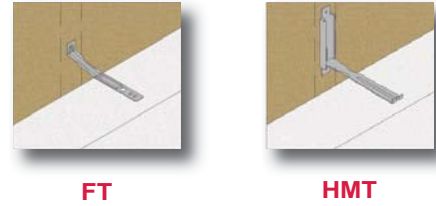


## Differential Movement In Timber Frame

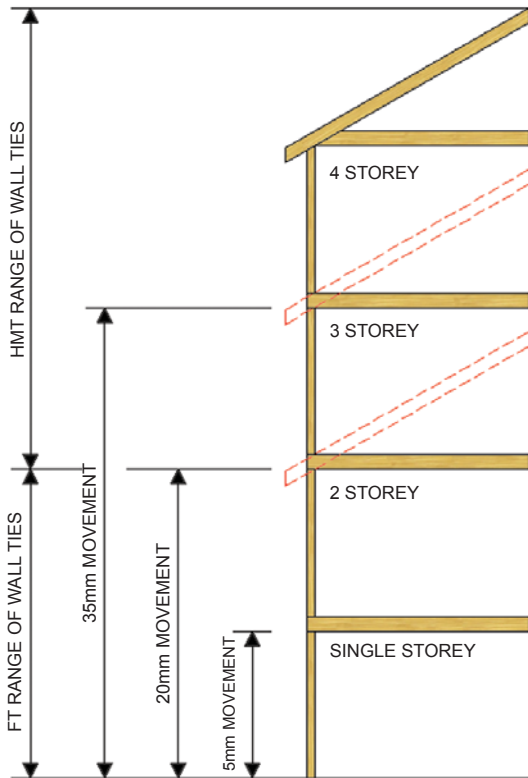
The requirements for differential movement within timber frame are changing, due to a special project carried out by the UKTFA. Since September 2008, the following applies:

New requirements (Build type)		Vertical movement allowed	Solution
Solid Timber Joists	2- storey	20mm	Standard wall tie (FT range)
	3-storey and above	35+mm	High Movement Tie (HMT)
EWP Joists	2-storey	15mm	FT
	3-storey	25mm	FT
	4 storey and above	35 - 60mm	HMT

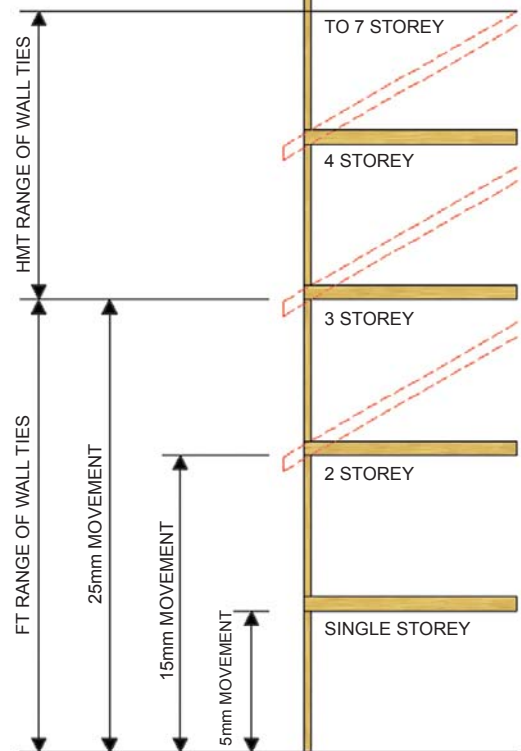


Cullen's standard wall ties FT-50, 75 &100 accommodate maximum differential movement of 25mm and therefore can be used up to eaves level on a 2 storey for Solid Timber joists and up to 3 storey for EWP Joist floors. For 3 storey Solid Timber joists and 4 storey EWP joists you will now require Cullen's High Movement Tie (HMT).

Previously, the old requirements stated 6mm movement per floor and allowed the FT range to be used for 4-storey buildings. The HMT is the only timber to masonry wall tie, which has been fully tested to allow for 75mm vertical movement. Under the new guidelines this would allow the HMT to be used on 7-storey timber frame with EWP joists on the intermediate floors.



INTERMEDIATE FLOORS CONSTRUCTED USING SOLID TIMBER JOISTS



INTERMEDIATE FLOORS CONSTRUCTED USING EWP JOISTS

The above information is for guidance only, it states the maximum allowable movement of the Cullen timber frame wall tie range. For specific tie fixings please refer to the building engineer and/or section 6.2 of NHBC Standards.

NHBC Standards 2008 - Section 6.2 - "In the absence of specific project calculations the following gaps are required".

Gap Location	W	Gap sizes Closing Gap (CG) at window sills levels and Opening (OG) at windows head levels	
		Joist material	
		Solid Timber (mm)	Engineered I-Joist (mm)
Bottom level (single storey)	A	5	5
Level 1 (2 storey)	B	20	15
Level 2 (3 storey)	C	35	20
Level 3 (4 storey)	D	45	35
level 4 (5 storey)	E	Specialist calculation to be submitted to NHBC	40
level 5 (6 storey)	F		50
level 6 (7 storey)	G		60
Eaves/verge		Add 5mm to level below	

# FT - Wall Tie



## PRODUCT DESCRIPTION

Wall tie range to suit nominal cavity widths of 50, 75 & 100mm.

## ADVANTAGES

- Larger cavity ties allow developers to standardise on common foundation plans and switch between various methods of construction.

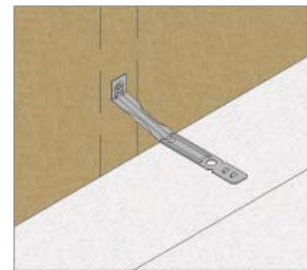
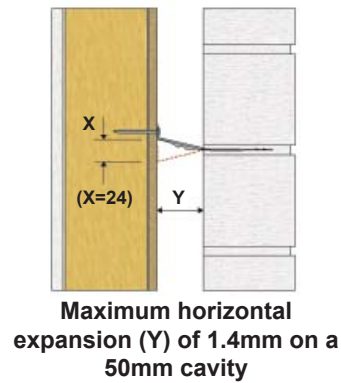
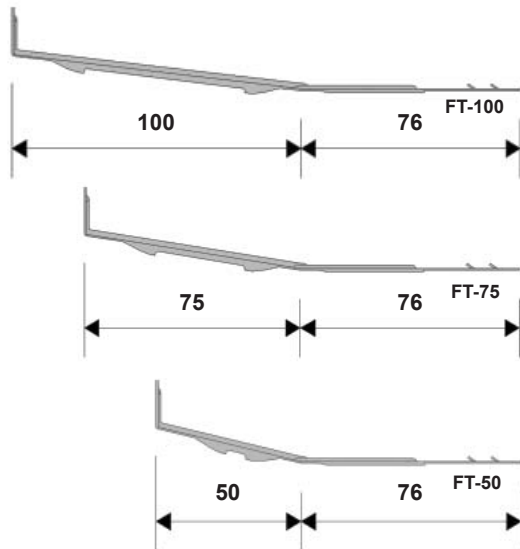
## MATERIAL

- FT-50 - 0.6mm austenitic stainless steel.
- FT-75 & FT-100 - 0.7mm austenitic stainless steel.



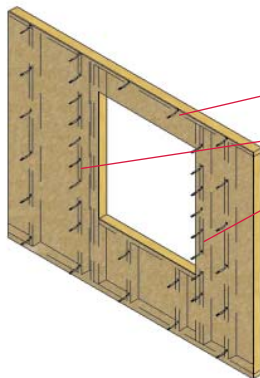
FT

CE marked - Tested in accordance with EN846-6	✓
Meets NHBC technical requirements	✓
Meets Homebond technical requirements	✓



FT-50 accommodates maximum differential movement of 24mm

### Additional ties required at door and window openings



- Top row of ties should be 3 courses below top of brickwork.
- Ties should be fixed at the sides of window and door openings spaced at not more than 300mm vertical centres and within 225mm of the jambs.
- This spacing is also required at each side of vertical expansion joints.
- Closer vertical spacing may be required in exposed locations as determined by the Building Designer.

- NHBC Standards 2008 - 6.2 - D6 - Wall ties should be of a type which complies with BS EN845
- BS EN845-1:2008 - Material / coating specification in accordance with table A.1 - Austenitic stainless steel to EN10088

## FT - Wall Tie

### Results of tests to BS EN845-1 and assessment in accordance with the requirements of BS DD140

Test Condition		FT-50		FT-75		FT-100	
		Characteristic Capacity @ 1mm (N)	Characteristic Capacity (N)	Characteristic Capacity @ 1mm (N)	Characteristic Capacity (N)	Characteristic Capacity @ 1mm (N)	Characteristic Capacity (N)
Tension @ 0mm vertical displ.	Test value	205√	1206√	270√	897√	274√	789√
	Requirement	(185)	(665)	(185)	(665)	(185)	(665)
Tension @ 24mm vertical displ.	Test value	336√	1279√	295√	945√	377√	704√
	Requirement	(185)	(665)	(185)	(665)	(185)	(665)
Compression @ 0mm vertical displ.	Test value	582√	1223√	176√	686√	195√	978√
	Requirement	(135)	(465)	(135)	(465)	(135)	(465)
Compression @ 24mm vertical displ.	Test value	282√	1225√	204√	810√	184√	766√
	Requirement	(135)	(465)	(135)	(465)	(135)	(465)

√ Signifies pass on BS DD140 Type 6 requirement

The values stated are valid for cavity widths up to 15mm greater than the nominal value (BS EN845-1). For larger cavities, reduced design capacities will apply, please contact Cullen Technical Department for further information.

### Maximum net surface wind pressures for the FT range of brick / timber wall-ties

FT Wall Tie Type	Vertical Tie Spacing (mm)															
	225				300				375				450			
	Stud Centres (mm)															
	400		600		400		600		400		600		400		600	
Maximum Net Surface Wind Pressure																
	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>
FT-50 (50mm cavity)	2.28	11.1	1.52	7.4	1.71	8.3	1.13	5.5	1.37	6.7	0.91	4.4	1.14	5.6	0.76	3.7
FT-75 (75mm cavity)	1.96	11.1	1.30	7.4	1.47	8.3	0.98	5.5	1.17	6.7	0.78	4.4	0.98	5.6	0.65	3.7
FT-100 (100mm cavity)	2.04	11.1	1.36	7.4	1.53	8.3	1.02	5.5	1.23	6.7	0.82	4.4	1.02	5.6	0.68	3.7

### Recommended vertical tie spacing for FT range of brick / timber wall-ties subject to various surface wind pressures.

Maximum net surface wind pressure kN/m <sup>2</sup>	Stud Spacing (mm)					
	600		400		600	
	FT-50	FT-50	FT-75	FT-75	FT-100	FT-100
0.6	525	600	450	600	450	600
0.8	375	600	300	525	375	525
1.0	300	450	225	375	300	450
1.2	225	375	225	300	225	375
1.4	225	300	150	300	150	300
1.6	150	300	150	225	150	225
1.8	150	225	150	225	150	225
2.0	150	225	75	150	150	225
2.2	150	225	75	150	75	150
2.4	75	150	75	150	75	150

#### GENERAL NOTES

- All performance figures on the FT range are derived from independent test at CERAM.
- Minimum embedment length in mortar = 50mm.
- Only use nails supplied by Cullen to install FT range of wall ties.
- FT ties are packaged in boxes of 250 and includes 3.35 x 50mm stainless steel annular ring shank nails.
- For applications outside the scope of those specified contact Cullen Technical Department at 01592 777570.
- Wall ties are required to be located at stud positions, not randomly into sheathing.

# HMT - High Movement Wall Tie



## PRODUCT DESCRIPTION

The HMT is a higher performance wall tie that allows the differential movement in medium to high-rise structures to be accommodated.

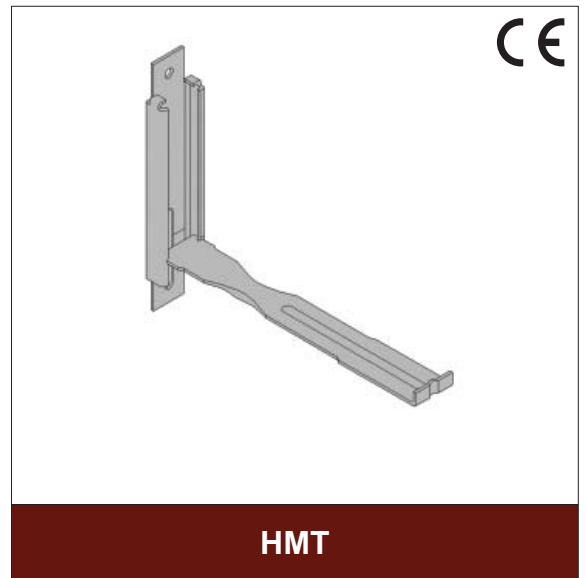
The HMT range is a two-piece design with the channel section being fitted plumb to the structure and secured with two standard wall tie nails. The tie element interlocks and provides a sliding arrangement which does not cause the historic binding problems normally associated with dovetail type ties when used in timber frame.

## ADVANTAGES

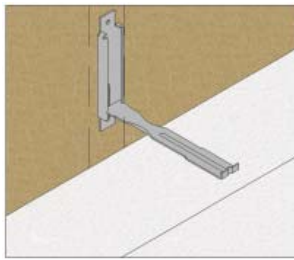
- Accommodates maximum differential movement of 75mm.

## MATERIAL

- HMT - 1.2mm austenitic stainless steel.

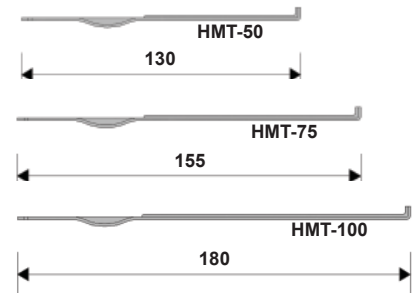
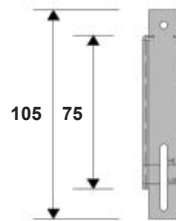
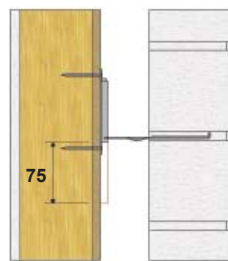


CE marked - Tested in accordance with EN846-6	✓
Meets NHBC technical requirements	✓
Meets Homebond technical requirements	✓



**HMT-50 Insitu**

Accommodates maximum differential movement of 75mm

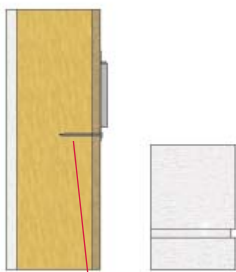


No horizontal displacement

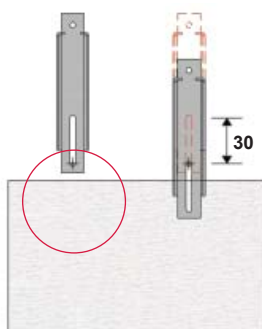
Position tie at low mark on channel for maximum vertical movement

## Installation Guide

### Stage 1

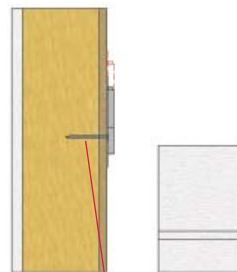


Nail channel into wall panel using slotted nail hole only, with nails provided (3.35 x 50mm stainless steel annular ring shank).

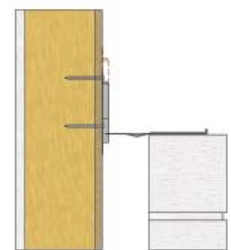


- Position nail to bottom of slot to allow for full 30mm vertical adjustment if required.
- Allow adequate space above masonry to hammer fix.

### Stage 2



Position channel by lightly tapping with a hammer until channel is in correct position at its lower extremity.



- Once channel is in position fix the top round hole into the wall panel using nails provided. (Ensure channel is fitted plumb).
- Position tie into channel between the high & low markers. Build up next row of masonry.
- Ensure both nails are fitted.**

# HMT - High Movement Wall Tie

## Results of tests to BS EN845-1 and assessment in accordance with the requirements of BS DD140

Test Condition		HMT-50		HMT-75		HMT-100	
		Characteristic Capacity @ 1mm (N)	Characteristic Capacity (N)	Characteristic Capacity @ 1mm (N)	Characteristic Capacity (N)	Characteristic Capacity @ 1mm (N)	Characteristic Capacity (N)
Tension @ 0mm vertical displ.	Test value	295√	826√	295√	826√	295√	826√
	Requirement	(185)	(665)	(185)	(665)	(185)	(665)
Tension @ 24mm vertical displ.	Test value	295√	826√	295√	826√	295√	826√
	Requirement	(185)	(665)	(185)	(665)	(185)	(665)
Compression @ 0mm vertical displ.	Test value	475√	1575√	518√	1471√	493√	1021√
	Requirement	(135)	(465)	(135)	(465)	(135)	(465)
Compression @ 24mm vertical displ.	Test value	475√	1575√	518√	1471√	493√	1021√
	Requirement	(135)	(465)	(135)	(465)	(135)	(465)

√ Signifies pass on BS DD140 Type 6 requirement

The values stated are valid for cavity widths up to 15mm greater than the nominal value (BS EN845-1). For larger cavities, reduced design capacities will apply, please contact Cullen Technical Department for further information.

## Maximum net surface wind pressures for the HMT range of brick / timber wall-ties

HMT Wall Tie Type	Vertical Tie Spacing (mm)															
	225				300				375				450			
	Stud Centres (mm)															
	400		600		400		600		400		600		400		600	
Maximum Net Surface Wind Pressure																
	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>	kN/m <sup>2</sup>	ties/m <sup>2</sup>
HMT-50 (50mm cavity)	3.27	11.1	2.18	7.4	2.45	8.3	1.62	5.5	1.98	6.7	1.30	4.4	1.65	5.6	1.09	3.7
HMT-75 (75mm cavity)	3.27	11.1	2.18	7.4	2.45	8.3	1.62	5.5	1.98	6.7	1.30	4.4	1.65	5.6	1.09	3.7
HMT-100 (100mm cavity)	3.27	11.1	2.18	7.4	2.45	8.3	1.62	5.5	1.98	6.7	1.30	4.4	1.65	5.6	1.09	3.7

## Recommended vertical tie spacing for HMT range of brick / timber wall-ties subject to various surface wind pressures.

Maximum net surface wind pressure kN/m <sup>2</sup>	Stud Spacing (mm)					
	600		400		600	
	HMT-50	HMT-50	HMT-75	HMT-75	HMT-100	HMT-100
0.6	600	600	600	600	600	600
0.8	600	600	600	600	600	600
1.0	450	600	450	600	450	600
1.2	375	600	375	600	375	600
1.4	300	525	300	525	300	525
1.6	300	450	300	450	300	450
1.8	225	375	225	375	225	375
2.0	225	300	225	300	225	300
2.2	150	300	150	300	150	300
2.4	150	300	150	300	150	300

### GENERAL NOTES

- All performance figures on the HMT range are derived from independent test at CERAM.
- Minimum embedment length in mortar = 50mm.
- Only use nails supplied by Cullen to install HMT range of wall ties.
- HMT ties are packaged in boxes of 250 and includes 3.35 x 50mm stainless steel annular ring shank nails.
- For applications outside the scope of those specified contact Cullen Technical Department at 01592 77 75 70.
- Wall ties are required to be located at stud positions, not randomly into sheathing.