment:		When used in a masonry cavity wall, the products will provide an equivalent performance to that of equivalent gauge ties to BS 1243 : 1978, with reference to clauses 2.2.8 ⁽¹⁾ , 2.3.0 ⁽¹⁾⁽²⁾ and 2.4.0 ⁽¹⁾⁽²⁾ . See the tinted areas in the <i>Behaviour in relation to fire</i> section of these Front Sheets.
Standard:	3.10	Precipitation
Standard:	3.15	Condensation
Comment:		When used in an external cavity wall, the products will not adversely affect the resistance of the wall to the passage of moisture, with reference to clauses 3.10.3 ⁽¹⁾⁽²⁾ and 3.15.5 ⁽¹⁾ . See the tinted area in the <i>Weathertightness</i> section of these Front Sheets.
Standard:	5.1	Resisting sound transmission to dwellings using appropriate constructions
Comment:		The HRT4 tie can be incorporated in a separating cavity wall meeting this Standard, with reference to clause 5.1.5 ⁽¹⁾ . See the tinted area (4.2) in the <i>Sound transmission</i> section of the accompanying Detail Sheet.
Standard:	6.2	Building insulation envelope
Comment:		When calculating the thermal transmittance of masonry cavity walls, the thermal bridging due to the ties may need to be taken into consideration with reference to clauses 6.2.3 ⁽¹⁾ and 6.2.4 ⁽²⁾ . See the relevant tinted area (9.1) in the <i>Thermal transmittance</i> section of these Front Sheets. (1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).

3 The Building Regulations (Northern Ireland) 2000



In the opinion of the BBA, the Staifix Range of Cavity Wall Ties, if used in accordance with the provisions of this Certificate, will satisfy or contribute to satisfying the various Building Regulations as listed below.

Regulation:	B2	Fitness of materials and workmanship
Comment:		The products are acceptable. See the tinted area in the <i>Durability</i> section of these Front Sheets and the <i>Installation</i> part of the accompanying Detail Sheet.
Regulation:	B3(2)	Suitability of certain materials
Comment:		The products are acceptable. See the tinted area in the <i>Maintenance</i> section of these Front Sheets.

Regulation:	C4	Resistance to ground moisture and weather
Comment:		When used in an external cavity wall, the products will not adversely affect the resistance of the wall to the passage of moisture. See the tinted area in the <i>Durability</i> section of these Front Sheets.
Regulation:	D1	Stability
Comment:		Where the products are relied on to contribute to the strength and stability of cavity walls in relation to wind loading, they will be satisfactory. See the tinted area in the <i>Structural performance</i> section of the accompanying Detail Sheet.
Regulation:	E4	Internal fire spread — Structure
Comment:		When used in a masonry cavity wall, the products will provide an equivalent performance to that of ties to BS 1243 : 1978. See the tinted areas in the <i>Behaviour in relation to fire</i> section of these Front Sheets.
Regulation:	F2	Building fabric
Comment:		When calculating the thermal transmittance of masonry cavity walls in which the ties are used, the thermal bridging due to the ties can be disregarded. See the relevant tinted area (9.2) in the <i>Thermal transmittance</i> section of these Front Sheets.
Regulation:	G2(1)	Separating walls and separating floors
Comment:		The HRT4 tie can be incorporated in a separating cavity wall meeting this Regulation. See the tinted area (4.3) in the <i>Sound transmission</i> section of the accompanying Detail Sheet.

4 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.

Technical Specification

5 Delivery and site handling

Staifix Cavity Wall Ties are delivered to the site in boxes of 250 or bags of 20, each box or bag bearing the BBA identification mark incorporating the number of this Certificate.

Design Data

6 Practicability of installation

6.1 The products can be built easily into brickwork or blockwork during construction.

6.2 The products are smooth and without sharp edges and are slender in plan to resist collection of mortar droppings.

7 Weathertightness



The products are effective in preventing the transmission of water along the tie, and therefore across the cavity.

8 Behaviour in relation to fire



8.1 The products are non-combustible.

8.2 The effectiveness of the installed products in fire is assessed as being equivalent to that of conventional wire ties complying with BS 1243 : 1978. Guidance on the fire resistance of walls incorporating conventional wire ties is given in BS 5628-3 : 2005. A cavity wall consisting of two 100 mm leaves of brickwork or blockwork incorporating the ties will have a fire resistance period of six hours when non-loadbearing, and at least two hours when loadbearing.

9 Thermal transmittance



9.1 In England and Wales and in Scotland, thermal losses through wall ties in insulated cavities need to be taken into account if, in conjunction with thermal losses through air gaps in the insulation, they amount to 3% or more of the uncorrected thermal loss through the wall. Procedures for calculating these losses for ties and air gaps are given in Annex D of BS EN ISO 6946 : 1997, taking into account tie density, tie diameter and the thermal conductivity of stainless steel ($17 \text{ Wm}^{-1}\text{K}^{-1}$), and in BRE Report BR 443 *Conventions for U-value calculations*, 2002, respectively.



9.2 In Northern Ireland, the products can be disregarded when calculating the thermal transmittance of masonry cavity walls.

10 Maintenance



As the products are confined within the wall cavity and has suitable durability, maintenance is not required.

11 Durability



The products will have adequate durability and will not be impaired by contact with conventional cavity insulation materials, mortar admixtures or timber preservative treatments.

Bibliography

BS 1243 : 1978 *Specification for metal ties for cavity wall construction*

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

BS EN ISO 6946 : 1997 *Building components and building elements — Thermal resistance and thermal transmittance — Calculation method*

Conditions of Certification

12 Conditions

12.1 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.

12.2 References in this Certificate to any Act of Parliament, Statutory Instrument, Directive or Regulation of the European Union, British, European or International Standard, Code of Practice, manufacturers' instructions or similar publication, are references to such publication in the form in which it was current at the date of this Certificate.

12.3 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.

12.4 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.

12.5 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.



In the opinion of the British Board of Agrément, the Staifix Range of Cavity Wall Ties is fit for its intended use provided it is installed, used and maintained as set out in this Certificate. Certificate No 99/3659 is accordingly awarded to Ancon Building Products.

On behalf of the British Board of Agrément

Date of Fourth issue: 9th June 2008

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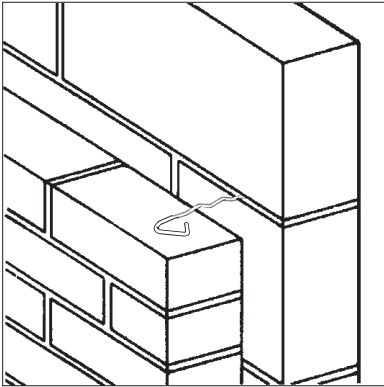
Head of Approvals
— Engineering

Handwritten signature of G. A. Cooper in black ink.

Chief Executive

**Original Certificate was issued on 21st February 2000. This amended version includes reference to revised Building Regulations and Conditions of Certification.*

Product



- THIS DETAIL SHEET REPLACES DETAIL SHEET 2 AND RELATES TO STAIFIX CAVITY WALL TIES HRT4 AND RT2, FOR TYING CAVITY WALLS.
- The HRT4 and RT2 ties are Type 4 and Type 2 respectively, and should be used in accordance with BS 5628-1 : 2005, Annex C, Table C1. See sections 2.1 and 2.2.
- The ties are manufactured from stainless steel and are available in three sizes, for cavity widths up to 75 mm, 100 mm and 125 mm.

This Detail Sheet must be read in conjunction with the Front Sheets, which give the products' position regarding the Building Regulations, common information relating to the ties, and the Conditions of Certification, respectively.

Technical Specification

1 Description

1.1 Staifix HRT4 ties are manufactured from either 2.1 mm (200 mm long ties) or 2.3 mm (225 mm long ties) nominal diameter and Staifix RT2 ties from either 3.1 mm (200 mm and 225 mm long ties) or 3.3 mm (250 mm long tie) nominal diameter, 18/8 austenitic stainless steel wire, to a specification which complies with BS EN 10088-3 : 2005.

1.2 The shape and dimensions of the ties are shown in Figure 1. They are available in three lengths:

- 200 mm long for cavity widths up to 75 mm
- 225 mm long for cavity widths up to 100 mm
- 250 mm long for cavity widths up to 125 mm⁽¹⁾.

(1) RT2 tie only.

Design Data

2 General

2.1 Staifix HRT4 ties are suitable only for masonry cavity walls, comprising two leaves of similar thickness in the range 90 mm to 150 mm, in box-form domestic dwellings of up to 10 m in height. They are not suitable for cavity walls with leaves of disparate thickness or stiffness, for cladding walls of any type, or for structures more than three storeys high.

2.2 Staifix RT2 ties are suitable for domestic dwellings and small commercial buildings not exceeding 15 m in height, made with box-form masonry walls comprising two leaves of brickwork or blockwork of similar thickness in the range 90 mm to 150 mm. They may be suitable for cavity walls with leaves of disparate thickness or

stiffness, or for cladding walls with negligible horizontal spanning capability, and for buildings exceeding 15 m in height, but should only be used in these situations if shown to be of adequate performance through calculation by a suitably qualified engineer.

2.3 The ties are satisfactory for use in cavity walls in which butterfly ties or double triangle ties (see section 3.1) to BS 1243 : 1978 would be acceptable, and which are constructed in accordance with the requirements of sections 2.2 to 2.4 as appropriate.

2.4 Masonry walls into which the ties are incorporated must be constructed in accordance with one or more of the following technical specifications:

- BS 5628-1 : 2005 and BS 5628-3 : 2005.
- the national Building Regulations:

England and Wales

Approved Document A1/2, Section 1C

Scotland

Mandatory Standard 1.1, *Structure*⁽¹⁾⁽²⁾

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

Northern Ireland

Technical Booklet D, *Structure*.

2.5 The ties have not been assessed for use in dwellings where partial cavity fill insulants are used.

3 Structural performance

3.1 Staifix housing cavity wall ties HRT4 have been assessed as having strength properties and applications at least equal to those of butterfly ties. The general purpose ties RT2 have been assessed as having strength properties and applications at least equal to double triangle ties, both to BS 1243 :

1978. When correctly embedded, the tensile strength of the tie is determined by its resistance to straightening of the drip. As with other ties used in masonry walls, it is important to ensure correct embedment.

3.2 The tests for compression and resistance to pull-out of ties embedded in mortar joints were conducted on precompressed (0.1 Nmm^{-2}) brick couplets, fabricated using mortar of designation (iv) to BS 5628-1 : 1992 and BS 5628-3 : 2001, in accordance with BS DD 140-1 : 1986.

3.3 The strength and rigidity of Staifix housing cavity wall ties HRT4 were compared with the requirements of BS DD 140-2 : 1987 for a Type 4 tie (masonry: light duty tie) and were found to be greater than, or equal to, them in every respect.

3.4 The strength and rigidity of Staifix general purpose cavity wall ties RT2 were compared with the requirements of BS DD 140-2 : 1987 for a Type 2 tie (masonry: general purpose) and were found to be greater than, or equal to, them in every respect.

3.5 The ties were tested in accordance with BS DD 140-1 : 1986. To compare the performance of the tie against the requirements of BS EN 845-1 : 2003, additional load values were recorded at 1 mm displacement. The specified test method for BS EN 845-1 : 2003 is given in BS EN 846-5 : 2000 and is very similar to that of BS DD 140-1 : 1986. However, in respect of extended cavity width, the test requirement in BS DD 140-1 : 1986 (plus 25 mm extended cavity) is more onerous than that in BS EN 846-5 : 2000 (plus 15 mm extended cavity). Therefore, the results indicate that, in respect of the requirements of BS EN 845-1 : 2003, the manufacturer could declare the values of 1800 N in tension and 1300 N in compression for the RT2 tie, and 650 N in tension and 450 N in compression for the HRT4 tie.

3.6 The ties are sufficiently flexible to allow in-plane differential movement of the two connected leaves of masonry, also to allow site adjustment for differences in height between inner and outer leaves.

4 Sound transmission



4.1 The HRT4 tie, when tested in a 50 mm wide cavity at a standard density of 2.5 ties per m^2 , achieved a dynamic stiffness value of less than 4.8 MNm^{-3} . This satisfies the requirements of Approved Document E. Therefore, the HRT4 tie can be used, at the same standard density, in separating walls with cavity widths up to 100 mm. Separating walls are subject to pre-completion testing in accordance with Approved Document E.



4.2 In Scotland, any pre-completion testing undertaken should be in accordance with the guidance given in the Technical Handbook Domestic Buildings, Section 5 Noise.



4.3 In Northern Ireland, any pre-completion testing undertaken should be in accordance with the guidance given in Technical Booklet G, Section 2.

Installation

5 Procedure

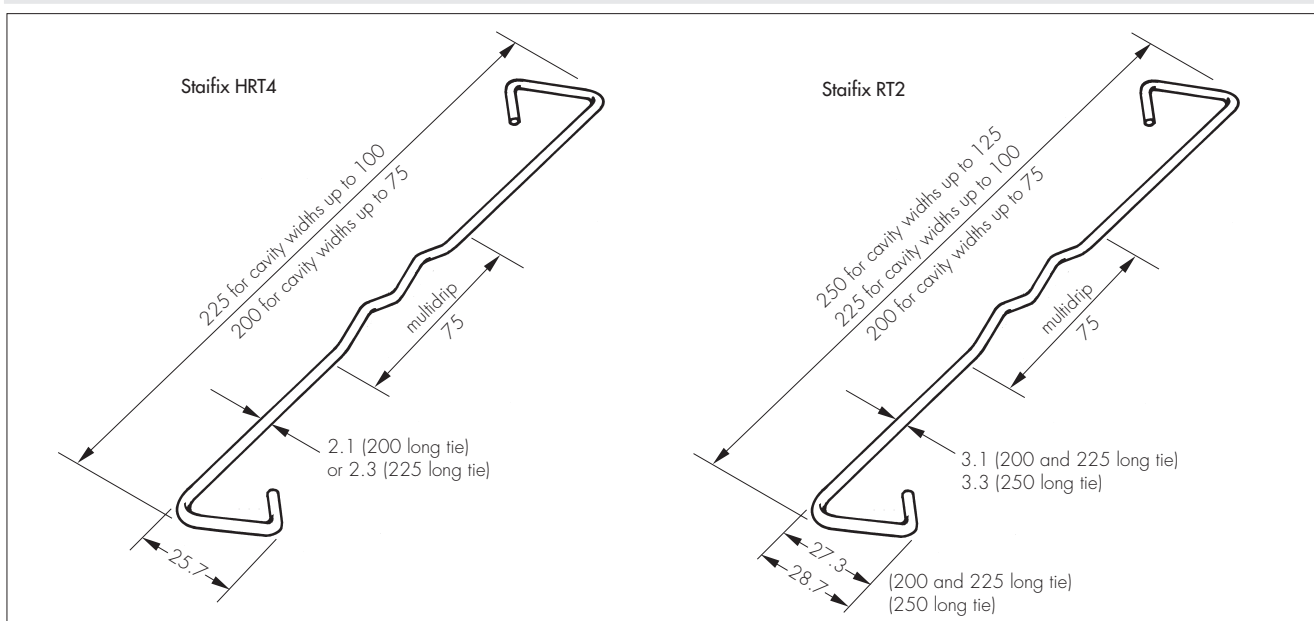
5.1 The wall ties are to be built into the bed joints of masonry to an embedment length of 62.5 mm, taking care to place them horizontally or with a slight fall to the outer leaf of the wall. The ties are to be placed at right angles to the walls by lining up the tight-key (see Figure 1) at each end of the tie parallel to the walls.

5.2 The first run of ties is to be laid as near as possible to, though not directly on, the damp-proof course at a horizontal spacing of 450 mm.

5.3 As construction continues the ties are spaced at 450 mm vertically and 900 mm horizontally with successive rows staggered. The spacing may be varied, when required by the relevant Building Regulations, Standards, or Codes of Practice referred to in section 3 of this Detail Sheet, provided the number of ties per unit area is not decreased.

5.4 Normal precautions must be taken to prevent mortar droppings and protrusions impairing the functioning of the drips.

Figure 1 Staifix Cavity Wall Ties (all dimensions in mm)



Technical Investigations

The following is a summary of the technical investigations carried out on Staifix Cavity Wall Ties HRT4 and RT2.

6 Tests

Tests were carried out to establish the tensile and compressive strength characteristics of ties embedded in mortar joints.

7 Investigations

7.1 Checks were carried out to assess:

- the effectiveness of the drip against the transmission of water to the inner leaf
- the flexibility of the ties
- dimensional accuracy
- the dynamic stiffness of HRT4 tie in relation to sound transmission requirement in Approved Document E.

7.2 The manufacturing operation, including the methods adopted for quality control and the quality and composition of the material used, was assessed and audited.

7.3 As part of the assessment leading to the issue of Certificates Nos 89/2347, 93/2875 and 96/3290, the following investigations were carried out:

- An assessment was made of:
 - behaviour in fire
 - practicability of installation.
- Existing information relating to durability, corrosion resistance and compatibility with materials in contact was examined.

Bibliography

BS 1243 : 1978 *Specification for metal ties for cavity wall constructions*

BS 5628-1 : 1992 *Code of practice for use of masonry — Structural use of unreinforced masonry*

BS 5628-1 : 2005 *Code of practice for the use of masonry — Structural use of unreinforced masonry*

BS 5628-3 : 2001 *Code of practice for use of masonry — Materials and components, design and workmanship*

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

BS DD 140-1 : 1986 *Wall ties — Methods of test for mortar joint and timber frame connections*

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

BS EN 845-1 : 2003 *Specification for ancillary components for masonry — Ties, tension strips, hangers and brackets*

BS EN 846-5 : 2000 *Methods of test for ancillary components for masonry — Determination of tensile and compressive load capacity and load displacement characteristics of wall ties (couplet test)*

BS EN 10088-3 : 2005 *Stainless steels — Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes*



On behalf of the British Board of Agrément

BC Chamberlain

Head of Approvals
— Engineering

G N Cooper

Chief Executive

Date of Second issue: 9th June 2008

**Original Detail Sheet issued 14th February 2005. This revised version includes an additional size of tie and reference to revised Standards.*