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Agrément Certificate

16/5359

Product Sheet 1

SIGMAT STEEL FRAMING COMPONENTS

SIGMAT PROFILES

This Agrément Certificate Product Sheet⁽¹⁾ relates to Sigmat Profiles, lightweight cold-formed steel loadbearing profiles for use as joists, studs and lintels in floors, walls and roofs of multi-storey new or 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).

Durability — the products are assessed as 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: 6 November 2020

Originally certificated on 3 October 2016

A handwritten signature in black ink, appearing to read 'Hardy Giesler'.

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
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, Sigmat 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)

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



The Building (Scotland) Regulations 2004 (as amended)

Regulation:	8(1)	Durability, workmanship and fitness of materials
Comment:		The products can contribute to a construction satisfying this Regulation. See section 9 and the <i>Installation</i> part of this Certificate.
Regulation:	9	Building standards applicable to construction
Standard:	1.1(a)(b)	Structure
Comment:		The products have adequate strength and stability to satisfy this Standard, with reference to clauses 1.1.1 ⁽¹⁾⁽²⁾ , 1.1.2 ⁽¹⁾⁽²⁾ and 1.1.3 ⁽¹⁾⁽²⁾ . 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, with reference to clause 1.2.1 ⁽¹⁾ . 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 ⁽¹⁾⁽²⁾ . 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 ⁽¹⁾⁽²⁾ . 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.
Regulation:	12	Building standards applicable to conversions
Comment:		All comments given for the products under Regulation 9, Standards 1 to 6, also apply to this Regulation, with reference to clause 0.12.1 ⁽¹⁾⁽²⁾ and Schedule 6 ⁽¹⁾⁽²⁾ .

(1) Technical Handbook (Domestic).

(2) Technical Handbook (Non-Domestic).



The Building Regulations (Northern Ireland) 2012 (as amended)

Regulation:	23(a)(i)	Fitness of materials and workmanship
Comment:	(iii)(b)(i)	The products are acceptable. See section 9 and the <i>Installation</i> part of this Certificate.
Regulation:	30	Stability
Comment:		The products have adequate strength and stability. See section 6 of this Certificate.
Regulation:	31	Disproportionate collapse
Comment:		A system incorporating the products can be designed to incorporate adequate ties to satisfy this Regulation, when necessary. See section 6.1 of this Certificate.
Regulation:	35(4)	Internal fire spread – Structure
Comment:		The products can contribute to satisfying this Regulation. See section 7 of this Certificate.
Regulation:	36(a)	External fire spread
Comment:		The products can contribute to satisfying 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 2020

In the opinion of the BBA, Sigmat 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*.

CE marking

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

Technical Specification

1 Description

1.1 Sigmat Profiles comprise a range of lightweight cold-formed steel profiles in conjunction with bracing, straps, bolts, screws and brackets, and are for use as joists, studs and lintels, provided that the applied loads do not exceed the section resistances of the products as defined in section 6, and that they are not used at foundation and ground floor levels. Connections between elements, and connections between the structure and bracing, are formed using mechanical fixings as detailed in section 1.4.

1.2 The products are manufactured to the following nominal characteristics, and have the dimensions given in Table 1:

Tolerance on dimensions and shapes	BS EN 1090-4 : 2018 Tolerance Class 1
Fracture toughness	S450GD+Z 27J at 20°C
Reaction to fire	Class A1 (steel only)
Release of cadmium and its compounds	zero for the product(s) in the intended use
Durability	ore hot-dipped galvanized G275
Manufacture	Execution Class 2.

Table 1 Cold-formed section details

Component	Section code/thickness (mm)
Stud Wide flange (SW)	
	100SW20/2.0 100SW24/2.4 100SW30/3.0
Stud Narrow flange (SN)	
	100SN13/1.3 100SN16/1.6 100SN20/2.0
Stud Jamb (SJ)	
	100SJ20/2.0 100SJ24/2.4 100SJ30/3.0
Joist Wide flange (JW)	
	160JW20/2.0 160JW30/3.0
Joist Narrow flange (JN)	
	160JN13/1.3 160JN20/2.0
Joist Narrow flange (N)	
	220JN13/1.3 220JN20/2.0
Joist Wide flange (JW)	
	220JW20/2.0 220JW30/3.0

Table 1 Cold-formed section details (continued)

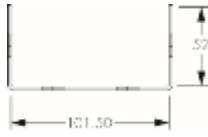


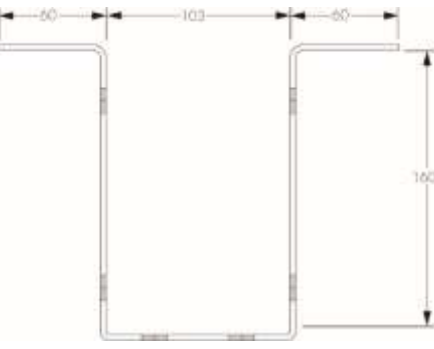
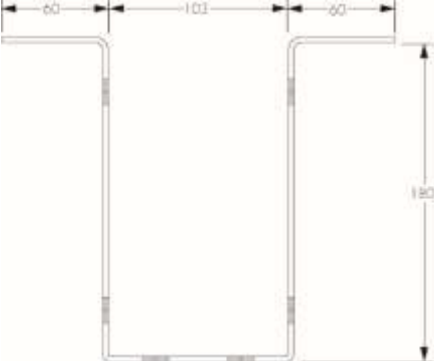
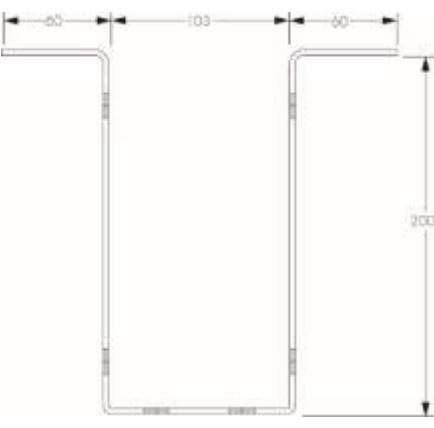
Component	Section code/thickness (mm)
Track (TR) ⁽¹⁾	
	100TR16/1.6 100TR20/2.0 100TR30/3.0
	160TR20/2.0
	220TR20/2.0
Top Hat TH	
	160TH20/2.0 160TH30/3.0
	180TH20/2.0 180TH30/3.0
	200TH20/2.0 200TH30/3.0

Table 1 Cold-formed section details (continued)


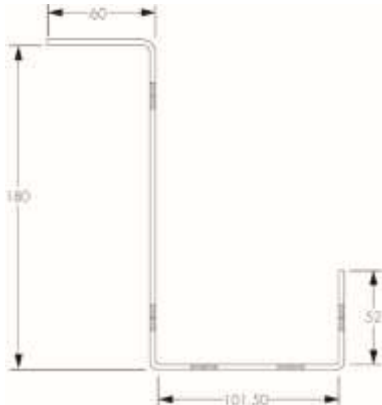
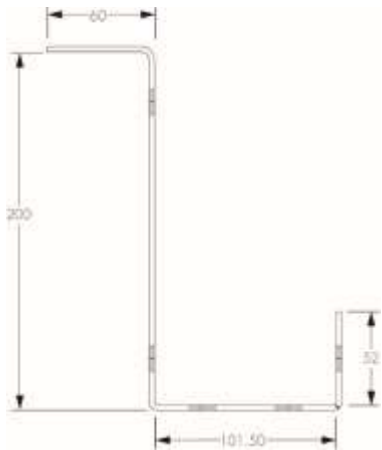


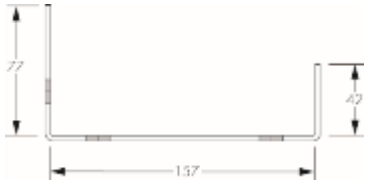
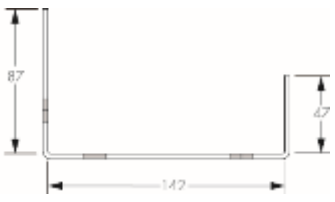


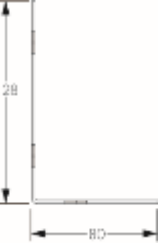
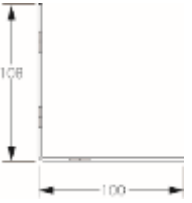
Component	Section code/thickness (mm)
Gable Rail (GR)	
	160GR20/2.0 160GR30/3.0
	180GR20/2.0 180GR30/3.0
	200GR20/2.0 200GR30/3.0
Asymmetric Channel (AC)	
	200AC30/3.0
	180AC30/3.0

Table 1 Cold-formed section details (continued)

Component	Section code/thickness (mm)
Asymmetric Channel (AC)	
	160AC30/3.0
	145AC30/3.0
	125AC30/3.0
Shutter Angle (SA)	
	148SA20/2.0
	128SA20/2.0
	108SA20/2.0

(1) Unlipped Sigmat channel profiles have not been assessed where subjected to bending about the minor axis.

1.3 The products are cold formed from coil strip to grade S450 with a GD+Z G275 coating in accordance with BS EN 10346 : 2015.

Flat strap specification

1.4 54 x 1.6 mm straps conforming to BS EN 10346 : 2015 grade S450 with a GD+Z G275, are used with M12 bolts (see Table 2 for fastener specifications and Figure 1 for strap details).

Table 2 Fastener (bolt) specifications

Nominal size/thread diameter and class of bolts	Standard	Connection
M12 low profile bolt (Class 10.9 into recess boss)	BS EN 1993-1-8 : 2005	stud to track ⁽¹⁾
M12 cuphead bolt (Class 8.8 or higher)		stud to gable rail (recessed)
M12 cuphead bolt (Class 8.8 or higher)		stud to gable rail ⁽¹⁾
M12 bolts (Class 8.8 or higher)		stud to top hat stud to jamb stud

(1) See Figure 2.

Figure 1 Bracing strap connection to Sigmat Track

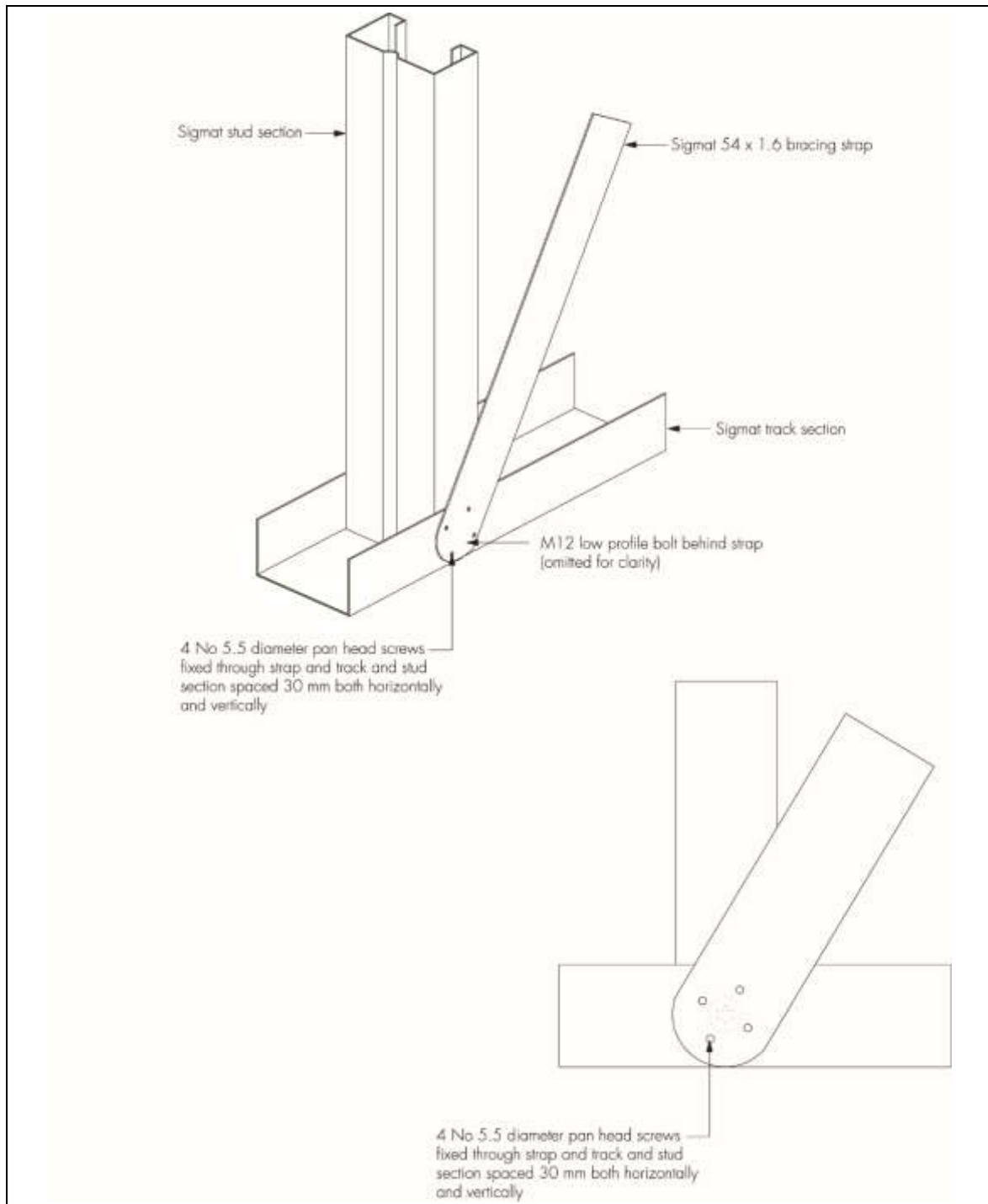
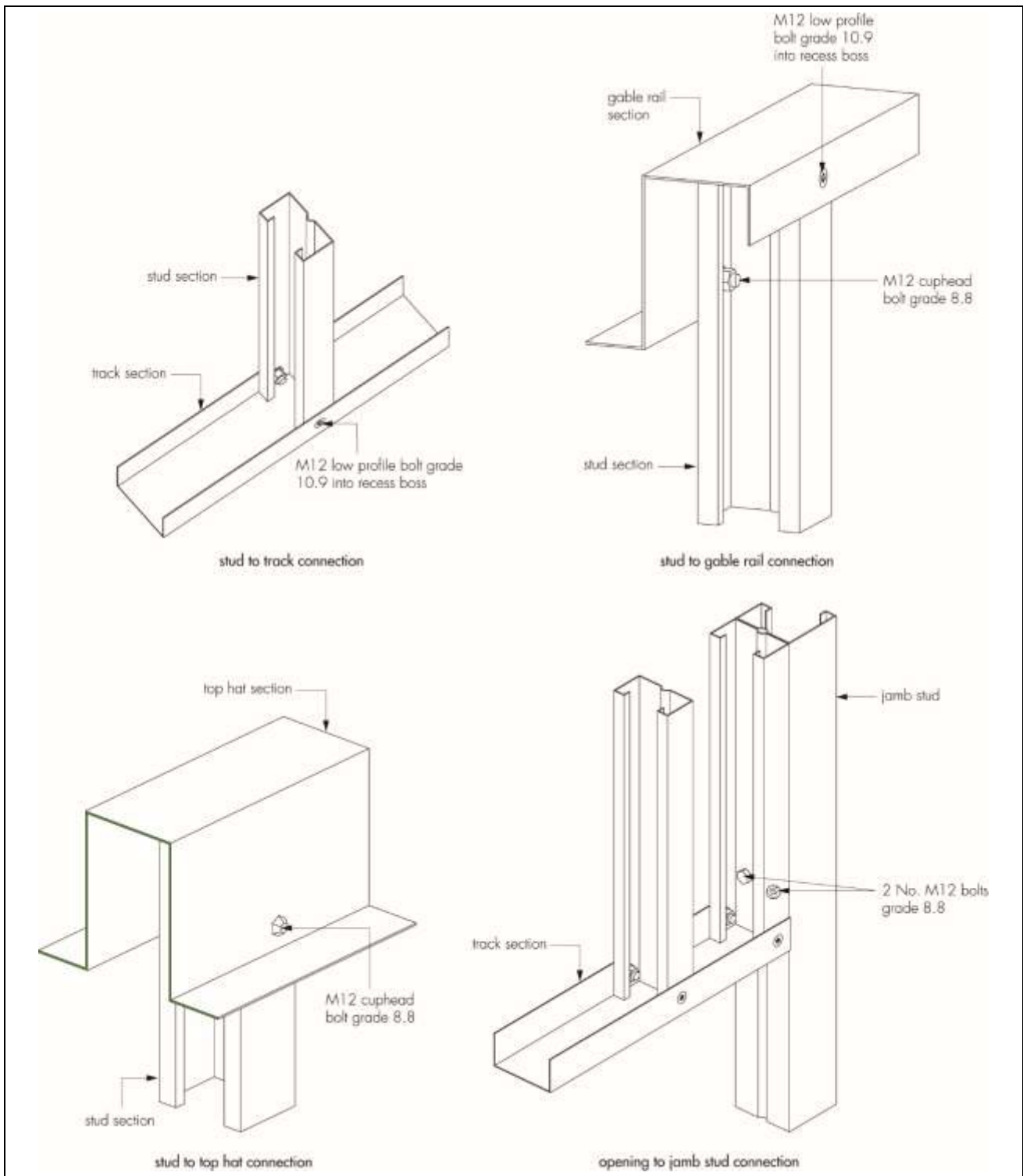


Figure 2 Stud to track, gable rail, top hat and jamb stud connections



1.5 A series of tests and calculations was carried out to determine the characteristic shear and tensile failure load of connections, the results of which are given in Table 3.

Table 3 Characteristic shear and tensile failure for low profile M12 bolt, grade 10.9, Torx 45 drive, obtained from test

Nominal thickness of connection (mm)	Grade of connection	Characteristic shear failure load (kN)	Characteristic tensile failure load (kN)
1.30	S450	11.67	9.45
3.00	S450	41.26	36.92

1.6 Fixings must be suitable for the design, and adequately protected against corrosion. 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.

1.7 Ancillary items for use with the products, but outside the scope of this Certificate, include fire, thermal and sound protection to the finished system.

2 Manufacture

2.1 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.

2.2 The management system of the Certificate holder has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by BSI (Certificate number FS 621480).

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 Sigmat Profiles is 9 m; masses of 9 m length Sigmat Profiles are given in Table 4.

Table 4 Self-weight of Sigmat Profiles

No.	Sigmat Profile	Mass for 9 m length (kg)	No.	Sigmat Profile	Mass for 9 m length (kg)
1	100SW20	47	22	220TR20	51
2	100SW24	56	23	160TH20	84
3	100SW30	69	24	160TH30	125
4	100SN13	26	25	180TH20	90
5	100SN16	32	26	180TH30	134
6	100SN20	40	27	200TH20	96
7	100SJ20	47	28	200TH30	143
8	100SJ24	56	29	160GR20	58
9	100SJ30	69	30	160GR30	87
10	160JW20	56	31	180GR20	61
11	160JW30	83	32	180GR30	91
12	160JN13	32	33	200GR20	64
13	160JN20	49	34	200GR30	96
14	220JN13	38	35	200AC30	65
15	220JN20	59	36	180AC30	65
16	220JW20	65	37	160AC30	65
17	220JW30	97	38	145AC30	65
18	100TR16	26	39	125AC30	48
19	100TR20	32	40	148SA20	32
20	100TR30	47	41	128SA20	32
21	160TR20	42	42	108SA20	32

Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on the Sigmat Profiles.

Design Considerations

4 General

4.1 Sigmat Profiles are loadbearing elements for use in floors, walls and roofs in steel-framed buildings in dry internal conditions and Corrosivity category C1 in accordance with BS EN ISO 14713-1 : 2017. Applications such as sports centres with swimming pools and others with high internal humidity levels are outside the scope of this Certificate (see section 8).

4.2 A suitably qualified 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 be given to the requirements of Approved Document A, including loading, deflection and disproportionate collapse (see section 6).

4.3 This Certificate covers only the loadbearing adequacy of the Sigmat Profiles and their durability. Fire, sound insulation, protection and thermal performance are outside the scope of this Certificate. However, the completed building must be designed and constructed to satisfy all of the relevant requirements of the national Building Regulations.

4.4 The applied bending, tensile and compression stresses to the profiles must not exceed the section resistances specified in section 6 of this Certificate. The profiles are restricted for use up to the maximum number of storeys in accordance with Table 11 of Approved Document A.

4.5 NHBC acceptance of the components, when used as framed, volumetric or modular self-supporting structures, requires compliance with NHBC Standards 2020, Part 6, Chapter 6.10, Section 6.10.3 and the issue of 'Stage 1 – System Certification' and 'Stage 2 – Project Certification'.

4.6 When Sigmat Profiles are used in ground floors, additional corrosion protection measures are required (eg a two-part bitumen-based coating to BS 1070 : 1993, BS 3416 : 1991 or BS 6949 : 1991) or a two-coat asphaltic coating.

4.7 Components and bracing are assembled off site using self-drilling, self-tapping 5.5 mm pan screws.

5 Practicability of installation

The products should only be installed by installers who have been trained and approved by the Certificate holder.

6 Strength and stability



6.1 A suitably qualified and experienced engineer must underwrite the structural design of any buildings. In addition, it is assumed the design engineer will undertake the calculations to the relevant code of practice, including ensuring that:

- the floor and roof imposed loads are in accordance with BS EN 1991-1-1 : 2002 and its UK National Annex
- the wind load is in accordance with BS EN 1991-1-4 : 2005 and its UK National Annex
- the snow loads are in accordance with BS EN 1991-1-3 : 2003 and its UK National Annex
- the applied compression, tension, flexural buckling loads and bending moment to the steel cold-formed profiles do not exceed the values defined in section 6.4
- the section resistances and spans of Sigmat Profiles given in this Certificate are reduced if appropriate fire protection has not been provided in accordance with BS EN 1993-1-2 : 2005 and its UK National Annex
- full consideration is given to Table 11 of Approved Document A in terms of number of storeys to ensure that the building can resist disproportionate collapse in the event of accidental loading. Where required, calculations of the accidental loading design must be in accordance with BS EN 1991-1-7 : 2006 and its UK National Annex using accidental load combination (expression 6.11a and 6.11b) to BS EN 1990 : 2002 and its UK National Annex

- adequate bracing and/or sheathing is provided to prevent horizontal deformation and sway and the racking resistance owing to wind loads evaluated
- the horizontal deflection of the steel cold-formed profiles owing to wind loads is within the acceptable limit of height/300 in accordance with Table NA.2.24 of the UK National Annex to BS EN 1993-1-1 : 2005
- the deflection of the floor beams and lintels under the characteristic load combination owing to variable (imposed) loads are restricted to spans as defined in clause NA.2.23 of the UK National Annex to BS EN 1993-1-1 : 2005, which is summarised in Table 5.

Table 5 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

- the deflection of a single joist does not exceed the values defined in *NHBC Standards 2020*, 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 load: span/350 or 15 mm

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 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 6.

Table 6 Limitation of deflection of joist against 1 kN point load 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

- 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 7 for the number of effective joists.

Table 7 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 meet the UK National Annex to BS EN 1993-1-1 : 2005 and NHBC requirements for static loading, dynamic loadings and imposed UDL (uniformly distributed load) or point loads, are shown in Tables 8 and 9.

Table 8 Example load span table for simply supported joists at 600 mm spacing with maximum 18 mm plywood (ply deck). Deflection limit to meet the UK National Annex to BS EN 1993-1-1 : 2005 (span/360 at mid-span owing to imposed loads) and NHBC requirements for static and dynamic loadings

Section reference	Maximum span					
	Loading – light UDL ⁽¹⁾		Loading – medium UDL ⁽¹⁾		Loading – heavy UDL ⁽¹⁾	
	Permanent	Variable	Permanent	Variable	Permanent	Variable
	kN/m ²	kN/m ²	kN/m ²	kN/m ²	kN/m ²	kN/m ²
	0.8	1.5	1.0	3.0	1.0	5.0
160JN13	3.65		3.04		2.59	
160JN20	4.07		3.50		2.99	
160JW20	4.29		3.76		3.21	
160JW30	4.74		4.29		3.66	
220JN13	4.42		3.91		3.34	
220JN20	4.92		4.48		3.86	
220JW20	5.16		4.70		4.11	
220JW30	5.71		5.20		4.70	

(1) Imposed point loads and required load for moveable partition load have not been included.

Notes

The maximum spans relate to Sigmat Profiles with appropriate fire protection. The maximum spans for unprotected Sigmat Profiles exposed to fire must be reduced according to BS EN 1993-1-2 : 2005.

Table 9 Example load span tables for joists at 600 mm spacing with maximum 18 mm plywood (ply deck) to meet the deflection limit of Span/360 according to the UK National Annex to BS EN 1993-1-1 : 2005 against the imposed point⁽¹⁾ load

Section reference	I _{yy} cm ⁴	kN						
		2.0	2.7	3.0	3.6	4.0	4.5	7.0
		Max span for concentrated loads (m)						
160JN13	149	4.52	3.89	3.69	3.37	3.19	3.01	2.41
160JN20	230	5.60	4.82	4.57	4.18	3.96	3.74	2.99
160JW20	283	6.22	5.36	5.08	4.64	4.40	4.15	3.33
160JW30	422	7.59	6.53	6.20	5.66	5.37	5.06	4.06
220JN13	319	6.61	5.69	5.39	4.92	4.67	4.40	3.53
220JN20	493	8.21	7.06	6.70	6.12	5.80	5.47	4.39
220JW20	595	9.02	7.76	7.36	6.72	6.38	6.01	4.82
220JW30	889	11.02	9.49	9.00	8.21	7.79	7.35	5.89

(1) Self-weight of floors and cold-formed steel profiles have not been included in the load span in Tables 8 and 9.

Notes

The maximum spans relate to Sigmat Profiles with appropriate fire protection. The maximum spans for unprotected Sigmat Profiles exposed to fire must be reduced according to BS EN 1993-1-2 : 2005.

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 (equations 6.10 and 6.14a, or the less favourable equations, 6.10a, 6.10b and 6.14a).

6.4 Section resistance of the profiles in the absence of fire resistance requirements has been verified by the BBA and 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. 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.

Example results of the stud and joist section resistances are given in Tables 10 and 11.

Table 10 Example stud and joist section resistances

Section reference	Design resistance to normal forces of the cross-section for uniform compression $N_{c,Rd}$ kN	Axial flexural buckling design resistance $N_{b,Rd}$ kN	$L_{cr}^{(1)}$ (mm)
100SN13	111.2	34.86	2520
100SN16	156.7	44.59	2520
100SN20	215.5	57.65	2520
100SW20	218.2	82.38	3060
100SW24	289.3	102.20	3060
100SW30	391.9	132.00	3060
100SJ20	215.5	57.65	2520
100SJ24	271	70.92	2520
100SJ30	355.6	91.17	2520
160JN13	104.9	—	—
160JN20	217.1	—	—
160JW20	218.9	—	—
160JW30	417.9	—	—
220JN13	100.9	—	—
220JN20	214.7	—	—
220JW20	215.5	105.72	—
220JW30	422.1	—	—

(1) L_{cr} is the buckling length and relates to axial flexural buckling design resistance ($N_{b,Rd}$)

Table 11 Example design values of $N_{t,Rd}$ (design values of the resistance to tension forces) and $M_{c,Rd}^{(1)}$ (bending moment resistances)

Profile	Section reference	Design values of the resistance to tension forces ($N_{t,Rd}$) kN	Design resistance for bending about one principal axis of a cross-section ($M_{c,Rd}$) kN·m
Channels	100TR16	97.26	—
	100TR20	122.70	—
	100TR30	186.90	—
	160TR20	170.80	—
	220TR20	218.90	—
	125AC30	174.00	—
	145AC30	230.90	—
	160AC30	240.60	—
	180AC30	252.70	—
	200AC30	264.80	—
Angles	108SA20	131.53	—
	128SA20	131.53	—
	148SA20	131.53	—
Gable rail	160GR20	196.76	—
	160GR30	298.08	—
	180GR20	212.80	—
	180GR30	322.30	—
	200GR20	228.83	—
	200GR30	346.52	—
Stud and joist	100SN13	76.80	3.789
	100SN16	95.00	5.153
	100SN20	119.40	6.953
	100SW20	154.70	7.470
	100SW24	186.30	9.788
	100SW30	233.60	12.980
	100SJ20	154.70	6.953
	100SJ24	186.30	8.541
	100SJ30	233.60	10.730
	160JN13	107.70	6.813
	160JN20	167.50	12.490
	160JW20	202.80	13.210
	160JW30	306.30	23.220
	220JN13	138.60	10.230
	220JN20	215.60	18.640
220JW20	250.90	19.530	
220JW30	378.90	34.000	
Top hat	160TH20	270.90	—
	160TH30	409.20	—
	180TH20	302.90	—
	180TH30	457.70	—
	200TH20	335.00	—
	200TH30	506.10	—

(1) The lateral-torsional buckling ($M_{b,Rd}$) is outside the scope of this Certificate.

7 Behaviour in relation to fire



7.1 The Sigmat Profiles, bracing, straps, bolts, screws and brackets are classified as 'non-combustible', in accordance with the national Building Regulations, and are not subject to any restriction on building height or proximity to boundaries.

7.2 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, 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



9.1 Sigmat Profiles grade S450 with a GD+Z G275 coating 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 (see also section 4.1) and covered by appropriate fire protection insulation, and that the building design utilises the warm frame principle by the application of external insulated cladding.

9.2 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.

10 Reuse and recyclability

The steel components of the system 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 components must be installed in accordance with the design and the Certificate holder's documented procedure.

11.3 Members must not be cut or modified on site.

11.4 Where required, diagonal steel bracing is factory fitted to the panels.

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

Technical Investigations

12 Tests

A series of tests was carried out to determine the shear and tensile failure load characteristics of connections for low profile M12 bolt, grade 10.9, Trox 45.

13 Investigations

13.1 An assessment was made of existing data to determine:

- mechanical resistance of profiles
- mechanical resistance of fixings by calculation
- durability.

13.2 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.

13.3 An assessment was made of the practicability of installation.

Bibliography

- BS 1070 : 1993 *Specification for black paint (tar-based)*
- BS 3416 : 1991 *Specification for bitumen-based coatings for cold application, suitable for use in contact with potable water*
- BS 6949 : 1991 *Specification for bitumen-based coatings for cold application, excluding use in contact with potable water*
- BS EN 1090-1 : 2009 + A1 : 2011 *Execution of steel structures and aluminium structures — Requirements for conformity assessment of structural components*
- BS EN 1090-4 : 2018 *Execution of steel structures and aluminium structures Part 4 : Technical requirements for cold-formed structural steel elements and cold-formed structures for roof, ceiling, floor and wall applications*
- BS EN 1990 : 2002 + A1 : 2005 *Eurocode — Basis of structural design*
- NA to BS EN 1990 : 2002 + A1 : 2005 *UK National Annex for Eurocode — Basis of structural design*
- BS EN 1991-1-1 : 2002 *Eurocode 1 : Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
- NA to BS EN 1991-1-1 : 2002 *UK National Annex to Eurocode 1: Actions on structures — General actions — Densities, self-weight, imposed loads for buildings*
- BS EN 1991-1-3 : 2003 + A1 : 2015 *Eurocode 1: Actions on structures — General actions — Snow loads*
- NA to BS EN 1991-1-3 : 2003 + A1 : 2015 *UK National Annex to Eurocode 1: Actions on structures — General actions — Snow loads*
- BS EN 1991-1-4 : 2005 + A1 : 2010 *Eurocode 1 : Actions on structures — General actions — Wind actions*
- NA to BS EN 1991-1-4 : 2005 + A1 : 2010 *UK National Annex to Eurocode 1: Actions on structures — General actions — Wind actions*
- BS EN 1991-1-7 : 2006 + A1 : 2014 *Eurocode 1 : Actions on structures — General actions — Accidental actions*
- NA + A1 : 2014 to BS EN 1991-1-7 : 2006 + A1 : 2014 *UK National Annex to Eurocode 1: Actions on structures — General actions — Accidental actions*
- BS EN 1993-1-1 : 2005 + A1 : 2014 *Eurocode 3 : Design of steel structures — General rules and rules for buildings*
- NA to BS EN 1993-1-1 : 2005 + A1 : 2014 *UK National Annex to Eurocode 3 : Design of steel structures — General rules and rules for buildings*
- BS EN 1993-1-2 : 2005 *Eurocode 3 : Design of steel structures — General rules — Structural fire design*
- NA to BS EN 1993-1-2 : 2005 *UK National Annex to Eurocode 3 : Design of steel structures — General rules — Structural fire design*
- BS EN 1993-1-3 : 2006 *Eurocode 3 : Design of steel structures — General rules — Supplementary rules for cold formed members and sheeting*
- 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*
- BS EN 1993-1-8 : 2005 *Eurocode 3 : Design of steel structures — Design of joints*
- NA to BS EN 1993-1-8 : 2005 *UK National Annex to Eurocode 3: Design of steel structures — Design of joints*
- BS EN 10346 : 2015 *Continuously hot-dip coated steel flat products for cold forming — Technical delivery conditions*
- BS EN ISO 3506-1 : 2009 *Mechanical properties of corrosion-resistant stainless-steel fasteners — Bolts, screws and studs*
- BS EN ISO 3506-2 : 2009 *Mechanical properties of corrosion-resistant stainless-steel fasteners — Nuts*
- BS EN ISO 9001 : 2015 *Quality management systems — Requirements*
- BS EN ISO 14713-1 : 2017 *Zinc coatings — Guidelines and recommendations for the protection against corrosion of iron and steel in structures — General principles of design and corrosion resistance*

14 Conditions

14.1 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.

14.2 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.

14.3 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.

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

14.5 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.

14.6 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.