Ayrshire Steel Framing

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MAY 2003

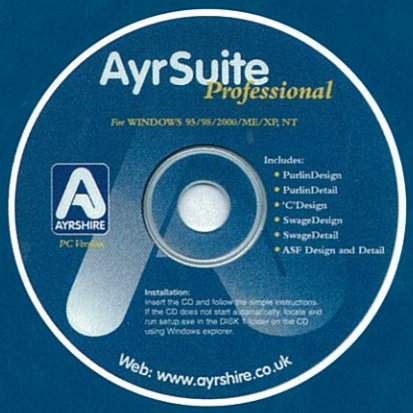
QUALITY ASSURANCE
BS EN ISO 9002 1994
Certificate No. FM 33431

BSI REGISTERED FIRM

NATIONAL ACCREDITATION OF CERTIFICATION BODIES

Lightweight Construction Solutions using
Ayrshire's Load Bearing Steel Stud and Track System

User Manual:
Design and Application
supported by
ASF Design and Detail Software



AYRSHIRE
Ayrshire Steel Framing

The Steel Construction Institute
Member

Introduction to
Ayrshire Steel Framing

Ayrshire Steel Framing is part of Ayrshire Metal Products plc, one of Britain's leading manufacturers of cold formed steel profiles and steel building systems. The company has earned an enviable reputation for innovation and quality, the result of many years experience.

The extensive production facilities at Irvine allow us to manufacture and process cold formed steel sections tailored to the requirements of our customers. Examples include various components used to build truck, bus and railway carriage chassis. Other applications include storage racking, trailers, prefabricated buildings and trench sheeting etc. The huge stock of forming rolls bears testament to our opinion that if it can be roll formed, Ayrshire has made it, is making it, or will make it.

At Irvine we also manufacture a unique range of Ayrshire designed and patented products. These include our load bearing Ayrshire Steel Framing stud and track system and Swagebeam, a high performance range of lightweight structural beams and accessories. The two systems can be combined to produce lightweight structural solutions unequalled from any other source.

Examples of our unique and innovative construction systems are:-

- **AyrHousing** **Prefabricated or site assembled housing.**
- **AyrFrame** **Prefabricated building modules eg hotel bedrooms.**
- **AyrTruss** **Prefabricated lattice beams and trusses.**
- **AyrJoists** **Domestic floor joist system.**

Load bearing structural framing (stud and track) is now a firmly established method of construction which provides users with a viable alternative to the more traditional methods of block and timber. It is our firm recommendation that only specialist subcontractors skilled in the installation of lightweight framing are used. A list of experienced installers is available on request.

- **CS studs are made in any transportable length.**
- **CS studs have service slots along the centre of the web at 600mm centres. The slotted holes are 38mm x 100mm long, except the CS70's where the hole is 25mm x 50mm long.**
- **Light duty and heavy duty track profiles are referenced CR and UR respectively. CR's are 1.2mm thick, UR's are 2.0mm thick. Both types are supplied from stock in 3.0 metre lengths as standard.**
- **Lateral and vertical bracing profiles reference VB3809 and VB10012 supplied from stock in 4.0 metre lengths as standard.**
- **A range of stud end cleats and web stiffeners are available from stock.**

Ayrshire Design Tools
ASF Design & Detail 1.0
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Licensed to Customers of Ayrshire Steel Framing

Job No.		Sheet No. 1/1	Rev
Job Title Sample Panel Project	Part ASF Wall Panel		
	Ref P1		
	By AW	Date 30-10-2002	Chd
Client Ayrshire	File ASF1.sfd	Print Date 06 Dec 2002, 12:56	

Refer to Ayrshire Steel Framing Manual for section properties & applications. Costs are based on the Dec. 2001 price list. The values indicated do not represent an official quotation. Database: UK 1.00

Section Design Report (Single Span Stud) - ID: Stud1

Design Case

Design Geometry		Design Loadings		Load Factors	
Span (m)	3.2	Axial Dead (kN/m)	2	Dead	1.4
Centres (m)	0.6	Axial Service (kN/m)	0.1	Service	1.4
Max. Def. (mm)	L/360=8.9	Axial Imposed (kN/m)	0	Imposed	1.6
		Wind Pressure (kN/m2)	1.2	Wind Pressure	1.4
		Wind Suction (kN/m2)	1.2	Wind Suction	1.4
		Self weight (kg/m)	2.3	Restraining Dead	1
es: Shift in N.A. (mm)	6.329			Dead+Serv.+Wind+Imp.	1.2

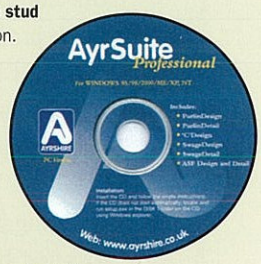
Assumed no torsional lateral restraint.
VB bracing & blocking at mid-height.
Considering lateral buckling about the minor axis between restraints.

Major Axis Load Case	Factored	Working
(including self weight)	(kN)	(kN)
Axial Only: Dead+Service+Imposed	1.865	1.332
Lateral Wind Only	+3.226 / -3.226	+2.304 / -2.304
Combined Dead+Service+Imposed & Wind	Fc: 1.599 Wx: +2.765 / -2.765	
Nominal My = Critical Fc x es	B.S. reference Cl.6.4.2.	

Critical Load Case: Combined: Dead, Service and Wind Pressure

Our **AyrSuite Professional CD ROM**, provides you with the unique opportunity to install individual programs, covering a comprehensive range of Ayrshire products. The disk includes intuitive demos, to help you identify the products of most interest. **ASF Design and Detail** is the new program to use in conjunction with this manual, and Ayrshire Steel Framing in general.

One can quickly, and accurately identify the **most cost effective stud size**, for a specific load bearing wall, floor or roof joist application. An infinite range of load cases is possible, for both laterally restrained and unrestrained conditions. The programme includes Ayrshire's unique **wind and snow load analysis** software, to BS6399 (Part 2) - including the latest amendments: March 2002. The user can design, draught and detail complete **panels**, including openings, together with individual stud and joist components.



The software will automatically generate panel and component drawings with **priced bills of materials** for loose section, simply and quickly.

Hard copies of design reports, panel drawings, individual stud drawings and pricing, are available at the touch of a button. It is the **complete** package for the design professional.

We have experienced Ayrshire and independent structural engineers available to ensure that specific applications are structurally endorsed.

The manual provides technical information with clear illustrations to ensure that our structural framing solutions are used effectively and economically. The standard range of stud and track sizes are shown on page 11.

Ultimate Performance

High Yield Steel Grade 'S390' enables the load carrying capacity of our system to be fully maximized. The careful application of this manual, ASF Design and Detail software and the associated literature will lead to the design of highly efficient and competitive building solutions.

The following pages demonstrate the extreme flexibility of our system and its ability to adapt itself to the needs of a changing and developing marketplace.

Rapid Dry Envelope Construction

Ayrshire Steel Framing has been instrumental in successfully introducing load bearing steel stud wall solutions to the construction market. High performance, prefabrication, speed and reduced weight are just some of the advantages over traditional timber and masonry options.

For example, there are solutions for the inner-leaf on external walls that allow the structure to be made watertight quickly (a rapid dry envelope). The external leaf of brick, rainscreen, insulated render, or other proprietary cladding, follows off the critical path. Acting as integral wind posts that support the lateral load from the external skin, the studs also provide a zone for a high degree of insulation.

We are able to provide technical support, through an experienced team of sales and engineering staff. This, added to continued development, such as our excellent ASF Design and Detail software package, ensures we remain market leaders.

In situ Construction

Loose Stud and Track Sections and Prefabricated Panels

Ayrshire Steel Framing has made significant gains in areas of construction, particularly structural walls and floors which have traditionally been built using masonry and timber.

Our comprehensive range of load bearing stud and track profiles cover most requirements. The tables featured in this manual can be used as a guide to identifying a suitable stud size for a given load or span condition.

Creating a rapid dry envelope around a new or existing building is a typical application for our stud wall solutions. Traditional methods of wall construction, particularly masonry, are increasingly unable to match the demands placed on them. In cavity wall construction our system is used to quickly build the inner leaf and make it watertight before completing the outer leaf. The stud wall created will support the internal dry wall lining eg. plasterboard, plus insulation and an exterior cladding or render system. The steel is transported

to site either as individual components banded together in bundles or as prefabricated panels. Site conditions will dictate which is appropriate. Individual studs are supplied cut to length and track sections are supplied in 3.0 metre lengths as standard. Refer to pages 15 & 16 for typical wall configurations. Steel connections are usually made on site using self drill self tapping screws, although alternatives such as riveting and welding can be considered. Connections to concrete are normally made using plug and screw fixings.

Prefabrication is an increasingly viable alternative to shipping loose section. This is where the wall panels and/or floor panels are manufactured under factory conditions and delivered to site ready to be dropped in place. This significantly reduces the build program and introduces factory standards of quality and efficiency to the site. Ayrshire has developed the skills and equipment at it's Irvine site to match the demands of our customers for a fast and trouble free supply of prefabricated panels. These consist of a framework of our steel framing profiles welded into made to measure panels designed to include openings for windows, doors etc. We ensure the integrity of every galvanised steel panel by preparing and painting the welded joints to protect them from corrosion.

Whatever your building requirements, we are confident Ayrshire Steel Framing can provide an effective and economic solution.

AyrFrame

Prefabricated Building Modules

AyrFrame is a unique lightweight high strength modular steel building system for fast track construction projects including multi-rise applications. The individual rooms are delivered to site fully fitted out for immediate positioning. Our system is particularly appropriate for repetitive cellular buildings such as hotels, nursing homes and apartment buildings. Prefabricated wall, floor and ceiling panels are used in areas of the structure which cannot be built using AyrFrame technology.

Applying an AyrFrame solution instead of more traditional building methods can reduce the construction period by typically 35% resulting in significant cost savings. Other benefits include factory standards of quality and the early generation of revenue. The modules also provide excellent performance with regards to fire resistance, acoustic and insulation properties.

AyrFrame modules have been used for major hotel and student accomodation contracts throughout the UK.

Further details available on request.

AyrHousing

In situ or Factory Built Housing

Ayrshire has assumed a leading role in the development of steel framed housing in the UK and further afield. Our galvanised steel house kits are supplied either as a totally prefabricated system or as individual profiles to be stick built on site. Alternatively a mix of prefabrication and loose section can be employed. Whichever solution is applied the net result is reduced build time and high standards of quality at a competitive price. The performance in relation to fire resistance, acoustics, insulation and low running costs set new standards for the building industry.

Projects to-date include private, local authority and co-operative housing consisting of flats, detached and semi-detached houses.

Further details available on request.

AyrTruss

Lattice Beams and Roof Trusses

AyrTruss can be used as an alternative to heavy hot rolled steel roof trusses and lattice beams. Various standard and special configurations are possible by exploiting the versatility and excellent strength to weight ratio of the product. Significant weight and cost savings are possible. Depending on the loads applied it is possible for our fully welded lattice beams to achieve long spans within the approximate depth range 400mm to 1200mm.

For example AyrTruss is the ideal alternative for buildings with restricted access or for roof top extensions and refurbishment where the self weight of our truss or lattice beams will reduce the load on the existing structure and foundations. In housing, AyrTruss lightweight trusses can be easily configured to help create an additional living area within the attic space.

In all cases the protection provided by the standard galvanised coating produces a long lasting and durable finish.

Further details available on request.

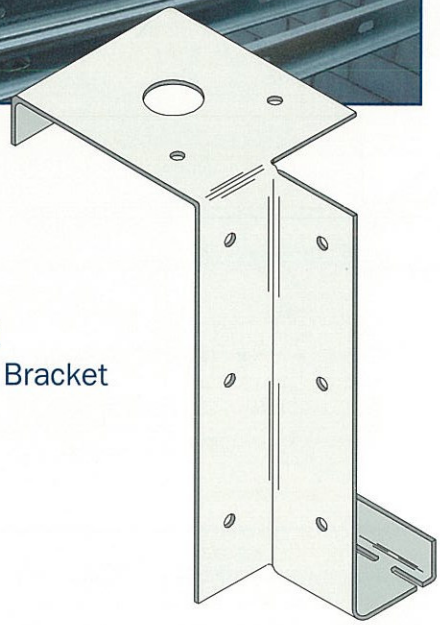
AyrJoist

Hanger Joist System for Suspended Domestic Floors

Looking for a lightweight high performance alternative to timber floor joists? Ayrshire has the answer with its specially designed AyrJoist system of cold formed steel beams and hanger brackets.

The inherent problems associated with timber floor joists found prior to, during and following construction are well documented elsewhere. AyrJoists are not subject to the negative aspects of timber and are the ideal alternative at any floor level.

Our joists are made in a strictly controlled factory environment to provide a high quality product. They are delivered in any precut length complete with service slots at regular intervals along the joist to facilitate the quick installation of electrical and plumbing runs.



AyrJoist
Hanger Bracket

Specially designed hanger brackets allow for fast on-site fixing to either traditional brick, block or timber walls. The brackets are normally screw fixed to our joists on site. AyrJoists can support any of the flooring systems currently available. Accessories such as service hole grommets and fixing screws are available on request.

'C' section in shape, our joists are supplied in various gauges and typically 200mm or 250mm deep by 44mm wide. For detailed dimensions and physical properties refer to profiles prefixed 'CS200' and 'CS250' on pages 13 & 14.

The high strength to weight ratio of our AyrJoists is the result of combining the cold roll forming process with high yield steel. Pre-galvanised steel is used to give high durability and maintenance free service for the life span of the floor.

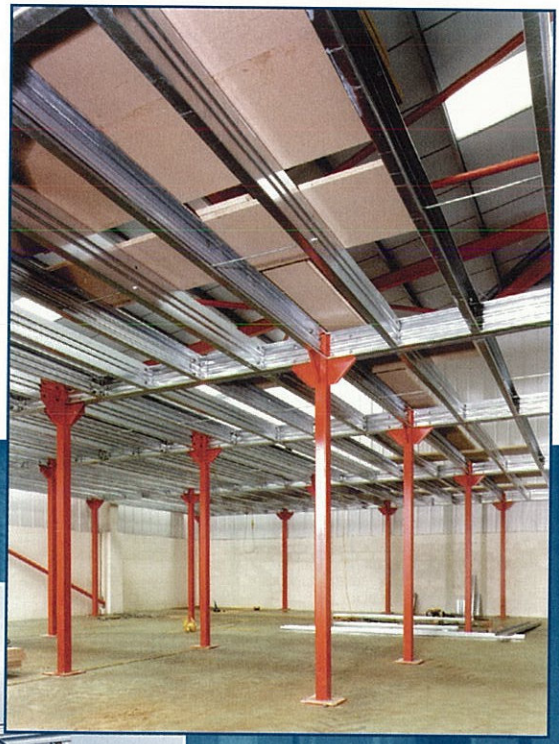
Further details including load capacity available on request.

SwageBeam

Heavy Duty Bolted Construction Systems

SwageBeam is a comprehensive system of cold formed structural beams and accessories unique to Ayrshire. It is a heavy duty bolted system which can be used to bolster the various steel framing solutions shown in this manual. There are particular applications including the Ayrshire mezzanine floor and portal framed building systems, where we have taken the base product and engineered advanced lightweight steel framed solutions. These replace hot rolled steel or timber alternatives. Our SwageDesign and SwageDetail software is available by asking for a copy of our **AyrSuite Professional CD Rom.** This will allow you to comprehensively design, detail, quantify and price your optimum SwageBeam requirements.

The range of available beam sizes is 220, 250, and 300mm deep and includes options from 1.2 to 3.0mm thick. The modern high speed production process includes cutting each beam to length and punching web and flange holes as specified. The use of pre-galvanised high yield steel ensures maximum strength and durability.



Our extensive customer base is testament to our ability to provide a technically competent and competitively priced product range.

Further details available on request.

Ayrshire

Construction Solutions

Advice on high performance structural drywall construction solutions is available free on request for:

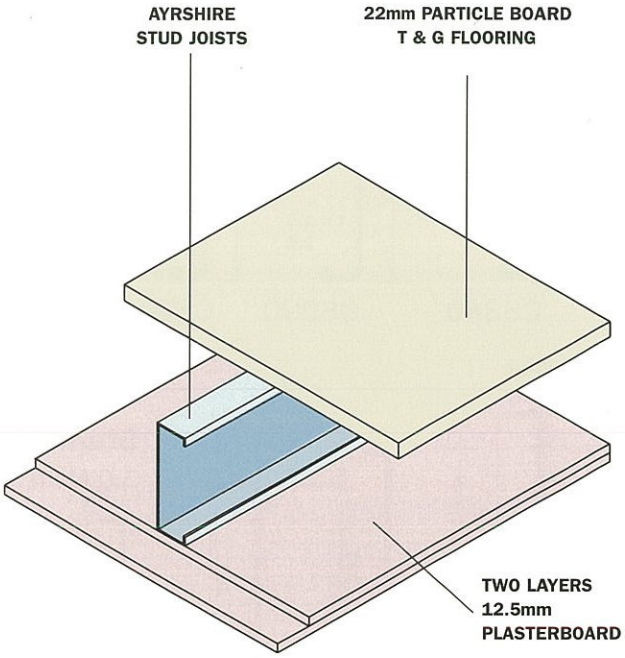
- Load bearing partitions
- Load bearing party walls
- Rapid dry envelope systems
- Mezzanine floors
- Domestic separating floors
- Non-load bearing division walls in industrial buildings
- Separating floors for AyrFrame hotel bedroom modules

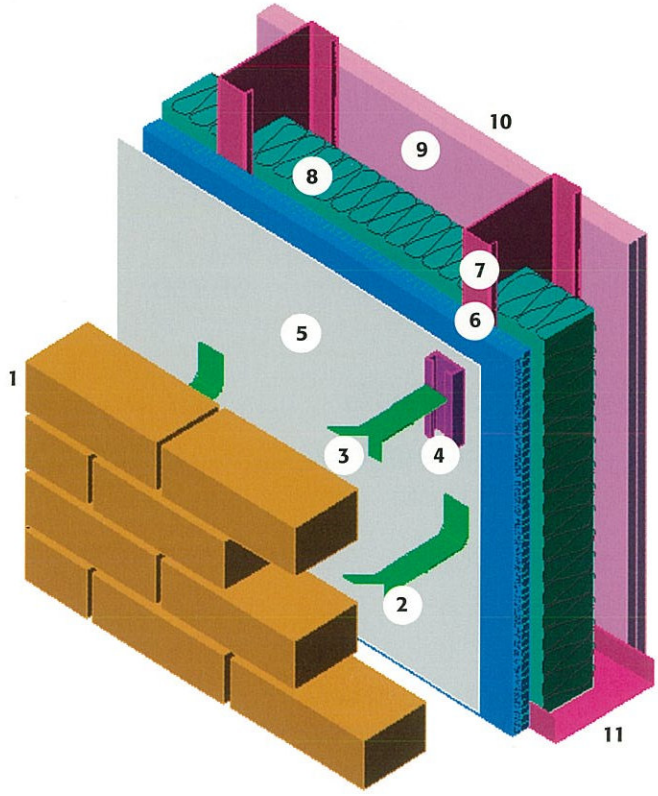
For each of the above applications, various lightweight construction options can be recommended. The required thermal insulation, sound and fire resistance can be addressed, and the overall thickness indicated.

Acoustic, and loaded fire test programmes by most major suppliers of plasterboard have resulted in a wide variety of test data and certificates from government approved laboratories.

"U" factor calculations, and condensation risk analysis, utilising a range of insulation products, are also available.

There is an Ayrshire Steel Framing solution to complement the many different types of cladding options and combinations of construction materials currently available. The drawings opposite are indicative examples of simple wall and floor applications.





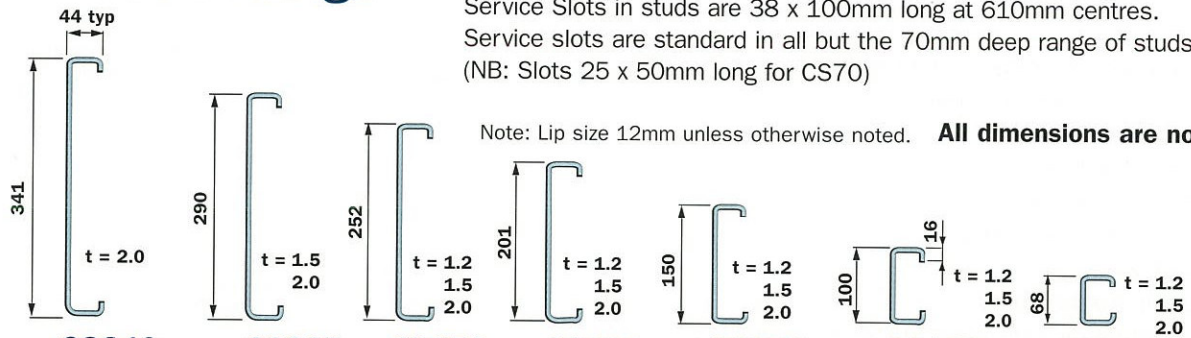
1 Brickwork
2 Stainless steel brick ties (frame cramps), or:
3 Twist in ties, with:-
4 Stainless steel brick tie track fixed with self-drill self-tapping screws, through the board to the studs.
5 Waterproof, vapour permeable, membrane.
6 Thermal sheathing board.
7 Galvanised Ayrshire Steel Framing CS stud.
8 Mineral fibre insulation to suit fire, thermal and acoustic requirements.
9 Plasterboard including vapour barrier.
10 Plasterboard to fire and acoustic requirements
11 CR Base Track

Ayrshire Steel Stud and Channel Track Sections

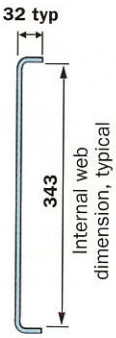
Section Range

Stud Joists (Any Transportable Length)
Service Slots in studs are 38 x 100mm long at 610mm centres.
Service slots are standard in all but the 70mm deep range of studs.
(NB: Slots 25 x 50mm long for CS70)

Note: Lip size 12mm unless otherwise noted. **All dimensions are nominal and in mm**

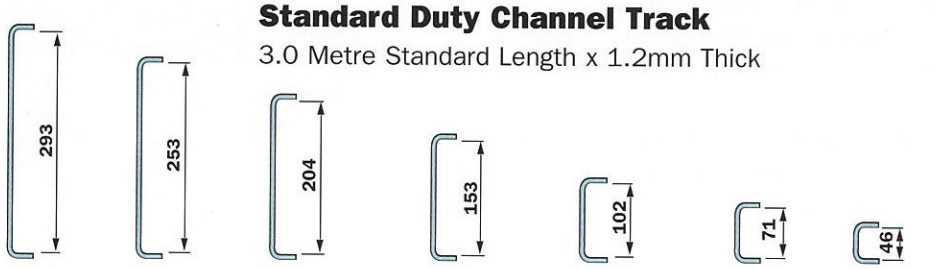


CS340 CS290 CS250 CS200 CS150 CS100 CS70

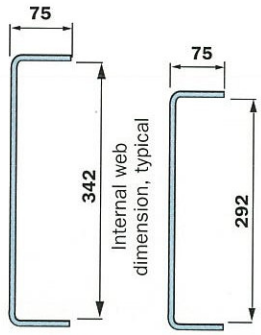


Standard Duty Channel Track

3.0 Metre Standard Length x 1.2mm Thick



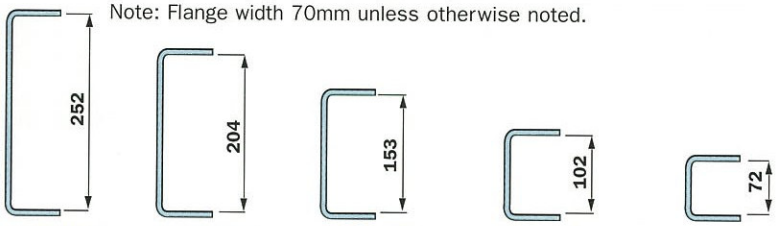
CR340 CR290 CR250 CR200 CR150 CR100 CR70 CR45



Heavy Duty Channel Track

3.0 Metre Standard Length x 2.0mm Thick

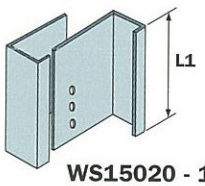
Note: Flange width 70mm unless otherwise noted.



UR340 UR290 UR250 UR200 UR150 UR100 UR70

Accessories

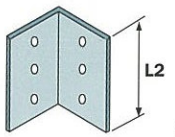
Web Stiffeners
(2mm Thick)



L1

WS15020 - 146mm
WS20020 - 197mm
WS25020 - 248mm
WS29020 - 286mm
WS34020 - 336mm

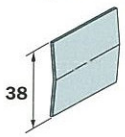
End Cleats
(2mm Thick)



L2

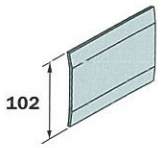
EC7020 - 60mm
EC10020 - 90mm
EC15020 - 140mm
EC20020 - 190mm
EC25020 - 240mm

Lateral Bracing
(0.9mm Thick)



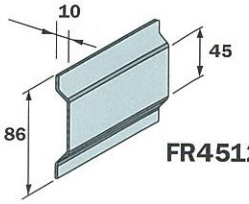
VB3809
(4.0 Metre Standard Length)

Cross Bracing
(1.2mm Thick)



VB10012
(4.0 Metre Standard Length)

Furring Runners
(1.2mm Thick)

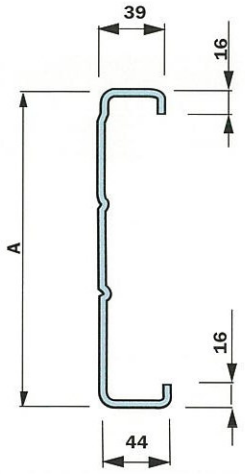


FR4512

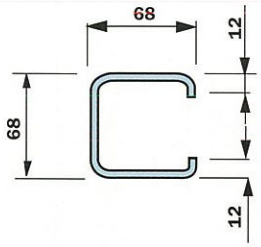
Special Sections

1.2mm, 1.5mm & 2.0mm Thick

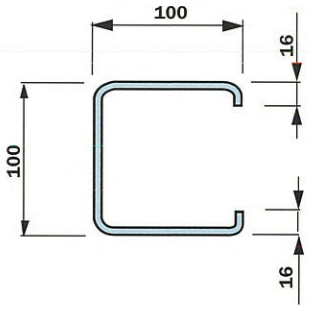
All dimensions are nominal and in mm.



SECTION	DIM A
SJ340	341
SJ290	290
SJ205	201
SJ150	150
SJ100	100
SJ70 no swages	68



SQ70



SQ100

The above sections are available to special order and minimum batch quantity with extended delivery. An extensive range of other profiles is also available.

Material Specification

The Ayrshire Steel Framing range of CS, CR and UR profiles and accessories are manufactured from 'S390' galvanised steel.

BS EN 10147 is the standard code of practice for the specification of hot dipped zinc coated steel strip for cold formed sections.

Whilst this code does not explicitly carry a standard specification for 'S390' material, an appropriate technical description can be calculated that complies with the principles given in Table 1 of this code.

These structural parameters are defined as follows:

Yield strength R_{eH} = 390 N/mm^2 guaranteed minimum value
Tensile strength R_m = 468 N/mm^2 minimum value
(i.e. 1.2 Yield strength in accordance with the design code BS5950: Part 5:1998)

Elongation A_{80} = 14%

All other technical delivery conditions for the coating, surface finish, quality and treatment, as defined in BS EN 10147 are satisfied. Hence the material reference is 'S390GD+Z275'-N-A-C zinc coated steel, with a minimum guaranteed yield strength of 390 N/mm^2.

Ayrshire Steel Stud and Channel Track Sections

Section Properties - Ayrshire Steel Stud and Track Sections

Section Reference	Mass (kg/m)	t (mm)	D (mm)	B (mm)	b (mm)	Area (mm^2)	Cy (mm)	Ixx (cm^4)
CS7012	1.55	1.20	68	44	12	195.30	16.40	15.17
CS7015	1.94	1.50	68	44	12	244.10	16.40	18.78
CS7020	2.57	2.00	68	44	12	323.60	16.40	24.48
CR7012	1.21	1.20	73	32	0	151.70	8.10	12.45
UR7020	3.24	2.00	76	70	0	407.50	23.80	42.61
CS10012	1.92	1.20	100	44	16	241.30	15.00	37.96
CS10015	2.40	1.50	100	44	16	302.10	15.00	47.18
CS10020	3.19	2.00	100	44	16	401.60	15.00	61.93
CR10012	1.49	1.20	104	32	0	187.30	6.60	28.66
UR10020	3.71	2.00	106	70	0	466.00	20.90	89.43
CS15012	2.30	1.20	150	44	12	289.60	11.30	95.01
CS15015	2.89	1.50	150	44	12	363.00	11.30	118.40
CS15020	3.84	2.00	150	44	12	483.50	11.30	156.00
CR15012	1.96	1.20	155	32	0	246.00	5.20	75.73
UR15020	4.50	2.00	157	70	0	565.40	17.40	218.60
CS20012	2.77	1.20	201	44	12	348.20	9.50	191.80
CS20015	3.47	1.50	201	44	12	437.00	9.50	239.30
CS20020	4.63	2.00	201	44	12	582.90	9.50	316.40
CR20012	2.42	1.20	206	32	0	304.60	4.30	154.80
UR20020	5.29	2.00	208	70	0	664.90	14.90	421.20
CS25012	3.24	1.20	252	44	12	406.90	8.20	333.80
CS25015	4.06	1.50	252	44	12	510.90	8.20	417.10
CS25020	5.43	2.00	252	44	12	682.40	8.30	552.50
CR25012	2.88	1.20	256	32	0	362.10	3.70	270.70
UR25020	6.04	2.00	256	70	0	758.54	13.22	690.79
CS29015	4.50	1.50	290	44	12	566.00	7.50	592.20
CS29020	6.01	2.00	290	44	12	756.50	7.60	785.50
CR29012	3.24	1.20	295	32	0	407.00	3.40	392.20
UR29020	6.81	2.00	296	75	0	856.00	13.50	1024.00
CS34020	6.81	2.00	341	44	12	855.90	6.80	1185.00
CR34012	3.70	1.20	346	32	0	465.60	3.00	598.30
UR34020	7.58	2.00	346	75	0	953.50	12.20	1498.00

General Notes:

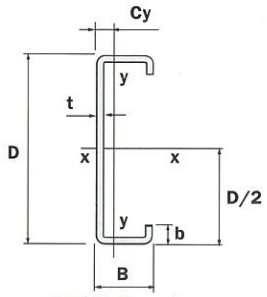
- Physical properties are calculated using the nominal base steel thickness (excludes galvanised coating) in accordance with BS5950:Part 5:1998
- Section properties are for single profiles
- 'C' Stud profiles referenced CS
- Standard duty track profiles referenced CR
- Heavy duty track profiles referenced UR
- Reference Code Example **CS10020:** **CS** = 'C' Stud **100** = depth of stud **20** = 2.0mm thick
- All dimensions are nominal

Section Properties

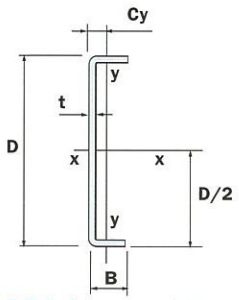
Steel Grade 'S390GD+Z275'-N-A-C zinc coated steel

Section Properties - Ayrshire Steel Stud and Track Sections

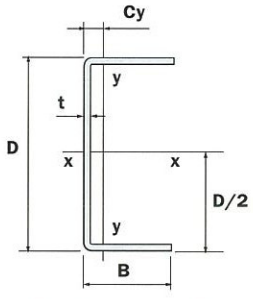
Zxx (cm^3)	rxx (cm)	Iyy (cm^4)	Zyy (cm^3)	ryy (cm)	Q	es (mm)	Section Reference
4.47	2.79	5.33	1.93	1.65	0.88	1.60	CS7012
5.53	2.77	6.55	2.38	1.64	0.96	0.60	CS7015
7.21	2.75	8.44	3.06	1.62	1.00	0.10	CS7020
3.41	2.87	1.53	0.64	1.00	0.62	3.21	CR7012
11.22	3.23	21.55	4.67	2.30	0.69	13.63	UR7020
7.60	3.97	6.88	2.37	1.69	0.76	3.90	CS10012
9.44	3.95	8.47	2.93	1.67	0.84	2.70	CS10015
12.39	3.93	10.95	3.78	1.65	0.93	1.10	CS10020
5.52	3.91	1.69	0.66	0.95	0.48	2.72	CR10012
16.88	4.38	24.21	4.93	2.28	0.61	11.81	UR10020
12.67	5.73	6.93	2.12	1.55	0.61	6.30	CS15012
15.79	5.71	8.52	2.61	1.53	0.67	5.10	CS15015
20.81	5.68	10.99	3.37	1.51	0.75	3.40	CS15020
9.77	5.55	1.85	0.69	0.87	0.38	1.35	CR15012
27.85	6.22	27.47	5.22	2.20	0.48	9.64	UR15020
19.08	7.42	7.49	2.17	1.47	0.51	7.90	CS20012
23.82	7.40	9.21	2.67	1.45	0.56	6.80	CS20015
31.49	7.37	11.87	3.45	1.43	0.63	5.10	CS20020
15.03	7.13	1.95	0.71	0.80	0.31	0.54	CR20012
40.51	7.96	29.75	5.40	2.12	0.39	8.62	UR20020
26.50	9.06	7.88	2.21	1.39	0.44	9.00	CS25012
33.11	9.04	9.70	2.71	1.38	0.49	7.90	CS25015
43.86	9.00	12.50	3.51	1.35	0.54	6.20	CS25020
21.15	8.65	2.02	0.71	0.75	0.27	0.01	CR25012
53.98	9.54	31.35	5.52	2.03	0.32	7.07	UR25020
40.85	10.23	9.98	2.74	1.33	0.44	8.50	CS29015
54.18	10.19	12.86	3.54	1.30	0.49	6.80	CS29020
26.59	9.82	2.06	0.72	0.71	0.24	0.45	CR29012
69.18	10.94	39.37	6.40	2.15	0.32	7.23	UR29020
69.51	11.77	13.25	3.57	1.24	0.44	7.40	CS34020
34.59	11.34	2.10	0.73	0.67	0.21	0.60	CR34012
86.58	12.53	40.74	6.49	2.07	0.29	6.09	UR34020



'CS' Stud



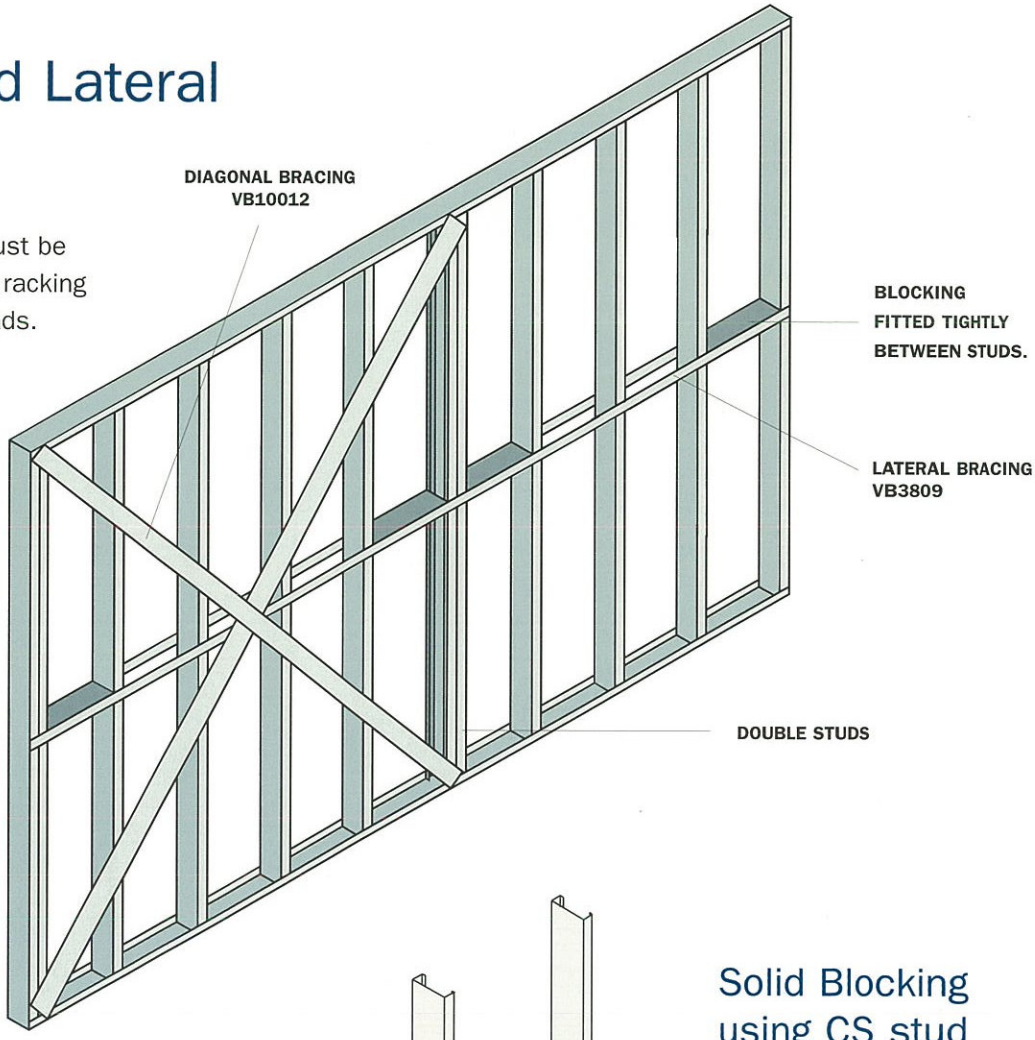
'CR' Channel Track



'UR' Channel Track

Bracing

Diagonal and Lateral



All load bearing structures must be adequately braced to prevent racking movement under imposed loads.

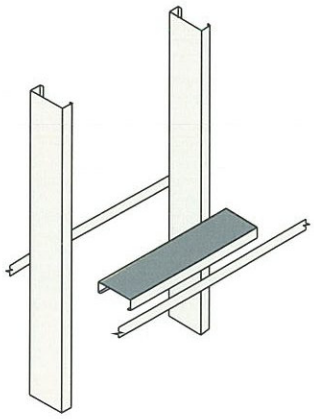
Under severe load conditions which may be applied through high wind or seismic forces the diagonal bracing maybe required to both sides of the stud frame. Additional details are available on request.

Flat strap diagonal bracing is positioned at the corners of all frames where the greatest loads are applied and adjacent to large openings. The diagonal bracing is referenced VB10012

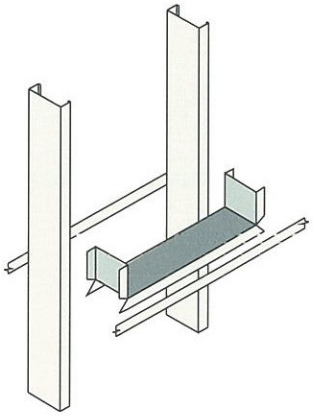
Flat strap lateral bracing is fixed to both sides of the wall frames at horizontal centres as required by the structural designer. The lateral bracing is referenced VB3809.

Solid blocking is placed at each end of wall and adjacent to wall openings and at maximum 2400mm centres.

The illustrations show two methods of solid blocking using either a short length of CS stud cut to fit snugly between the wall studs and held in position by the lateral bracing, or for heavier load conditions, a short length of CR runner cut and fixed through the return flanges.



Solid Blocking using CS stud



Solid blocking using CR runner

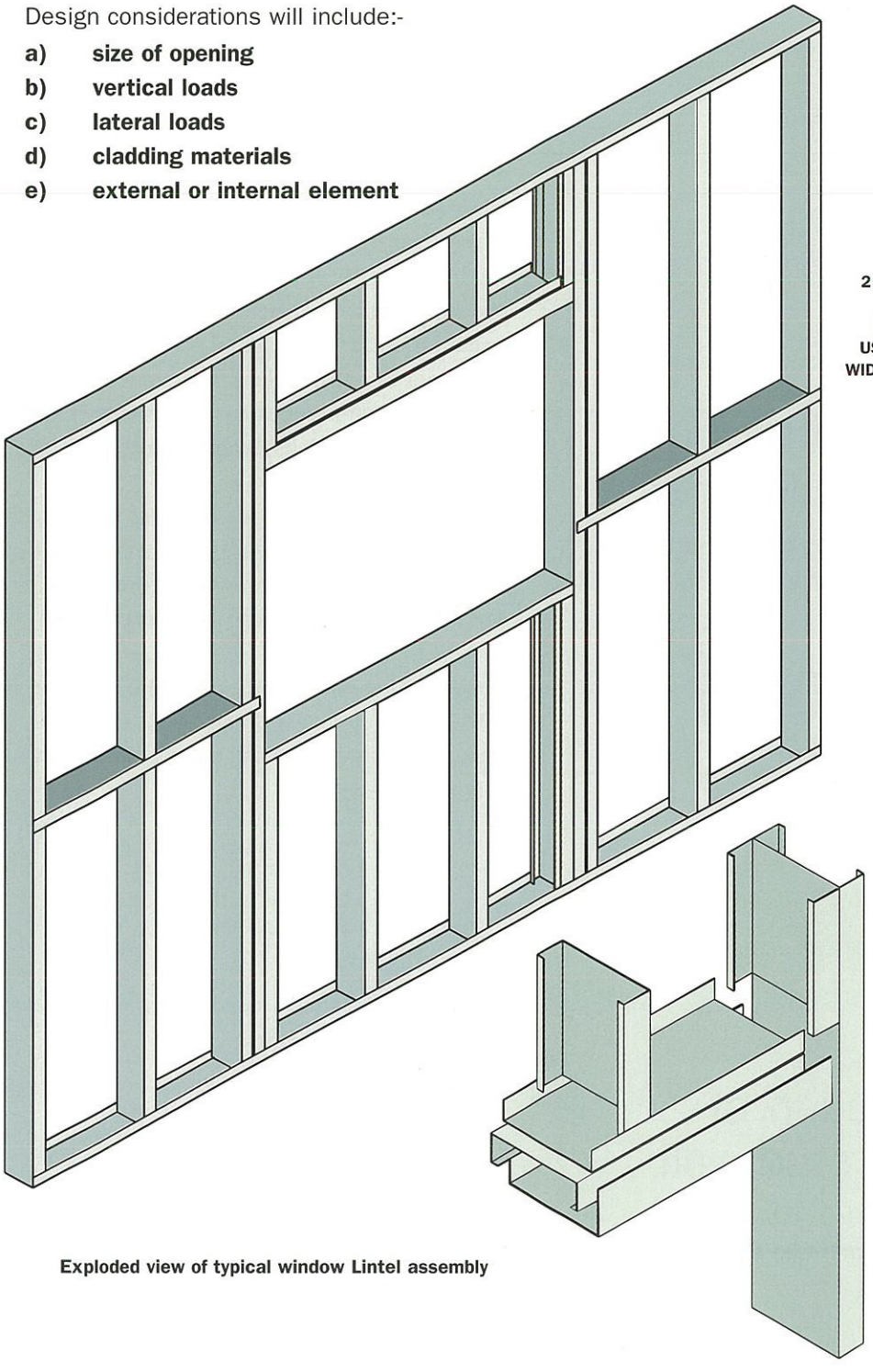
Lintels

Openings in load bearing stud walls

Lintels and headers can be constructed in a variety of ways to cope with different structural criteria. The illustrations demonstrate how lintels can be assembled using a combination of Joists and Channel Runners.

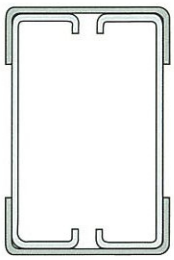
Design considerations will include:-

a) size of opening
b) vertical loads
c) lateral loads
d) cladding materials
e) external or internal element



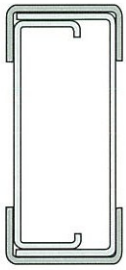
Exploded view of typical window Lintel assembly

BOXED LINTEL FROM 2 NO. JOISTS AND 2 NO. CHANNEL RUNNERS



BOXED LINTEL FROM 1 NO. JOIST AND 1 NO. DEEP UR RUNNER WITH 2 NO. CHANNEL RUNNERS.

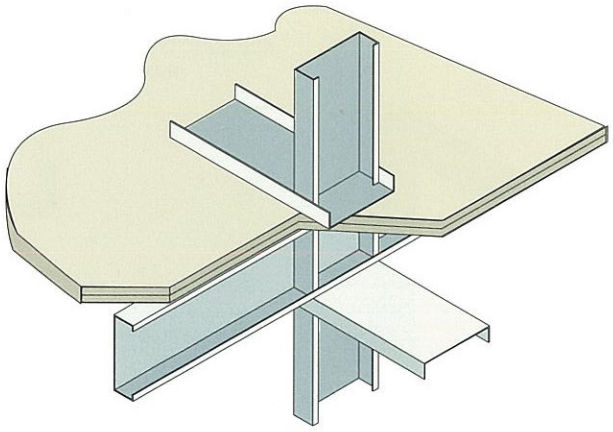
(THIS CONFIGURATION IS USED FOR STUD WALLS OF WIDTHS LESS THAN 100MM, I.E. TYPICALLY 70MM)



Floors

Joist web stiffening over load bearing wall

Floor joists must align directly over wall frame and be supported with web stiffeners.



Web stiffening provides added reinforcing for joists under concentrated loads or reactions at points of bearing. Stiffening increases load carrying capacity by preventing web crippling. A stiffener is also required at points of reaction or concentrated load when the centre of a web punchout is less than 300mm from the edge of bearing.

The ASF Web Stiffener consists of two identical steel sections which, when mated and screw attached to the joist web, enable the ASF steel joists to carry maximum allowable loads as shown in the Load Tables.

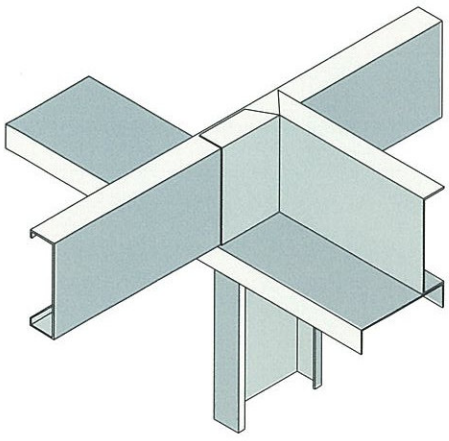
The ASF joists must bear directly over the wall frame studs for maximum load bearing efficiency. If alignment is not possible, then various types of spreader angles must be incorporated - please contact the Technical Department for advice.

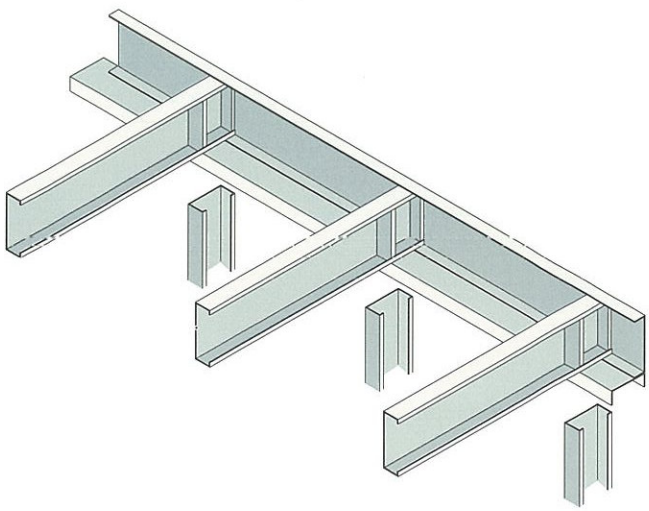
The floor decking provides restraint to the top flanges. The bottom flanges are restrained by lateral bracing straps fixed at maximum 2400mm centres and solid blocking every fourth row.

Floor Decking can be particle board, but preferably T & G plywood screwed directly to the steel joists with self-drilling self-tapping screws with countersunk heads.

Solid Blocking between joists using CR Runner

Solid blocking is required every fourth row using a short length of joist closure channel as shown below.





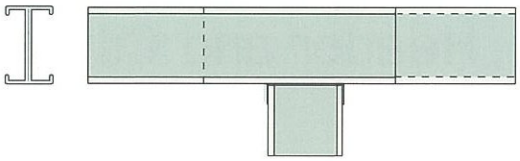
Joist intersection at load bearing stud wall

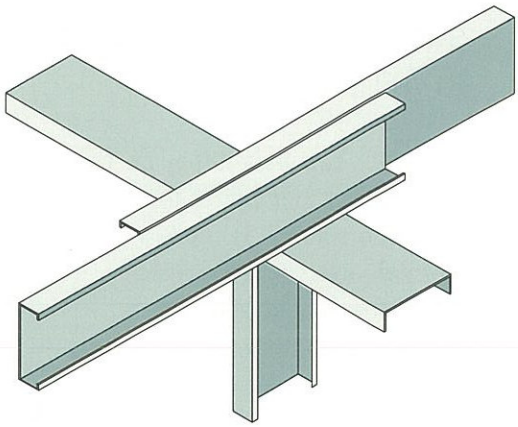
Floor joists must align directly over wall frame studs and be supported with web stiffeners.

Floors

Continuous span - lapped connection over interior load bearing stud wall or beam

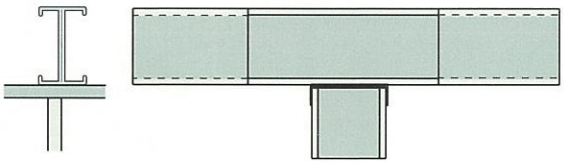
As a rule-of-thumb guide the overlap should be a minimum of 300mm, or 0.1 x length of the span, either side of the load bearing wall.

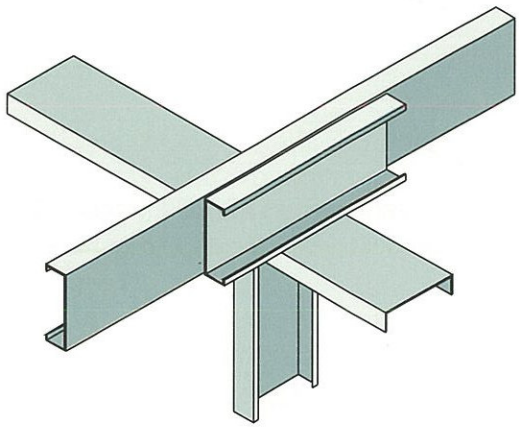




Continuous span - joist reinforcement over load bearing stud wall or beam

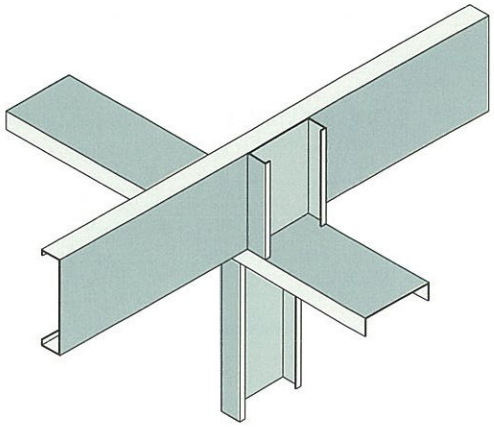
The criteria determining the length of the joist reinforcement will be the same as for the overlap condition shown above.





Joist reinforcement over load bearing wall

This joist is reinforced using a short length of wall stud screwed to the back of the joist. The recommended method is always to use a web stiffener.

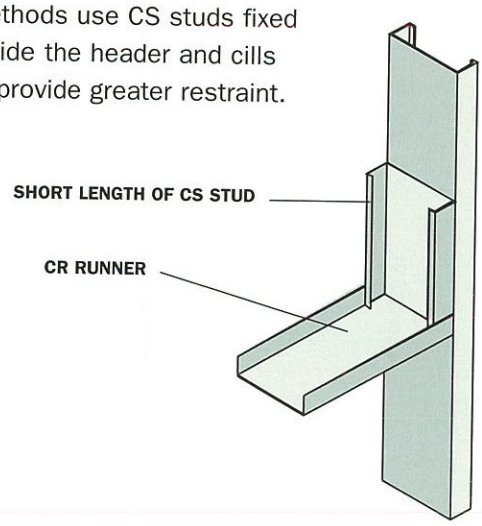


Openings

Header and Cill Members

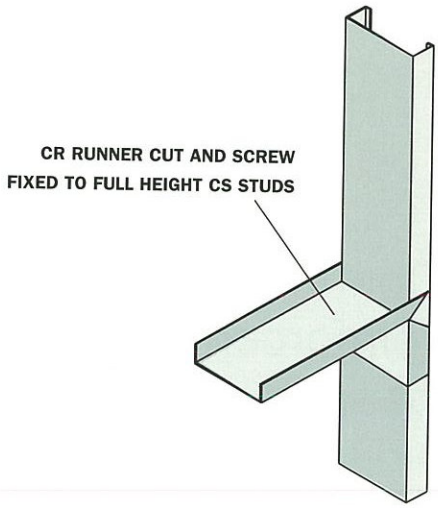
Header or Cill member attached to short length of CS stud screw-fixed to full height stud.

For larger openings it may be necessary to use a much stiffer member at the head and cill, in which case one solution is a deep UR runner. Alternative methods use CS studs fixed inside the header and cills to provide greater restraint.

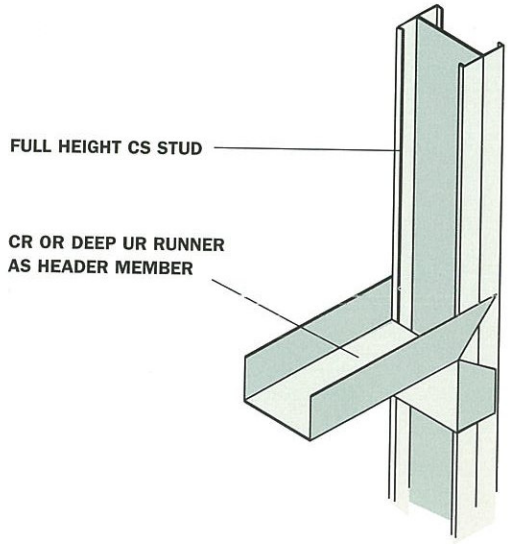


Header and Cill member attached by cutting flanges at 45 degrees and screw-attaching to full height stud.

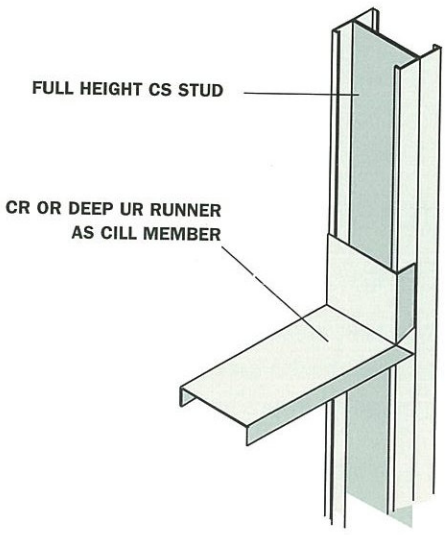
This method of attachment is used in areas subjected to high wind loads.



Larger openings may also require CS studs to be fitted back to back as shown here.

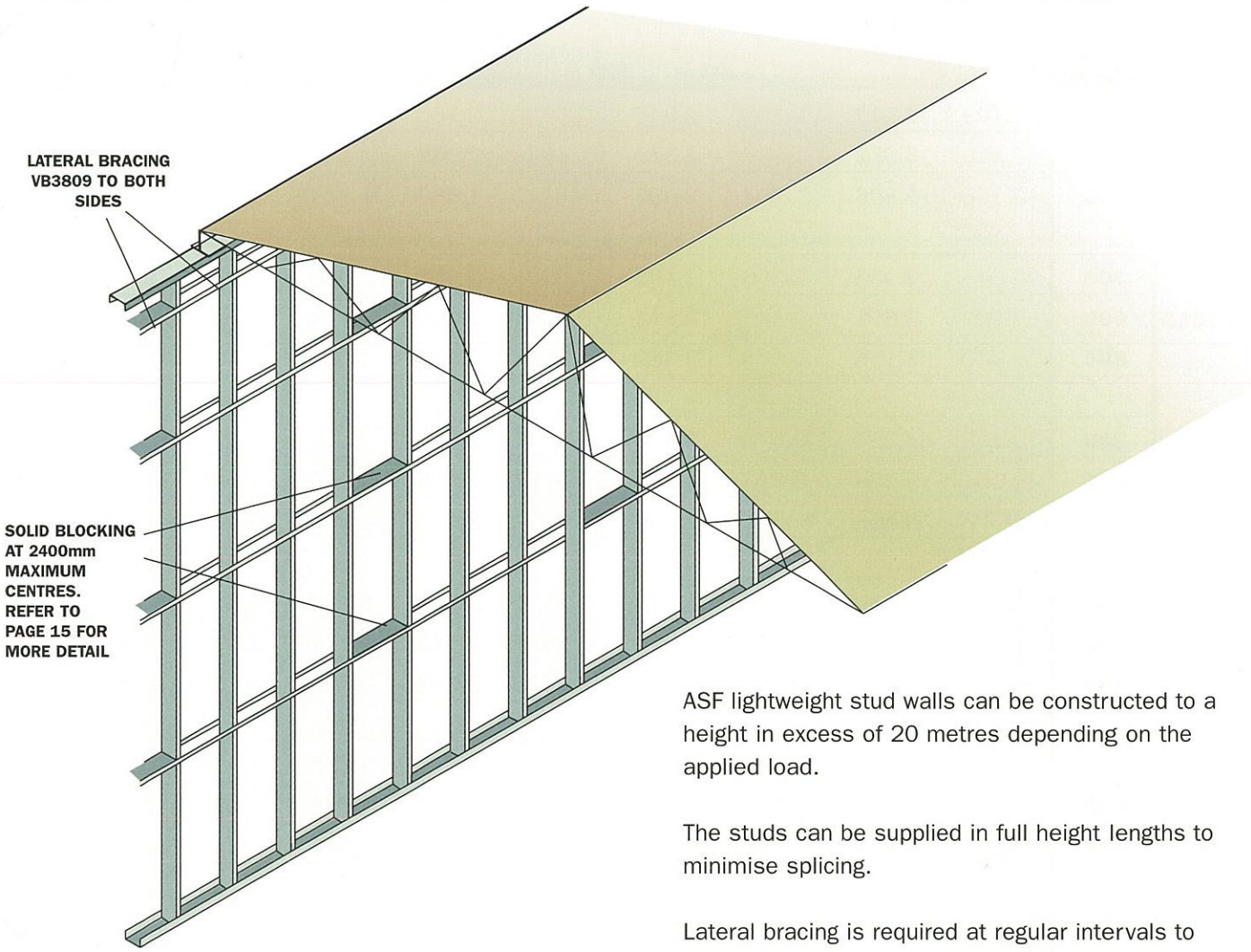


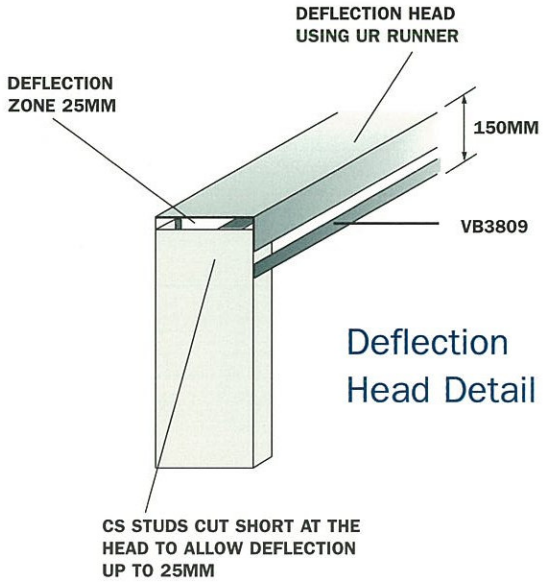
Detail showing Cill member fixed to full height back to back CS studs.



Division Walls

Industrial Units and Warehouses





Deflection Head Detail

ASF lightweight stud walls can be constructed to a height in excess of 20 metres depending on the applied load.

The studs can be supplied in full height lengths to minimise splicing.

Lateral bracing is required at regular intervals to both sides of the stud wall as determined by the structural engineer. Solid blocking is required every fourth row as indicated in the diagram, which has studs fixed at 610mm centres.

Lightweight stud walls can often be built off existing floor slabs without the need to strengthen existing foundations. This needs to be checked by the engineer responsible for the foundation design.

Stud walls can be clad either side with single or double layers of plasterboard depending upon the level of fire, or sound insulation required. Other sheet materials are equally suitable such as cement particle board, calcium silicate, or profiled steel cladding.

Floor Joists

Span Tables

Deflection Limited to Span/250

Stud Joists - Maximum Allowable Spans (metres)
FULLY LATERALLY RESTRAINED

Part Ref	Joist Ctrs	Uniform Load kN/m²									
		0.5 dead + 1.5 live		0.5 dead + 3.0 live		0.5 dead + 5.0 live		1.0 dead + 3.0 live		1.0 dead + 5.0 live	
		1 Span	2 Span	1 Span	2 Span	1 Span	2 Span	1 Span	2 Span	1 Span	2 Span
CS7012	300	2.769	3.712	2.198	2.946	1.854	2.363	2.198	2.806	1.854	2.271
	400	2.516	3.372	1.997	2.578	1.684	2.039	1.997	2.425	1.684	1.959
	600	2.198	2.806	1.744	2.095	1.471	1.650	1.744	1.970	1.471	1.584
CS7015	300	2.973	3.986	2.360	3.163	1.990	2.661	2.360	3.156	1.990	2.559
	400	2.701	3.621	2.144	2.874	1.808	2.298	2.144	2.731	1.808	2.209
	600	2.360	3.156	1.873	2.362	1.580	1.864	1.873	2.221	1.580	1.791
CS7020	300	3.248	4.354	2.578	3.456	2.174	2.915	2.578	3.456	2.174	2.915
	400	2.951	3.956	2.342	3.140	1.975	2.635	2.342	3.125	1.975	2.533
	600	2.578	3.456	2.046	2.706	1.726	2.142	2.046	2.547	1.726	2.059
CS10012	300	3.759	4.979	2.984	3.737	2.517	2.955	2.984	3.517	2.517	2.839
	400	3.415	4.316	2.711	3.228	2.286	2.543	2.711	3.035	2.286	2.441
	600	2.984	3.517	2.368	2.615	1.997	2.048	2.368	2.455	1.957	1.963
CS10015	300	4.042	5.418	3.208	4.300	2.706	3.441	3.208	4.076	2.706	3.310
	400	3.672	4.923	2.915	3.749	2.458	2.977	2.915	3.530	2.458	2.862
	600	3.208	4.076	2.546	3.058	2.148	2.421	2.546	2.878	2.148	2.326
CS10020	300	4.425	5.932	3.512	4.708	2.963	3.971	3.512	4.708	2.963	3.846
	400	4.021	5.390	3.191	4.278	2.692	3.461	3.191	4.100	2.692	3.329
	600	3.512	4.708	2.788	3.555	2.351	2.820	2.788	3.347	2.351	2.711
CS15012	300	5.104	5.972	4.051	4.415	3.417	3.420	4.051	4.136	3.390	3.270
	400	4.637	5.143	3.681	3.768	3.055	2.888	3.612	3.521	2.940	2.755
	600	4.051	4.136	3.136	2.981	2.498	2.241	2.956	2.773	2.404	2.129
CS15015	300	5.493	7.043	4.359	5.295	3.677	4.187	4.359	4.983	3.677	4.021
	400	4.990	6.111	3.961	4.573	3.341	3.600	3.961	4.299	3.341	3.455
	600	4.359	4.983	3.460	3.702	2.898	2.892	3.427	3.474	2.789	2.771
CS15020	300	6.021	7.975	4.779	6.343	4.031	5.061	4.779	5.982	4.031	4.870
	400	5.471	7.157	4.342	5.508	3.662	4.384	4.342	5.191	3.662	4.217
	600	4.779	5.982	3.793	4.502	3.199	3.574	3.793	4.240	3.199	3.436

Calculations have been prepared to BS5950:Part 5 with the following assumptions:

1. Loads have been taken as uniformly distributed
2. Joists are laterally restrained by the floor decking
3. Section properties are nett of the cutouts in the web
4. Calculations are based on simply-supported end conditions
5. The effects of cold forming have been ignored
6. Web crushing has been ignored and must be checked in individual cases
7. Designer should confirm stiffness criteria selected is suitable for application

Alternatively use our unique ASF Design and Detail software to identify the optimum stud section and print a section design report for either restrained or unrestrained conditions. Simply input the specific height, stud centres, applied loads, limiting deflection and restraint condition i.e. infinitely versatile.

Part Ref	Joist Ctrs	Uniform Load kN/m²									
		0.5 dead + 1.5 live		0.5 dead + 3.0 live		0.5 dead + 5.0 live		1.0 dead + 3.0 live		1.0 dead + 5.0 live	
		1 Span	2 Span	1 Span	2 Span	1 Span	2 Span	1 Span	2 Span	1 Span	2 Span
CS20012	300	6.451	6.577	5.089	4.718	4.063	3.512	4.799	4.380	3.911	3.331
	400	5.849	5.591	4.420	3.935	3.525	2.868	4.167	3.635	3.393	2.709
	600	4.799	4.380	3.619	2.981	2.883	2.100	3.411	2.731	2.699	1.971
CS20015	300	6.944	8.102	5.512	6.033	4.649	4.702	5.512	5.660	4.606	4.501
	400	6.309	7.002	5.008	5.168	4.153	3.989	4.906	4.837	3.997	3.812
	600	5.512	5.660	4.263	4.114	3.398	3.121	4.018	3.836	3.270	2.972
CS20020	300	7.622	9.085	6.050	7.474	5.102	5.955	6.050	7.055	5.102	5.727
	400	6.925	8.276	5.496	6.489	4.636	5.144	5.496	6.111	4.636	4.943
	600	6.050	7.055	4.802	5.286	4.050	4.166	4.802	4.970	3.935	3.999
CS25012	300	7.352	6.723	5.575	4.618	4.454	3.274	5.259	4.238	4.257	3.077
	400	6.404	5.606	4.844	3.740	3.460	2.584	4.568	3.409	3.205	2.418
	600	5.259	4.238	3.646	2.703	2.316	1.806	3.239	2.441	2.145	1.682
CS25015	300	8.357	8.810	6.633	6.448	5.355	4.908	6.317	6.018	5.156	4.675
	400	7.593	7.559	5.821	5.449	4.650	4.078	5.491	5.066	4.476	3.872
	600	6.317	6.018	4.773	4.224	3.807	3.071	4.500	3.900	3.664	2.899
CS25020	300	9.178	9.908	7.285	8.324	6.144	6.655	7.285	7.919	6.144	6.391
	400	8.339	9.111	6.619	7.270	5.582	5.717	6.619	6.834	5.476	5.483
	600	7.285	7.919	5.782	5.881	4.660	4.577	5.505	5.515	4.486	4.381
CS29015	300	9.357	9.108	7.123	6.551	5.701	4.875	6.722	6.083	5.490	4.622
	400	8.168	7.757	6.196	5.463	4.952	3.976	5.845	5.046	4.767	3.754
	600	6.722	6.083	5.083	4.134	4.016	2.904	4.792	3.785	3.720	2.725
CS29020	300	10.321	10.409	8.191	8.834	6.909	7.046	8.191	8.426	6.811	6.756
	400	9.377	9.613	7.442	7.718	6.148	6.015	7.249	7.242	5.920	5.759
	600	8.191	8.426	6.310	6.197	5.040	4.757	5.951	5.794	4.851	4.540
CS34020	300	11.837	10.977	9.395	9.400	7.694	7.386	9.051	8.915	7.412	7.064
	400	10.754	10.177	8.353	8.132	6.692	6.237	7.886	7.604	6.444	5.949
	600	9.051	8.915	6.867	6.439	5.488	4.827	6.478	5.988	5.283	4.584

Floor Joists

Span Tables Deflection Limited to Span/360

Stud Joists - Maximum Allowable Spans (metres)
FULLY LATERALLY RESTRAINED

Part Ref	Joist Ctrs	Uniform Load kN/m²									
		0.5 dead + 1.5 live		0.5 dead + 3.0 live		0.5 dead + 5.0 live		1.0 dead + 3.0 live		1.0 dead + 5.0 live	
		1 Span	2 Span	1 Span	2 Span	1 Span	2 Span	1 Span	2 Span	1 Span	2 Span
CS7012	300	2.452	3.287	1.946	2.609	1.641	2.200	1.946	2.609	1.641	2.200
	400	2.228	2.986	1.768	2.370	1.491	1.999	1.768	2.370	1.491	1.959
	600	1.946	2.609	1.545	2.071	1.303	1.650	1.545	1.970	1.303	1.584
CS7015	300	2.633	3.529	2.090	2.801	1.763	2.363	2.090	2.801	1.763	2.363
	400	2.392	3.207	1.899	2.545	1.601	2.147	1.899	2.545	1.601	2.147
	600	2.090	2.801	1.659	2.223	1.399	1.864	1.659	2.221	1.399	1.791
CS7020	300	2.876	3.855	2.283	3.060	1.925	2.581	2.283	3.060	1.925	2.581
	400	2.613	3.503	2.074	2.780	1.749	2.345	2.074	2.780	1.749	2.345
	600	2.283	3.060	1.812	2.429	1.528	2.049	1.812	2.429	1.528	2.049
CS10012	300	3.329	4.463	2.642	3.542	2.229	2.955	2.642	3.517	2.229	2.839
	400	3.025	4.054	2.401	3.218	2.025	2.543	2.401	3.035	2.025	2.441
	600	2.642	3.517	2.097	2.615	1.769	2.048	2.097	2.455	1.769	1.963
CS10015	300	3.579	4.798	2.841	3.808	2.396	3.212	2.841	3.808	2.396	3.212
	400	3.252	4.359	2.581	3.460	2.177	2.918	2.581	3.460	2.177	2.862
	600	2.841	3.808	2.255	3.023	1.902	2.421	2.255	2.878	1.902	2.326
CS10020	300	3.919	5.253	3.110	4.170	2.623	3.517	3.110	4.170	2.623	3.517
	400	3.561	4.773	2.826	3.788	2.384	3.195	2.826	3.788	2.384	3.195
	600	3.110	4.170	2.469	3.309	2.082	2.791	2.469	3.309	2.082	2.711
CS15012	300	4.520	5.972	3.587	4.415	3.026	3.420	3.587	4.136	3.026	3.270
	400	4.107	5.143	3.259	3.768	2.749	2.888	3.259	3.521	2.749	2.755
	600	3.587	4.136	2.847	2.981	2.402	2.241	2.847	2.773	2.402	2.129
CS15015	300	4.864	6.520	3.860	5.175	3.256	4.187	3.860	4.983	3.256	4.021
	400	4.419	5.924	3.507	4.573	2.958	3.600	3.507	4.299	2.958	3.455
	600	3.860	4.983	3.064	3.702	2.584	2.892	3.064	3.474	2.584	2.771
CS15020	300	5.332	7.148	4.232	5.673	3.570	4.785	4.232	5.673	3.570	4.785
	400	4.845	6.494	3.845	5.155	3.243	4.347	3.845	5.155	3.243	4.217
	600	4.232	5.673	3.359	4.502	2.833	3.574	3.359	4.240	2.833	3.436

Calculations have been prepared to BS5950:Part 5 with the following assumptions:

1. Loads have been taken as uniformly distributed
2. Joists are laterally restrained by the floor decking
3. Section properties are nett of the cutouts in the web
4. Calculations are based on simply-supported end conditions
5. The effects of cold forming have been ignored
6. Web crushing has been ignored and must be checked in individual cases
7. Designer should confirm stiffness criteria selected is suitable for application

Alternatively use our unique ASF Design and Detail software to identify the optimum stud section and print a section design report for either restrained or unrestrained conditions. Simply input the specific height, stud centres, applied loads, limiting deflection and restraint condition i.e. infinitely versatile.

Part Ref	Joist Ctrs	Uniform Load kN/m²									
		0.5 dead + 1.5 live		0.5 dead + 3.0 live		0.5 dead + 5.0 live		1.0 dead + 3.0 live		1.0 dead + 5.0 live	
		1 Span	2 Span	1 Span	2 Span	1 Span	2 Span	1 Span	2 Span	1 Span	2 Span
CS20012	300	5.712	6.577	4.534	4.718	3.824	3.512	4.534	4.380	3.824	3.331
	400	5.190	5.591	4.119	3.935	3.474	2.868	4.119	3.635	3.393	2.709
	600	4.534	4.380	3.599	2.981	2.883	2.100	3.411	2.731	2.699	1.971
CS20015	300	6.150	8.102	4.881	6.033	4.117	4.702	4.881	5.660	4.117	4.501
	400	5.587	7.002	4.435	5.168	3.740	3.989	4.435	4.837	3.740	3.812
	600	4.881	5.660	3.874	4.114	3.267	3.121	3.874	3.836	3.267	2.972
CS20020	300	6.750	9.048	5.357	7.181	4.518	5.955	5.357	7.055	4.518	5.727
	400	6.132	8.221	4.867	6.489	4.105	5.144	4.867	6.111	4.105	4.943
	600	5.357	7.055	4.252	5.286	3.586	4.166	4.252	4.970	3.586	3.999
CS25012	300	6.871	6.723	5.454	4.618	4.454	3.274	5.259	4.238	4.257	3.077
	400	6.243	5.606	4.844	3.740	3.460	2.584	4.568	3.409	3.205	2.418
	600	5.259	4.238	3.646	2.703	2.316	1.806	3.239	2.441	2.145	1.682
CS25015	300	7.401	8.810	5.874	6.448	4.954	4.908	5.874	6.018	4.954	4.675
	400	6.724	7.559	5.337	5.449	4.501	4.078	5.337	5.066	4.476	3.872
	600	5.874	6.018	4.662	4.224	3.807	3.071	4.500	3.900	3.664	2.899
CS25020	300	8.128	9.908	6.451	8.324	5.441	6.655	6.451	7.919	5.441	6.391
	400	7.385	9.111	5.861	7.270	4.944	5.717	5.861	6.834	4.944	5.483
	600	6.451	7.919	5.120	5.881	4.319	4.577	5.120	5.515	4.319	4.381
CS29015	300	8.318	9.108	6.602	6.551	5.568	4.875	6.602	6.083	5.490	4.622
	400	7.557	7.757	5.998	5.463	4.952	3.976	5.845	5.046	4.767	3.754
	600	6.602	6.083	5.083	4.134	4.016	2.904	4.792	3.785	3.720	2.725
CS29020	300	9.139	10.409	7.254	8.168	6.118	7.046	7.254	8.426	6.118	6.756
	400	8.304	9.613	6.591	7.421	5.559	6.015	6.591	7.242	5.559	5.759
	600	7.254	8.426	5.757	6.197	4.856	4.757	5.757	5.794	4.851	4.540
CS34020	300	10.482	10.977	8.319	9.400	7.017	7.386	8.319	8.915	7.017	7.064
	400	9.523	10.177	7.559	8.132	6.375	6.237	7.559	7.604	6.375	5.949
	600	8.319	8.915	6.603	6.439	5.488	4.827	6.478	5.988	5.283	4.584

Load Span Tables

Axially Loaded Wall Studs

Allowable Service, Axial Compressive Loads (kN/stud)

Stud clear height	Bracing Condition	CS7012	CS7015	CS7020	CS10012	CS10015	CS10020	CS15012	CS15015	CS15020
2.4m	**none**	8.34	10.94	15.87	12.23	15.75	21.46	11.25	14.49	19.92
2.4m	**mid-pt**	20.08	25.72	34.93	28.20	40.09	62.20	23.17	32.49	50.56
2.4m	**1/3 pt**	19.80	25.14	33.52	30.08	43.58	70.02	25.55	36.60	59.41
2.7m	**none**	6.82	9.05	13.39	10.00	12.77	17.23	9.34	11.93	16.21
2.7m	**mid-pt**	16.50	21.12	28.90	26.13	36.42	54.84	21.75	30.07	45.61
2.7m	**1/3 pt**	16.20	20.51	27.40	28.80	41.28	65.11	25.11	35.85	57.85
3.0m	**none**	5.72	#	#	8.30	10.53	#	#	#	#
3.0m	**mid-pt**	13.75	17.64	24.34	23.76	32.46	47.60	20.11	27.37	40.54
3.0m	**1/3 pt**	13.44	16.99	22.79	27.19	38.41	59.21	24.57	34.94	55.88
3.6m	**none**	#	#	#	#	#	#	#	#	#
3.6m	**mid-pt**	9.96	12.87	18.11	19.04	25.25	35.69	16.67	22.11	31.60
3.6m	**1/3 pt**	9.63	12.20	16.53	23.23	31.79	46.95	23.15	32.46	50.52
4.8m	**none**	#	#	#	#	#	#	#	#	#
4.8m	**mid-pt**	5.98	7.89	11.58	12.19	15.69	21.38	11.21	14.43	19.83
4.8m	**1/3 pt**	5.64	7.21	10.02	15.80	20.80	29.25	18.92	25.50	37.27
6.0m	**none**	#	#	#	#	#	#	#	#	#
6.0m	**mid-pt**	#	#	#	8.24	10.46	#	#	#	#
6.0m	**1/3 pt**	#	#	#	10.95	14.15	19.45	14.55	19.05	26.78

General Notes:

#: denotes a slenderness ratio of more than 180

N.B. The safe loads are calculated using a load factor (gf) of **1.6**

Condition: No wind or other lateral loads, fixed in position but not direction at both ends

Stud clear height	Bracing Condition	CS20012	CS20015	CS20020	CS25012	CS25015	CS25020	CS29015	CS29020	CS34020
2.4m	none	11.33	14.61	20.13	11.34	14.64	20.24	#	#	#
2.4m	mid-pt	21.61	29.96	46.05	20.66	28.50	43.48	27.76	42.18	40.95
2.4m	1/3 pt	23.57	33.18	52.62	22.40	31.33	49.04	30.42	47.33	45.77
2.7m	none	#	#	#	#	#	#	#	#	#
2.7m	mid-pt	20.48	28.07	42.31	19.66	26.87	40.33	26.25	39.27	38.27
2.7m	1/3 pt	23.19	32.57	51.43	22.06	30.79	48.01	29.90	46.36	44.85
3.0m	none	#	#	#	#	#	#	#	#	#
3.0m	mid-pt	19.14	25.92	38.29	18.49	25.00	36.88	24.51	36.08	35.31
3.0m	1/3 pt	22.74	31.85	49.95	21.65	30.14	46.75	29.29	45.19	43.74
3.6m	none	#	#	#	#	#	#	#	#	#
3.6m	mid-pt	16.23	21.50	30.76	15.89	21.06	30.17	20.80	29.78	29.40
3.6m	1/3 pt	21.58	29.92	45.99	20.62	28.45	43.41	27.71	42.11	40.87
4.8m	none	#	#	#	#	#	#	#	#	#
4.8m	mid-pt	11.26	14.53	20.02	11.26	14.55	20.11	#	#	#
4.8m	1/3 pt	18.14	24.37	35.58	17.59	23.62	34.48	23.21	33.83	33.19
6.0m	none	#	#	#	#	#	#	#	#	#
6.0m	mid-pt	#	#	#	#	#	#	#	#	#
6.0m	1/3 pt	14.33	18.78	26.45	14.13	18.54	26.18	18.39	25.95	25.73

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Load Span Tables

Exterior Wall Studs

Allowable Service, Axial Compressive Loads (kN/stud).
Studs fixed in position but not direction at both ends.

NB: The safe loads are calculated using load factors (gf) = 1.4 for wind and 1.4 for vertical loads.
Deflection limited to Height/360.
Loads based on lateral bracing of studs at max 1200mm centres.
Possible additional rigidity provided by wall boards or other sheeting material not included.

Stud clear height	Stud Ctrs (mm)	CS7012	CS7015	CS7020	CS10012	CS10015	CS10020	CS15012	CS15015
2.4m	400	15.31	22.22	33.28	24.62	36.10	59.34	20.97	29.82
	600	#	#	30.18	22.73	34.01	56.79	19.98	28.84
2.7m	400	#	17.07	25.74	23.62	34.99	57.98	20.44	29.29
	600	#	#	#	21.18	32.29	54.69	19.18	28.03
3.0m	400	#	#	#	21.83	32.62	54.24	19.85	28.70
	600	#	#	#	18.82	29.29	50.20	18.27	27.12
3.6m	400	#	#	#	#	25.25	41.25	18.45	27.30
	600	#	#	#	#	#	#	16.09	24.96
4.8m	400	#	#	#	#	#	#	#	22.80
	600	#	#	#	#	#	#	#	#
6.0m	400	#	#	#	#	#	#	#	#
	600	#	#	#	#	#	#	#	#

Stud clear height	Stud Ctrs (mm)	CS7012	CS7015	CS7020	CS10012	CS10015	CS10020	CS15012	CS15015
2.4m	400	#	20.83	31.73	23.68	35.06	58.07	20.48	29.33
	600	#	#	27.85	21.28	32.40	54.83	19.23	28.09
2.7m	400	#	#	24.14	22.41	33.66	56.35	19.81	28.67
	600	#	#	#	19.30	30.21	52.16	18.21	27.07
3.0m	400	#	#	#	20.34	30.97	52.23	19.06	27.91
	600	#	#	#	#	26.72	47.09	17.05	25.91
3.6m	400	#	#	#	#	#	38.72	17.28	26.14
	600	#	#	#	#	#	#	14.26	23.16
4.8m	400	#	#	#	#	#	#	#	#
	600	#	#	#	#	#	#	#	#
6.0m	400	#	#	#	#	#	#	#	#
	600	#	#	#	#	#	#	#	#

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Condition: Wind Pressure **1.00** kN/m²

CS15020	CS20012	CS20015	CS20020	CS25012	CS25015	CS25020	CS29015	CS29020	CS34020
46.89	20.12	28.09	43.21	19.55	27.12	41.26	26.62	40.67	39.70
45.79	19.43	27.42	42.54	19.00	26.61	40.76	26.18	40.47	39.53
46.29	19.75	27.73	42.84	19.25	26.84	40.98	26.37	40.55	39.59
44.89	18.86	26.88	41.99	18.54	26.19	40.35	25.81	40.29	39.38
45.63	19.33	27.32	42.43	18.91	26.52	40.67	26.10	40.41	39.47
43.87	18.22	26.26	41.37	18.03	25.72	39.89	25.41	40.09	39.21
44.06	18.34	26.37	41.47	18.11	25.79	39.96	25.46	40.09	39.20
41.47	16.71	24.82	39.92	16.82	24.62	38.83	24.45	39.63	38.82
38.50	15.75	23.91	38.99	16.05	23.91	38.13	23.83	39.30	38.53
33.71	12.70	21.03	36.13	13.66	21.75	36.07	21.98	38.47	37.84
#	#	20.62	35.72	13.32	21.43	35.74	21.70	38.29	37.68
#	#	#	31.03	9.37	17.91	32.41	18.70	36.97	36.59

Condition: Wind Pressure **1.25** kN/m²

CS15020	CS20012	CS20015	CS20020	CS25012	CS25015	CS25020	CS29015	CS29020	CS34020
46.34	19.78	27.76	42.88	19.28	26.86	41.01	26.40	40.47	39.53
44.95	18.90	26.92	42.03	18.58	26.22	40.39	25.85	40.16	39.28
45.60	19.31	27.30	42.42	18.90	26.51	40.67	26.10	40.29	39.38
43.82	18.19	26.23	41.34	18.00	25.70	39.88	25.39	39.90	39.06
44.76	18.77	26.79	41.90	18.47	26.12	40.28	25.75	40.09	39.21
42.53	17.37	25.46	40.57	17.36	25.11	39.31	24.88	39.61	38.81
42.78	17.53	25.60	40.70	17.47	25.21	39.39	24.96	39.63	38.82
39.47	15.46	23.64	38.74	15.83	23.72	37.97	23.68	38.93	38.24
36.13	14.24	22.48	37.58	14.87	22.84	37.10	22.91	38.47	37.84
#	10.31	18.80	33.93	11.80	20.09	34.49	20.57	37.20	36.80
#	#	#	33.40	11.37	19.69	34.09	20.21	36.97	36.59
#	#	#	#	#	15.17	29.83	16.38	34.96	34.95

Load Span Tables

Exterior Wall Studs

Allowable Service, Axial Compressive Loads (kN/stud).
Studs fixed in position but not direction at both ends.

NB: The safe loads are calculated using load factors (gf) = 1.4 for wind and 1.4 for vertical loads.
Deflection limited to Height/360.
Loads based on lateral bracing of studs at max 1200mm centres.
Possible additional rigidity provided by wall boards or other sheeting material not included.

Stud clear height	Stud Ctrs (mm)	CS7012	CS7015	CS7020	CS10012	CS10015	CS10020	CS15012	CS15015
2.4m	400	#	#	30.18	22.73	34.01	56.79	19.98	28.84
	600	#	#	#	19.80	30.76	52.83	18.47	27.33
2.7m	400	#	#	#	21.18	32.29	54.69	19.18	28.03
	600	#	#	#	#	28.07	49.57	17.22	26.09
3.0m	400	#	#	#	18.82	29.29	50.20	18.27	27.12
	600	#	#	#	#	#	43.91	15.80	24.68
3.6m	400	#	#	#	#	#	#	16.09	24.96
	600	#	#	#	#	#	#	#	21.30
4.8m	400	#	#	#	#	#	#	#	#
	600	#	#	#	#	#	#	#	#
6.0m	400	#	#	#	#	#	#	#	#
	600	#	#	#	#	#	#	#	#

Stud clear height	Stud Ctrs (mm)	CS7012	CS7015	CS7020	CS10012	CS10015	CS10020	CS15012	CS15015
2.4m	400	#	#	28.63	21.77	32.94	55.48	19.48	28.34
	600	#	#	#	18.28	29.09	50.80	17.69	26.56
2.7m	400	#	#	#	19.93	30.91	53.01	18.53	27.39
	600	#	#	#	#	#	46.94	16.22	25.10
3.0m	400	#	#	#	#	27.58	48.13	17.46	26.32
	600	#	#	#	#	#	#	14.53	23.43
3.6m	400	#	#	#	#	#	#	14.88	23.76
	600	#	#	#	#	#	#	#	19.41
4.8m	400	#	#	#	#	#	#	#	#
	600	#	#	#	#	#	#	#	#
6.0m	400	#	#	#	#	#	#	#	#
	600		#	#	#	#	#	#	#

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Condition: Wind Pressure **1.50** kN/m²

CS15020	CS20012	CS20015	CS20020	CS25012	CS25015	CS25020	CS29015	CS29020	CS34020
45.79	19.43	27.42	42.54	19.00	26.61	40.76	26.18	39.85	39.03
44.11	18.37	26.41	41.52	18.15	25.84	40.02	25.52	39.23	38.52
44.89	18.86	26.88	41.99	18.54	26.19	40.35	25.81	39.51	38.74
42.73	17.50	25.58	40.69	17.46	25.20	39.41	24.97	38.72	38.09
43.87	18.22	26.26	41.37	18.03	25.72	39.89	25.41	39.12	38.41
41.16	16.52	24.65	39.75	16.68	24.49	38.72	24.35	38.14	37.61
41.47	16.71	24.82	39.92	16.82	24.62	38.83	24.45	38.22	37.66
37.42	14.18	22.43	37.54	14.83	22.82	37.10	22.91	36.79	36.49
33.71	12.70	21.03	36.13	13.66	21.75	36.07	21.98	35.92	35.75
#	#	16.50	31.66	9.89	18.39	32.88	19.12	33.30	33.61
#	#	#	31.03	9.37	17.91	32.41	18.70	32.89	33.26
#	#	#	#	#	#	27.18	13.99	28.62	29.81

Condition: Wind Pressure **1.75** kN/m²

CS15020	CS20012	CS20015	CS20020	CS25012	CS25015	CS25020	CS29015	CS29020	CS34020
45.23	19.08	27.09	42.20	18.72	26.35	40.52	25.96	39.65	38.86
43.25	17.83	25.90	41.01	17.72	25.45	39.64	25.18	38.92	38.26
44.18	18.41	26.45	41.56	18.18	25.86	40.04	25.53	39.24	38.52
41.63	16.81	24.93	40.04	16.91	24.71	38.93	24.54	38.32	37.76
42.98	17.66	25.73	40.83	17.58	25.31	39.50	25.06	38.79	38.14
39.77	15.65	23.83	38.93	15.99	23.87	38.12	23.82	37.65	37.20
40.14	15.88	24.04	39.14	16.17	24.02	38.26	23.94	37.75	37.27
35.32	12.87	21.21	36.32	13.81	21.90	36.23	22.12	36.07	35.90
#	11.11	19.55	34.67	12.43	20.64	35.02	21.04	35.05	35.05
#	#	#	29.35	7.94	16.65	31.24	17.65	31.95	32.53
#	#	#	#	#	16.09	30.70	17.16	31.49	32.13
#	#	#	#	#	#	24.47	11.54	26.42	28.04

Load Span Tables

Exterior Wall Studs

Allowable Service, Axial Compressive Loads (kN/stud).
Studs fixed in position but not direction at both ends.

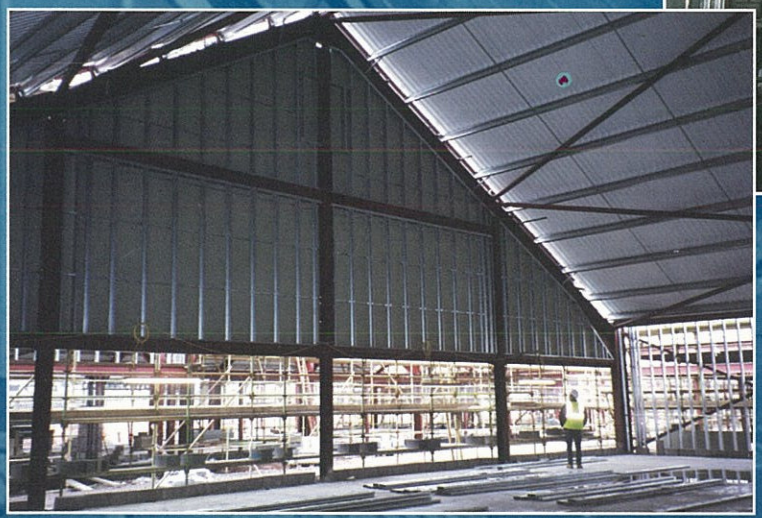
NB: The safe loads are calculated using load factors (gf) = 1.4 for wind and 1.4 for vertical loads.
Deflection limited to Height/360.
Loads based on lateral bracing of studs at max 1200mm centres.
Possible additional rigidity provided by wall boards or other sheeting material not included.

Stud clear height	Stud Ctrs (mm)	CS7012	CS7015	CS7020	CS10012	CS10015	CS10020	CS15012	CS1501
2.4m	400	#	#	#	20.79	31.86	54.16	18.98	27.84
	600	#	#	#	16.73	27.39	48.74	16.91	25.78
2.7m	400	#	#	#	18.66	29.50	51.30	17.88	26.74
	600	#	#	#	#	#	44.26	15.20	24.09
3.0m	400	#	#	#	#	#	46.03	16.63	25.50
	600	#	#	#	#	#	#	13.24	22.15
3.6m	400	#	#	#	#	#	#	13.64	22.54
	600	#	#	#	#	#	#	#	#
4.8m	400	#	#	#	#	#	#	#	#
	600	#	#	#	#	#	#	#	#
6.0m	400	#	#	#	#	#	#	#	#
	600	#	#	#	#	#	#	#	#

Alternatively use our unique ASF Design and Detail software to identify the optimum stud section and print a section design report for either restrained or unrestrained conditions. Simply input the specific height, stud centres, applied loads, limiting deflection and restraint condition i.e. infinitely versatile.

Condition: Wind Pressure **2.00** kN/m²

CS15020	CS20012	CS20015	CS20020	CS25012	CS25015	CS25020	CS29015	CS29020	CS34020
44.67	18.72	26.75	41.86	18.43	26.10	40.27	25.74	39.44	38.69
42.39	17.29	25.38	40.50	17.29	25.06	39.27	24.84	38.61	38.00
43.46	17.96	26.02	41.13	17.82	25.53	39.72	25.25	38.98	38.30
40.51	16.11	24.26	39.37	16.36	24.21	38.45	24.11	37.92	37.43
42.08	17.09	25.19	40.30	17.13	24.90	39.11	24.70	38.47	37.88
38.36	14.77	22.99	38.10	15.30	23.24	37.52	23.28	37.15	36.79
38.79	15.03	23.24	38.34	15.50	23.42	37.68	23.43	37.27	36.88
33.18	11.54	19.96	35.09	12.77	20.97	35.34	21.33	35.34	35.30
#	#	18.04	33.18	11.17	19.52	33.96	20.09	34.18	34.33
#	#	#	26.98	5.93	14.88	29.58	16.15	30.59	31.43
#	#	#	#	#	14.23	28.96	15.59	30.07	30.98
#	#	#	#	#	#	#	#	24.17	26.23



Load Span Tables Division Wall Studs

Wind Pressure kN/m²	Stud Centres mm	CS7012	CS7015	CS7020	CS10012	CS10015	CS10020	CS15012	CS15015	CS1502
0.25	300	6.34	6.81	7.44	8.61	9.25	10.13	11.69	12.57	13.79
	400	5.76	6.18	6.76	7.82	8.41	9.21	10.62	11.42	12.52
	600	5.03	5.40	5.90	6.83	7.34	8.04	9.27	9.98	10.94
0.50	300	5.03	5.40	5.90	6.83	7.34	8.04	9.27	9.98	10.94
	400	4.57	4.91	5.36	6.21	6.67	7.31	8.43	9.07	9.94
	600	3.99	4.29	4.68	5.42	5.83	6.38	7.36	7.92	8.68
0.75	300	4.40	4.72	5.16	5.97	6.42	7.02	8.10	8.72	9.56
	400	3.99	4.29	4.68	5.42	5.83	6.38	7.36	7.92	8.68
	600	3.49	3.75	4.09	4.74	5.09	5.58	6.43	6.92	7.59
1.00	300	3.99	4.29	4.68	5.42	5.83	6.38	7.36	7.92	8.68
	400	3.63	3.90	4.26	4.93	5.30	5.80	6.69	7.20	7.89
	600	3.17	3.40	3.72	4.30	4.63	5.07	5.84	6.29	6.89

Wind Pressure kN/m²	Stud Centres mm	CS7012	CS7015	CS7020	CS10012	CS10015	CS10020	CS15012	CS15015	CS15020
0.25	300	5.10	5.48	5.98	6.92	7.45	8.15	9.40	10.12	11.09
	400	4.63	4.98	5.44	6.29	6.76	7.41	8.54	9.19	10.08
	600	4.05	4.35	4.75	5.50	5.91	6.47	7.46	8.03	8.80
0.50	300	4.05	4.35	4.75	5.50	5.91	6.47	7.46	8.03	8.80
	400	3.68	3.95	4.31	4.99	5.37	5.88	6.78	7.30	8.00
	600	3.21	3.45	3.77	4.36	4.69	5.14	5.92	6.37	6.99
0.75	300	3.54	3.80	4.15	4.80	5.16	5.65	6.52	7.01	7.69
	400	3.21	3.45	3.77	4.36	4.69	5.14	5.92	6.37	6.99
	600	2.81	3.01	3.29	3.81	4.10	4.49	5.17	5.57	6.10
1.00	300	3.21	3.45	3.77	4.36	4.69	5.14	5.92	6.37	6.99
	400	2.92	3.13	3.42	3.96	4.26	4.67	5.38	5.79	6.35
	600	2.55	2.74	2.99	3.46	3.72	4.08	4.70	5.06	5.55

General Notes:

The values shown are the maximum vertical heights for the given lateral loads - no axial loads.
The maximum heights achievable are limited by:-

a) allowable ultimate moment
b) deflection of the stud
c) slenderness of the stud
d) lateral bracing at max 1200mm centres

Wall Stud Limiting Height in metres

Deflection Limited to Height/125

CS20012	CS20015	CS20020	CS25012	CS25015	CS25020	CS29015	CS29020	CS34020
14.77	15.90	17.45	17.76	19.13	21.01	21.50	23.63	27.10
13.42	14.44	15.85	16.14	17.38	19.09	19.54	21.47	24.62
11.72	12.62	13.85	14.10	15.19	16.68	17.07	18.75	21.51
11.72	12.62	13.85	14.10	15.19	16.68	17.07	18.75	21.51
10.65	11.46	12.58	12.81	13.80	15.15	15.51	17.04	19.54
9.30	10.02	10.99	11.19	12.05	13.24	13.55	14.88	17.07
10.24	11.02	12.10	12.32	13.27	14.57	14.91	16.38	18.79
9.30	10.02	10.99	11.19	12.05	13.24	13.55	14.88	17.07
8.13	8.75	9.60	9.14	10.53	11.56	11.74	13.00	14.91
9.30	10.02	10.99	11.19	12.05	13.24	13.55	14.88	17.07
8.45	9.10	9.99	9.70	10.95	12.03	12.31	13.52	15.51
7.21	7.95	8.72	7.92	9.54	10.51	10.17	11.81	13.55

Deflection Limited to Height/240

CS20012	CS20015	CS20020	CS25012	CS25015	CS25020	CS29015	CS29020	CS34020
11.88	12.79	14.04	14.29	15.39	16.91	17.30	19.01	21.80
10.80	11.62	12.76	12.99	13.99	15.36	15.72	17.27	19.81
9.43	10.15	11.14	11.34	12.22	13.42	13.73	15.09	17.31
9.43	10.15	11.14	11.34	12.22	13.42	13.73	15.09	17.31
8.57	9.22	10.12	10.31	11.10	12.19	12.48	13.71	15.72
7.49	8.06	8.84	9.00	9.70	10.65	10.90	11.98	13.74
8.24	8.87	9.73	9.91	10.67	11.72	12.00	13.18	15.12
7.49	8.06	8.84	9.00	9.70	10.65	10.90	11.98	13.74
6.54	7.04	7.73	7.87	8.47	9.30	9.52	10.46	12.00
7.49	8.06	8.84	9.00	9.70	10.65	10.90	11.98	13.74
6.80	7.32	8.04	8.18	8.81	9.68	9.90	10.88	12.48
5.94	6.40	7.02	7.15	7.70	8.45	8.65	9.51	10.90

Alternatively use our unique ASF Design and Detail software to identify the optimum stud section and print a section design report for either restrained or unrestrained conditions. Simply input the specific height, stud centres, applied loads, limiting deflection and restraint condition i.e. infinitely versatile.

Load Span Tables Curtain Wall Studs

	CS7012		CS7015		CS7020		CS10012		CS10015		CS10020		CS15012		CS15015		CS15020	
Wind Pressure							**Stud Centres mm**											
kN/m²	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**
0.25	4.63	4.05	4.98	4.35	5.44	4.75	6.29	5.50	6.76	5.91	7.41	6.47	8.54	7.46	9.19	8.03	10.08	8.80
0.50	3.68	3.21	3.95	3.45	4.31	3.77	4.99	4.36	5.37	4.69	5.88	5.14	6.78	5.92	7.30	6.37	8.00	6.99
0.75	3.21	2.81	3.45	3.01	3.77	3.29	4.36	3.81	4.69	4.10	5.14	4.49	5.92	5.17	6.37	5.57	6.99	6.10
1.00	2.92	2.55	3.13	2.74	3.42	2.99	3.96	3.46	4.26	3.72	4.67	4.08	5.38	4.70	5.79	5.06	6.35	5.55
1.25	2.71	2.37	2.91	2.54	3.18	2.78	3.68	3.21	3.96	3.46	4.33	3.78	5.00	4.36	5.38	4.70	5.89	5.15
1.50	2.55	2.23	2.74	2.39	2.99	2.61	3.46	3.02	3.72	3.25	4.08	3.56	4.70	4.11	5.06	4.42	5.55	4.84
1.75	2.42	2.12	2.60	2.27	2.84	2.48	3.29	2.87	3.54	3.09	3.87	3.38	4.47	3.90	4.81	4.20	5.27	4.60
2.00	2.32	2.02	2.49	2.17	2.72	2.37	3.15	2.75	3.38	2.95	3.70	3.24	4.27	3.73	4.60	4.02	5.04	4.40
2.25	2.23	1.95	2.39	2.09	2.61	2.28	3.02	2.64	3.25	2.84	3.56	3.11	4.11	3.59	4.42	3.86	4.84	4.23

	CS7012		CS7015		CS7020		CS10012		CS10015		CS10020		CS15012		CS15015		CS15020	
Wind Pressure							**Stud Centres mm**											
kN/m²	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**
0.25	4.05	3.54	4.35	3.80	4.75	4.15	5.50	4.80	5.91	5.16	6.47	5.65	7.46	6.52	8.03	7.01	8.80	7.69
0.50	3.21	2.81	3.45	3.01	3.77	3.29	4.36	3.81	4.69	4.10	5.14	4.49	5.92	5.17	6.37	5.57	6.99	6.10
0.75	2.81	2.45	3.01	2.63	3.29	2.88	3.81	3.33	4.10	3.58	4.49	3.92	5.17	4.52	5.57	4.86	6.10	5.33
1.00	2.55	2.23	2.74	2.39	2.99	2.61	3.46	3.02	3.72	3.25	4.08	3.56	4.70	4.11	5.06	4.42	5.55	4.84
1.25	2.37	2.07	2.54	2.22	2.78	2.43	3.21	2.81	3.46	3.02	3.78	3.31	4.36	3.81	4.70	4.10	5.15	4.50
1.50	2.23	1.95	2.39	2.09	2.61	2.28	3.02	2.64	3.25	2.84	3.56	3.11	4.11	3.59	4.42	3.86	4.84	4.23
1.75	2.12	1.85	2.27	1.99	2.48	2.17	2.87	2.51	3.09	2.70	3.38	2.95	3.90	3.41	4.20	3.67	4.60	4.02
2.00	2.02	1.77	2.17	1.90	2.37	2.07	2.75	2.40	2.95	2.58	3.24	2.83	3.73	3.26	4.02	3.51	4.40	3.85
2.25	1.95	1.70	2.09	1.83	2.28	1.99	2.64	2.31	2.84	2.48	3.11	2.72	3.59	3.13	3.86	3.37	4.23	3.70

	CS7012		CS7015		CS7020		CS10012		CS10015		CS10020		CS15012		CS15015		CS15020	
Wind Pressure							**Stud Centres mm**											
kN/m²	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**	**400**	**600**
0.25	3.41	2.98	3.67	3.20	4.00	3.50	4.64	4.05	4.98	4.35	5.46	4.77	6.29	5.50	6.77	5.92	7.42	6.49
0.50	2.71	2.37	2.91	2.54	3.18	2.78	3.68	3.21	3.96	3.46	4.33	3.78	5.00	4.36	5.38	4.70	5.89	5.15
0.75	2.37	2.07	2.54	2.22	2.78	2.43	3.21	2.81	3.46	3.02	3.78	3.31	4.36	3.81	4.70	4.10	5.15	4.50
1.00	2.15	1.88	2.31	2.02	2.52	2.20	2.92	2.55	3.14	2.74	3.44	3.00	3.96	3.46	4.27	3.73	4.68	4.09
1.25	2.00	1.74	2.14	1.87	2.34	2.05	2.71	2.37	2.91	2.55	3.19	2.79	3.68	3.22	3.96	3.46	4.34	3.79
1.50	1.88	1.64	2.02	1.76	2.20	1.93	2.55	2.23	2.74	2.40	3.00	2.62	3.46	3.03	3.73	3.26	4.09	3.57
1.75	1.78	1.56	1.92	1.67	2.09	1.83	2.42	2.12	2.61	2.28	2.85	2.49	3.29	2.87	3.54	3.09	3.88	3.39
2.00	1.71	1.49	1.83	1.60	2.00	1.75	2.32	2.02	2.49	2.18	2.73	2.38	3.15	2.75	3.39	2.96	3.71	3.24
2.25	1.64	1.43	1.76	1.54	1.93	1.68	2.23	1.95	2.40	2.09	2.62	2.29	3.03	2.64	3.26	2.84	3.57	3.12

General Notes: The values shown are the maximum vertical heights for the given lateral loads - no axial loads
The maximum heights achievable are limited by: a) the allowable ultimate moment b) the deflection of the stud c) the slenderness of the stud d) lateral bracing at max 1200mm centres

Wall Stud Limiting Height in metres

Deflection Limited to Height /240

CS20012		CS20015		CS20020		CS25012		CS25015		CS25020		CS29015		CS29020		CS34020	
Stud Centres mm																	
400	600	400	600	400	600	400	600	400	600	400	600	400	600	400	600	400	600
10.80	9.43	11.62	10.15	12.76	11.14	12.99	11.34	13.99	12.22	15.36	13.42	15.72	13.73	17.27	15.09	19.81	17.31
8.57	7.49	9.22	8.06	10.12	8.84	10.31	9.00	11.10	9.70	12.19	10.65	12.48	10.90	13.71	11.98	15.72	13.74
7.49	6.54	8.06	7.04	8.84	7.73	9.00	7.87	9.70	8.47	10.65	9.30	10.90	9.52	11.98	10.46	13.74	12.00
6.80	5.94	7.32	6.40	8.04	7.02	8.18	7.15	8.81	7.70	9.68	8.45	9.90	8.65	10.88	9.51	12.48	10.90
6.31	5.52	6.80	5.94	7.46	6.52	7.59	6.63	8.18	7.15	8.98	7.85	9.19	8.03	10.10	8.82	11.58	10.12
5.94	5.19	6.40	5.59	7.02	6.13	7.15	6.24	7.70	6.72	8.45	7.38	8.65	7.56	9.51	8.30	10.90	9.52
5.64	4.93	6.08	5.31	6.67	5.83	6.79	5.93	7.31	6.39	8.03	7.01	8.22	7.18	9.03	7.89	10.36	9.05
5.40	4.72	5.81	5.08	6.38	5.57	6.49	5.60	6.99	6.11	7.68	6.71	7.86	6.87	8.64	7.54	9.90	8.65
5.19	4.53	5.59	4.88	6.13	5.36	6.24	5.28	6.72	5.87	7.38	6.45	7.56	6.60	8.30	7.25	9.52	8.32

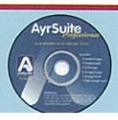
Deflection Limited to Height /360

CS20012		CS20015		CS20020		CS25012		CS25015		CS25020		CS29015		CS29020		CS34020	
Stud Centres mm																	
400	600	400	600	400	600	400	600	400	600	400	600	400	600	400	600	400	600
9.43	8.24	10.15	8.87	11.14	9.73	11.34	9.91	12.22	10.67	13.42	11.72	13.73	12.00	15.09	13.18	17.31	15.12
7.49	6.54	8.06	7.04	8.84	7.73	9.00	7.87	9.70	8.47	10.65	9.30	10.90	9.52	11.98	10.46	13.74	12.00
6.54	5.71	7.04	6.15	7.73	6.75	7.87	6.87	8.47	7.40	9.30	8.13	9.52	8.32	10.46	9.14	12.00	10.48
5.94	5.19	6.40	5.59	7.02	6.13	7.15	6.24	7.70	6.72	8.45	7.38	8.65	7.56	9.51	8.30	10.90	9.52
5.52	4.82	5.94	5.19	6.52	5.69	6.63	5.80	7.15	6.24	7.85	6.86	8.03	7.02	8.82	7.71	10.12	8.84
5.19	4.53	5.59	4.88	6.13	5.36	6.24	5.45	6.72	5.87	7.38	6.45	7.56	6.60	8.30	7.25	9.52	8.32
4.93	4.31	5.31	4.64	5.83	5.09	5.93	5.18	6.39	5.58	7.01	6.13	7.18	6.27	7.89	6.89	9.05	7.90
4.72	4.12	5.08	4.43	5.57	4.87	5.67	4.95	6.11	5.34	6.71	5.86	6.87	6.00	7.54	6.59	8.65	7.56
4.53	3.96	4.88	4.26	5.36	4.68	5.45	4.76	5.87	5.13	6.45	5.64	6.60	5.77	7.25	6.34	8.32	7.27

Deflection Limited to Height /600

CS20012		CS20015		CS20020		CS25012		CS25015		CS25020		CS29015		CS29020		CS34020	
Stud Centres mm																	
400	600	400	600	400	600	400	600	400	600	400	600	400	600	400	600	400	600
7.95	6.95	8.56	7.48	9.40	8.21	9.57	8.36	10.31	9.00	11.32	9.89	11.58	10.12	12.73	11.12	14.60	12.75
6.31	5.52	6.80	5.94	7.46	6.52	7.59	6.63	8.18	7.15	8.98	7.85	9.19	8.03	10.10	8.82	11.58	10.12
5.52	4.82	5.94	5.19	6.52	5.69	6.63	5.80	7.15	6.24	7.85	6.86	8.03	7.02	8.82	7.71	10.12	8.84
5.01	4.38	5.39	4.71	5.92	5.17	6.03	5.27	6.49	5.67	7.13	6.23	7.30	6.37	8.02	7.00	9.19	8.03
4.65	4.06	5.01	4.37	5.50	4.80	5.60	4.89	6.03	5.26	6.62	5.78	6.77	5.92	7.44	6.50	8.54	7.46
4.38	3.82	4.71	4.12	5.17	4.52	5.27	4.60	5.67	4.95	6.23	5.44	6.37	5.57	7.00	6.12	8.03	7.02
4.16	3.63	4.48	3.91	4.91	4.29	5.00	4.37	5.39	4.71	5.92	5.17	6.05	5.29	6.65	5.81	7.63	6.67
3.98	3.47	4.28	3.74	4.70	4.11	4.78	4.18	5.15	4.50	5.66	4.94	5.79	5.06	6.36	5.56	7.30	6.38
3.82	3.34	4.12	3.60	4.52	3.95	4.60	4.02	4.95	4.33	5.44	4.75	5.57	4.86	6.12	5.34	7.02	6.13

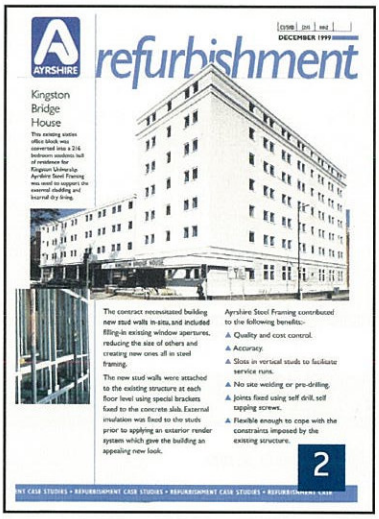
Alternatively use our unique ASF Design and Detail software to identify the optimum stud section and print a section design report for either restrained or unrestrained conditions. Simply input the specific height, stud centres, applied loads, limiting deflection and restraint condition i.e. infinitely versatile.

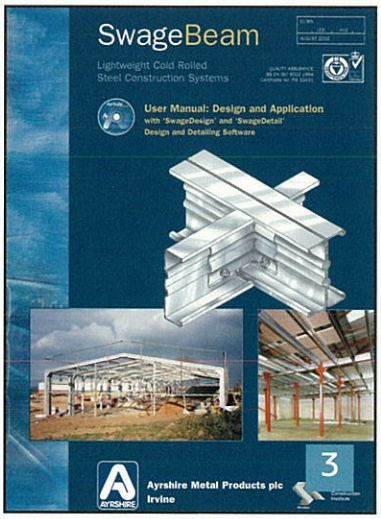


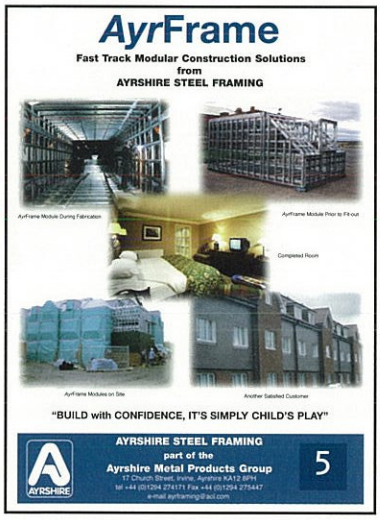
Product Literature

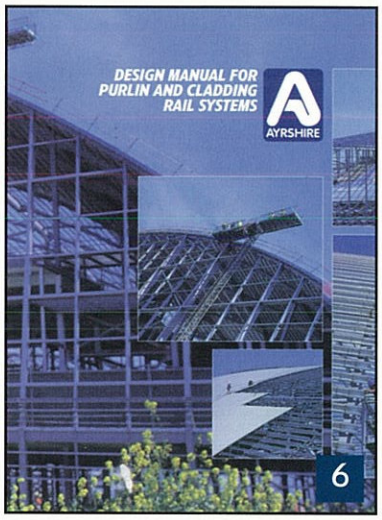
(For further product literature relating to associated systems produced within the Ayrshire Group see our Website)

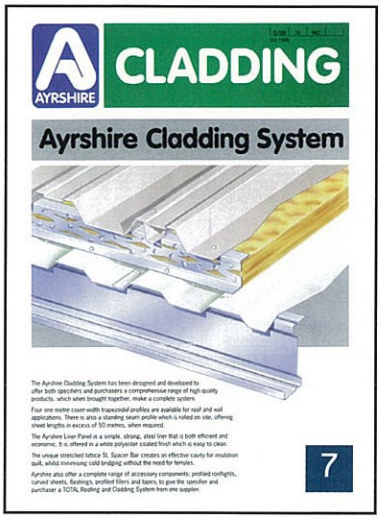
www.ayrshire.co.uk











1 SwageBeam Buildings

2 Refurbishment

3 Swagebeam Mezzanine Floors etc.

4 Ayrshire Steel Framing Sales Leaflet

5 AyrFrame Sales Leaflet

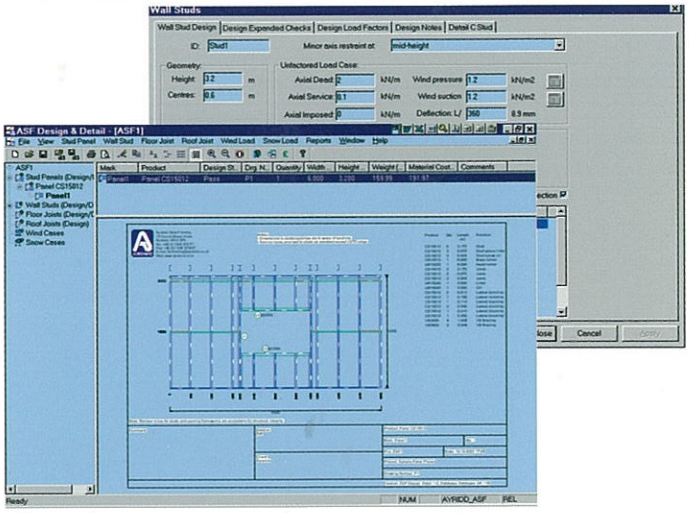
6 Design Manual for Purlin and Cladding Rail Systems

7 Ayrshire Cladding System

8 ASF Technical Data Sheets

AyrSuite Professional

CD Information



If you have not yet received your copy of our AyrSuite Professional software, please make your request through our website at **www.ayrshire.co.uk.** Alternatively call or email our Steel Framing Sales Office, at the address shown on the reverse of this manual.

You will be able to use our unique **ASF Design and Detail** program, by simply installing the AyrSuite Professional CD ROM provided. This is one of several programs found on the CD, which have been produced to enhance and compliment specific products available from the Ayrshire Group.

ASF Design and Detail is the program to be used in conjunction with this manual, and Ayrshire Steel Framing in general. The program can be used to generate hard copies, and electronic records of specific design projects, panel detail drawings including openings and priced bills of materials. The program includes access to our unique wind and snow analysis software, based on BS6399:Part 2:1997 - including latest amendments: March 2002.

Comprehensive printouts of design calculations, are available at the press of a button. These can be submitted as part of your package for building regulation approval.

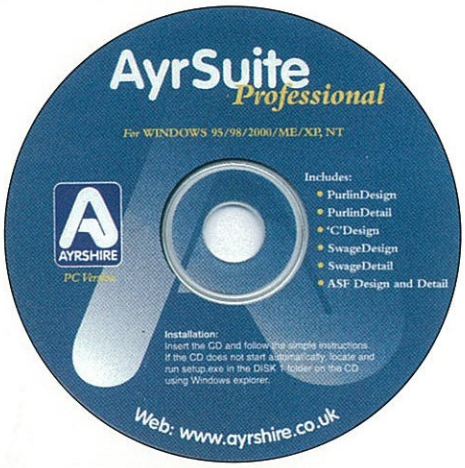
The **AyrSuite Professional CD ROM** also includes intuitive Previews, Quick Tours and On-line Help.

If you have a load bearing stud wall, floor or roof joists to design, use **ASF Design and Detail** to quickly identify which stud size can be used. Simply key-in span or height, stud centres, applied vertical and horizontal (wind) loads if applicable, specify deflection limit, and then let the software do the number crunching to BS5950-5:1998. The program will automatically highlight the optimum stud size, but you can manually override this to provide figures for other sizes.

ASF Design and Detail can also be used to quickly generate individual stud drawings, accurate panel drawings including framed openings for doors and windows, if required. A list of component parts is automatically generated and priced. This part of the program, can be used to detail either prefabricated panels or in situ panels built on site. The saved file can then be emailed to us to process your exact requirements.

Whether using the design, or the detailing and pricing elements of the program, one can easily change the parameters being used, through a simple edit facility built into the software.

We will be delighted to answer any questions you may have. Contact details can be found on the reverse of this manual.



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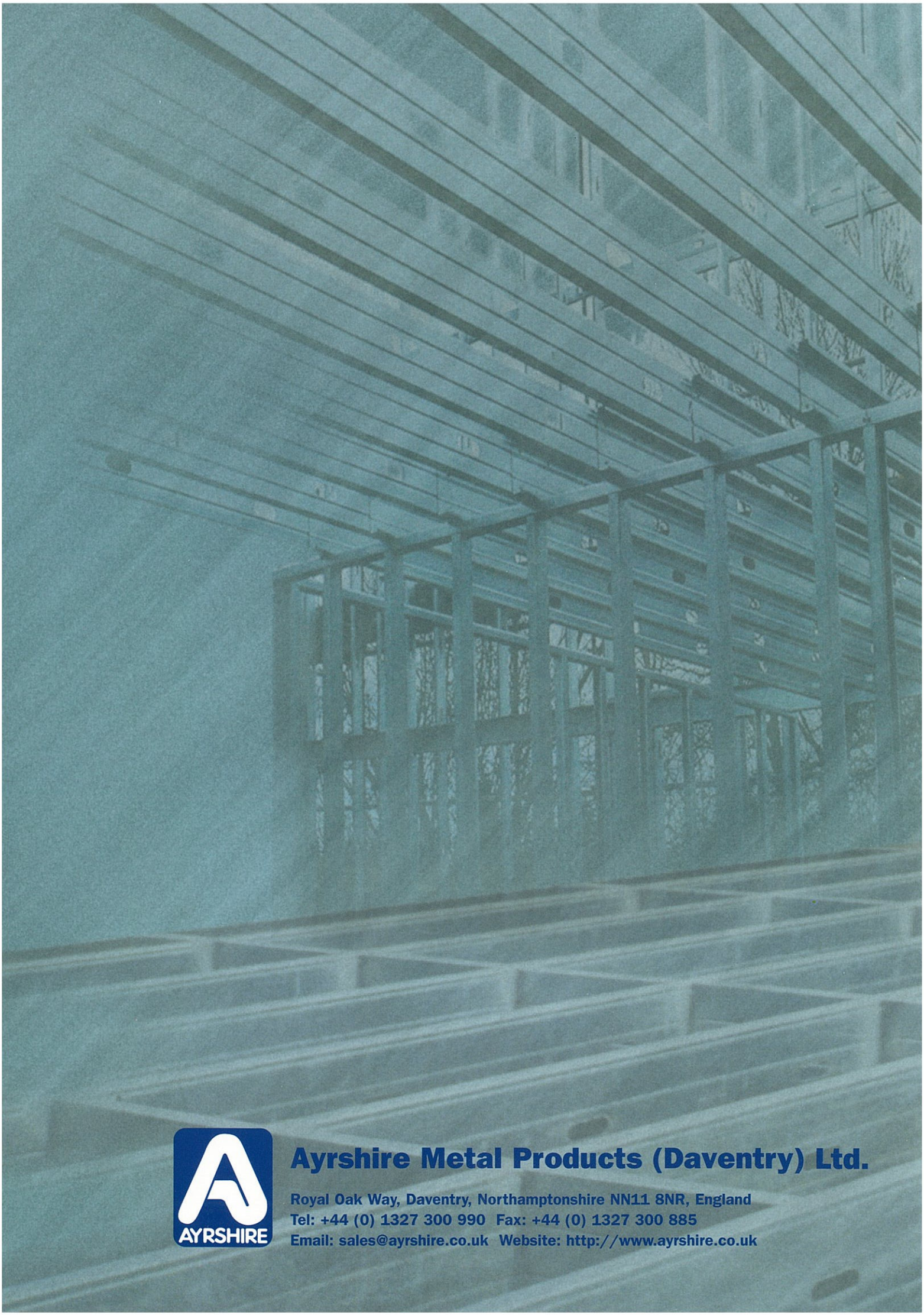

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