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**Agrément Certificate**

**19/5712**

Product Sheet 1

### HADLEY FRAMING COMPONENTS

### HADLEY COLD FORMED STEEL PROFILES

This Agrément Certificate Product Sheet<sup>(1)</sup> relates to Hadley Cold Formed Steel Profiles, for use as joists, studs and lintels in floors, walls and roofs of multi-storey new and existing domestic and non-domestic buildings.

(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

**Strength and stability** — structures designed and constructed using the products will have adequate strength and stability (see section 6).

**Behaviour in relation to fire** — the products (Hadley Cold Formed Steel Profiles, bracing, straps, bolts, screws and brackets) have a Class A1 reaction to fire classification in accordance with the national Building Regulations (see section 7).

**Durability** — the products are capable of achieving a design life of at least 60 years (see section 9).

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

Date of Second issue: 8 September 2022

Originally certificated on 17 December 2019

Hardy Giesler  
Chief Executive Officer

*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](http://www.bbacerts.co.uk)*

*Readers MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.*

*Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.*

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## Regulations

In the opinion of the BBA, Hadley Cold Formed Steel Profiles, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying 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) (as amended)

<b>Requirement:</b>	<b>A1</b>	<b>Loading</b>
Comment:		The products will have adequate strength and stability. See section 6 of this Certificate.
<b>Requirement:</b>	<b>A3</b>	<b>Disproportionate collapse</b>
Comment:		A system incorporating the products can be designed to incorporate adequate ties to satisfy this Requirement, when necessary to prevent disproportionate collapse. See section 6.1 of this Certificate.
<b>Regulation:</b>	<b>7(1)</b>	<b>Materials and workmanship</b>
Comment:		The products are acceptable. See section 9 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>7(2)</b>	<b>Materials and workmanship</b>
Comment:		The products are unrestricted by this Regulation. See section 7 of this Certificate.



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

<b>Regulation:</b>	<b>8(1)</b>	<b>Durability, workmanship and fitness of materials</b>
Comment:		The products can contribute to a construction satisfying this Regulation. See section 9 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>9</b>	<b>Building standards applicable to construction</b>
Standard:	1.1(a)(b)	Structure
Comment:		The products will have adequate strength and stability to satisfy this Standard, with reference to clauses 1.1.1 <sup>(1)(2)</sup> , 1.1.2 <sup>(1)(2)</sup> and 1.1.3 <sup>(1)(2)</sup> . See section 6 of this Certificate.
Standard:	1.2	Disproportionate collapse
Comment:		A system incorporating the products can be designed to incorporate adequate ties to satisfy this Standard, when necessary to prevent disproportionate collapse, with reference to clause 1.2.1 <sup>(1)</sup> . See section 6.1 of this Certificate.
Standard:	2.6	Spread to neighbouring buildings
Comment:		The products can contribute to satisfying this Standard, with reference to clause 2.6.4 <sup>(1)(2)</sup> . See section 7.1 of this Certificate.
Standard:	2.7	Spread on external walls
Comment:		The products can contribute to satisfying this Standard, with reference to clause 2.6.4 <sup>(1)(2)</sup> . See section 7 of this Certificate.
Standard:	7.1(a)(b)	Statement of sustainability
Comment:		The products can contribute to satisfying 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.

<b>Regulation:</b>	<b>12</b>	<b>Building standards applicable to conversions</b>
<b>Comment:</b>		All comments in relation to the products under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 <sup>(1)(2)</sup> and Schedule 6 <sup>(1)(2)</sup> .
		(1) Technical Handbook (Domestic). (2) Technical Handbook (Non-Domestic).
		
<b>The Building Regulations (Northern Ireland) 2012 (as amended)</b>		
<b>Regulation:</b>	<b>23(a)(i)(iii)</b>	<b>Fitness of materials and workmanship</b>
<b>Comment:</b>	<b>(iv)(b)(i)</b>	The products are acceptable. See section 9 and the <i>Installation</i> part of this Certificate.
<b>Regulation:</b>	<b>30</b>	<b>Stability</b>
<b>Comment:</b>		The products will have adequate strength and stability. See section 6 of this Certificate.
<b>Regulation:</b>	<b>31</b>	<b>Disproportionate collapse</b>
<b>Comment:</b>		A system incorporating the products can be designed to incorporate adequate ties to satisfy this Regulation, when necessary to prevent disproportionate collapse. See section 6.1 of this Certificate.
<b>Regulation:</b>	<b>36(a)</b>	<b>External fire spread</b>
<b>Comment:</b>		The products are unrestricted by this Regulation. See section 7 of this Certificate.

## Construction (Design and Management) Regulations 2015

## Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See section: 3 *Delivery and site handling* (3.2 and 3.3) of this Certificate.

### Additional Information

#### NHBC Standards 2022

In the opinion of the BBA, Hadley Cold Formed Steel Profiles, if installed, used and maintained in accordance with this Certificate, can satisfy or contribute to satisfying the relevant requirements in relation to *NHBC Standards*, Chapter 6.10 *Light steel framed walls and floors*.

#### UKCA marking

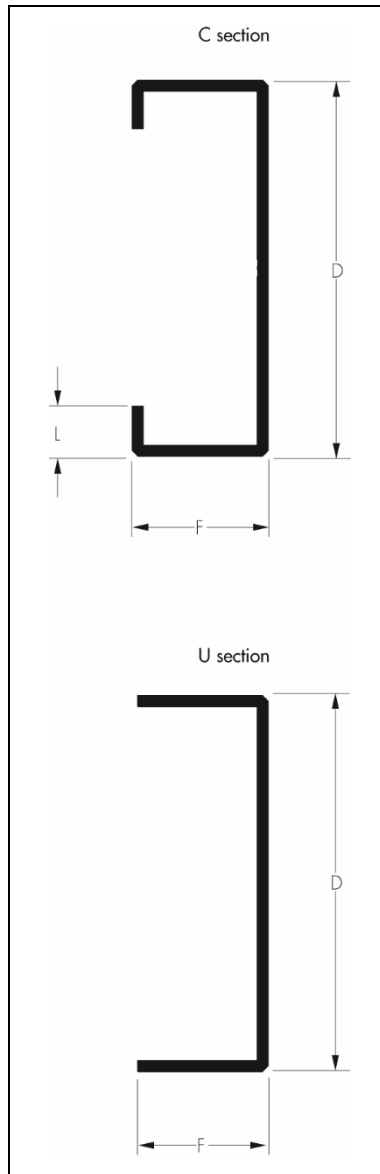
The Certificate holder has taken the responsibility of UKCA marking the products in accordance with harmonised European Standard BS EN 1090-1 : 2009.

### Technical Specification

#### 1 Description

1.1 Hadley Cold Formed Steel Profiles comprise a range of lightweight, load-bearing, cold-formed steel profiles (see Figure 1) in conjunction with bracing, straps, bolts, screws and brackets for use as joists, studs and lintels. The profiles are cold formed from coil strip to grade S450 and galvanized to 275 or 600 g·m<sup>-2</sup> (the latter, when used in ground floors or when required subject to specified durability requirements) in accordance with BS EN 10346 : 2015 (see also sections 4.3 and 9). Alternatively, they can be galvanized to 275 g·m<sup>-2</sup> with additional protection of a two-coat bitumen-based coating to BS 1070 : 1993, BS 3416 : 1991 or BS 6949 : 1991, or have a two-coat liquid asphaltic coating. See Tables 1 and 2 of this Certificate for dimensions (and mass per metre length) of Hadley cold formed C- and U-sections.

Figure 1 Typical sections



*Table 1 Dimensions and mass per metre length of Hadley cold formed C-sections*

No	Section reference	Dimensions				Mass per metre (kg)
		Web (D) (mm)	Flange (F) (mm)	Lip (L) (mm)	Thickness (t) (mm)	
1	070F5012	70	50	12	1.2	1.7
2	070F5015	70	50	12	1.5	2.2
3	070F5020	70	50	12	2.0	2.9
4	100F5012	100	50	12	1.2	2.0
5	100F5015	100	50	12	1.5	2.5
6	100F5020	100	50	12	2.0	3.3
7	100F6012	100	60	12	1.2	2.2
8	100F6015	100	60	12	1.5	2.7
9	100F6020	100	60	12	2.0	3.6
10	100F6025	100	60	12	2.5	4.5
11	100F7512	100	75	18	1.2	2.6
12	100F7515	100	75	18	1.5	3.2
13	100F7520	100	75	18	2.0	4.3
14	100F7525	100	75	18	2.5	5.3
15	100F7530	100	75	18	3.0	6.4
16	120F5012	120	50	12	1.2	2.2
17	120F5015	120	50	12	1.5	2.7
18	120F5020	120	50	12	2.0	3.6
19	120F7512	120	75	18	1.2	2.7
20	120F7515	120	75	18	1.5	3.4
21	120F7520	120	75	18	2.0	4.6
22	120F7525	120	75	18	2.5	5.7
23	150F5012	150	50	12	1.2	2.5
24	150F5015	150	50	12	1.5	3.1
25	150F5020	150	50	12	2.0	4.1
26	150F6012	150	60	12	1.2	2.6
27	150F6015	150	60	12	1.5	3.3
28	150F6020	150	60	12	2.0	4.4
29	150F6025	150	60	12	2.5	5.5
30	150F7512	150	75	18	1.2	3.0
31	150F7515	150	75	18	1.5	3.8
32	150F7520	150	75	18	2.0	5.0
33	150F7525	150	75	18	2.5	6.3
34	200F6312	200	63	18	1.2	3.3
35	200F6314	200	63	18	1.4	3.8
36	200F6316	200	63	18	1.6	4.4
37	200F6320	200	63	18	2.0	5.4
38	200F7512	200	75	18	1.2	3.5
39	200F7515	200	75	18	1.5	4.4
40	200F7520	200	75	18	2.0	5.8
41	200F7525	200	75	18	2.5	7.3
42	225F6314	225	63	18	1.4	4.1
43	225F6316	225	63	18	1.6	4.7
44	225F6320	225	63	18	2.0	5.8
45	255F6314	255	63	18	1.4	4.4
46	255F6316	255	63	18	1.6	5.0
47	255F6320	255	63	18	2.0	6.3
48	285F6316	285	63	18	1.6	5.4
49	285F6320	285	63	18	2.0	6.8
50	285F6330	285	63	18	3.0	10.1

**Table 1 Dimensions and mass per metre length of Hadley cold formed C-sections (continued)**

No	Section reference	Dimensions				Mass per metre (kg)
		Web (D) (mm)	Flange (F) (mm)	Lip (L) (mm)	Thickness (t) (mm)	
51	305F6316	305	63	18	1.6	5.6
52	305F6320	305	63	18	2.0	7.1
53	305F6330	305	63	18	3.0	10.6

**Table 2 Dimensions and mass per metre length of Hadley cold-formed U-sections**

No	Section reference	Dimensions			Mass per metre (kg)
		Web (D) (mm)	Flange (F) (mm)	Thickness (t) (mm)	
1	074T4012	74	40	1.2	1.4
2	074T7012	74	70	1.2	1.9
3	074T7020	74	70	2.0	3.2
4	104T4012	104	40	1.2	1.7
5	104T7012	104	70	1.2	2.2
6	104T7020	104	70	2.0	3.7
7	124T4012	124	40	1.2	1.8
8	124T7012	124	70	1.2	2.4
9	124T7020	124	70	2.0	4.0
10	154T4012	154	40	1.2	2.1
11	154T7012	154	70	1.2	2.7
12	154T7020	154	70	2.0	4.5
13	204T4012	204	40	1.2	2.6
14	204T7012	204	70	1.2	3.1
15	204T7020	204	70	2.0	5.2
16	229T4012	229	40	1.2	2.8
17	229T7020	229	70	2.0	5.6
18	259T4012	259	40	1.2	3.1
19	259T7020	259	70	2.0	6.1
20	290T4015	290	40	1.5	4.2
21	290T7025	290	70	2.5	8.2
22	310T4015	310	40	1.5	4.4
23	310T7025	310	70	2.5	8.6

1.2 Hadley Cold Formed Steel Profiles are manufactured to the nominal characteristics specified in Table 3. The minimum proof strength ( $R_{p0.2}$ ) and tensile strength ( $R_m$ ) of steel grade S450 GD in accordance with BS EN 10346 : 2015 is 450 and 510  $N \cdot mm^{-2}$  respectively.

**Table 3 Essential characteristic performance of Hadley Cold Formed Steel Profiles**

Essential characteristic	Performance	Harmonised technical specification
Tolerance on dimensions and shapes	BS EN 1090-2 Tolerance class 1	BS EN 1090-1 : 2009
Reaction to fire	Class A1	BS EN 1090-1 : 2009
Durability	S450 GD+Z 275 or 600	BS EN 1090-1 : 2009

### Specification of bracing straps

1.3 The strip steel is produced to BS EN 10346 : 2015 in S450 grade (yield strength of 450  $N \cdot mm^{-2}$ ), with a galvanized coating of G275 or G600 grade (275 or 600 grams of zinc per  $m^2$ ). The straps have the following dimensions:

- 100 x 1.2 mm thick
- 38 x 0.9 mm thick.

## **Fasteners**

1.4 The fixings must be bolt M12 class 8.8 or higher to BS EN 1993-1-8 : 2005 and appropriate screws of 5.5 mm diameter. All fasteners including washers, nuts, screws and bolts must have appropriate galvanized protection (zinc coating greater than 8 µm to BS EN ISO 4042 : 2018) or they must be stainless steel grade A2 in accordance with BS EN ISO 3506-1 : 2009 and BS EN ISO 3506-2 : 2009 (see also section 9 of this Certificate). The number of screws and the thickness of the steel plate must be adequate to resist applied shear and tensile forces.

## **Accuracy and tolerances**

1.5 The accuracy of the section shape is within  $\pm 0.5$  mm. The ends of the members may be pre-formed with holes to permit easy inter-connection.

## **Packing gap**

1.6 If the gap between the bottom rail and the substructure is less than 10 mm, packing is carried out under each stud, using galvanized steel shims. For gaps of 10 to 20 mm, shims are required under each stud, and grout is required under the whole of the base rail. For gaps of more than 20 mm, remedial work to the base/sub structure is required.

1.7 The typical application of Hadley Cold Formed Steel Profiles is as follows:

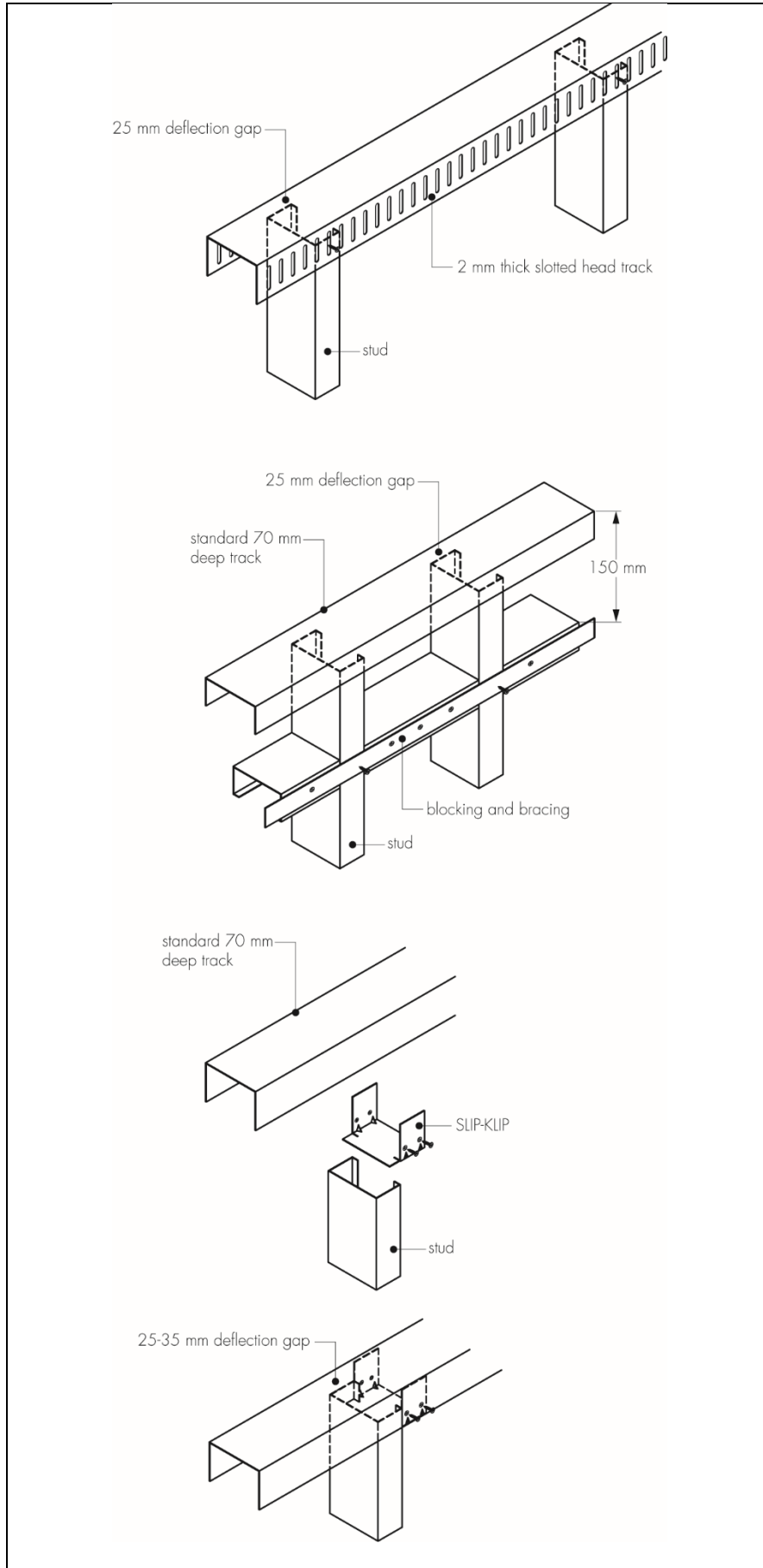
## **Wall frames**

Wall frames – consisting of studs (compression members) typically at 400 or 600 mm centres, or as modified at openings; bottom and top tracks which fit around the studs; and noggings to provide lateral restraint. The load bearing wall frame must resist against wind loads when used on the periphery of the building.

## **Infill walls**

Infill walls are fitted between floors in multi-storey buildings as separating walls. Differential movement of the infill walls and the primary structure is accommodated through use of a sliding deflection head, using slotted head tracks, Slip Klip deflection head clips, FC series cleats or blocking and bracing with flat straps (see Figure 2).

Figure 2 Infill framing incorporating deflection head details





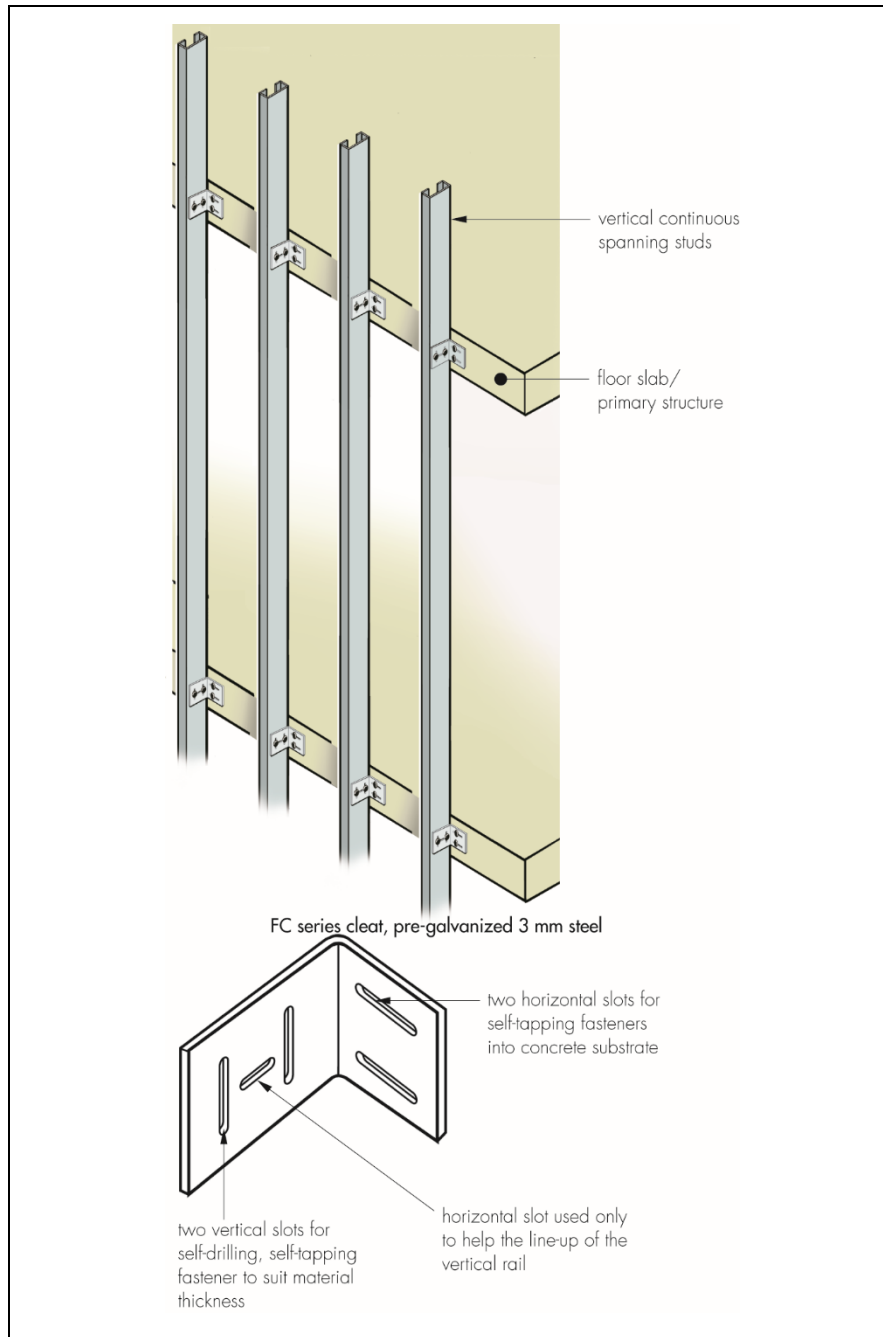
## Floor joists

Joists are generally placed at 400 or 600 mm centres, depending on the spanning capabilities of the boarding.

## Oversail/continuous walls

The oversail/continuous walls are constructed on the outside of the building and fixed back to the main structural frame using steel cleats. Differential movement of the continuous walls and the primary structure is accommodated through use of slotted holes, and the correct positioning of fixings, in the cleats (see Figure 3).

Figure 3 Typical oversail detail fixed to the main structural frame

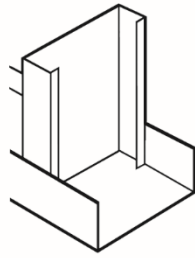


## Lintels

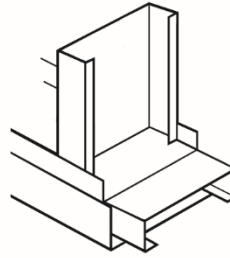
Lintels and openings may be formed from the components in several configurations depending on the design (see Figures 4 and 5).

Figure 4 Lintels

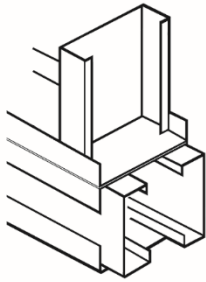
intel types



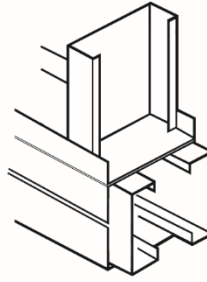
LT2  
deep track



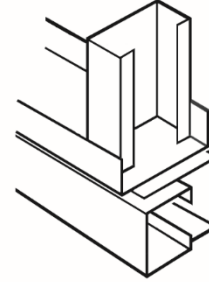
LT3  
deep track with stud and  
shallow track on back of stud



LT4  
shallow track with two stud sections inserted  
vertically and capped with a pair of  
back-to-back shallow track sections

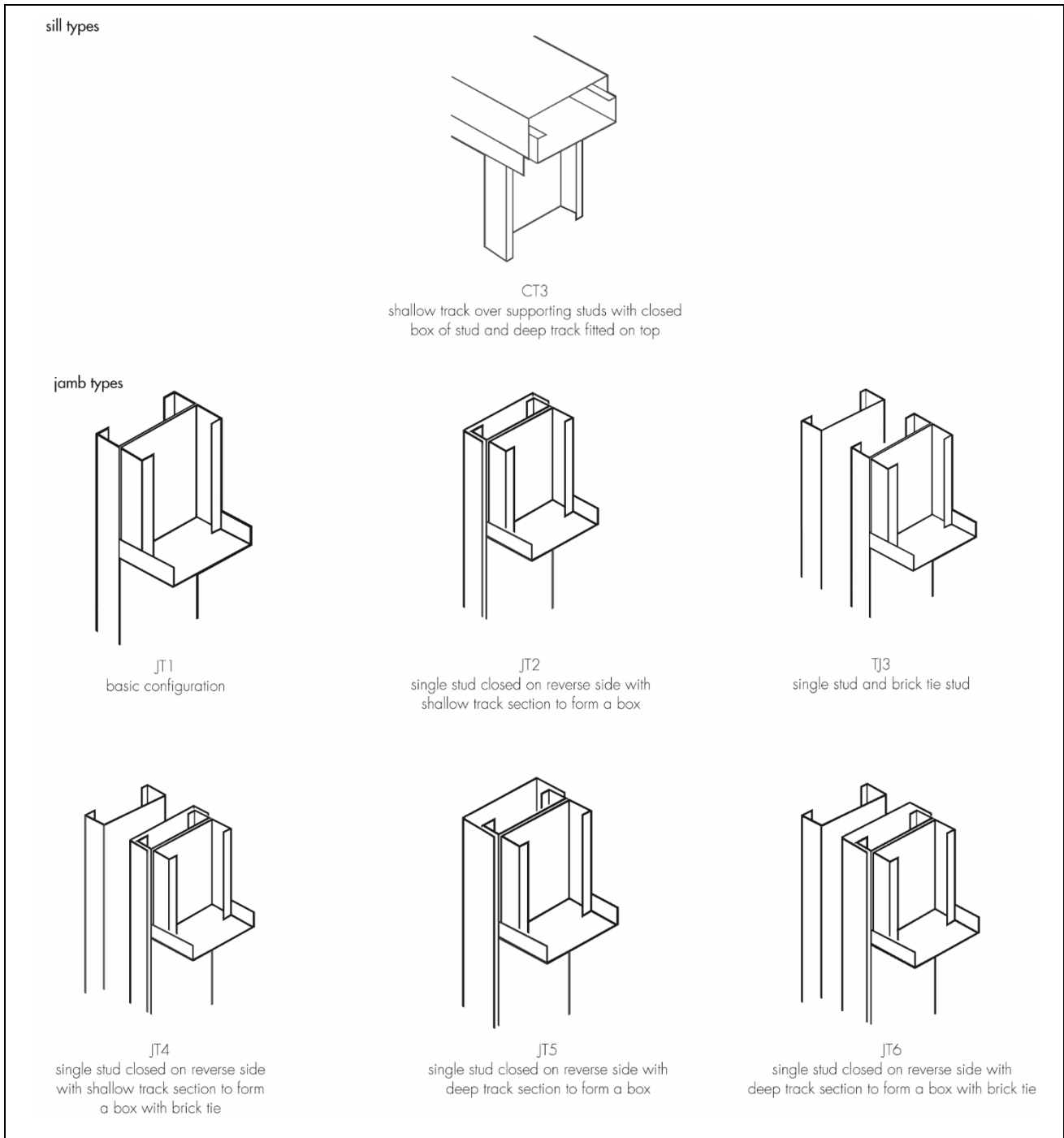


LT5  
deep track with two stud sections inserted  
vertically and capped with a pair of  
back-to-back deep track sections



LT6  
heavy duty with deep track and stud to form a  
closed box and capped with shallow track section

Figure 5 Openings



1.8 Ancillary items for use with the products, but outside the scope of this Certificate, include:

- fire protection, thermal insulation and sound protection
- holding-down devices
- screws 5.5 mm diameter with zinc coating greater than 8 µm to BS EN ISO 4042 : 2018
- foundation.

## 2 Manufacture

2.1 The products are manufactured from cold-rolled steel coil.

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 management system of the Certificate holder has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by SCCS (Certificate Q027).

## 3 Delivery and site handling

3.1 The products are delivered to site in the form of prefabricated sections.

3.2 The products are offloaded with mechanical handling equipment (eg by crane) and placed in a suitable holding area until lifted into their final position.

3.3 The maximum length of Hadley Cold Formed Steel Profiles is 9 m; the self-mass for one metre length of the profiles is given in Tables 1 and 2.

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Hadley Cold Formed Steel Profiles.

### Design Considerations

## 4 General

4.1 A suitably competent and experienced engineer must design the elements and connections for individual projects by means of structural calculation against applied wind loads, dead loads and imposed loads to the relevant parts of Eurocodes and, if necessary, the appropriate reduction factor for unprotected profiles exposed to fire. Full consideration must also be given to the requirements of the national Building Regulations based on the building class (relating to building type, occupancy, number of storeys and size of building), and the provision of adequate horizontal and vertical ties for the integrity of the structure and avoidance of disproportionate collapse.

4.2 The products are loadbearing and non-load bearing elements for use in floors, walls and roofs in steel-framed buildings in dry, internal conditions, and are corrosivity category C1 in accordance with BS EN ISO 14713-1 : 2017. Applications such as sports centres with swimming pools or buildings with high internal humidity levels are outside the scope of this Certificate (see also section 9).

4.3 Hadley Cold Formed Steel Profiles are grade S450 with 275 g·m<sup>-2</sup> galvanized zinc coating in accordance with BS EN 10346 : 2015. When the profiles are used as floor joists and ring beams in ground floors or where specifications indicate the need for enhanced corrosion protection, a higher durability coating Z600 (600 g·m<sup>-2</sup> of zinc) is required. Alternatively, they can be galvanized to 275 g·m<sup>-2</sup> with additional protection of either a two-coat liquid asphaltic composition, or a two-coat bitumen-based coating to BS 1070 : 1993, BS 3416 : 1991 or BS 6949 : 1991. Ring beams to ground floors should be totally protected as mentioned above, and joists protected for a minimum of 300 mm adjacent to an external wall support or ring beam. Where Hadley Cold Formed Steel Profiles are used less than 150 mm above ground level, the steel must be adequately protected from the effects of moisture (see also section 9 of this Certificate). The base rail should be kept a minimum of 150 mm above the external ground level (or waterproofing layer of a flat roof, balcony or terrace) and cavity fill.

4.4 When Hadley Cold Formed Steel Profiles are used in cladding, the cavity depth must be extended at least 150 mm below the damp-proof course (dpc), and weep holes, or other suitable means of drainage, must be provided to ensure moisture is drained from the cavity; the width of cavity must be in accordance with *NHBC Standards 2022*, Chapter 6.10, Table 8.

4.5 Fixings must be suitable for the design, and adequately protected against corrosion (see also sections 1.4 and 9 of this Certificate).

4.6 This Certificate covers only the loadbearing capacity and durability of Hadley Cold Formed Steel Profiles. The fire protection, sound insulation protection and thermal performance are dependent on the overall construction and are therefore outside the scope of this Certificate and should be ascertained by a competent building designer. The completed building must be designed and constructed to satisfy all the relevant requirements of the national Building Regulations.

4.7 The applied bending, shear, tensile and compression stresses to the profiles must not exceed the section resistances specified in section 6.

4.8 NHBC acceptance of the components when used as framed, volumetric or modular self-supporting structures, requires compliance with *NHBC Standards 2022*, Part 6, Chapter 6.10, Section 6.10.3 and the issue of 'Stage 1 – System Certification' and 'Stage 2 – Project Certification'.

4.9 Connections between elements and connections between the structure and bracing are formed using mechanical fixings as detailed in section 6.

4.10 The overall stability of the structure, including overturning and sliding, is outside the scope of this Certificate and must be confirmed by a suitably competent and experienced engineer.

## **5 Practicability of installation**

The system is designed to be installed by installers who have been trained and approved by the Certificate holder. Any installation work should follow the details and information contained in the construction drawings, as prepared by the Certificate holder. The Certificate holder conducts training sessions with the installer.

## 6 Strength and stability



6.1 A suitably competent and experienced engineer must undertake the structural design of any buildings to the relevant codes of practice, taking into account the following:

- the variable actions (imposed, snow, wind loads, thermal to BS EN 1991-1-1 : 2002, BS EN 1991-1-3 : 2003, BS EN 1991-1-4 : 2005 and BS EN 1991-1-5 : 2003, and their UK National Annexes) for wall, floor and roof loadings
- the applied compression, shear, tension and flexural buckling loads and bending moment to Hadley Cold Formed Steel Profiles must not exceed the values defined in section 6.4
- if appropriate, fire protection has not been provided to the profiles, the section resistances and spans of the profiles given in this Certificate must be reduced in accordance with BS EN 1993-1-2 : 2005 and its UK National Annex. The section resistance of the straps, brackets, bolts and screws must also be reduced in accordance with the requirements of BS EN 1993-1-2 : 2005 and its UK National Annex
- full consideration must be given to the required horizontal and vertical ties and robustness of the building to avoid disproportionate collapse under accidental loading in accordance with BS EN 1990 : 2002 and BS EN 1991-1-7 : 2006, and their UK National Annexes. The required level of robustness will be determined in accordance with the national Building Regulations based on the building or consequence class (relating to building type, occupancy, number of storeys and size of building)
- the adequacy of fixings and fasteners against applied loads in accordance with BS EN 1993-1-8 : 2005 and its UK National Annex
- the applied loads must not exceed the section resistances of Hadley Cold Formed Steel Profiles (as defined in Table 9 of this Certificate)
- adequate bracing and/or sheathing must be provided to prevent horizontal deformation and sway, and the racking resistance owing to wind loads evaluated
- the horizontal deflection of the cold formed steel profiles owing to wind loads must be within the acceptable limit of height/300 in accordance with the UK National Annex to BS EN 1993-1-1 : 2005, clause NA.2.24 and Table NA.3
- the deflection of the floor beams and lintels under the characteristic load combination owing to variable (imposed) loads must be restricted to the limits as defined in the UK National Annex to BS EN 1993-1-1 : 2005, clause NA.2.23, which are summarised in Table 4 of this Certificate

*Table 4 Limit of deflection to UK National Annex to BS EN 1993-1-1 : 2005*

Vertical deflection	Deflection limitation to UK National Annex to BS EN 1993-1-1 : 2005
Cantilevers	length/180
Beams carrying plaster or other brittle finish	span/360
Other beams (except purlins and sheeting rails)	span/200
Purlins and sheeting rails	to suit the characteristics of particular cladding

- deflection of a single joist must not exceed the values defined in *NHBC Standards 2022*, Chapter 6.10, for static and dynamic loading

*static load:*

- limit of deflection owing to imposed load span/450
- limit of deflection owing to dead and imposed loads span/350 or 15 mm, whichever is less

*dynamic criteria (vibration control):*

- the natural frequency of the floor should be limited to 8Hz for dead load plus 0.2 x imposed load. This can be achieved by limiting the deflection of a single joist to 5 mm<sup>(1)</sup> for the given loading
- the deflection of the floor (ie a series of joists plus the floor decking) when subject to a 1 kN point load should be limited to the values in Table 5 of this Certificate
- the deflection of a single joist is dependent on the overall floor construction and the number of effective joists that are deemed to share the applied 1 kN point load. See Table 6 of this Certificate for the number of effective joists.

(1) The natural frequency of the floor must not exceed 8 Hz. The natural frequency,  $f$ , is given by:  $f = 18/\Delta^{0.5}$ .

*Table 5 Limitation of deflection of joist against 1 kN point for vibration control of the floor*

Span (m)	Maximum deflection (mm)
3.5	1.7
3.8	1.6
4.2	1.5
4.6	1.4
5.3	1.3
6.2	1.2

*Table 6 The effective number of joists to share the applied 1 kN point load*

Floor configuration	Joist centres	
	400 mm	600 mm
	Number of effective joists	
Chipboard, plywood or oriented strand board	2.50	2.35
Built-up acoustic floor	4	3.50

6.2 Examples of load spans to satisfy the UK National Annex to BS EN 1993-1-1 : 2005, and NHBC requirements of static loading, dynamic loadings and imposed uniformly distributed load (UDL) or imposed concentrated loads are shown in Tables 7 and 8 of this Certificate. The maximum spans defined in Tables 7 and 8 relate to Hadley Cold Formed Steel Profiles if the appropriate fire protection is in place. The maximum spans for unprotected profiles exposed to fire must be reduced according to BS EN 1993-1-2 : 2005.

**Table 7 Example of load spans for simply supported joists at 600 mm spacing, for dead and live loads (UDL)**

Section reference	Maximum span <sup>(1)</sup> (m)					
	Loading – light UDL		Loading – medium UDL		Loading – heavy UDL	
	Dead <sup>(2)</sup>	Live	Dead <sup>(2)</sup>	Live	Dead <sup>(2)</sup>	Live
	kN·m <sup>-2</sup>	kN·m <sup>-2</sup>	kN·m <sup>-2</sup>	kN·m <sup>-2</sup>	kN·m <sup>-2</sup>	kN·m <sup>-2</sup>
	0.8	1.5	1.0	3.0	1.0	5.0
150F5012	3.25		2.70		2.31	
150F5015	3.48		2.90		2.47	
150F5020	3.77		3.17		2.70	
200F6312	4.14		3.59		3.06	
200F6314	4.30		3.77		3.22	
200F6316	4.44		3.94		3.36	
200F6320	4.68		4.23		3.61	

(1) The load required for moveable, line load partition and finishes has not been included in the load spans shown.

(2) Self-weight of floors and cold formed steel profiles has not been included in the load spans shown.

**Table 8 Example of load spans for simply supported joists at 600 mm spacing, for dead<sup>(1)</sup> and concentrated live loads**

Section reference	Imposed load (kN)					
	2.0	2.50	3.0	3.5	4.0	4.5
	Maximum span for concentrated load (m)					
150F5012	3.78	3.37	3.07	2.85	2.66	2.51
150F5015	4.20	3.75	3.42	3.16	2.96	2.78
150F5020	4.81	4.30	3.92	3.63	3.39	3.19
200F6312	5.82	5.20	4.74	4.39	4.1	3.86
200F6314	6.27	5.60	5.12	4.73	4.42	4.16
200F6316	6.70	5.99	5.46	5.05	4.72	4.45
200F6320	7.46	6.67	6.08	5.62	5.26	4.96

(1) Self-weight of floors and cold formed steel profiles has not been included in the load spans shown.

6.3 The joists are designed as simply supported beams. The ultimate load and service load applied to the beams must be calculated using the equations from BS EN 1990 : 2002 and its UK National Annex.

6.4 Section resistance of Hadley Cold Formed Steel Profiles and the fixing/fasteners when there are no fire conditions has been verified by the BBA in accordance with BS EN 1993-1-1 : 2005, BS EN 1993-1-3 : 2006 and BS EN 1993-1-8 : 2005, and their UK National Annexes. The results are summarised in Table 9 of this Certificate. The section resistances, load spans of the profiles and the resistance of the fasteners and fixing in case of fire must be reduced in accordance with BS EN 1993-1-2 : 2005 and its UK National Annex, to satisfy the requirements of the national Building Regulations in respect of fire resistance for the given building type.



**Table 9 Example of studs and joists section resistance**

Section reference	Axial tension design resistance	Axial compression design resistance	Design buckling resistance of compression member for $L_{cr} = 2550$ mm	Design moment resistance about y axis	Design moment resistance about z axis	Design buckling resistance moment for unrestrained length of 2700 mm
	$N_{t,Rd}$ (kN)	$N_{c,Rd}$ (kN)	$N_{b,Rd}$ (kN)	$M_{cy,Rd}$ (kNm)	$M_{cz,Rd}$ (kNm)	$M_{b,Rd}$ (kNm)
100F5012	114.422	60.93	19.008	2.836	1.054	0.796
100F5015	143.226	90.73	25.338	3.961	1.334	1.048
100F5020	190.512	141.69	37.256	5.505	1.781	1.507
100F7512	146.786	67.13	27.581	3.074	2.296	2.027
100F7515	183.960	100.77	36.305	4.527	2.930	2.776
100F7520	245.196	170.74	51.693	6.922	3.963	3.994
100F7525	305.532	243.43	67.889	9.264	4.958	5.238
100F7530	364.968	313.41	85.306	11.268	5.904	6.469
120F5012	127.12	61.23	23.69	3.43	1.07	0.93
120F5015	159.95	90.11	31.45	5.00	1.34	1.22
120F5020	214.61	142.40	45.76	6.96	1.80	1.72
120F7512	159.49	67.09	34.73	3.73	2.31	2.32
120F7515	200.68	101.06	46.48	5.59	2.95	3.17
120F7520	269.29	170.92	66.98	8.70	3.99	4.53
120F7525	337.84	244.98	88.06	11.60	5.01	5.88
150F5012	140.522	61.07	29.262	4.286	1.073	1.158
150F5015	176.076	88.99	38.865	6.254	1.352	1.498
150F5020	234.612	142.61	56.212	9.353	1.814	2.095
150F7512	172.886	66.92	42.970	4.714	2.320	2.829
150F7515	216.810	101.04	59.168	7.005	2.964	3.816
150F7520	289.296	169.91	87.346	11.572	4.026	5.511
150F7525	360.882	245.57	115.965	15.340	5.060	7.067
200F6312	186.458	66.69	46.876	6.335	1.819	2.895
200F6314	218.117	88.50	59.160	8.381	2.155	3.496
200F6316	249.631	113.04	71.981	10.644	2.489	4.099
200F6320	312.228	166.59	97.931	15.382	3.149	5.289

## 7 Behaviour in relation to fire



7.1 Hadley Cold Formed Steel Profiles, bracing, straps, bolts, screws and brackets are classified as A1 in accordance with the national Building Regulations and are not subject to any restriction on building height or proximity to boundaries.

7.2 The section resistances and spans of the profiles must be reduced in accordance with BS EN 1993-1-2 : 2005 and its UK National Annex, to take account of the resistance to fire requirements of the structure and the degree of fire protection provided by the finishes.

## 8 Maintenance

As the steel framework is confined within the building elements and has suitable durability (see section 9), maintenance is not required, provided that the whole building element is designed and constructed properly to prevent adverse moisture on steel surfaces owing to precipitation or condensation.

## 9 Durability



Hadley Cold Formed Steel Profiles are grade S450 with a 275 or 600 g·m<sup>-2</sup> zinc coating (see section 4.3 of this Certificate) in accordance with BS EN 10346 : 2015 and have been assessed as being capable of achieving a design life of at least 60 years provided that:

- the building is constructed in accordance with this Certificate, and covered by appropriate fire protection insulation, and the building design utilises the warm frame principle by the application of external insulated cladding
- the criteria in sections 4.2 to 4.4 of this Certificate are satisfied
- for applications where the base rail or lowest steel are less than 150 mm above ground level, the guidance in *NHBC Standards 2022*, Part 6, Chapter 6.10, Section 6.10.16 should be followed
- the moisture is drained away from the cavity
- the steel is adequately protected from the effects of moisture by providing cavities in external walls, protection of steel at low level and dpc, damp-proof membrane (dpm) and cavity trays
- all fasteners, washers, nuts, screws and bolts have appropriate corrosion protection or are stainless steel grade A2 (see also sections 1.4 and 4.2 of this Certificate).

## 10 Reuse and recyclability

The steel profiles can be readily recycled.

### Installation

## 11 Procedure

11.1 The products are installed by specialist sub-contractors trained by the Certificate holder. The Certificate holder retains a list of such installers.

11.2 The products must be installed in accordance with the design and the Certificate holder's documented procedure.

11.3 Pre-assembled profiles must not be cut or modified on site.

11.4 Where required, diagonal steel bracing is factory fitted to the pre-assembled structure.

11.5 Where structures are diagonally braced with a flat strip, this should be fixed to each stud at the intersection, to minimise the bow in the bracing member.

11.6 Typical details of the various constructions covered by the Certificate are given in Figures 6 to 8.

Figure 6 Typical construction walls

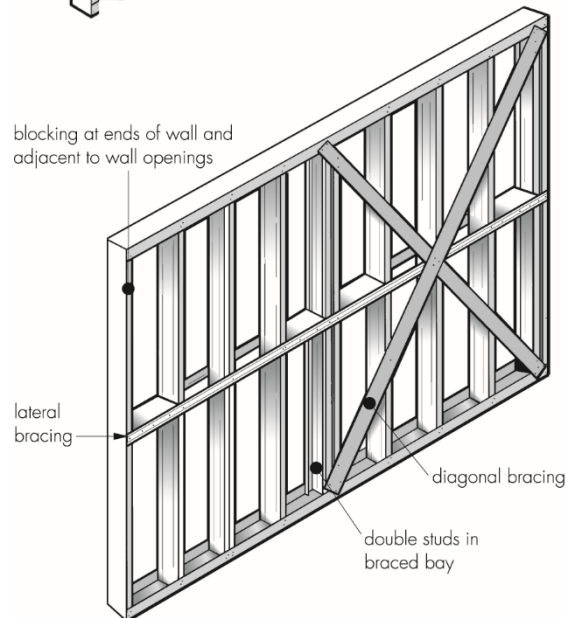
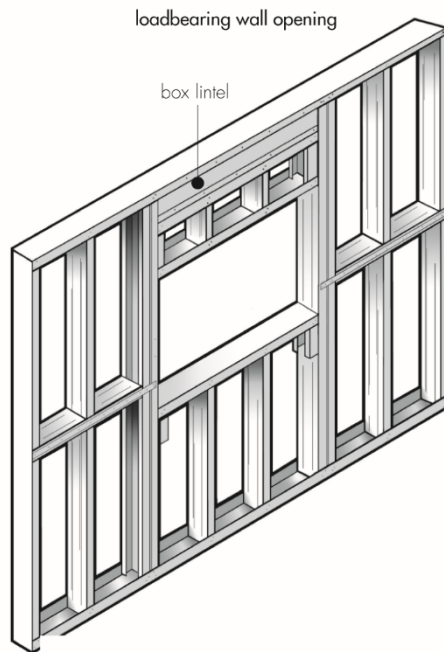
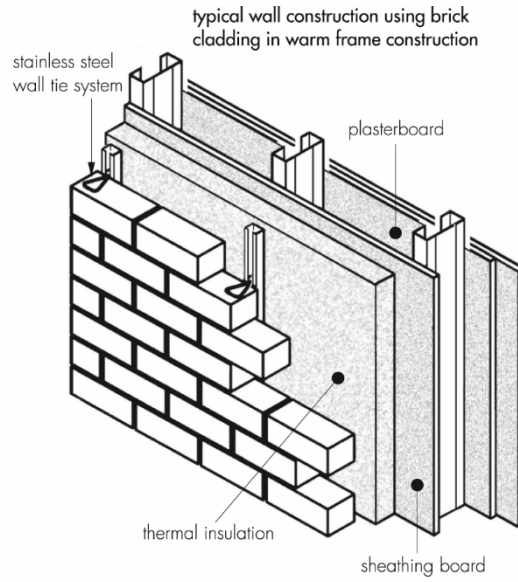
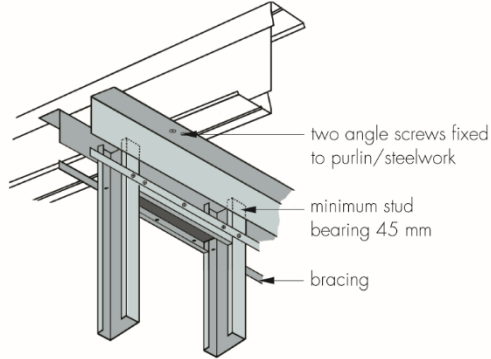
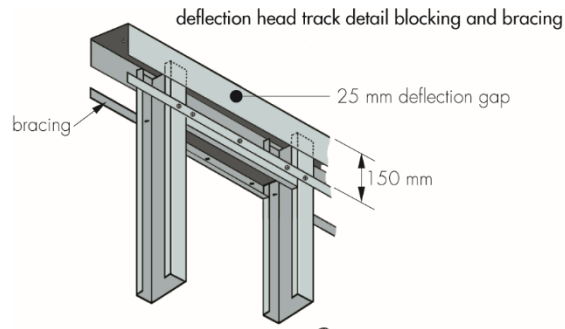
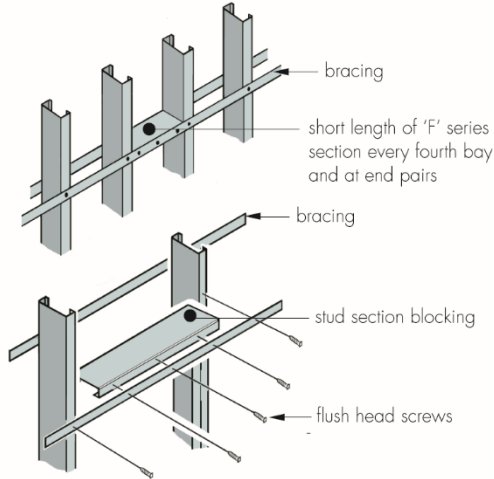


Figure 7 Typical detail partition walls



lateral restraint blocking and bracing



opening lintel construction

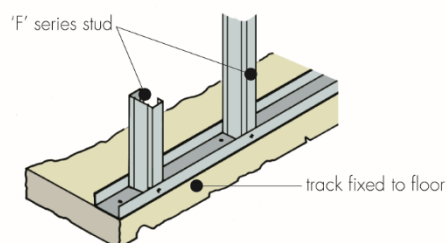
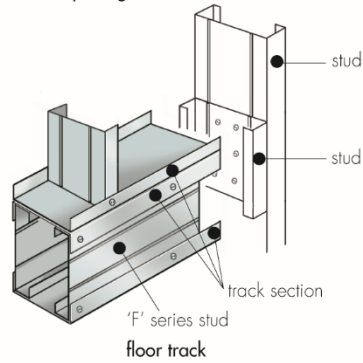
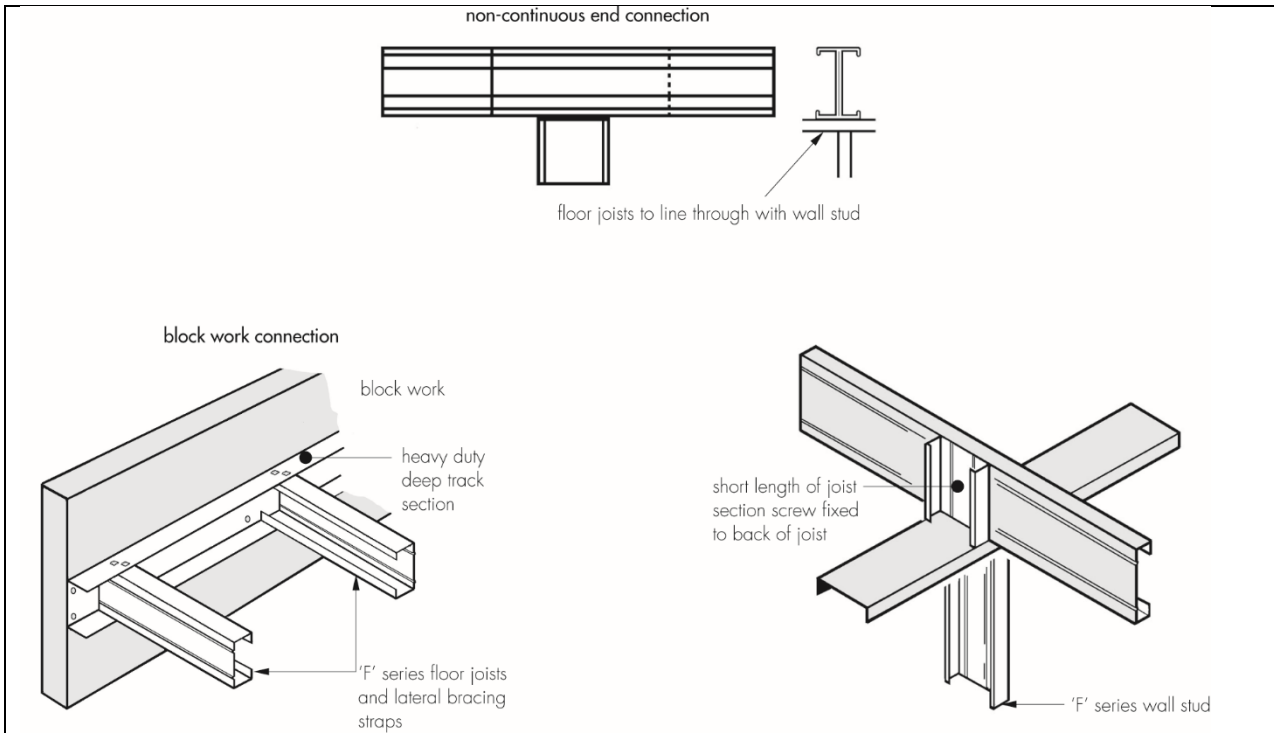


Figure 8 Typical detail floor joists



## Technical Investigations

### 12 Investigations

12.1 An assessment was made of existing data, to determine:

- load span tables
- mechanical resistance of profiles
- mechanical resistance of fixings by calculation
- durability.

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

## Bibliography

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- BS 3416 : 1991 *Specification for bitumen-based coatings for cold application, suitable for use in contact with potable water*
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- BS EN 1090-1 : 2009 + A1 : 2011 *Execution of steel structures and aluminium structures — Requirements for conformity assessment of structural components*
- BS EN 1090-2 : 2018 *Execution of steel structures and aluminium structures Part 2: Technical requirements for steel structures*
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- NA to BS EN 1993-1-3 : 2006 UK National Annex to *Eurocode 3: Design of steel structures — General rules — Supplementary rules for cold formed members and sheeting*
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### 13 Conditions

#### 13.1 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.

13.2 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.

13.3 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.

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

13.5 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.

13.6 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.