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Agrément Certificate
99/3659
Product Sheet 1

ANCON CAVITY WALL TIES

STAIFIX CAVITY WALL TIES RT2, RT3 AND HRT4

This Agrément Certificate Product Sheet⁽¹⁾ relates to Staifix Cavity Wall Ties RT2, RT3 and HRT4, a range of stainless steel ties for tying masonry cavity walls.

(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

Structural performance — the wall ties can be used in multi-storey buildings. They are comparable to ties of types 2, 3 and 4 as defined in PD 6697 : 2010 (see section 6).

Behaviour in relation to fire — the wall ties are considered to satisfy the requirements for performance class A1 (see section 9).

Durability — the products will not be adversely affected by mortar or cavity insulation materials (see section 12).

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

Brian Chamberlain
Head of Approvals — Engineering

Greg Cooper
Chief Executive

Date of First issue: 19 September 2012

Originally certificated on 21 February 2000

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, Staifix Cavity Wall Ties RT2, RT3 and HRT4, if installed, used and maintained in accordance with the provisions of 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: A1	Loading
Comment:	The products can contribute to a cavity wall meeting this requirement in relation to wind loading. See section 6.1 of this Certificate.
Requirement: B3(1)	Internal fire spread (structure)
Comment:	When used in masonry cavity walls, these products will contribute to meeting this Requirement. See sections 9.1 and 9.2 of this Certificate.
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 section 7.1 of this Certificate.
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 section 10.1 of this Certificate.
Requirement: Regulation 7	Materials and workmanship
Comment:	The products are acceptable. See section 12 and the <i>Installation</i> 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 section 12 and the <i>Installation</i> part of this Certificate.
Regulation: 9	Building standards – construction
Standard: 1.1(a)(b)	Structure
Comment:	The products can contribute to a cavity wall meeting this requirement in relation to wind loading, with reference to clauses 1.1.1 ⁽¹⁾⁽²⁾ and 1.1.2 ⁽¹⁾⁽²⁾ . See section 6.1 of this Certificate.
Standards: 2.2	Separation
2.3	Structural protection
2.4	Cavities
Comment:	When used in masonry cavity walls, the products will contribute to meeting these Standards, with reference to clauses 2.2.8 ⁽¹⁾ , 2.3.0 ⁽¹⁾⁽²⁾ and 2.4.0 ⁽¹⁾⁽²⁾ . See section 9.1 and 9.2 of this Certificate.
Standard: 5.1	Noise separation
Comment:	The HRT4 tie can be incorporated in a separating cavity wall meeting this Standard, with reference to clause 5.1.5 ⁽¹⁾ . See section 7.2 of this Certificate.
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 section 10.1 of this Certificate.
Standard: 7.1(a)(b)	Statement of sustainability
Comment:	The product 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 systems under Regulation 9, also apply to this Regulation, with reference to clause 0.1.2.1 ⁽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 products are acceptable. See section 12 and the <i>Installation</i> section of this Certificate.
Regulation: D1	Stability
Comment:	The products can contribute to a cavity wall meeting this requirement in relation to wind loading. See section 6.1 of this Certificate.
Regulation: E4	Internal fire spread – Structure
Comment:	When used in masonry cavity walls, the products will contribute to meeting this Regulation. See section 9.1 and 9.2 of this Certificate.
Regulation: F2	Conservation measures
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 section 10.2 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.

Additional Information

NHBC Standards 2011

NHBC accepts the use of Staifix Cavity Wall Ties RT2, RT3 and HRT4, when installed and used in accordance with this Certificate, in relation to *NHBC Standards*, Chapter 6.1 *External masonry walls*.

Technical Specification

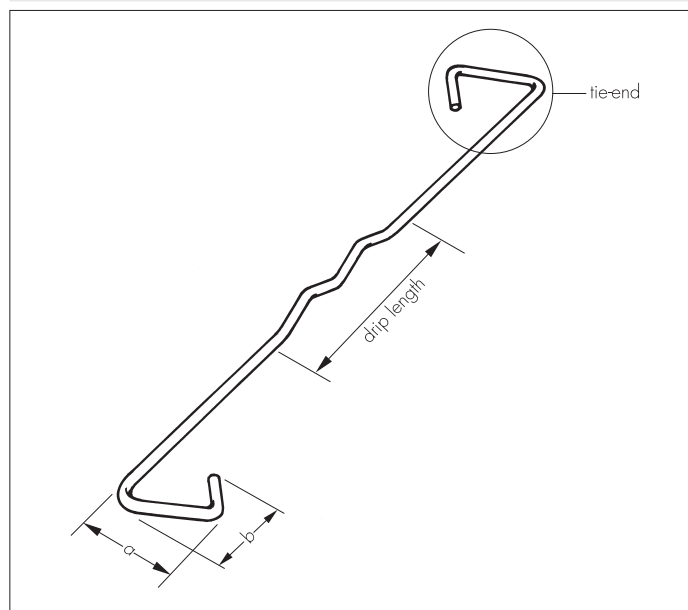
1 Description

Staifix Cavity Wall Ties RT2, RT3 and HRT4 are wall ties manufactured from stainless steel to tie conventional masonry cavity walls for new-build construction. The ties have multiple drips to prevent water crossing the cavity. The RT2, RT3 and HRT4 cavity wall ties are manufactured from wire of austenitic stainless steel (number 1.4301) and austenitic ferritic stainless steel (number 1.4482) in accordance with BS EN 10088-1 : 2005. The ties are available in various lengths, diameters and features to suit various cavity widths and building heights as shown in Table 1 and Figure 1.

Table 1 Tie characteristics and use

Wall tie	Tie type	Tie wire diameter (mm)	Tie length (mm)	Drips		Tie-end dimensions nominal (mm)		Cavity width range (mm)	Maximum building height (m)
				No	Length (mm)	Width (a)	Depth (b)		
RT2	2	3.1	200	3	75	27.3	23.5	50 – 75	15
RT2	2	3.1	225	3	75	27.3	23.5	76 – 100	15
RT2	2	3.3	250	3	75	27.7	23.9	101 – 125	15
RT2	2	3.6	275	4	100	28.2	24.3	126 – 150	15
RT3	3	2.8	200	3	75	26.7	22.9	50 – 75	15
RT3	3	2.8	225	3	75	26.7	22.9	76 – 100	15
RT3	3	3.1	250	4	100	27.3	23.5	101 – 125	15
RT3	3	3.3	275	4	100	27.3	23.5	126 – 150	15
HRT4	4	2.1	200	3	75	25.7	22.0	50 – 75	10
HRT4	4	2.3	225	3	75	25.7	22.0	76 – 100	10
HRT4	4	2.5	250	4	100	26.7	22.9	101 – 125	10
HRT4	4	2.8	275	4	100	26.7	22.9	126 – 150	10

Figure 1 Typical tie



2 Manufacture

2.1 The wire is manufactured using conventional wire fabrication techniques, cut to size and shaped accordingly.

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.

3 Delivery and site handling

The ties are delivered in boxes of 250 or bags of 20, each box or bag bearing 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 Staifix Cavity Wall Ties RT2, RT3 and HRT4.

Design Considerations

4 General

4.1 Staifix Cavity Wall Ties RT2, RT3 and HRT4 are suitable for use in walls of buildings as given in Table 2 and defined in PD 6697 : 2010 Table 10.

Table 2 Wall use and limitations

Tie	Wall description	Type/Use	Location
RT2	90 mm to 150 mm thick, box form wall of two leaves of similar thickness ⁽¹⁾	Type 2 : General purpose masonry for domestic and light commercial buildings up to 15 metres in height	Flat sites with fundamental basic wind velocity ⁽²⁾ up to 31 m·s ⁻¹ except areas where the site is at an altitude of 150 metres or more above sea level ⁽³⁾ .
RT3	90 mm to 150 mm thick, box form wall of two leaves of similar thickness ⁽¹⁾	Type 3 : Basic purpose masonry for domestic and light commercial buildings up to 15 metres in height	Flat sites with fundamental basic wind velocity ⁽²⁾ up to 27 m·s ⁻¹ and any areas where the site is at an altitude of 150 metres or more above sea level ⁽³⁾ .
HRT4	90 mm to 150 mm thick, box form wall of two leaves of similar thickness only	Type 4 : Light duty up to 10 metres in height. Suitable for internal separating cavity walls in most buildings	Flat sites, towns and cities, except North West Scotland and Ireland (where the fundamental basic wind velocity ⁽²⁾ exceeds 27 m·s ⁻¹) and any areas where the site is at an altitude of 150 m or more above sea level ⁽³⁾ .

(1) When shown to be of adequate performance by a suitably qualified engineer, the ties may be suitable for cavity wall of disparate thickness or stiffness or for cladding walls having none or limited horizontal spanning capability.

(2) As defined in BS EN 1991-1-4 : 2005 + A1 : 2010.

(3) May be used outside these parameters if shown to be adequate through a calculation by a suitably qualified engineer.

4.2 The ties must be used in accordance with the requirements of BS EN 1996-1-2 : 2005, PD 6697 : 2010, BS EN 1996-2 : 2006 and BS EN 1996-3 : 2006.

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

- PD 6697 : 2010, BS EN 1996-1-1 : 2005, BS EN 1996-1-2 : 2005, BS EN 1996-3 : 2006, BS EN 1996-2 : 2006
- the national Building Regulations:
 - England and Wales** — Approved Document A1/2, Section 1C
 - Scotland** — Mandatory Standard 1.1 *Structure*⁽¹⁾⁽²⁾
 - Northern Ireland** — Technical Booklet D *Structure*.


(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).

5 Practicability of installation

The product is designed to be installed by a competent general builder, or a contractor, experienced with this type of product.

6 Structural performance

 6.1 The RT2 ties have been assessed as having strength properties and applications at least equal to those of Type 2 ties⁽¹⁾. The RT3 ties have been assessed as having strength properties and applications at least equal to those of Type 3 ties⁽¹⁾. The HRT4 ties have been assessed as having strength properties and applications at least equal to those of Type 4 ties⁽¹⁾. The strength and rigidity of each type of tie meets the requirements of PD 6697 : 2010 for:

- RT2 Type 2 tie (masonry: general purpose)
- RT3 Type 3 tie (masonry: basic)
- HRT4 Type 4 tie (masonry: light-duty tie).


(1) Conforming to PD 6697 : 2010 and BS EN 845-1 : 2003.


6.2 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.


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

6.4 For walls in which both leaves are at least 90 mm thick, ties should be used at a minimum density of 2.5 ties per square metre.

7 Sound transmission

 7.1 The HRT4 tie, when tested in a 50 mm wide cavity at a standard density of 2.5 ties per m², achieved a dynamic stiffness value of less than 4.8 MN·m⁻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 150 mm. Unless an accredited Robust Standard Detail is used, separating walls are subject to pre-completion testing in accordance with Approved Document E.


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

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

8 Weathertightness


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

9 Behaviour in relation to fire

 9.1 The wall ties are considered to satisfy the requirements for performance class A1 of the characteristic reaction to fire, in accordance with the provisions of EC decision 96/603/EC (as amended). As the material specification of the ties is listed in this Decision, there is no requirement to carrying out testing.

9.2 Guidance on obtaining the fire resistance of walls incorporating wall ties is given in BS EN 1996-1-2 : 2005.


10 Thermal transmittance

 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 BS EN ISO 6946 : 2007, Annex D, taking into account tie density, tie diameter and the thermal conductivity of stainless steel (17 W·m⁻¹·K⁻¹), and in BRE Report BR 443 *Conventions for U-value calculations*, 2007 respectively.

11 Maintenance

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

12 Durability

 The wall ties will have a service life similar to that of the building in which they are used and will not be impaired by contact with conventional cavity insulation materials or mortar admixtures.

Installation

13 Procedure

13.1 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 tie end parallel to the walls.

13.2 In partially-filled cavity applications:

- the wall ties must be used in conjunction with securely fitted insulation retaining clips
- insulation should be cut/notched as necessary to fit closely around the ties (and about the adjacent board, slab or batt)
- insulation retaining clips must be pushed firmly onto the ties, at right angles, until securely engaged
- insulation retaining clips must be pushed up against the insulation to hold it securely in place against the inner leaf
- a 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 at a horizontal spacing of 450 mm.

13.4 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 4 of this Certificate, provided the number of ties per unit area is not decreased. However, ties should be evenly distributed over the wall area, except around openings, and should preferably be staggered.

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

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

Technical Investigations

14 Tests

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

15 Investigations

15.1 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.

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

15.3 As part of the assessment leading to the issue of Certificates 89/2347, 93/2875 and 96/3290:

- 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 5628-3 : 2005 *Code of practice for the use of masonry — Materials and components, design and workmanship*
- BS EN 845-1 : 2003 *Specification for ancillary components for masonry — Ties, tension strips, hangers and brackets*
- BS EN 846-2 : 2000 *Methods of test for ancillary components for masonry — Determination of bond strength of prefabricated bed joint reinforcement in mortar joints*
- 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 998-2 : 2010 *Specification for mortar masonry — Masonry mortar*
- BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 — Action 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 1996-1-2 : 2005 *Eurocode 6 — Design of masonry structures — General rules — Structural fire design*

BS EN 1996-2 : 2006 *UK National Annex to Eurocode 6 — Design of masonry structures — Design considerations, selection of materials and execution of masonry*

BS EN 1996-3 : 2006 *UK National Annex to Eurocode 6 — Design of masonry structures. Simplified calculation methods for unreinforced masonry structures*

BS EN 10088-1 : 2005 *Stainless steels — List of stainless steels*

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*

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

PD 6697 : 2010 *Recommendations for the design of masonry structures to BS EN 1996-1-1 and BS EN 1996-2*

Conditions of Certification

16 Conditions

16.1 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.

16.2 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.

16.3 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.

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

16.5 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.

16.6 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.