



Ayrshire Metals Limited

Steel Framing Brochure



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Disclaimer

Every care has been taken to ensure the accuracy of all information and specifications contained in this brochure. However Ayrshire Metals Limited cannot be held responsible for any errors or omissions.

Ayrshire Metals Limited reserve the right to amend or alter specifications where necessary, without prior notice.

Ayrshire Metals Limited has earned an enviable reputation for innovation and quality, which is the result of many years experience.

Our extensive production facilities allow us to manufacture and process cold formed steel sections tailored to the requirements of our customers.

At Daventry we 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.

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 timber and masonry. 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 610mm centres. The slotted holes are 38mm x 100mm long, except the CS70's which are generally supplied unpunched.

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.

Ultimate Performance

High yield steel grade 'S450' enables the load carrying capacity of our system to be fully maximized. The careful application of this manual, our AyrSuite™ 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.

Our products are manufactured in accordance with BS EN 1090-1 & 1090-2 to execution class 4.

Rapid Dry Envelope Construction

Ayrshire steel framing has been instrumental in successfully introducing 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). This allows the external leaf of brick, rainscreen, insulated render, or other proprietary cladding, to be taken 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 AyrSuite™ software package, ensures we remain market leaders.

AyrSuite™ Software

 Ayrshire Design Tools AyrSuite Plus 4.4.00016 Ayrshire Steel Products (Europe) Ltd. 1990-2008 Licensed to Customers of Ayrshire Steel Products (Europe) Ltd.	Job No.	Sheet No.	Rev.
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	Part		
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Client	File	Print Date 29 Mar 2016, 09:35	

Ref: Design Manual: Feb 2000. Applicable price lists: Purlin - Feb 2000 Swagebeam - Jul 2007, ASF sections - Jul 2007. The values indicated do not represent an official quotation. Integrated 3.30045

Section Design Report (Secondary SwageBeam) - ID: SecBeam1

Design Case

Design Geometry		Design Loadings		Load Factors	
Span (m)	4.87	Dead (kN/m ²)	0.29	Dead	1.4
Centres (m)	0.6	Service (kN/m ²)	0	Service	1.4
Max. Def. (mm)	L/250=19.5	Imposed (kN/m ²)	5	Imposed	1.6
		Self weight (kg/m)	4.94		

Adequate lateral torsional restraint assumed from the screw fixed decking for Secondary Joists (unless noted otherwise) and incoming joists for Primary Beams.
Major axis bending only.

Total Applied UDL	Factored (kN)	Working (kN)
Dead +Service +Imposed (including self weight)	24.893	15.693
Imposed	23.376	14.610

Consider: SB25015 Secondary SwageBeam, Major Axis (With Decking Restraint).

Major axis capacity:	+Ult. Capacity (kN)	+Defln. Capacity (kN)	
+ve stress ratio	24.893/25.176 = 0.989		17.344
Deflection ratio:	14.610/17.344 = 0.842	Thus, max. def. for imposed load =	16.4 mm
		Max. def. for total load =	17.6 mm

Conclusion: Section: SB25015 S390G Checks results: PASS
 System: Secondary SwageBeam. Method: Major Axis (With Decking Restraint).
 Bracing: Tie rods required at mid span.
 Design in accordance with BS5950:Part5:1998.

AyrSuite™ Design

AyrSuite™ Design is a Design & Detailing software package that provides an all in one solution for structural engineers, consultants, architects and steel fabricators.

The Design part of the software allows the user to establish the most appropriate section sizes required based on various conditions, such as wind or snow loadings.

Features of AyrSuite™ Design:-

- Design & Detailing for most of Ayrshire's product range
- Wind & Snow Load Assessment to BS6399
- Auto Optimisation facility for maximum economy
- Generates design reports, cost reports & drawings
- Breve 3 for improved accuracy of wind results
- Illustrated Wind Results

AyrSuite™ Detailing

Our latest detailing software contains many new features and products to make ordering sections from Ayrshire as easy as possible.

The software allows the user to input lengths, hole positions and quantities or alternatively import the details directly from today's leading 3D CAD packages. Once in 'AyrSuite™ Detailing', the user then has access to product drawings and fully costed BOM.

Please visit our website (www.ayrshire.co.uk) to request a copy.

Loose Stud / 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.

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 e.g.. 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 10 & 11 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 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 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 screw fixed or 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.



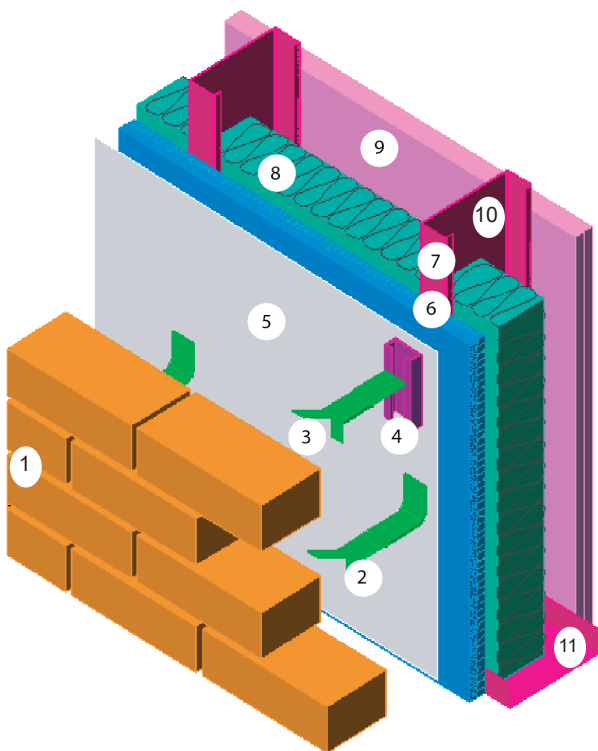
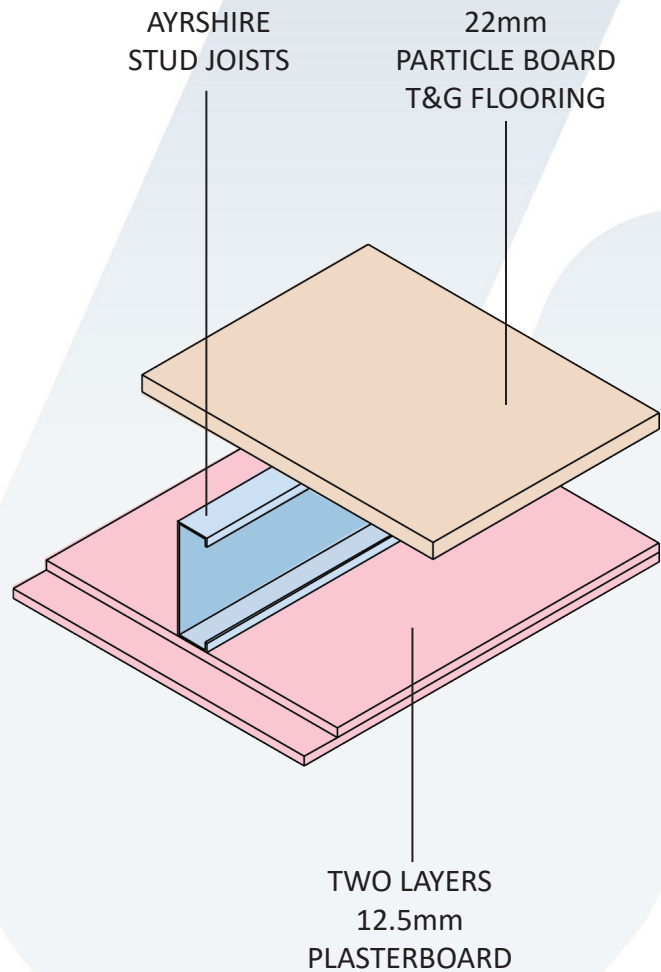
Advice on high performance structural drywall construction solutions is available free on request for:

- Load bearing partitions
- Load bearing party walls
- Rapid dry envelope systems
- Mezzanine floors
- Domestic separating floors
- Non-load bearing division walls in industrial buildings

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

Ayrshire have conducted a number of bespoke fire tests for our products used in both load bearing structures and infill wall construction. This allows us to specify our products with confidence to match our clients needs.

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 and below 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

Steel Framing Sections

Dimensions and Properties

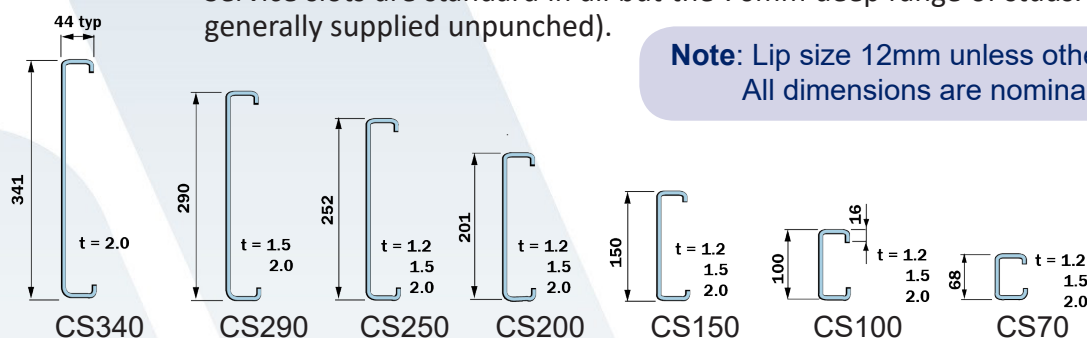
Stud Joists

(Any Transportable Length)

Service Slots in studs are 38 x 100mm long at 610mm centres.

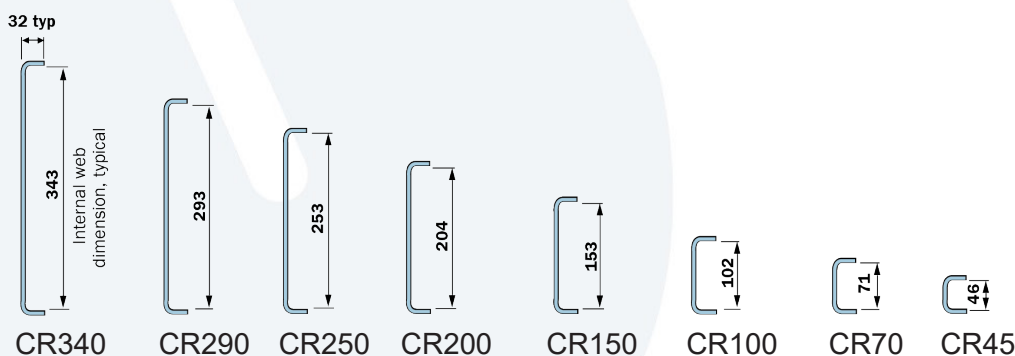
Service slots are standard in all but the 70mm deep range of studs. (NB: CS70 sections are generally supplied unpunched).

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



Standard Duty Channel Track

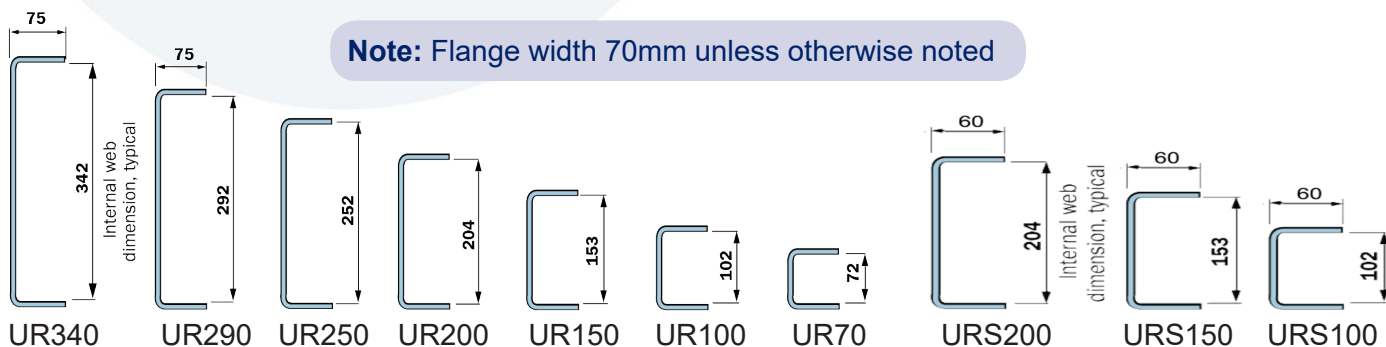
3.0 Metre Standard Length x 1.2mm Thick



Heavy Duty Channel Track

3.0 Metre Standard Length x 2.0mm Thick

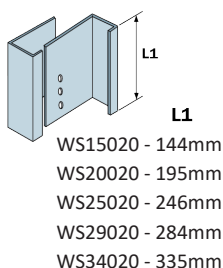
Slotted Head Track



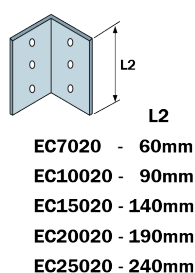
Note: Flange width 70mm unless otherwise noted

Accessories

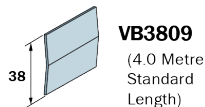
Web Stiffeners (2mm Thick)



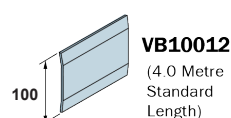
End Cleats (2mm Thick)



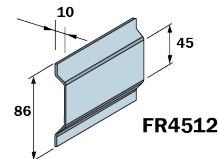
Lateral Bracing (0.9mm Thick)



Cross Bracing (1.2mm Thick)



Furring Runners (1.2mm Thick)



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

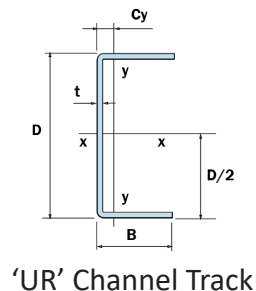
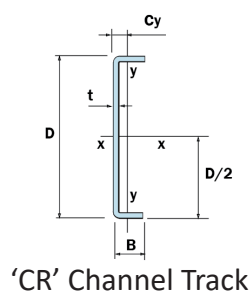
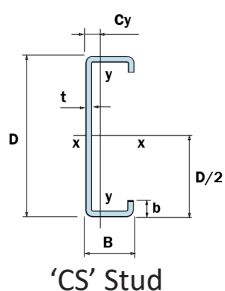
General Notes:

- 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

Steel Framing Sections

Section Properties

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



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

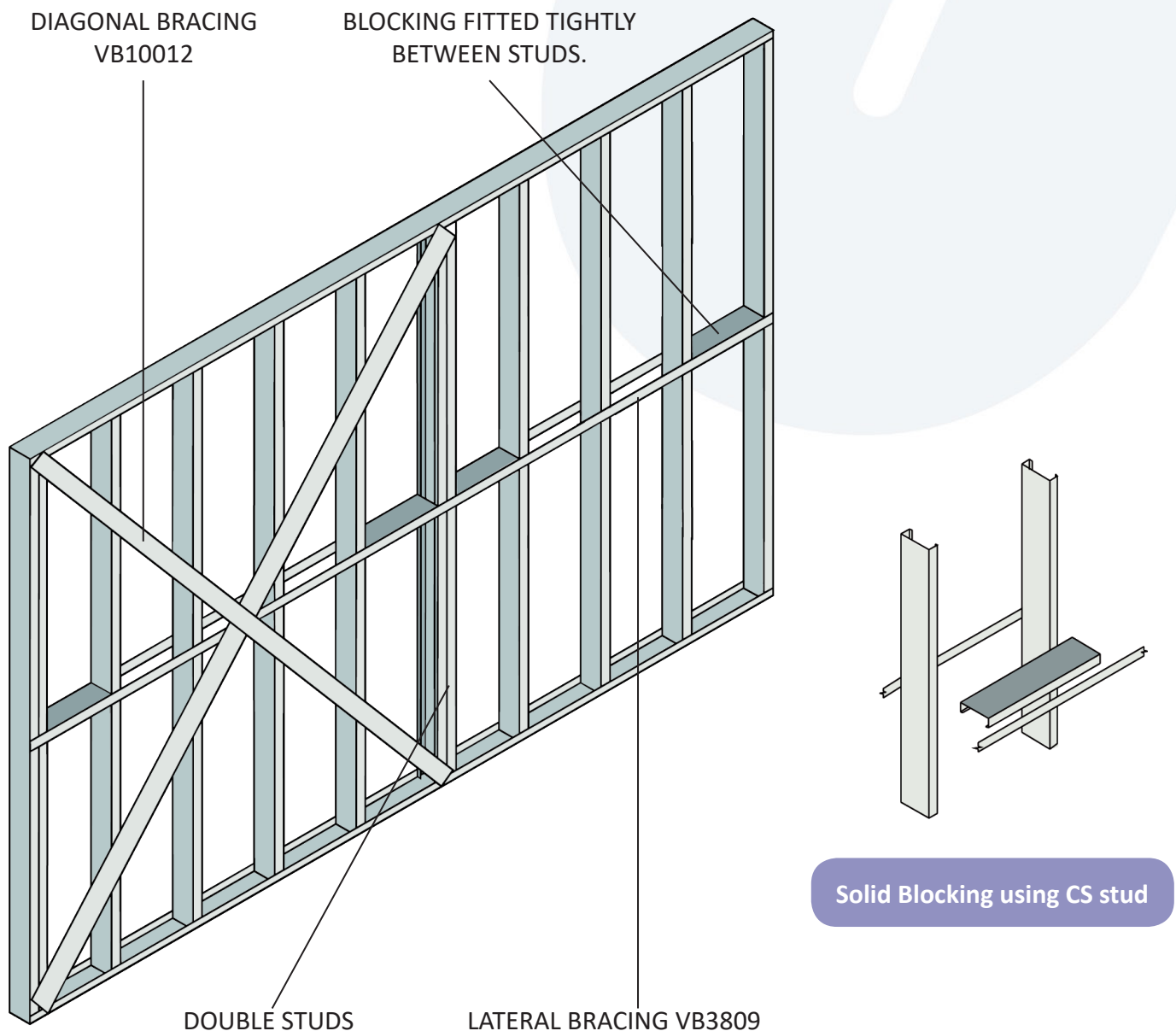
Under severe load conditions which may be applied through high wind or seismic forces the diagonal bracing maybe required to both sides of the stud frame. Additional details are available on request.

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 a method of solid blocking using a short length of CS stud cut to fit snugly between the wall studs and held in position by the lateral bracing.



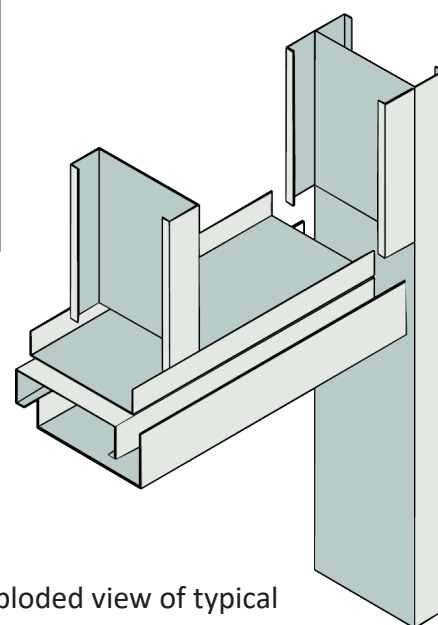
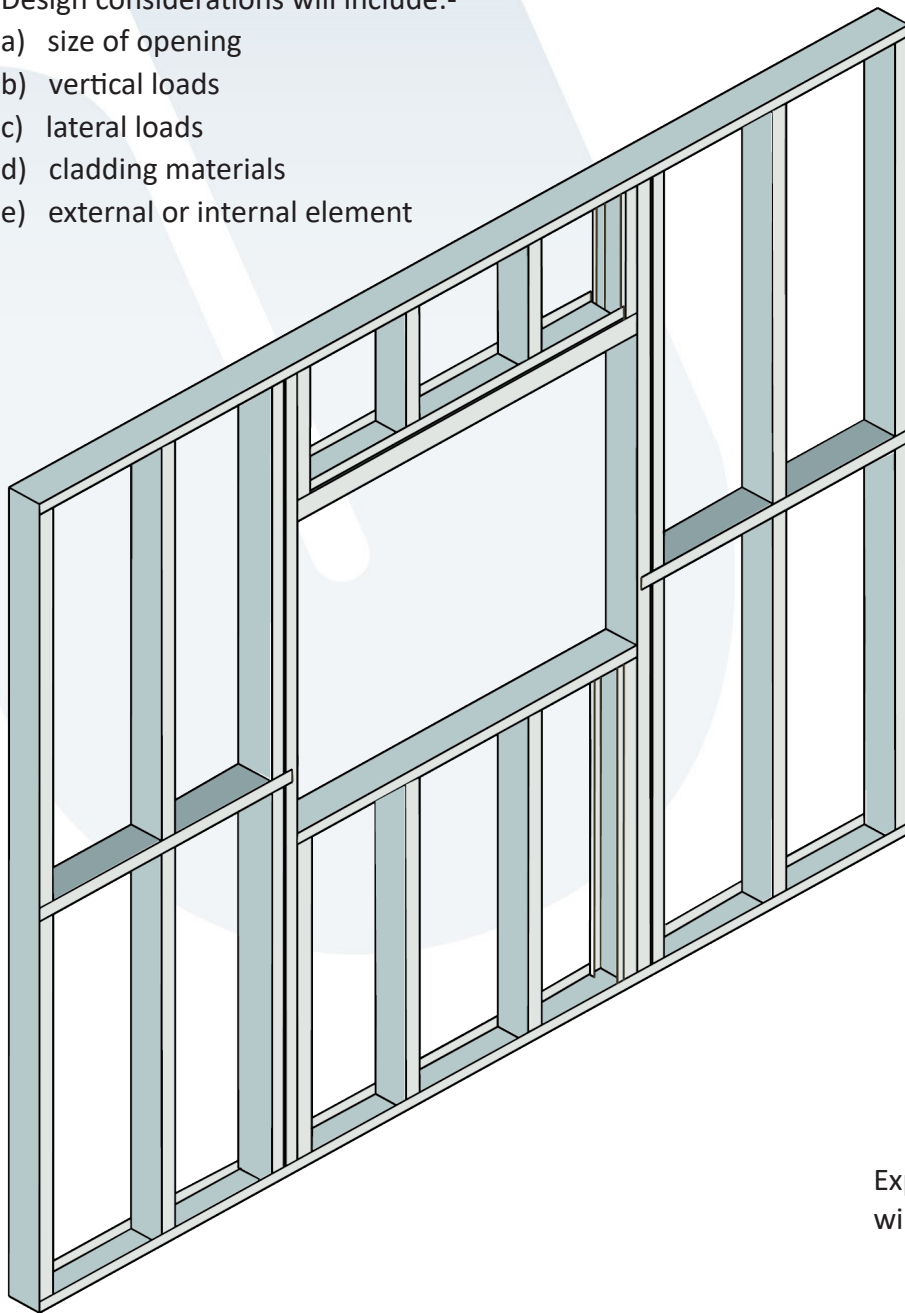
Solid Blocking using CS stud

Openings in Load Bearing Stud Walls

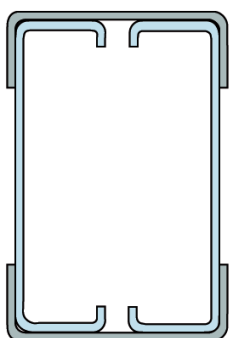
Lintels and headers can be constructed in a variety of ways to cope with different structural criteria. The illustrations demonstrate how lintels can be assembled using a combination of joists and channel runners.

Design considerations will include:-

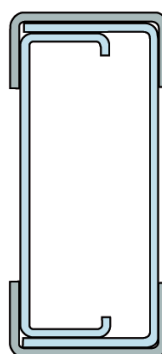
- a) size of opening
- b) vertical loads
- c) lateral loads
- d) cladding materials
- e) external or internal element



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)

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 web stiffener consists of two identical steel sections which, when mated and screw attached to the joist web, enable the steel joists to carry maximum allowable loads.

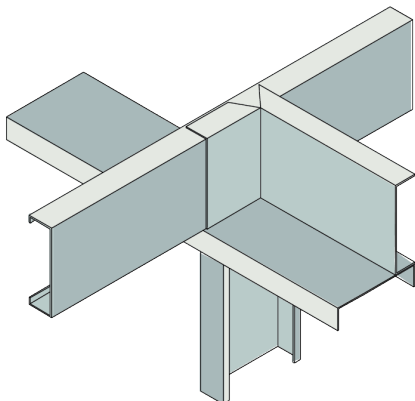
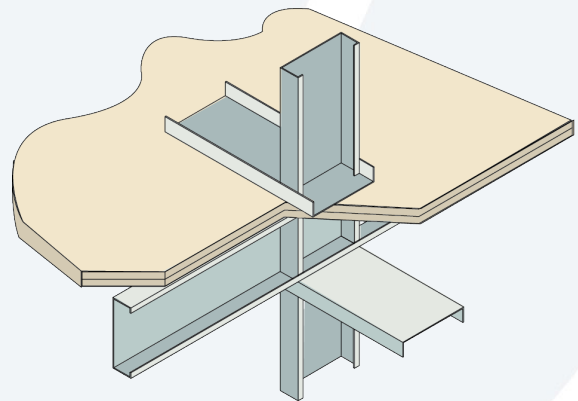
The joists must bear directly over the wall frame studs for maximum load bearing efficiency. If alignment is not possible, then various types of spreader angles must be incorporated - please contact the Technical Department for advice.

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 second row.

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

Joist web stiffening over load bearing wall

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

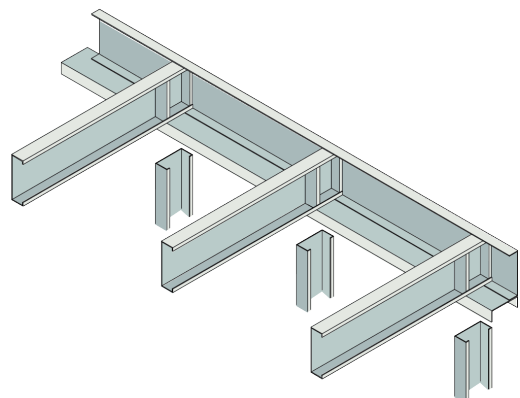


Solid blocking between joists using CR runner

Solid blocking is required using a short length of joist closure channel as shown.

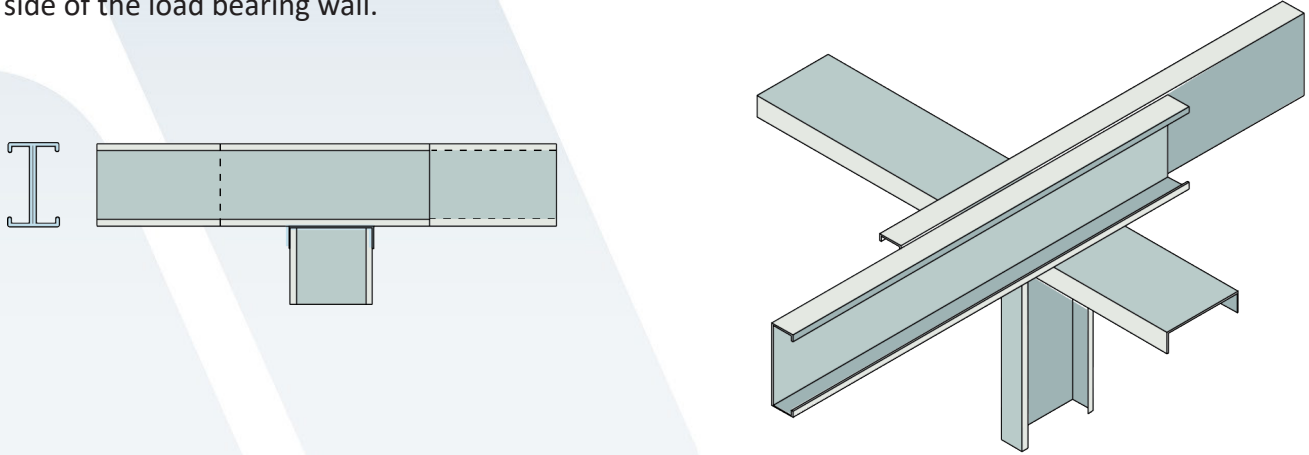
Joist intersection at load bearing stud wall

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



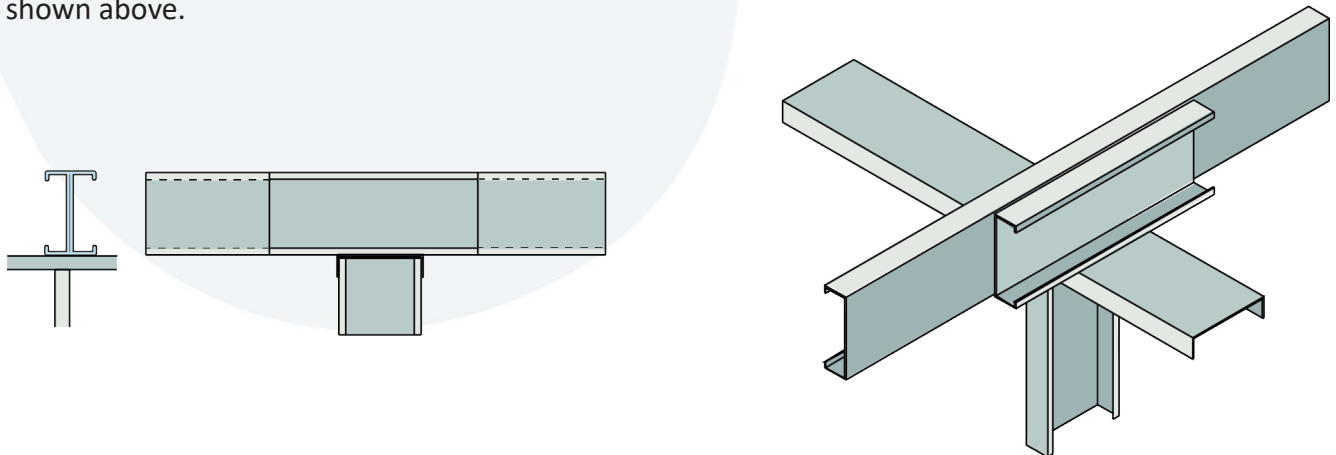
Continuous span - lapped connection over interior load bearing stud wall or beam

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.



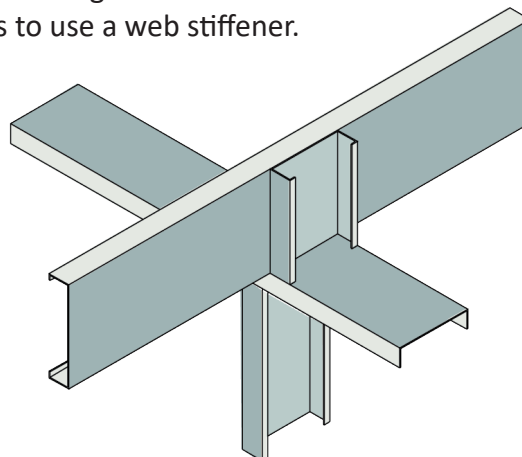
Continuous span - joist reinforcement over load bearing stud wall or beam

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



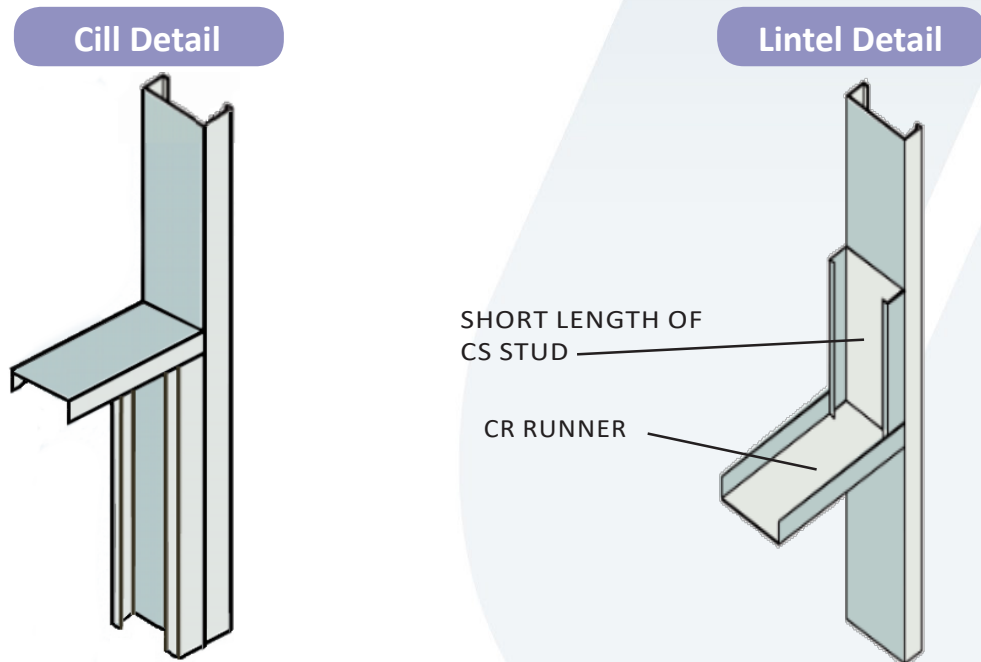
Joist reinforcement over load bearing wall

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.



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

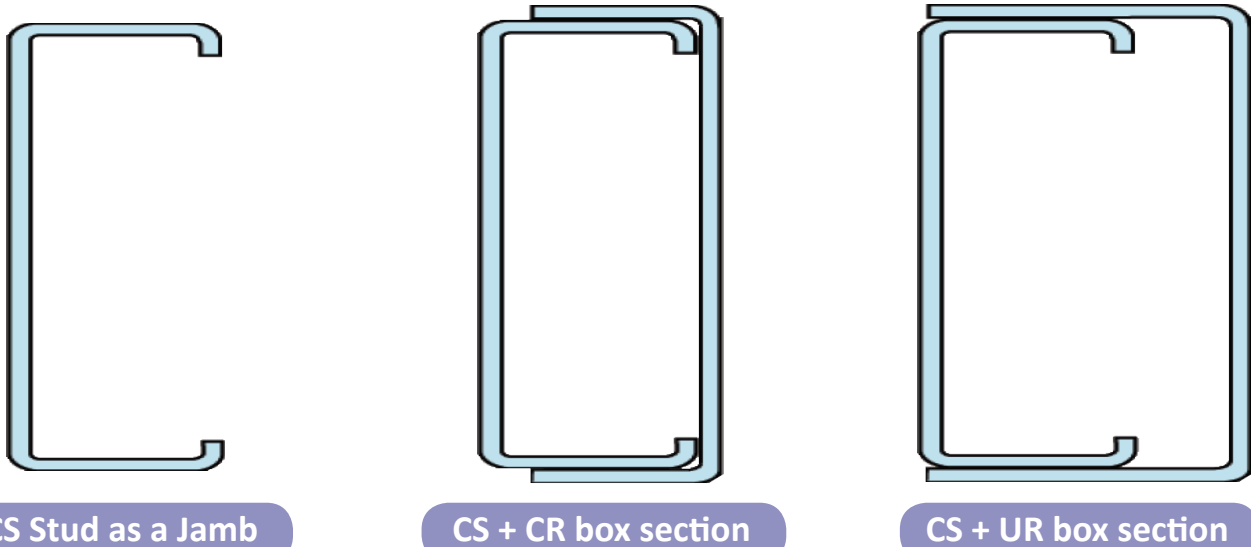
For larger openings it may be necessary to use a much stiffer member at the head and cill, in which case one solution is a deep UR runner. Alternative methods use CS studs fixed inside the header and cills to provide greater restraint.

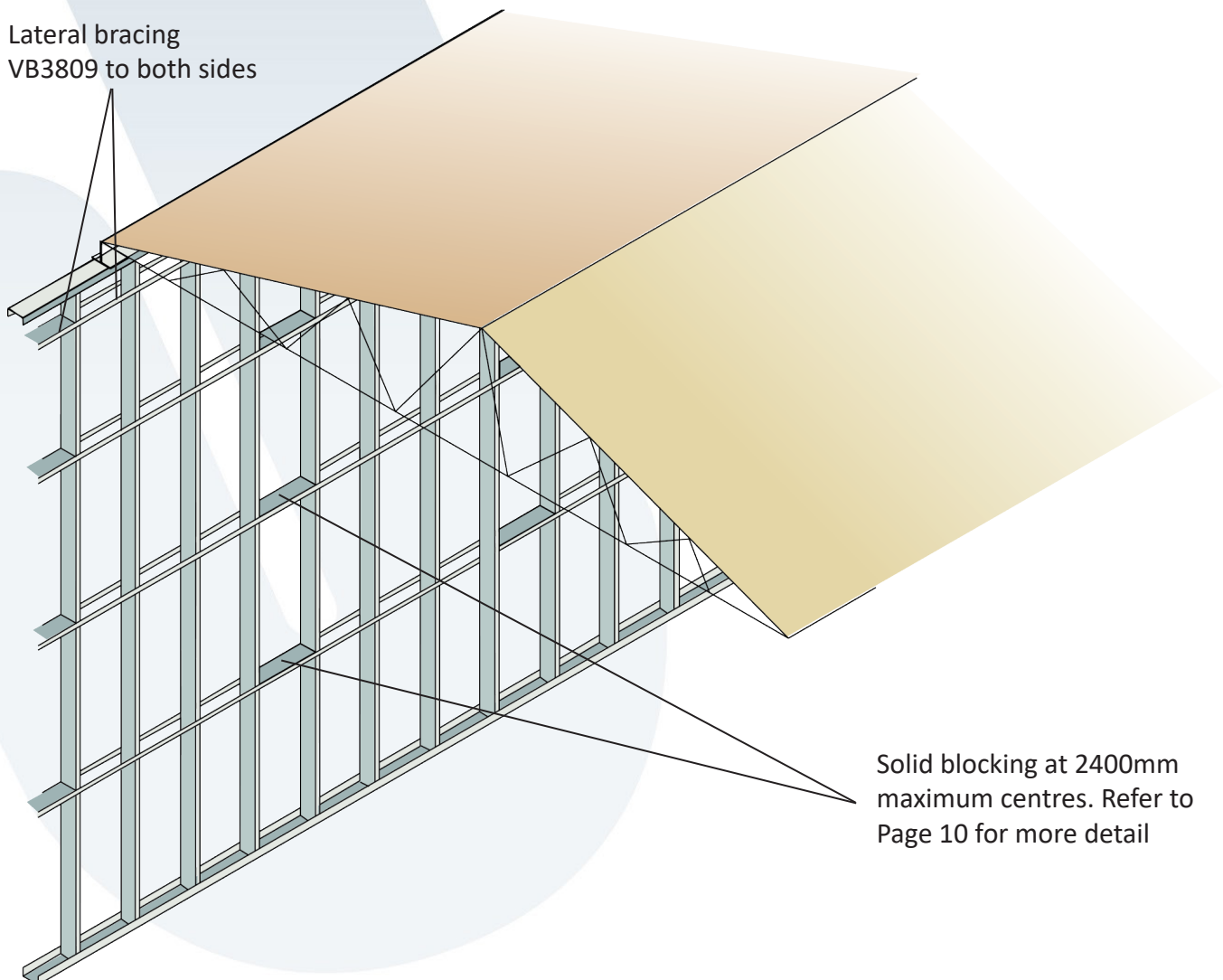


Jamb Members

Typical jamb details for forming openings are shown below. Smaller openings can use a single CS stud section.

Where support is required for larger openings it may be necessary to use several Ayrshire sections together to form a box.





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 600mm 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.

Stud wall systems are often used to infill between a structural frame, forming a rapid dry envelope (RDE) to the building. In these situations it is necessary to use a deflection head detail at the top of the panel, to prevent vertical loads from the structural frame being transferred to the studs. Typically these deflection heads can overhang the main structure by up to one third of the stud depth.

Ayrshire's stud system has a variety of solutions to allow for deflection, as shown below.

Slotted Head Track



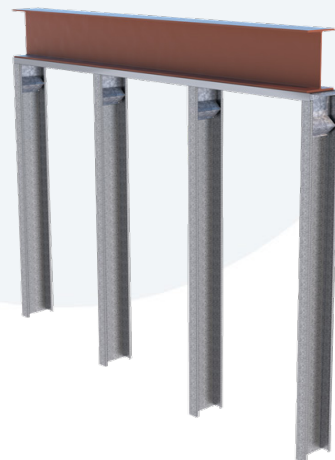
The slotted head track is an efficient system that minimises the number of components & increases the speed of erection. Ayrshire's URS head track is fixed to the structure above and features slotted holes in both flanges. Fixings are positioned at the mid-height of the slot & screw into the stud behind.

This head track can move up & down as the structure above is loaded, allowing for + / - 15mm vertical deflection.

Ayrshire have developed a range of bespoke brackets to be used with our studs. These brackets are fixed to the structure above but are free to slide up and down within the studs. The benefit of this system is that the it uses a much lighter CR head track, which can even be omitted in some circumstances.

This detail allows for + / - 25mm vertical deflection.

Deflection Head Brackets



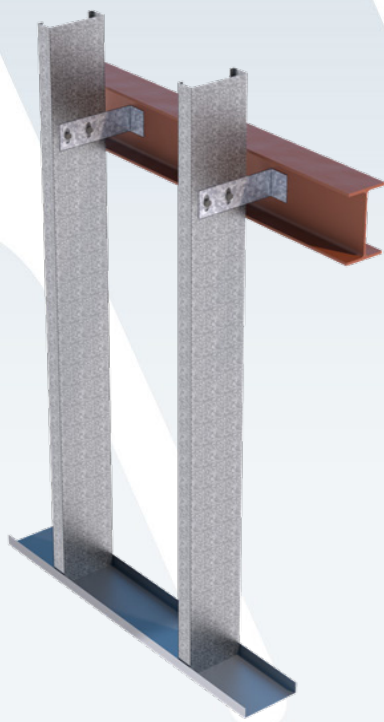
Head with blocking & bracing



The traditional deflection head system uses Ayrshire's UR head track fixed to the structural frame above. The studs slide into the head track but are not fixed directly to it. A line of bracing & blocking is installed to the studs, 150mm down from the top of the panel, to prevent racking of the studs.

This detail allows for + / - 25mm vertical deflection.

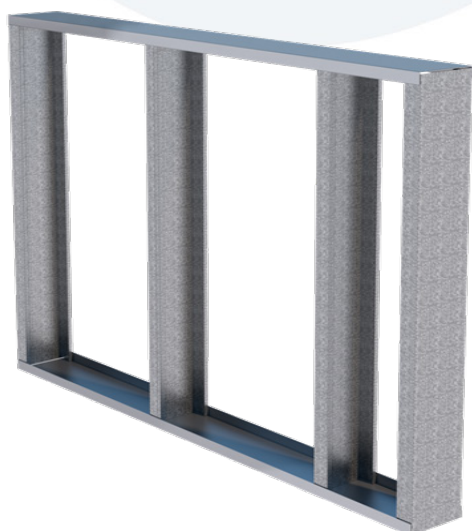
Studs Oversailing Main Structure



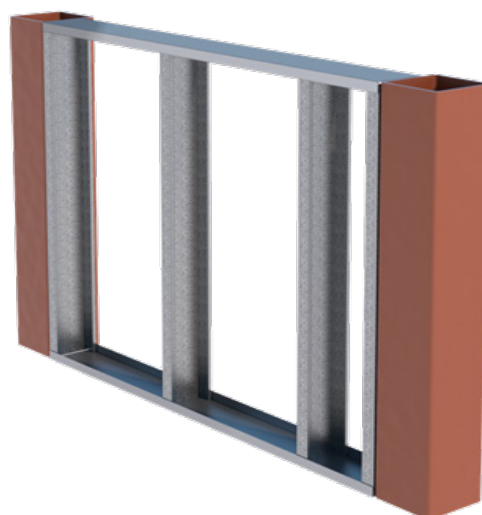
Where the line of the stud wall is outside the main structural frame studs are often laterally restrained using brackets. The connection of the studs to the brackets will typically be through slotted holes, to allow for the vertical movement of the main structure.

Parapets

Parapets up to 500mm tall can usually be formed as an upstand panel in Ayrshire steel framing sections alone.



Taller parapets are usually formed by infilling Ayrshire sections between hot rolled posts. These posts are often spaced at 3m or 4m centres. Longer spacings can be achieved but may require an Ayrshire boxed section at the head of the parapet.



Part Ref	Joist Ctrs	Uniform Load kN/m ²									
		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

Floor Joists



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

Part Ref	Joist Ctrs	Uniform Load kN/m ²									
		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	4.42	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	5.66	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	4.65	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	4.66	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	3.72	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

Part Ref	Joist Ctrs	Uniform Load kN/m ²									
		0.5 dead 1 Span	+ 1.5 live 2 Span	0.5 dead 1 Span	+ 3.0 live 2 Span	0.5 dead 1 Span	+ 5.0 live 2 Span	1.0 dead 1 Span	+ 3.0 live 2 Span	1.0 dead 1 Span	+ 5.0 live 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	2.37	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	2.09	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

Floor Joists



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

Part Ref	Joist Ctrs	Uniform Load kN/m ²									
		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 Load
(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

Alternatively use our unique AyrSuite™ Design 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

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	#	#	#	#	#	#	#	#

Alternatively use our unique AyrSuite™ Design 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 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	32.39	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	#	#	#	#	#	#	#	#

Alternatively use our unique AyrSuite™ Design 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 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	CS15015
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	#	#	#	#	#	#	#	#

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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

Wind Pressure kN/m ²	Stud Centres (mm)	CS7012	CS7015	CS7020	CS10012	CS10015	CS10020	CS15012	CS15015
0.25	300	6.34	6.81	7.44	8.61	9.25	10.13	11.69	12.57
	400	5.76	6.18	6.76	7.82	8.41	9.21	10.62	11.42
	600	5.03	5.40	5.90	6.83	7.34	8.04	9.27	9.98
0.50	300	5.03	5.40	5.90	6.83	7.34	8.04	9.27	9.98
	400	4.57	4.91	5.36	6.21	6.67	7.31	8.43	9.07
	600	3.99	4.29	4.68	5.42	5.83	6.38	7.36	7.92
0.75	300	4.40	4.72	5.16	5.97	6.42	7.02	8.10	8.72
	400	3.99	4.29	4.68	5.42	5.83	6.38	7.36	7.92
	600	3.49	3.75	4.09	4.74	5.09	5.58	6.43	6.92
1.00	300	3.99	4.29	4.68	5.42	5.83	6.38	7.36	7.92
	400	3.63	3.90	4.26	4.93	5.30	5.80	6.69	7.20
	600	3.17	3.40	3.72	4.30	4.63	5.07	5.84	6.29

Wind Pressure kN/m ²	Stud Centres (mm)	CS7012	CS7015	CS7020	CS10012	CS10015	CS10020	CS15012	CS15015
0.25	300	5.10	5.48	5.98	6.92	7.45	8.15	9.40	10.12
	400	4.63	4.98	5.44	6.29	6.76	7.41	8.54	9.19
	600	4.05	4.35	4.75	5.50	5.91	6.47	7.46	8.03
0.50	300	4.05	4.35	4.75	5.50	5.91	6.47	7.46	8.03
	400	3.68	3.95	4.31	4.99	5.37	5.88	6.78	7.30
	600	3.21	3.45	3.77	4.36	4.69	5.14	5.92	6.37
0.75	300	3.54	3.80	4.15	4.80	5.16	5.65	6.52	7.01
	400	3.21	3.45	3.77	4.36	4.69	5.14	5.92	6.37
	600	2.81	3.01	3.29	3.81	4.10	4.49	5.17	5.57
1.00	300	3.21	3.45	3.77	4.36	4.69	5.14	5.92	6.37
	400	2.92	3.13	3.42	3.96	4.26	4.67	5.38	5.79
	600	2.55	2.74	2.99	3.46	3.72	4.08	4.70	5.06

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

CS15020	CS20012	CS20015	CS20020	CS25012	CS25015	CS25020	CS29015	CS29020	CS34020
13.79	14.77	15.90	17.45	17.76	19.13	21.01	21.50	23.63	27.10
12.52	13.42	14.44	15.85	16.14	17.38	19.09	19.54	21.47	24.62
10.94	11.72	12.62	13.85	14.10	15.19	16.68	17.07	18.75	21.51
10.94	11.72	12.62	13.85	14.10	15.19	16.68	17.07	18.75	21.51
9.94	10.65	11.46	12.58	12.81	13.80	15.15	15.51	17.04	19.54
8.68	9.30	10.02	10.99	11.19	12.05	13.24	13.55	14.88	17.07
9.56	10.24	11.02	12.10	12.32	13.27	14.57	14.91	16.38	18.79
8.68	9.30	10.02	10.99	11.19	12.05	13.24	13.55	14.88	17.07
7.59	8.13	8.75	9.60	9.14	10.53	11.56	11.74	13.00	14.91
8.68	9.30	10.02	10.99	11.19	12.05	13.24	13.55	14.88	17.07
7.89	8.45	9.10	9.99	9.70	10.95	12.03	12.31	13.52	15.51
6.89	7.21	7.95	8.72	7.92	9.54	10.51	10.17	11.81	13.55

Deflection Limited to Height /240

CS15020	CS20012	CS20015	CS20020	CS25012	CS25015	CS25020	CS29015	CS29020	CS34020
11.09	11.88	12.79	14.04	14.29	15.39	16.91	17.30	19.01	21.80
10.08	10.80	11.62	12.76	12.99	13.99	15.36	15.72	17.27	19.81
8.80	9.43	10.15	11.14	11.34	12.22	13.42	13.73	15.09	17.31
8.80	9.43	10.15	11.14	11.34	12.22	13.42	13.73	15.09	17.31
8.00	8.57	9.22	10.12	10.31	11.10	12.19	12.48	13.71	15.72
6.99	7.49	8.06	8.84	9.00	9.70	10.65	10.90	11.98	13.74
7.69	8.24	8.87	9.73	9.91	10.67	11.72	12.00	13.18	15.12
6.99	7.49	8.06	8.84	9.00	9.70	10.65	10.90	11.98	13.74
6.10	6.54	7.04	7.73	7.87	8.47	9.30	9.52	10.46	12.00
6.99	7.49	8.06	8.84	9.00	9.70	10.65	10.90	11.98	13.74
6.35	6.80	7.32	8.04	8.18	8.81	9.68	9.90	10.88	12.48
5.55	5.94	6.40	7.02	7.15	7.70	8.45	8.65	9.51	10.90

Alternatively use our unique AyrSuite™ Design 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 kN/m ²							Stud Centres mm											
	400	600	400	600	400	600	400	600	400	600	400	600	400	600	400	600	400	600
	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
	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
	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
	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
	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
	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
	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
	2.32	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
2.23	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 kN/m ²							Stud Centres mm											
	400	600	400	600	400	600	400	600	400	600	400	600	400	600	400	600	400	600
	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
	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
	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
	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
	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
	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
	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
	2.02	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 kN/m ²							Stud Centres mm												
	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) 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 /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

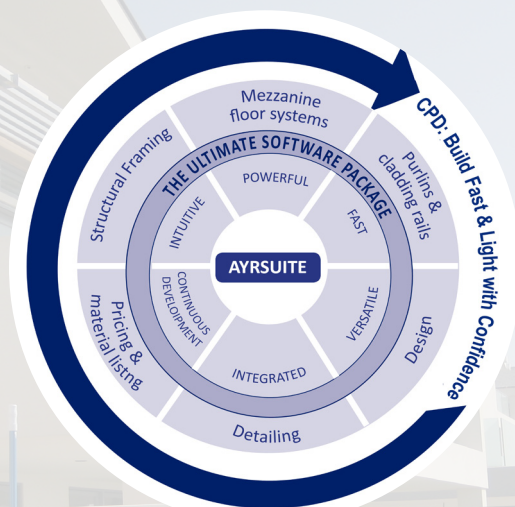
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