DESIGN GUIDE - PURLIN SYSTEMS

This guide is an extract from the Dimond Structural Systems Manual and it is to be read in conjunction with the full Dimond Structural Systems Manual available at www.dimond.co.nz under the Architects/Specifiers section. This guide will not be updated by Dimond and it is intended that the user updates this guide using the current Dimond Structural Systems Manual on our website.

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Dimond, a division of Fletcher Steel Ltd

August 2016

2.0 SCOPE OF USE

Dimond Purlin Systems are intended for use as structural support to roofing and wall cladding. The systems provide for bolted connections to primary structural framework and include Dimond Hi-Span (DHS) Purlins, Fastbrace, Dimond Brace Channels and Top Notch purlins. The systems are subject to limitations on the environment in which they are used, depending on the type of coating specified.

Dimond Purlin Systems are not intended to be used as members to which fall arrest anchor points are attached.

Dimond purlin systems are not intended to be used as vertical studs or horizontal wall girts where plaster board is fixed directly to the DHS purlin and a level 4 finish or above is required. Where a level 4 finish or above is required, Dimond recommend fixing a secondary adjustable grid framing system to the DHS purlins prior to lining with plasterboard to ensure a tighter alignment and fixing tolerances, to achieve the required finish.

It is critical to product performance that the loads applied, member spans, member sizes and bracing points are designed within the appropriate Limit State Loads and limitations published in this manual. Before commencing a project using a Dimond Purlin System, the designer must ensure relevant information is available to the end user. Failure to observe this information may result in a significant reduction in product performance. Dimond accepts no liability whatsoever for products which are used otherwise than in accordance with these recommendations.

The information contained within Purlin Systems is only applicable to Dimond Purlin and Bracing Systems – it cannot be assumed to apply to similar products from other manufacturers.

USE OUTSIDE THE STATED GUIDELINES

If the need arises to use a Dimond Purlin System outside the limitations and procedures given in this manual or if there exists any doubt on product handling or use, written approval should be obtained from Dimond for the specific project, before the project is commenced.

2.1 DURABILITY

2.1.1 SCOPE OF USE

The Dimond Purlin Systems described in this manual are subject to limitations on the environment in which they are used, depending on the type of coating specified in detail in this section.

2.1.2 COATING MATERIAL SPECIFICATIONS

Dimond Purlin Systems are manufactured from galvanised coil in the following protective galvanised zinc coating weights.

1. Standard grade (typically used for interor use) Z 275, i.e. 275 g/m² total zinc coating weight, for DHS Purlins. Fastbrace channel standard is Z450, i.e. 450 g/m² total zinc coating weight.
2. Special grade (typically used for exposed external use) Z450, i.e. 450 g/m² total zinc coating weight, for DHS Purlins and Fastbrace channel and cleat ends.

Refer to Section 2.1.3 on the selection of the appropriate grade.
Refer to Section 2.1.3.1 where extra paint protection may be required

The special grade Z450 usually requires a three-month lead time from date of order to supply for all sizes of purlins and quantities.

2.1.3 ENVIRONMENTS

2.1.3.1 GENERAL

The durability of galvanised zinc coated products is dependent on:

- the environment it will be installed in.
- the grade or weight of the zinc coating used.
- the degree and extent of the maintenance that will be undertaken over the life of the product.

Performance of galvanised zinc coated products is affected by:

- the cumulative effects of the weather.
- the amount of dust that settles on the product (which can hold moisture).
- any other wind-blown deposits that may settle on the product, promoting corrosion.

If these deposits are not removed, they will greatly lessen the durability of the product. Regular maintenance should be carried out on these areas – refer Section 2.1.6.

Standard zinc coating weight is used on most buildings where components are kept dry, protected from exposure to moisture and corrosive environments. Inside the building the galvanised zinc coated products can be used in the temperature range of +60°C and down to a minimum of -30°C.

In high risk areas such as the underside of canopies, exposed purlin systems used above underslung canopies or exposed purlin systems around large door openings facing the prevailing wind direction, attention should be given to specifying a suitably protective paint coating on the purlin and bracing. Refer Section 2.1.5. The special grade Z450 material may also be specified for the purlins. Bracing Channel and cleats are supplied standard as Z450 galv weight.

2.1.3.2 LIMITATIONS ON USE

Avoid the use of galvanised steel purlin systems without the additional protection of an appropriate coating in the following environments:

- Swimming pool covers, where high concentrations of chlorine are combined with a high humidity environment. In this situation the purlin system remains wet for long periods of time, causing a rapid consumption of the galvanised zinc coating and eventual red rusting of the base metal.
- Any use where the galvanised surface is being exposed to continuous moisture, without a chance for the surface to dry out.
- In or near marine environments, where the prevailing wind may deposit marine salts on the galvanised surface.
- In areas surrounding chemical or industrial storage buildings where any chemical attack may lessen the life of the structure or wind-driven chemical fumes may attack the galvanised coating. Please call 0800 Roofspec (0800 766 377) to discuss.
- When in contact with the ground (ie soil or clay) or where embedded in concrete.

Avoid the use of galvanised steel purlin systems:

- When in contact with timber and especially treated timber such as CCA (copper chrome arsenic) without the use of an isolating material such as Malthoid (DPC) between the timber and galvanised steel flooring sheet. This avoids any moisture or chemical reaction between the two materials.
- When in contact with the ground (ie soil or clay) or where embedded in concrete.
- When used in sub-floor areas with less than 450mm ground clearance.
- When used in sub-floor areas where ventilation does not comply with NZS 3604 Clause 6.14.
- When used within 50mm of the concrete ground slab.

2.1.4 NZBC COMPLIANCE

Past history of use of Dimond Purlin Systems indicate that provided the product use and maintenance is in line with the guidelines in this manual, Dimond Purlin Systems can reasonably be expected to meet the performance criteria in clause B1 Structure and B2 Durability of the New Zealand Building Code for a period of not less than 50 years.

2.1.5 DURABILITY STATEMENT

The use of Dimond Purlin Systems is limited to dry and non corrosive environments. It is the responsibility of the designer to assess the durability requirements of the Dimond Purlin System.

Dimond can, for specific job locations, give advice on the performance of the Dimond galvanised zinc coated purlin system. Call Dimond on 0800 Roofspec (0800 766 377).

The durability of the galvanised zinc coating can be extended by the application of a suitable paint system. Overpainting specifications for specific locations can be obtained from Ameron Coatings 0800 263 766 or Akzo Nobel Coatings Limited 0800 808 807.

2.1.6 MAINTENANCE

Dimond Purlin Systems require a minimum degree of maintenance in order that the expected performance is achieved by ensuring the galvanised surface is free from dirt buildup. Careful maintenance can extend the useful life of the Dimond Purlin System.

As a guide the following should be carried out as often as is needed (this could be as often as every three months).

a) Keep surfaces clean and free from continuous contact with moisture, dust and other debris. This includes areas such as exposed undersides of canopies.

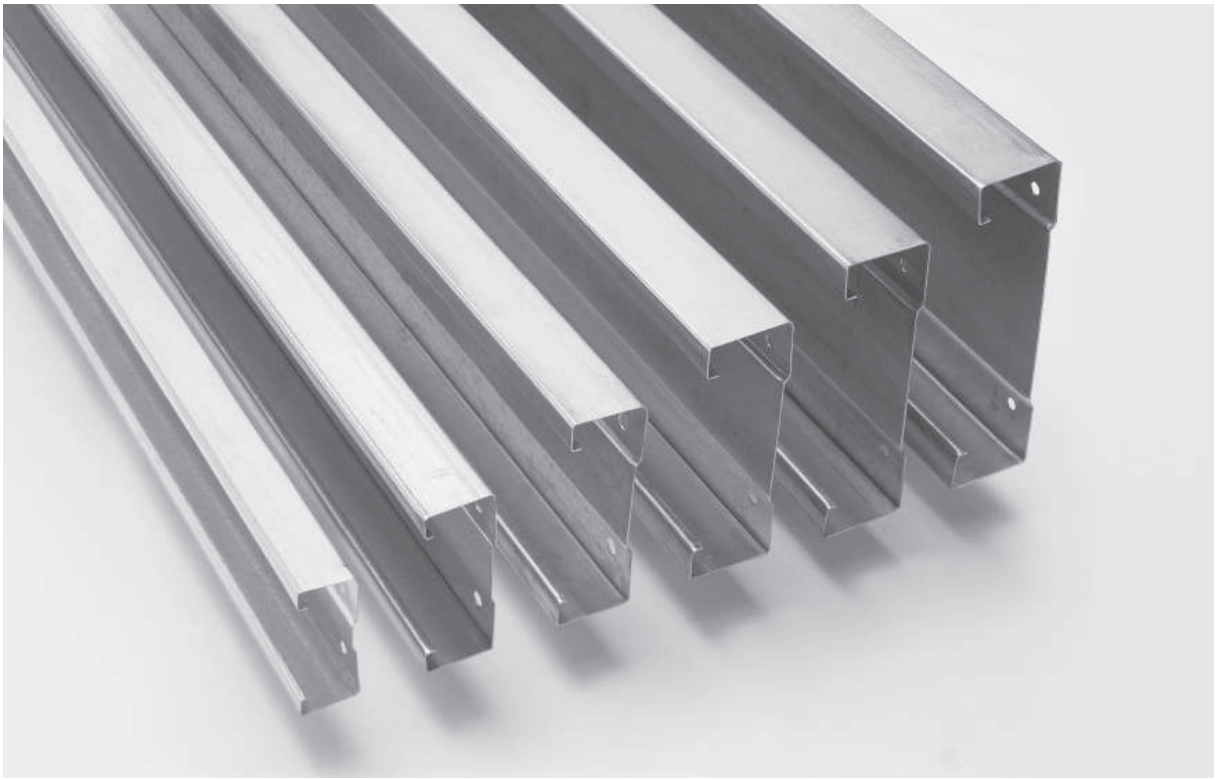
b) Regular maintenance should include a washdown programme to remove all the accumulated dirt or salt buildup on all the galvanised surfaces with a soft brush and plenty of clean water or by water blasting at 15 MPa (2000 psi).

c) Periodically inspect and replace where necessary any bolts or fasteners that have deterioriated to the extent that red rust has become obvious over most of their surface.

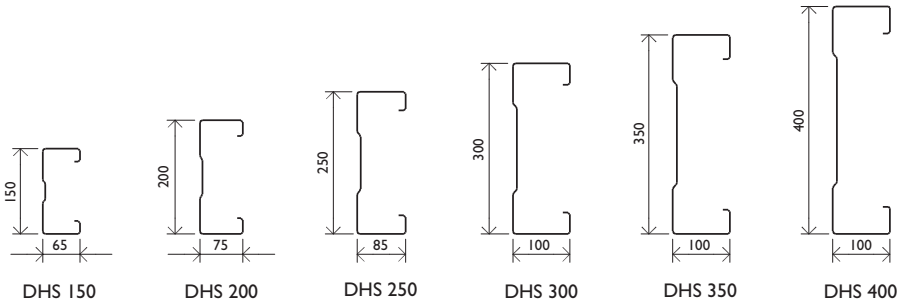
d) Periodically inspect the Purlin, Girt, Fastbrace Brace Channel, Sag Rod members and all connections for signs of surface corrosion. Remove any surface corrosion and spot prime corroded areas that exhibit exposed steel substrate, and repaint to an appropriate paint manufacturer's recommendations.

Any case of severe damage or corrosion must be reported to the design engineer.

DESIGN TABLES – DHS PURLINS



DHS Purlins – Nominal Dimensions



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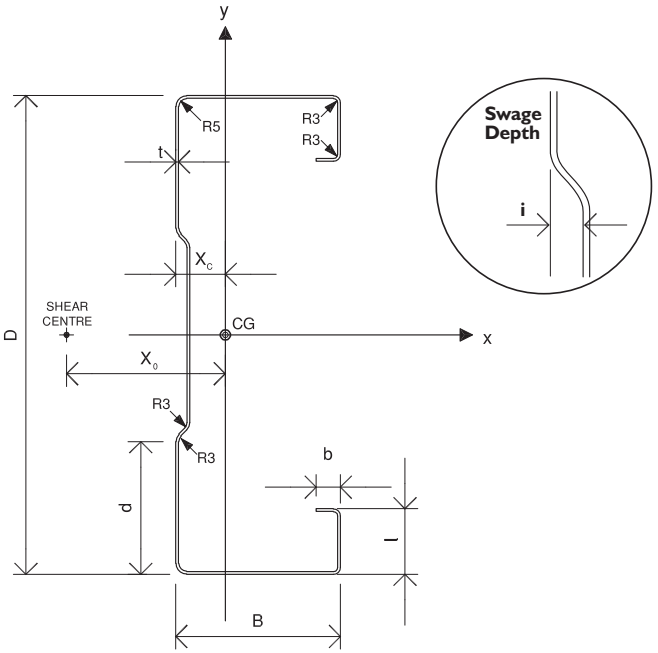
2.3.4 DHS SECTION PROPERTIES

DHS Section	Depth D mm	Width B mm	Thickness t mm	Mass kg/m	Weight kN/m	d mm	Swage Depth i mm	b mm	l mm	x_c mm	x_0 mm
DHS 150/12	150	65	1.15	2.99	0.030	54	4	10	23	24.0	56.6
DHS 150/15	150	65	1.45	3.74	0.037	54	4	10	23	23.9	56.1
DHS 200/12	200	75	1.15	3.71	0.037	62	4	10	28	26.3	62.0
DHS 200/15	200	75	1.45	4.65	0.046	62	4	10	28	26.2	61.4
DHS 200/18	200	75	1.75	5.59	0.055	62	4	10	28	26.1	60.8
DHS 250/13	250	85	1.25	4.87	0.048	67	6	12	33	29.4	67.1
DHS 250/15	250	85	1.45	5.63	0.056	67	6	12	33	29.3	66.7
DHS 250/18	250	85	1.75	6.76	0.067	67	6	12	33	29.3	66.2
DHS 300/15	300	100	1.45	6.66	0.066	67	7	12	38	34.0	76.1
DHS 300/18	300	100	1.75	8.01	0.079	67	7	12	38	33.9	75.6
DHS 350/18	350	100	1.75	8.83	0.087	77	7	12	43	32.7	73.4
DHS 400/20	400	100	1.95	10.74	0.106	79	7	12	48	31.8	70.9



Note: Mass assumes a total coated weight for the standard zinc coating of 275 g/m

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DHS Section	FULL (GROSS) SECTION PROPERTIES											EFFECTIVE SECTION PROPERTIES						
	A_g mm^2	I_x 10^6mm^4	I_y 10^6mm^4	Z_x 10^3mm^3	$Z_{y(+ve)}$ 10^3mm^3	$Z_{y(-ve)}$ 10^3mm^3	r_x mm	r_y mm	β_y mm	J mm^4	I_w 10^9mm^6	$A_{e(fy)}$ mm^2	I_{ex} 10^6mm^4	$I_{ey(+ve)}$ 10^6mm^4	$I_{ey(-ve)}$ 10^6mm^4	Z_{ex} 10^3mm^3	$Z_{ey(+ve)}$ 10^3mm^3	$Z_{ey(-ve)}$ 10^3mm^3
DHS 150/12	381	1.33	0.24	17.8	5.9	10.2	59.2	25.3	166	168	1.44	223	1.18	0.24	0.16	14.6	5.9	4.9
DHS 150/15	477	1.66	0.30	22.2	7.3	12.6	59.1	25.1	165	334	1.76	314	1.57	0.30	0.22	20.2	7.3	6.6
DHS 200/12	473	2.90	0.40	29.0	8.2	15.2	78.4	29.1	207	208	4.04	238	2.37	0.40	0.25	20.7	8.2	6.2
DHS 200/15	593	3.63	0.49	36.3	10.1	18.9	78.2	28.9	206	415	4.96	336	3.22	0.49	0.33	29.8	10.1	8.6
DHS 200/18	712	4.34	0.59	43.4	12.0	22.4	78.1	28.7	206	726	5.82	445	4.12	0.59	0.42	39.9	12.0	10.8
DHS 250/13	620	5.86	0.66	46.8	11.8	22.4	97.2	32.6	246	323	10.47	290	4.62	0.66	0.39	31.6	11.8	8.6
DHS 250/15	717	6.76	0.76	54.1	13.6	25.8	97.1	32.5	245	502	11.97	361	5.62	0.76	0.47	39.6	13.6	10.5
DHS250/18	861	8.10	0.90	64.8	16.1	30.7	97.0	32.3	245	879	14.13	478	7.20	0.90	0.60	53.2	16.1	13.8
DHS 300/15	849	11.55	1.22	77.0	18.4	35.8	116.7	37.9	292	595	27.41	381	8.93	1.22	0.73	50.2	18.4	13.5
DHS 300/18	1020	13.86	1.45	92.4	22.0	42.7	116.5	37.7	292	1042	32.47	505	11.46	1.45	0.92	67.1	22.0	17.6
DHS 350/18	1125	20.22	1.60	115.6	23.7	48.8	134.1	37.7	333	1149	48.48	523	16.36	1.60	0.96	80.8	23.7	18.0
DHS 400/20	1368	31.31	1.91	156.5	28.0	60.0	151.3	37.4	380	1734	75.70	635	25.75	1.91	1.14	112.2	28.0	21.4

Note: Notation used is consistent with Table 1.4 in AS/NZS 4600:1996 (+ve) = Lip in compression (–ve) = Web in compression

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2.3.6 INTRODUCTION TO DHS PURLIN SYSTEMS CAPACITY TABLES

The capacity tables given in Sections 2.3.7 and 2.3.8 relate to the following span configurations:

Single span – pinned at both ends.
End span – pinned at one end and fixed at the other.
Internal span – fixed at both ends.

Note: End and internal spans can be continuous or lapped.

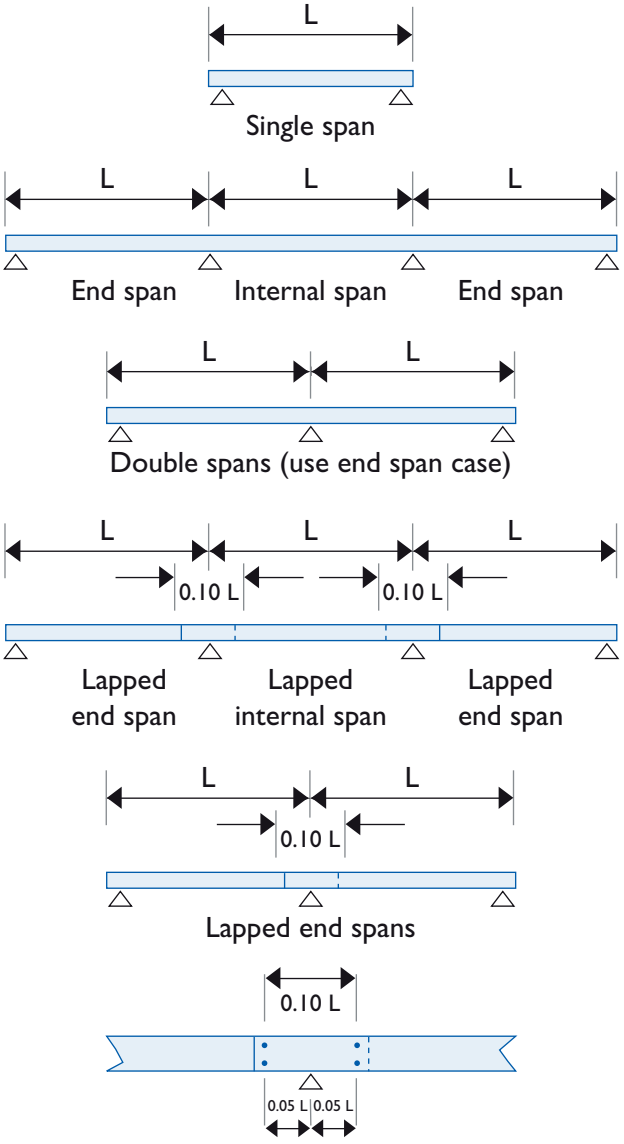
No bolt slip or member rotation has been allowed for at fixed ends.

Use of end span tables with corresponding internal span tables assumes that the end span is within plus 5% or minus 10% of the internal spans, provided that for a 3 span configuration both end spans are reduced by the same amount. Otherwise specific design to AS/NZS 4600 is required.

As a guide, single spans are used most frequently, particularly where purlins are set down between the rafters. Deflections may govern on larger spans.

End and continuous configurations may be used where lower deflections are required.

Lapped end and lapped internal configurations are more economical on large purlin spans where better strength and lower deflections are required.



All lap lengths are to be a minimum of 0.1 of the maximum span, measured from bolt centre to bolt centre each end of the lap, positioned equally each side of the portal rafter. Refer detail N in Section 2.3.16.15.

L = Span length

2.3.7 DHS LOAD SPAN TABLES – SINGLE SPANS

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span (m)	DHS 150/12					DHS 150/15					DHS 200/12					DHS 200/15					DHS 200/18					DHS 250/13				
	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S
3.0	5.17	5.17	5.17	5.17	4.73																									
3.5	3.80	3.80	3.80	3.80	3.02	5.18	5.18	5.18	5.18	3.92	5.63	5.63	5.63	5.63	5.86															
4.0	2.91	2.91	2.91	2.91	2.05	3.96	3.96	3.96	3.96	2.65	4.31	4.31	4.31	4.31	4.03	5.91	5.91	5.91	5.91	5.51	7.60	7.60	7.60	7.60	6.80	5.37	5.37	5.37	5.37	7.48
4.5	2.30	2.30	2.30	2.30	1.45	3.09	3.13	3.13	3.13	1.86	3.40	3.40	3.40	3.40	2.90	4.67	4.67	4.67	4.67	3.91	6.00	6.00	6.00	6.00	4.82	4.77	4.77	4.77	4.77	5.37
5.0	1.73	1.86	1.86	1.86	1.06	2.29	2.53	2.53	2.53	1.36	2.69	2.75	2.75	2.75	2.16	3.78	3.78	3.78	3.78	2.87	4.86	4.86	4.86	4.86	3.54	4.27	4.27	4.27	4.27	3.99
5.5	1.26	1.54	1.54	1.54	0.80	1.67	2.09	2.09	2.09	1.02	2.09	2.28	2.28	2.28	1.65	3.02	3.12	3.12	3.12	2.17	3.85	4.02	4.02	4.02	2.66	3.43	3.53	3.53	3.53	3.05
6.0	0.94	1.29	1.29	1.29	0.62	1.24	1.76	1.76	1.76	0.78	1.63	1.91	1.91	1.91	1.29	2.35	2.62	2.62	2.62	1.68	2.94	3.38	3.38	3.38	2.05	2.73	2.96	2.96	2.96	2.39
6.5	0.71	1.10	1.10	1.10	0.49	0.94	1.50	1.50	1.50	0.62	1.27	1.63	1.63	1.63	1.02	1.79	2.23	2.23	2.23	1.33	2.24	2.88	2.88	2.88	1.61	2.20	2.53	2.53	2.53	1.91
7.0	0.55	0.94	0.95	0.95	0.39	0.72	1.26	1.29	1.29	0.49	1.00	1.40	1.40	1.40	0.82	1.39	1.93	1.93	1.93	1.07	1.73	2.48	2.48	2.48	1.29	1.75	2.18	2.18	2.18	1.55
7.5	0.43	0.78	0.82	0.82	0.32	0.56	1.03	1.12	1.12	0.40	0.81	1.21	1.22	1.22	0.67	1.09	1.68	1.68	1.68	0.87	1.36	2.16	2.16	2.16	1.05	1.41	1.90	1.90	1.90	1.28
8.0						0.44	0.84	0.99	0.99	0.33	0.65	1.02	1.07	1.07	0.56	0.87	1.47	1.47	1.47	0.72	1.07	1.90	1.90	1.90	0.86	1.15	1.66	1.67	1.67	1.07
8.5											0.53	0.86	0.95	0.95	0.47	0.70	1.25	1.30	1.30	0.60	0.85	1.60	1.68	1.68	0.72	0.94	1.43	1.48	1.48	0.90
9.0											0.43	0.74	0.85	0.85	0.39	0.57	1.07	1.16	1.16	0.50	0.69	1.34	1.50	1.50	0.60	0.79	1.23	1.32	1.32	0.77
9.5											0.35	0.62	0.76	0.76	0.34	0.47	0.89	1.04	1.04	0.43	0.56	1.11	1.34	1.34	0.51	0.66	1.06	1.18	1.18	0.66
10.0											0.29	0.53	0.67	0.69	0.29	0.38	0.75	0.94	0.94	0.37	0.46	0.93	1.21	1.21	0.44	0.56	0.92	1.06	1.06	0.57
10.5																0.32	0.63	0.85	0.85	0.32	0.38	0.79	1.10	1.10	0.38	0.48	0.79	0.97	0.97	0.49
11.0																					0.32	0.67	0.97	1.00	0.33	0.40	0.68	0.86	0.88	0.43
11.5																					0.27	0.57	0.85	0.92	0.29	0.34	0.59	0.77	0.80	0.38
12.0																										0.29	0.52	0.68	0.74	0.33
12.5																										0.25	0.45	0.61	0.68	0.29
13.0																														
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1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** W_S: Load at a deflection of span/150.

2.3.7 DHS LOAD SPAN TABLES – SINGLE SPANS

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span (m)	DHS 250/15					DHS 250/18					DHS 300/15					DHS 300/18					DHS 350/18					DHS 400/20				
	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S
3.0																														
3.5																														
4.0																														
4.5																														
5.0	5.24	5.24	5.24	5.24	4.90	6.77	6.77	6.77	6.77	6.35	5.53	5.53	5.53	5.53	7.44															
5.5	4.31	4.33	4.33	4.33	3.75	5.60	5.60	5.60	5.60	4.81	5.03	5.03	5.03	5.03	5.69															
6.0	3.44	3.64	3.64	3.64	2.94	4.63	4.70	4.70	4.70	3.73	4.61	4.61	4.61	4.61	4.46															
6.5	2.77	3.10	3.10	3.10	2.35	3.74	4.01	4.01	4.01	2.95	3.86	4.05	4.05	4.05	3.56	5.17	5.25	5.25	5.25	4.63										
7.0	2.21	2.67	2.67	2.67	1.91	2.98	3.45	3.45	3.45	2.37	3.18	3.49	3.49	3.49	2.89	4.26	4.52	4.52	4.52	3.77	5.15	5.46	5.46	5.46	5.17					
7.5	1.78	2.33	2.33	2.33	1.57	2.36	3.01	3.01	3.01	1.94	2.64	3.04	3.04	3.04	2.39	3.54	3.94	3.94	3.94	3.11	4.27	4.76	4.76	4.76	4.26	5.95	6.26	6.26	6.26	6.54
8.0	1.45	2.04	2.04	2.04	1.30	1.88	2.64	2.64	2.64	1.60	2.17	2.67	2.67	2.67	1.99	2.91	3.46	3.46	3.46	2.60	3.52	4.18	4.18	4.18	3.56	4.91	5.66	5.66	5.66	5.46
8.5	1.20	1.79	1.81	1.81	1.09	1.52	2.34	2.34	2.34	1.34	1.79	2.36	2.36	2.36	1.68	2.41	3.07	3.07	3.07	2.20	2.91	3.70	3.70	3.70	3.00	4.06	5.01	5.01	5.01	4.60
9.0	0.99	1.54	1.61	1.61	0.92	1.24	2.08	2.09	2.09	1.13	1.49	2.11	2.11	2.11	1.43	2.02	2.74	2.74	2.74	1.86	2.43	3.30	3.30	3.30	2.56	3.39	4.47	4.47	4.47	3.92
9.5	0.82	1.34	1.45	1.45	0.78	1.02	1.80	1.87	1.87	0.96	1.26	1.85	1.89	1.89	1.23	1.70	2.45	2.45	2.45	1.59	2.05	2.96	2.96	2.96	2.20	2.85	4.01	4.01	4.01	3.37
10.0	0.68	1.16	1.31	1.31	0.67	0.85	1.57	1.69	1.69	0.82	1.07	1.62	1.71	1.71	1.07	1.45	2.17	2.21	2.21	1.37	1.74	2.63	2.67	2.67	1.91	2.42	3.62	3.62	3.62	2.92
10.5	0.57	1.00	1.19	1.19	0.58	0.71	1.35	1.53	1.53	0.71	0.91	1.43	1.55	1.55	0.93	1.23	1.91	2.01	2.01	1.18	1.49	2.31	2.42	2.42	1.66	2.07	3.22	3.28	3.28	2.54
11.0	0.48	0.86	1.08	1.08	0.51	0.59	1.16	1.40	1.40	0.62	0.79	1.26	1.41	1.41	0.82	1.04	1.69	1.83	1.83	1.03	1.28	2.04	2.21	2.21	1.46	1.79	2.85	2.99	2.99	2.23
11.5	0.41	0.75	0.96	0.99	0.45	0.50	0.99	1.28	1.28	0.54	0.68	1.12	1.29	1.29	0.72	0.89	1.50	1.67	1.67	0.91	1.11	1.81	2.02	2.02	1.29	1.55	2.52	2.73	2.73	1.97
12.0	0.35	0.66	0.86	0.91	0.39	0.42	0.86	1.16	1.17	0.47	0.59	0.98	1.18	1.18	0.64	0.76	1.32	1.54	1.54	0.80	0.97	1.60	1.86	1.86	1.15	1.35	2.23	2.51	2.51	1.75
12.5	0.30	0.58	0.77	0.83	0.35	0.36	0.74	1.04	1.08	0.42	0.52	0.86	1.07	1.09	0.57	0.66	1.16	1.42	1.42	0.71	0.84	1.40	1.71	1.71	1.02	1.17	1.96	2.31	2.31	1.56
13.0	0.26	0.51	0.69	0.77	0.31	0.31	0.65	0.94	1.00	0.37	0.45	0.76	0.97	1.01	0.51	0.57	1.03	1.30	1.31	0.63	0.73	1.24	1.57	1.58	0.92	1.01	1.73	2.14	2.14	1.40
13.5						0.27	0.57	0.84	0.93	0.33	0.40	0.67	0.88	0.93	0.46	0.50	0.91	1.18	1.21	0.57	0.63	1.10	1.42	1.46	0.82	0.87	1.54	1.98	1.98	1.26
14.0						0.23	0.50	0.75	0.86	0.30	0.35	0.60	0.80	0.87	0.41	0.43	0.81	1.07	1.13	0.51	0.55	0.98	1.29	1.36	0.74	0.76	1.37	1.80	1.84	1.14
14.5											0.30	0.54	0.72	0.81	0.37	0.38	0.73	0.97	1.05	0.46	0.48	0.88	1.18	1.27	0.66	0.66	1.22	1.64	1.72	1.03
15.0											0.27	0.48	0.66	0.76	0.33	0.33	0.66	0.89	0.98	0.41	0.42	0.79	1.07	1.19	0.60	0.58	1.10	1.49	1.61	0.94
15.5											0.24	0.43	0.60	0.71	0.30	0.29	0.59	0.81	0.92	0.38	0.37	0.71	0.98	1.11	0.55	0.51	0.99	1.36	1.50	0.85
16.0																0.26	0.53	0.73	0.86	0.34	0.33	0.64	0.89	1.04	0.50	0.45	0.89	1.24	1.41	0.77
16.5																0.23	0.47	0.66	0.81	0.31	0.29	0.58	0.80	0.98	0.45	0.40	0.81	1.12	1.33	0.71
17.0																					0.26	0.53	0.73	0.92	0.41	0.36	0.73	1.02	1.25	0.65
17.5																					0.23	0.48	0.67	0.87	0.38	0.32	0.67	0.93	1.18	0.59
18.0																					0.21	0.44	0.61	0.82	0.35	0.29	0.61	0.85	1.11	0.54

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** W_S: Load at a deflection of span/150.

2.3.7 DHS LOAD SPAN TABLES – END SPANS

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span (m)	DHS 150/12					DHS 150/15					DHS 200/12					DHS 200/15					DHS 200/18					DHS 250/13				
	1B	2B	3B	FR	W_s	1B	2B	3B	FR	W_s	1B	2B	3B	FR	W_s	1B	2B	3B	FR	W_s	1B	2B	3B	FR	W_s	1B	2B	3B	FR	W_s
3.0	4.75	4.75	4.75	4.75	10.78	7.05	7.05	7.05	7.05	14.30	4.57	4.57	4.57	4.57	21.64															
3.5	3.69	3.69	3.69	3.69	6.78	5.18	5.18	5.18	5.18	9.01	3.74	3.74	3.74	3.74	13.63	6.46	6.46	6.46	6.46	18.50	9.71	9.71	9.71	9.71	23.62	4.39	4.39	4.39	4.39	26.55
4.0	2.91	2.91	2.91	2.91	4.54	3.96	3.96	3.96	3.96	6.03	3.11	3.11	3.11	3.11	9.13	5.27	5.27	5.27	5.27	12.39	7.60	7.60	7.60	7.60	15.83	3.73	3.73	3.73	3.73	17.78
4.5	2.30	2.30	2.30	2.30	3.19	3.13	3.13	3.13	3.13	4.24	2.63	2.63	2.63	2.63	6.41	4.37	4.37	4.37	4.37	8.70	6.00	6.00	6.00	6.00	11.11	3.21	3.21	3.21	3.21	12.49
5.0	1.86	1.86	1.86	1.86	2.33	2.53	2.53	2.53	2.53	3.10	2.25	2.25	2.25	2.25	4.67	3.68	3.68	3.68	3.68	6.34	4.86	4.86	4.86	4.86	8.10	2.79	2.79	2.79	2.79	9.10
5.5	1.54	1.54	1.54	1.54	1.78	2.09	2.09	2.09	2.09	2.35	1.94	1.94	1.94	1.94	3.51	3.12	3.12	3.12	3.12	4.76	4.02	4.02	4.02	4.02	6.08	2.45	2.45	2.45	2.45	6.84
6.0	1.29	1.29	1.29	1.29	1.39	1.76	1.76	1.76	1.76	1.82	1.69	1.69	1.69	1.69	2.70	2.62	2.62	2.62	2.62	3.67	3.38	3.38	3.38	3.38	4.69	2.17	2.17	2.17	2.17	5.27
6.5	1.10	1.10	1.10	1.10	1.11	1.50	1.50	1.50	1.50	1.44	1.49	1.49	1.49	1.49	2.12	2.23	2.23	2.23	2.23	2.88	2.88	2.88	2.88	2.88	3.69	1.93	1.93	1.93	1.93	4.14
7.0	0.95	0.95	0.95	0.95	0.89	1.29	1.29	1.29	1.29	1.16	1.31	1.31	1.31	1.31	1.70	1.93	1.93	1.93	1.93	2.33	2.48	2.48	2.48	2.48	2.97	1.73	1.73	1.73	1.73	3.31
7.5	0.82	0.82	0.82	0.82	0.73	1.11	1.12	1.12	1.12	0.95	1.17	1.17	1.17	1.17	1.40	1.68	1.68	1.68	1.68	1.92	2.16	2.16	2.16	2.16	2.43	1.56	1.56	1.56	1.56	2.69
8.0	0.70	0.72	0.72	0.72	0.60	0.93	0.99	0.99	0.99	0.78	1.05	1.05	1.05	1.05	1.16	1.47	1.47	1.47	1.47	1.61	1.90	1.90	1.90	1.90	2.01	1.41	1.41	1.41	1.41	2.22
8.5	0.59	0.64	0.64	0.64	0.50	0.78	0.86	0.87	0.87	0.66	0.91	0.94	0.94	0.94	0.98	1.30	1.30	1.30	1.30	1.36	1.68	1.68	1.68	1.68	1.68	1.28	1.28	1.28	1.28	1.85
9.0	0.49	0.55	0.57	0.57	0.43	0.65	0.74	0.78	0.78	0.55	0.79	0.85	0.85	0.85	0.84	1.14	1.16	1.16	1.16	1.15	1.46	1.50	1.50	1.50	1.43	1.17	1.17	1.17	1.17	1.56
9.5	0.41	0.47	0.51	0.51	0.36	0.54	0.63	0.70	0.70	0.47	0.68	0.74	0.76	0.76	0.72	0.98	1.04	1.04	1.04	0.98	1.25	1.34	1.34	1.34	1.22	1.07	1.07	1.07	1.07	1.34
10.0	0.34	0.40	0.46	0.46	0.31	0.45	0.53	0.63	0.63	0.40	0.59	0.64	0.69	0.69	0.62	0.85	0.93	0.94	0.94	0.85	1.06	1.20	1.21	1.21	1.05	0.98	0.98	0.98	0.98	1.16
10.5						0.39	0.45	0.57	0.57	0.35	0.50	0.56	0.62	0.62	0.54	0.72	0.82	0.85	0.85	0.73	0.90	1.04	1.10	1.10	0.91	0.86	0.90	0.90	0.90	1.01
11.0						0.33	0.39	0.52	0.52	0.30	0.44	0.50	0.57	0.57	0.47	0.61	0.72	0.78	0.78	0.64	0.77	0.91	1.00	1.00	0.79	0.75	0.82	0.83	0.83	0.88
11.5											0.38	0.43	0.52	0.52	0.42	0.53	0.62	0.71	0.71	0.56	0.66	0.78	0.92	0.92	0.69	0.66	0.73	0.77	0.77	0.78
12.0											0.33	0.38	0.47	0.47	0.37	0.46	0.54	0.65	0.65	0.50	0.57	0.68	0.84	0.84	0.61	0.57	0.65	0.72	0.72	0.69
12.5											0.29	0.33	0.44	0.44	0.33	0.40	0.47	0.60	0.60	0.44	0.50	0.59	0.77	0.77	0.54	0.50	0.58	0.67	0.67	0.62
13.0											0.26	0.29	0.40	0.40	0.30	0.35	0.41	0.56	0.56	0.39	0.43	0.51	0.72	0.72	0.48	0.45	0.51	0.62	0.62	0.55
13.5																0.30	0.36	0.51	0.51	0.35	0.38	0.45	0.66	0.66	0.43	0.40	0.45	0.58	0.58	0.49
14.0																0.27	0.32	0.47	0.48	0.31	0.33	0.40	0.61	0.62	0.38	0.35	0.40	0.54	0.54	0.45
14.5																					0.29	0.35	0.55	0.57	0.35	0.31	0.36	0.49	0.50	0.40
15.0																					0.25	0.31	0.50	0.54	0.31	0.28	0.32	0.45	0.47	0.37
15.5																										0.25	0.29	0.41	0.44	0.33
16.0																										0.23	0.26	0.38	0.41	0.31
16.5																														
17.0																														
17.5																														
18.0																														

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** W_s: Load at a deflection of span/150.

2.3.7 DHS LOAD SPAN TABLES – END SPANS

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span (m)	DHS 250/15					DHS 250/18					DHS 300/15					DHS 300/18					DHS 350/18					DHS 400/20				
	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S
3.0																														
3.5																														
4.0	5.41	5.41	5.41	5.41	21.61	8.47	8.47	8.47	8.47	27.70	5.01	5.01	5.01	5.01	34.35															
4.5	4.61	4.61	4.61	4.61	15.17	7.12	7.12	7.12	7.12	19.45	4.36	4.36	4.36	4.36	24.13															
5.0	3.97	3.97	3.97	3.97	11.06	6.05	6.05	6.05	6.05	14.18	3.82	3.82	3.82	3.82	17.59	6.11	6.11	6.11	6.11	22.56	5.67	5.67	5.67	5.67	32.21					
5.5	3.45	3.45	3.45	3.45	8.31	5.20	5.20	5.20	5.20	10.65	3.39	3.39	3.39	3.39	13.21	5.35	5.35	5.35	5.35	16.95	5.04	5.04	5.04	5.04	24.20					
6.0	3.03	3.03	3.03	3.03	6.40	4.52	4.52	4.52	4.52	8.20	3.02	3.02	3.02	3.02	10.18	4.73	4.73	4.73	4.73	13.05	4.51	4.51	4.51	4.51	18.64	5.53	5.53	5.53	5.53	29.35
6.5	2.68	2.68	2.68	2.68	5.03	3.95	3.95	3.95	3.95	6.45	2.71	2.71	2.71	2.71	8.00	4.21	4.21	4.21	4.21	10.27	4.07	4.07	4.07	4.07	14.66	5.01	5.01	5.01	5.01	23.08
7.0	2.38	2.38	2.38	2.38	4.03	3.45	3.45	3.45	3.45	5.16	2.45	2.45	2.45	2.45	6.41	3.76	3.76	3.76	3.76	8.22	3.69	3.69	3.69	3.69	11.74	4.57	4.57	4.57	4.57	18.48
7.5	2.13	2.13	2.13	2.13	3.27	3.01	3.01	3.01	3.01	4.20	2.22	2.22	2.22	2.22	5.21	3.38	3.38	3.38	3.38	6.68	3.35	3.35	3.35	3.35	9.54	4.18	4.18	4.18	4.18	15.02
8.0	1.91	1.91	1.91	1.91	2.70	2.64	2.64	2.64	2.64	3.46	2.02	2.02	2.02	2.02	4.29	3.05	3.05	3.05	3.05	5.50	3.07	3.07	3.07	3.07	7.86	3.84	3.84	3.84	3.84	12.38
8.5	1.73	1.73	1.73	1.73	2.25	2.34	2.34	2.34	2.34	2.90	1.85	1.85	1.85	1.85	3.58	2.77	2.77	2.77	2.77	4.59	2.81	2.81	2.81	2.81	6.55	3.53	3.53	3.53	3.53	10.32
9.0	1.57	1.57	1.57	1.57	1.90	2.09	2.09	2.09	2.09	2.47	1.70	1.70	1.70	1.70	3.01	2.52	2.52	2.52	2.52	3.86	2.59	2.59	2.59	2.59	5.52	3.27	3.27	3.27	3.27	8.69
9.5	1.40	1.43	1.43	1.43	1.64	1.87	1.87	1.87	1.87	2.12	1.56	1.56	1.56	1.56	2.56	2.31	2.31	2.31	2.31	3.28	2.39	2.39	2.39	2.39	4.69	3.03	3.03	3.03	3.03	7.39
10.0	1.23	1.30	1.30	1.30	1.42	1.66	1.69	1.69	1.69	1.84	1.44	1.44	1.44	1.44	2.19	2.12	2.12	2.12	2.12	2.82	2.21	2.21	2.21	2.21	4.02	2.82	2.82	2.82	2.82	6.34
10.5	1.08	1.17	1.19	1.19	1.23	1.45	1.53	1.53	1.53	1.60	1.33	1.33	1.33	1.33	1.89	1.95	1.95	1.95	1.95	2.43	2.05	2.05	2.05	2.05	3.47	2.62	2.62	2.62	2.62	5.47
11.0	0.95	1.04	1.08	1.08	1.08	1.28	1.40	1.40	1.40	1.41	1.24	1.24	1.24	1.24	1.65	1.77	1.80	1.80	1.80	2.13	1.91	1.91	1.91	1.91	3.02	2.45	2.45	2.45	2.45	4.76
11.5	0.83	0.92	0.99	0.99	0.96	1.12	1.24	1.28	1.28	1.24	1.15	1.15	1.15	1.15	1.45	1.58	1.66	1.66	1.66	1.88	1.78	1.78	1.78	1.78	2.64	2.29	2.29	2.29	2.29	4.16
12.0	0.72	0.82	0.91	0.91	0.85	0.97	1.11	1.17	1.17	1.10	1.05	1.07	1.07	1.07	1.29	1.41	1.53	1.54	1.54	1.67	1.66	1.66	1.66	1.66	2.33	2.15	2.15	2.15	2.15	3.66
12.5	0.64	0.73	0.83	0.83	0.76	0.85	0.99	1.08	1.08	0.98	0.94	1.00	1.00	1.00	1.15	1.26	1.38	1.42	1.42	1.49	1.52	1.55	1.55	1.55	2.06	2.02	2.02	2.02	2.02	3.24
13.0	0.56	0.65	0.77	0.77	0.68	0.74	0.88	1.00	1.00	0.87	0.83	0.93	0.94	0.94	1.03	1.12	1.24	1.31	1.31	1.34	1.35	1.46	1.46	1.46	1.84	1.88	1.90	1.90	1.90	2.88
13.5	0.50	0.58	0.72	0.72	0.61	0.65	0.78	0.93	0.93	0.78	0.74	0.84	0.88	0.88	0.93	1.00	1.12	1.21	1.21	1.20	1.20	1.36	1.37	1.37	1.66	1.67	1.79	1.79	1.79	2.57
14.0	0.45	0.51	0.66	0.66	0.55	0.57	0.68	0.86	0.86	0.70	0.66	0.76	0.82	0.82	0.84	0.89	1.02	1.13	1.13	1.09	1.08	1.23	1.29	1.29	1.50	1.49	1.69	1.69	1.69	2.31
14.5	0.40	0.46	0.62	0.62	0.50	0.51	0.61	0.80	0.80	0.63	0.59	0.68	0.78	0.78	0.76	0.80	0.92	1.05	1.05	0.98	0.96	1.11	1.21	1.21	1.36	1.34	1.55	1.59	1.59	2.09
15.0	0.36	0.41	0.57	0.58	0.45	0.45	0.54	0.75	0.75	0.57	0.53	0.62	0.73	0.73	0.69	0.72	0.83	0.98	0.98	0.89	0.87	1.00	1.14	1.14	1.23	1.20	1.40	1.51	1.51	1.90
15.5	0.32	0.37	0.52	0.54	0.41	0.40	0.48	0.70	0.70	0.52	0.48	0.55	0.69	0.69	0.63	0.65	0.75	0.92	0.92	0.82	0.78	0.90	1.08	1.08	1.12	1.09	1.26	1.43	1.43	1.73
16.0	0.29	0.34	0.48	0.51	0.38	0.36	0.43	0.65	0.66	0.47	0.43	0.50	0.65	0.65	0.57	0.59	0.68	0.86	0.86	0.75	0.71	0.82	1.02	1.02	1.03	0.98	1.14	1.35	1.35	1.58
16.5	0.26	0.31	0.44	0.48	0.35	0.32	0.39	0.59	0.62	0.43	0.39	0.45	0.61	0.62	0.53	0.54	0.62	0.81	0.81	0.68	0.64	0.74	0.97	0.97	0.94	0.89	1.04	1.29	1.29	1.45
17.0	0.23	0.28	0.41	0.45	0.32	0.29	0.35	0.55	0.58	0.39	0.36	0.41	0.57	0.58	0.48	0.49	0.56	0.76	0.76	0.63	0.58	0.68	0.92	0.92	0.87	0.81	0.94	1.22	1.22	1.33
17.5						0.26	0.31	0.51	0.55	0.36	0.33	0.38	0.52	0.55	0.45	0.44	0.51	0.70	0.72	0.58	0.53	0.62	0.85	0.87	0.80	0.74	0.86	1.16	1.16	1.23
18.0						0.23	0.28	0.46	0.52	0.33	0.30	0.34	0.49	0.52	0.41	0.40	0.47	0.65	0.68	0.54	0.49	0.56	0.79	0.82	0.74	0.68	0.79	1.10	1.11	1.13

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** W_S: Load at a deflection of span/150.

2.3.7 DHS LOAD SPAN TABLES – INTERNAL SPANS

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span (m)	DHS 150/12					DHS 150/15					DHS 200/12					DHS 200/15					DHS 200/18					DHS 250/13				
	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S
3.0																														
3.5	5.18	5.18	5.18	5.18	14.11	7.77	7.77	7.77	7.77	18.74	4.93	4.93	4.93	4.93	28.35															
4.0	4.17	4.17	4.17	4.17	9.45	5.95	5.95	5.95	5.95	12.55	4.15	4.15	4.15	4.15	18.99															
4.5	3.43	3.43	3.43	3.43	6.64	4.70	4.70	4.70	4.70	8.81	3.54	3.54	3.54	3.54	13.34	6.06	6.06	6.06	6.06	18.10	9.01	9.01	9.01	9.01	23.12	4.20	4.20	4.20	4.20	25.98
5.0	2.79	2.79	2.79	2.79	4.84	3.80	3.80	3.80	3.80	6.42	3.06	3.06	3.06	3.06	9.72	5.15	5.15	5.15	5.15	13.19	7.30	7.30	7.30	7.30	16.85	3.69	3.69	3.69	3.69	18.94
5.5	2.31	2.31	2.31	2.31	3.63	3.14	3.14	3.14	3.14	4.83	2.67	2.67	2.67	2.67	7.30	4.42	4.42	4.42	4.42	9.91	6.03	6.03	6.03	6.03	12.66	3.26	3.26	3.26	3.26	14.23
6.0	1.94	1.94	1.94	1.94	2.80	2.64	2.64	2.64	2.64	3.72	2.34	2.34	2.34	2.34	5.62	3.83	3.83	3.83	3.83	7.63	5.07	5.07	5.07	5.07	9.75	2.91	2.91	2.91	2.91	10.96
6.5	1.65	1.65	1.65	1.65	2.20	2.25	2.25	2.25	2.25	2.92	2.07	2.07	2.07	2.07	4.42	3.35	3.35	3.35	3.35	6.00	4.32	4.32	4.32	4.32	7.67	2.61	2.61	2.61	2.61	8.62
7.0	1.42	1.42	1.42	1.42	1.76	1.94	1.94	1.94	1.94	2.35	1.84	1.84	1.84	1.84	3.54	2.89	2.89	2.89	2.89	4.81	3.72	3.72	3.72	3.72	6.14	2.35	2.35	2.35	2.35	6.90
7.5	1.24	1.24	1.24	1.24	1.45	1.69	1.69	1.69	1.69	1.92	1.65	1.65	1.65	1.65	2.88	2.52	2.52	2.52	2.52	3.91	3.24	3.24	3.24	3.24	4.99	2.13	2.13	2.13	2.13	5.61
8.0	1.09	1.09	1.09	1.09	1.21	1.48	1.48	1.48	1.48	1.59	1.48	1.48	1.48	1.48	2.37	2.21	2.21	2.21	2.21	3.22	2.85	2.85	2.85	2.85	4.11	1.94	1.94	1.94	1.94	4.62
8.5	0.96	0.96	0.96	0.96	1.02	1.31	1.31	1.31	1.31	1.33	1.34	1.34	1.34	1.34	1.97	1.96	1.96	1.96	1.96	2.68	2.52	2.52	2.52	2.52	3.43	1.77	1.77	1.77	1.77	3.85
9.0	0.86	0.86	0.86	0.86	0.87	1.17	1.17	1.17	1.17	1.13	1.22	1.22	1.22	1.22	1.66	1.75	1.75	1.75	1.75	2.26	2.25	2.25	2.25	2.25	2.89	1.62	1.62	1.62	1.62	3.24
9.5	0.77	0.77	0.77	0.77	0.74	1.05	1.05	1.05	1.05	0.96	1.11	1.11	1.11	1.11	1.41	1.57	1.57	1.57	1.57	1.93	2.02	2.02	2.02	2.02	2.47	1.49	1.49	1.49	1.49	2.76
10.0	0.69	0.69	0.69	0.69	0.64	0.95	0.95	0.95	0.95	0.83	1.01	1.01	1.01	1.01	1.22	1.41	1.41	1.41	1.41	1.67	1.82	1.82	1.82	1.82	2.12	1.38	1.38	1.38	1.38	2.36
10.5	0.63	0.63	0.63	0.63	0.55	0.86	0.86	0.86	0.86	0.72	0.93	0.93	0.93	0.93	1.06	1.28	1.28	1.28	1.28	1.46	1.65	1.65	1.65	1.65	1.84	1.27	1.27	1.27	1.27	2.04
11.0	0.57	0.57	0.57	0.57	0.48	0.78	0.78	0.78	0.78	0.63	0.85	0.85	0.85	0.85	0.93	1.17	1.17	1.17	1.17	1.28	1.50	1.50	1.50	1.50	1.61	1.18	1.18	1.18	1.18	1.77
11.5	0.52	0.52	0.52	0.52	0.42	0.72	0.72	0.72	0.72	0.55	0.78	0.78	0.78	0.78	0.82	1.07	1.07	1.07	1.07	1.13	1.38	1.38	1.38	1.38	1.41	1.10	1.10	1.10	1.10	1.55
12.0	0.48	0.48	0.48	0.48	0.37	0.66	0.66	0.66	0.66	0.48	0.71	0.71	0.71	0.71	0.73	0.98	0.98	0.98	0.98	1.00	1.26	1.26	1.26	1.26	1.25	1.02	1.02	1.02	1.02	1.37
12.5	0.44	0.44	0.44	0.44	0.33	0.60	0.60	0.60	0.60	0.43	0.66	0.66	0.66	0.66	0.65	0.90	0.90	0.90	0.90	0.89	1.16	1.16	1.16	1.16	1.11	0.95	0.95	0.95	0.95	1.21
13.0	0.41	0.41	0.41	0.41	0.29	0.56	0.56	0.56	0.56	0.38	0.61	0.61	0.61	0.61	0.58	0.84	0.84	0.84	0.84	0.80	1.08	1.08	1.08	1.08	0.99	0.89	0.89	0.89	0.89	1.08
13.5						0.51	0.50	0.52	0.52	0.34	0.56	0.56	0.56	0.56	0.52	0.77	0.77	0.77	0.77	0.71	1.00	1.00	1.00	1.00	0.88	0.83	0.83	0.83	0.83	0.97
14.0						0.46	0.46	0.48	0.48	0.31	0.52	0.52	0.52	0.52	0.47	0.72	0.72	0.72	0.72	0.64	0.93	0.93	0.93	0.93	0.79	0.78	0.78	0.78	0.78	0.88
14.5											0.48	0.48	0.49	0.49	0.43	0.67	0.67	0.67	0.67	0.58	0.86	0.86	0.86	0.86	0.71	0.74	0.74	0.74	0.74	0.79
15.0											0.44	0.44	0.46	0.46	0.39	0.63	0.63	0.63	0.63	0.52	0.81	0.81	0.81	0.81	0.65	0.69	0.69	0.69	0.69	0.72
15.5											0.41	0.40	0.42	0.43	0.35	0.59	0.58	0.59	0.59	0.48	0.76	0.75	0.76	0.76	0.59	0.65	0.65	0.65	0.65	0.66
16.0											0.37	0.37	0.39	0.40	0.32	0.54	0.53	0.55	0.55	0.43	0.69	0.69	0.71	0.71	0.53	0.61	0.61	0.62	0.62	0.60
16.5											0.35	0.34	0.36	0.38	0.30	0.50	0.49	0.52	0.52	0.40	0.64	0.63	0.67	0.67	0.49	0.56	0.56	0.58	0.58	0.55
17.0																0.46	0.45	0.48	0.49	0.36	0.58	0.58	0.62	0.63	0.45	0.52	0.52	0.54	0.55	0.51
17.5																0.43	0.42	0.45	0.46	0.33	0.54	0.52	0.57	0.59	0.41	0.48	0.48	0.51	0.52	0.47
18.0																0.39	0.38	0.41	0.43	0.31	0.49	0.48	0.53	0.56	0.38	0.45	0.44	0.47	0.49	0.43

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** W_S: Load at a deflection of span/150.

2.3.7 DHS LOAD SPAN TABLES – INTERNAL SPANS

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span (m)	DHS 250/15					DHS 250/18					DHS 300/15					DHS 300/18					DHS 350/18					DHS 400/20				
	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S
3.0																														
3.5																														
4.0																														
4.5	6.13	6.13	6.13	6.13	31.56	9.68	9.68	9.68	9.68	40.46	5.63	5.63	5.63	5.63	50.18															
5.0	5.33	5.33	5.33	5.33	23.01	8.31	8.31	8.31	8.31	29.49	4.98	4.98	4.98	4.98	36.58															
5.5	4.68	4.68	4.68	4.68	17.29	7.21	7.21	7.21	7.21	22.16	4.44	4.44	4.44	4.44	27.48															
6.0	4.14	4.14	4.14	4.14	13.31	6.31	6.31	6.31	6.31	17.07	3.98	3.98	3.98	3.98	21.17	6.36	6.36	6.36	6.36	27.15	5.90	5.90	5.90	5.90	38.77					
6.5	3.68	3.68	3.68	3.68	10.47	5.56	5.56	5.56	5.56	13.42	3.60	3.60	3.60	3.60	16.65	5.70	5.70	5.70	5.70	21.35	5.35	5.35	5.35	5.35	30.50					
7.0	3.29	3.29	3.29	3.29	8.38	4.93	4.93	4.93	4.93	10.75	3.27	3.27	3.27	3.27	13.33	5.13	5.13	5.13	5.13	17.10	4.87	4.87	4.87	4.87	24.42	5.97	5.97	5.97	5.97	38.44
7.5	2.96	2.96	2.96	2.96	6.81	4.40	4.40	4.40	4.40	8.74	2.98	2.98	2.98	2.98	10.84	4.64	4.64	4.64	4.64	13.90	4.46	4.46	4.46	4.46	19.85	5.48	5.48	5.48	5.48	31.25
8.0	2.68	2.68	2.68	2.68	5.61	3.94	3.94	3.94	3.94	7.20	2.73	2.73	2.73	2.73	8.93	4.22	4.22	4.22	4.22	11.45	4.10	4.10	4.10	4.10	16.36	5.06	5.06	5.06	5.06	25.75
8.5	2.43	2.43	2.43	2.43	4.68	3.51	3.51	3.51	3.51	6.00	2.51	2.51	2.51	2.51	7.44	3.85	3.85	3.85	3.85	9.55	3.78	3.78	3.78	3.78	13.63	4.68	4.68	4.68	4.68	21.47
9.0	2.22	2.22	2.22	2.22	3.94	3.13	3.13	3.13	3.13	5.05	2.31	2.31	2.31	2.31	6.27	3.52	3.52	3.52	3.52	8.04	3.49	3.49	3.49	3.49	11.49	4.35	4.35	4.35	4.35	18.08
9.5	2.03	2.03	2.03	2.03	3.35	2.81	2.81	2.81	2.81	4.30	2.14	2.14	2.14	2.14	5.33	3.24	3.24	3.24	3.24	6.84	3.24	3.24	3.24	3.24	9.76	4.05	4.05	4.05	4.05	15.37
10.0	1.86	1.86	1.86	1.86	2.87	2.54	2.54	2.54	2.54	3.68	1.98	1.98	1.98	1.98	4.57	2.98	2.98	2.98	2.98	5.86	3.01	3.01	3.01	3.01	8.37	3.78	3.78	3.78	3.78	13.18
10.5	1.71	1.71	1.71	1.71	2.48	2.30	2.30	2.30	2.30	3.18	1.84	1.84	1.84	1.84	3.95	2.75	2.75	2.75	2.75	5.06	2.81	2.81	2.81	2.81	7.23	3.54	3.54	3.54	3.54	11.39
11.0	1.58	1.58	1.58	1.58	2.16	2.10	2.10	2.10	2.10	2.77	1.72	1.72	1.72	1.72	3.43	2.55	2.55	2.55	2.55	4.40	2.62	2.62	2.62	2.62	6.29	3.32	3.32	3.32	3.32	9.90
11.5	1.46	1.46	1.46	1.46	1.89	1.92	1.92	1.92	1.92	2.42	1.60	1.60	1.60	1.60	3.00	2.37	2.37	2.37	2.37	3.85	2.45	2.45	2.45	2.45	5.50	3.12	3.12	3.12	3.12	8.66
12.0	1.36	1.36	1.36	1.36	1.66	1.76	1.76	1.76	1.76	2.15	1.50	1.50	1.50	1.50	2.64	2.20	2.20	2.20	2.20	3.39	2.30	2.30	2.30	2.30	4.84	2.93	2.93	2.93	2.93	7.63
12.5	1.25	1.25	1.25	1.25	1.48	1.62	1.62	1.62	1.62	1.91	1.41	1.41	1.41	1.41	2.34	2.06	2.06	2.06	2.06	3.00	2.16	2.16	2.16	2.16	4.28	2.76	2.76	2.76	2.76	6.75
13.0	1.16	1.16	1.16	1.16	1.32	1.50	1.50	1.50	1.50	1.72	1.32	1.32	1.32	1.32	2.08	1.92	1.92	1.92	1.92	2.67	2.03	2.03	2.03	2.03	3.81	2.61	2.61	2.61	2.61	6.00
13.5	1.08	1.08	1.08	1.08	1.19	1.39	1.39	1.39	1.39	1.54	1.24	1.24	1.24	1.24	1.85	1.80	1.80	1.80	1.80	2.38	1.92	1.92	1.92	1.92	3.40	2.47	2.47	2.47	2.47	5.35
14.0	1.00	1.00	1.00	1.00	1.07	1.29	1.29	1.29	1.29	1.39	1.17	1.17	1.17	1.17	1.66	1.69	1.69	1.69	1.69	2.13	1.81	1.81	1.81	1.81	3.05	2.34	2.34	2.34	2.34	4.80
14.5	0.93	0.93	0.93	0.93	0.97	1.20	1.20	1.20	1.20	1.26	1.10	1.10	1.10	1.10	1.50	1.58	1.58	1.58	1.58	1.92	1.71	1.71	1.71	1.71	2.74	2.21	2.21	2.21	2.21	4.32
15.0	0.87	0.87	0.87	0.87	0.88	1.13	1.13	1.13	1.13	1.15	1.04	1.04	1.04	1.04	1.35	1.47	1.47	1.47	1.47	1.74	1.62	1.62	1.62	1.62	2.48	2.10	2.10	2.10	2.10	3.90
15.5	0.81	0.81	0.81	0.81	0.81	1.05	1.05	1.05	1.05	1.05	0.99	0.99	0.99	0.99	1.23	1.38	1.38	1.38	1.38	1.59	1.53	1.53	1.53	1.53	2.24	2.00	2.00	2.00	2.00	3.54
16.0	0.76	0.76	0.76	0.76	0.74	0.99	0.99	0.99	0.99	0.96	0.93	0.93	0.93	0.93	1.12	1.30	1.30	1.30	1.30	1.45	1.45	1.45	1.45	1.45	2.04	1.90	1.90	1.90	1.90	3.21
16.5	0.70	0.70	0.72	0.72	0.68	0.93	0.93	0.93	0.93	0.88	0.89	0.89	0.89	0.89	1.03	1.22	1.22	1.22	1.22	1.33	1.38	1.38	1.38	1.38	1.86	1.81	1.81	1.81	1.81	2.93
17.0	0.65	0.65	0.68	0.68	0.62	0.87	0.87	0.87	0.87	0.81	0.84	0.84	0.84	0.84	0.95	1.15	1.15	1.15	1.15	1.23	1.31	1.31	1.31	1.31	1.70	1.72	1.72	1.72	1.72	2.68
17.5	0.61	0.60	0.64	0.64	0.57	0.81	0.81	0.83	0.83	0.74	0.80	0.80	0.80	0.80	0.87	1.08	1.08	1.08	1.08	1.13	1.25	1.25	1.25	1.25	1.56	1.64	1.64	1.64	1.64	2.46
18.0	0.56	0.56	0.59	0.60	0.53	0.76	0.76	0.78	0.78	0.68	0.76	0.76	0.76	0.76	0.81	1.02	1.02	1.02	1.02	1.05	1.19	1.19	1.19	1.19	1.44	1.57	1.57	1.57	1.57	2.26

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** W_S: Load at a deflection of span/150.

2.3.7 DHS LOAD SPAN TABLES – LAPPED END SPAN

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span (m)	DHS 150/12					DHS 150/15					DHS 200/12					DHS 200/15					DHS 200/18					DHS 250/13				
	1B	2B	3B	FR	W_s	1B	2B	3B	FR	W_s	1B	2B	3B	FR	W_s	1B	2B	3B	FR	W_s	1B	2B	3B	FR	W_s	1B	2B	3B	FR	W_s
3.0	5.66	5.66	5.66	5.66	12.02	8.98	8.98	8.98	8.98	15.96	5.18	5.18	5.18	5.18	24.15															
3.5	4.45	4.45	4.45	4.45	7.57	6.62	6.62	6.62	6.62	10.05	4.28	4.28	4.28	4.28	15.21															
4.0	3.58	3.58	3.58	3.58	5.07	5.06	5.06	5.06	5.06	6.73	3.60	3.60	3.60	3.60	10.19	6.24	6.24	6.24	6.24	13.83	9.41	9.41	9.41	9.41	17.66	4.21	4.21	4.21	4.21	19.84
4.5	2.94	2.94	2.94	2.94	3.56	4.00	4.00	4.00	4.00	4.73	3.06	3.06	3.06	3.06	7.15	5.22	5.22	5.22	5.22	9.71	7.67	7.67	7.67	7.67	12.40	3.65	3.65	3.65	3.65	13.94
5.0	2.38	2.38	2.38	2.38	2.59	3.24	3.24	3.24	3.24	3.44	2.64	2.64	2.64	2.64	5.21	4.43	4.43	4.43	4.43	7.08	6.22	6.22	6.22	6.22	9.04	3.20	3.20	3.20	3.20	10.16
5.5	1.96	1.96	1.96	1.96	1.95	2.68	2.68	2.68	2.68	2.59	2.30	2.30	2.30	2.30	3.92	3.80	3.80	3.80	3.80	5.32	5.14	5.14	5.14	5.14	6.79	2.83	2.83	2.83	2.83	7.63
6.0	1.65	1.65	1.65	1.65	1.50	2.25	2.25	2.25	2.25	2.00	2.02	2.02	2.02	2.02	3.02	3.29	3.29	3.29	3.29	4.09	4.31	4.31	4.31	4.31	5.23	2.52	2.52	2.52	2.52	5.88
6.5	1.40	1.40	1.40	1.40	1.20	1.92	1.92	1.92	1.92	1.58	1.78	1.78	1.78	1.78	2.37	2.86	2.86	2.86	2.86	3.22	3.68	3.68	3.68	3.68	4.11	2.25	2.25	2.25	2.25	4.62
7.0	1.21	1.21	1.21	1.21	0.97	1.61	1.65	1.65	1.65	1.27	1.59	1.59	1.59	1.59	1.90	2.46	2.46	2.46	2.46	2.58	3.17	3.17	3.17	3.17	3.29	2.03	2.03	2.03	2.03	3.70
7.5	1.00	1.05	1.05	1.05	0.80	1.33	1.44	1.44	1.44	1.04	1.42	1.42	1.42	1.42	1.54	2.14	2.14	2.14	2.14	2.09	2.76	2.76	2.76	2.76	2.68	1.84	1.84	1.84	1.84	3.01
8.0	0.83	0.91	0.93	0.93	0.66	1.10	1.22	1.26	1.26	0.86	1.27	1.27	1.27	1.27	1.27	1.88	1.88	1.88	1.88	1.72	2.42	2.43	2.43	2.43	2.21	1.67	1.67	1.67	1.67	2.48
8.5	0.68	0.78	0.82	0.82	0.55	0.90	1.03	1.12	1.12	0.72	1.11	1.15	1.15	1.15	1.06	1.60	1.67	1.67	1.67	1.45	2.04	2.15	2.15	2.15	1.85	1.53	1.53	1.53	1.53	2.06
9.0	0.56	0.65	0.73	0.73	0.47	0.74	0.86	1.00	1.00	0.61	0.95	1.03	1.04	1.04	0.90	1.37	1.49	1.49	1.49	1.24	1.72	1.92	1.92	1.92	1.57	1.40	1.40	1.40	1.40	1.74
9.5	0.47	0.54	0.66	0.66	0.40	0.62	0.72	0.89	0.89	0.52	0.80	0.89	0.95	0.95	0.77	1.15	1.29	1.33	1.33	1.06	1.44	1.65	1.72	1.72	1.34	1.28	1.28	1.28	1.28	1.48
10.0	0.39	0.46	0.59	0.59	0.34	0.52	0.61	0.81	0.81	0.45	0.69	0.78	0.87	0.87	0.67	0.97	1.13	1.20	1.20	0.92	1.21	1.42	1.55	1.55	1.15	1.18	1.18	1.18	1.18	1.27
10.5	0.33	0.38	0.54	0.54	0.30	0.44	0.51	0.73	0.73	0.39	0.59	0.67	0.80	0.80	0.58	0.82	0.97	1.09	1.09	0.80	1.03	1.21	1.41	1.41	1.00	1.02	1.09	1.09	1.09	1.09
11.0						0.37	0.44	0.65	0.67	0.34	0.51	0.58	0.72	0.72	0.51	0.70	0.82	0.99	0.99	0.70	0.87	1.03	1.28	1.28	0.87	0.88	0.99	1.01	1.01	0.95
11.5						0.31	0.37	0.58	0.61	0.30	0.44	0.50	0.66	0.66	0.45	0.60	0.71	0.91	0.91	0.62	0.75	0.89	1.17	1.17	0.76	0.77	0.88	0.94	0.94	0.84
12.0											0.39	0.44	0.60	0.61	0.40	0.52	0.61	0.83	0.83	0.54	0.64	0.77	1.08	1.08	0.67	0.67	0.77	0.88	0.88	0.74
12.5											0.34	0.39	0.54	0.56	0.36	0.45	0.53	0.77	0.77	0.48	0.55	0.66	0.99	0.99	0.60	0.59	0.67	0.82	0.82	0.66
13.0											0.30	0.34	0.48	0.52	0.32	0.39	0.46	0.70	0.71	0.43	0.48	0.58	0.90	0.92	0.53	0.52	0.59	0.76	0.76	0.59
13.5											0.26	0.30	0.44	0.48	0.29	0.34	0.40	0.63	0.66	0.38	0.42	0.50	0.81	0.85	0.48	0.46	0.53	0.72	0.72	0.53
14.0																0.30	0.36	0.57	0.61	0.35	0.37	0.44	0.72	0.79	0.43	0.41	0.47	0.65	0.67	0.48
14.5																0.27	0.31	0.51	0.57	0.31	0.32	0.39	0.64	0.74	0.39	0.37	0.42	0.60	0.63	0.43
15.0																					0.28	0.34	0.57	0.69	0.35	0.33	0.38	0.54	0.59	0.39
15.5																					0.25	0.30	0.51	0.64	0.32	0.30	0.34	0.50	0.56	0.36
16.0																					0.22	0.27	0.46	0.60	0.29	0.27	0.31	0.45	0.53	0.33
16.5																										0.24	0.28	0.41	0.50	0.30
17.0																														
17.5																														
18.0																														

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** W_s: Load at a deflection of span/150.

2.3.7 DHS LOAD SPAN TABLES – LAPPED END SPAN

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span (m)	DHS 250/15					DHS 250/18					DHS 300/15					DHS 300/18					DHS 350/18					DHS 400/20				
	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S
3.0																														
3.5																														
4.0	6.18	6.18	6.18	6.18	24.11	9.86	9.86	9.86	9.86	30.91	5.61	5.61	5.61	5.61	38.33															
4.5	5.31	5.31	5.31	5.31	16.93	8.36	8.36	8.36	8.36	21.71	4.89	4.89	4.89	4.89	26.92															
5.0	4.61	4.61	4.61	4.61	12.34	7.17	7.17	7.17	7.17	15.82	4.32	4.32	4.32	4.32	19.62															
5.5	4.04	4.04	4.04	4.04	9.27	6.21	6.21	6.21	6.21	11.89	3.85	3.85	3.85	3.85	14.74	6.19	6.19	6.19	6.19	18.91	5.69	5.69	5.69	5.69	27.01					
6.0	3.57	3.57	3.57	3.57	7.14	5.43	5.43	5.43	5.43	9.16	3.45	3.45	3.45	3.45	11.36	5.50	5.50	5.50	5.50	14.57	5.12	5.12	5.12	5.12	20.80					
6.5	3.17	3.17	3.17	3.17	5.62	4.78	4.78	4.78	4.78	7.20	3.12	3.12	3.12	3.12	8.93	4.92	4.92	4.92	4.92	11.46	4.64	4.64	4.64	4.64	16.36	5.66	5.66	5.66	5.66	25.76
7.0	2.84	2.84	2.84	2.84	4.50	4.23	4.23	4.23	4.23	5.76	2.83	2.83	2.83	2.83	7.15	4.43	4.43	4.43	4.43	9.17	4.22	4.22	4.22	4.22	13.10	5.18	5.18	5.18	5.18	20.62
7.5	2.55	2.55	2.55	2.55	3.65	3.77	3.77	3.77	3.77	4.69	2.58	2.58	2.58	2.58	5.81	4.00	4.00	4.00	4.00	7.46	3.86	3.86	3.86	3.86	10.65	4.76	4.76	4.76	4.76	16.76
8.0	2.30	2.30	2.30	2.30	3.01	3.38	3.38	3.38	3.38	3.86	2.36	2.36	2.36	2.36	4.79	3.64	3.64	3.64	3.64	6.14	3.55	3.55	3.55	3.55	8.77	4.39	4.39	4.39	4.39	13.81
8.5	2.09	2.09	2.09	2.09	2.51	2.99	2.99	2.99	2.99	3.22	2.17	2.17	2.17	2.17	3.99	3.31	3.31	3.31	3.31	5.12	3.27	3.27	3.27	3.27	7.31	4.06	4.06	4.06	4.06	11.51
9.0	1.90	1.90	1.90	1.90	2.11	2.65	2.67	2.67	2.67	2.71	2.00	2.00	2.00	2.00	3.36	3.03	3.03	3.03	3.03	4.31	3.02	3.02	3.02	3.02	6.16	3.77	3.77	3.77	3.77	9.70
9.5	1.71	1.74	1.74	1.74	1.80	2.30	2.39	2.39	2.39	2.30	1.85	1.85	1.85	1.85	2.86	2.78	2.78	2.78	2.78	3.67	2.80	2.80	2.80	2.80	5.24	3.51	3.51	3.51	3.51	8.25
10.0	1.48	1.60	1.60	1.60	1.54	2.00	2.16	2.16	2.16	1.97	1.71	1.71	1.71	1.71	2.45	2.56	2.56	2.56	2.56	3.14	2.60	2.60	2.60	2.60	4.49	3.27	3.27	3.27	3.27	7.07
10.5	1.28	1.42	1.47	1.47	1.33	1.73	1.92	1.96	1.96	1.72	1.59	1.59	1.59	1.59	2.12	2.37	2.37	2.37	2.37	2.71	2.42	2.42	2.42	2.42	3.88	3.06	3.06	3.06	3.06	6.11
11.0	1.11	1.25	1.36	1.36	1.16	1.49	1.69	1.79	1.79	1.51	1.48	1.48	1.48	1.48	1.84	2.15	2.19	2.19	2.19	2.36	2.26	2.26	2.26	2.26	3.37	2.87	2.87	2.87	2.87	5.31
11.5	0.97	1.10	1.25	1.25	1.03	1.28	1.49	1.63	1.63	1.33	1.38	1.38	1.38	1.38	1.61	1.91	2.03	2.03	2.03	2.06	2.12	2.12	2.12	2.12	2.95	2.69	2.69	2.69	2.69	4.65
12.0	0.85	0.97	1.16	1.16	0.91	1.11	1.31	1.50	1.50	1.18	1.25	1.29	1.29	1.29	1.42	1.68	1.86	1.89	1.89	1.82	1.98	1.98	1.98	1.98	2.60	2.53	2.53	2.53	2.53	4.09
12.5	0.75	0.85	1.07	1.07	0.81	0.96	1.14	1.38	1.38	1.06	1.10	1.21	1.21	1.21	1.25	1.48	1.67	1.76	1.76	1.61	1.78	1.86	1.86	1.86	2.30	2.38	2.38	2.38	2.38	3.62
13.0	0.66	0.75	0.99	0.99	0.73	0.84	1.00	1.28	1.28	0.95	0.97	1.12	1.13	1.13	1.11	1.31	1.50	1.65	1.65	1.43	1.58	1.75	1.75	1.75	2.04	2.19	2.25	2.25	2.25	3.22
13.5	0.59	0.67	0.90	0.92	0.65	0.74	0.88	1.18	1.18	0.85	0.87	1.00	1.07	1.07	1.00	1.17	1.34	1.54	1.54	1.29	1.41	1.62	1.65	1.65	1.82	1.95	2.13	2.13	2.13	2.87
14.0	0.52	0.60	0.82	0.85	0.59	0.65	0.77	1.10	1.10	0.77	0.77	0.89	1.00	1.00	0.90	1.04	1.20	1.44	1.44	1.16	1.25	1.45	1.56	1.56	1.63	1.74	2.01	2.01	2.01	2.57
14.5	0.46	0.53	0.75	0.79	0.53	0.57	0.68	1.01	1.03	0.69	0.69	0.80	0.95	0.95	0.81	0.94	1.07	1.34	1.34	1.06	1.12	1.30	1.47	1.47	1.47	1.56	1.81	1.91	1.91	2.32
15.0	0.41	0.48	0.68	0.74	0.49	0.51	0.61	0.93	0.96	0.63	0.62	0.71	0.89	0.89	0.74	0.84	0.97	1.26	1.26	0.96	1.01	1.17	1.39	1.39	1.33	1.40	1.62	1.81	1.81	2.09
15.5	0.36	0.43	0.63	0.69	0.44	0.45	0.54	0.85	0.90	0.57	0.56	0.64	0.85	0.85	0.67	0.76	0.87	1.17	1.18	0.87	0.91	1.05	1.32	1.32	1.21	1.26	1.46	1.72	1.72	1.90
16.0	0.32	0.38	0.57	0.65	0.40	0.40	0.48	0.77	0.84	0.52	0.51	0.58	0.80	0.80	0.62	0.69	0.79	1.08	1.10	0.80	0.82	0.95	1.25	1.25	1.11	1.14	1.32	1.63	1.63	1.72
16.5	0.29	0.34	0.52	0.61	0.37	0.36	0.43	0.71	0.79	0.47	0.46	0.53	0.74	0.76	0.57	0.62	0.72	0.99	1.04	0.73	0.75	0.86	1.19	1.19	1.01	1.04	1.20	1.55	1.55	1.57
17.0	0.26	0.31	0.47	0.58	0.34	0.32	0.39	0.64	0.74	0.43	0.42	0.48	0.68	0.72	0.52	0.55	0.65	0.92	0.98	0.68	0.68	0.78	1.11	1.13	0.93	0.94	1.09	1.48	1.48	1.44
17.5	0.23	0.28	0.43	0.54	0.31	0.29	0.35	0.58	0.70	0.40	0.38	0.44	0.63	0.68	0.48	0.50	0.60	0.85	0.92	0.62	0.62	0.71	1.03	1.07	0.86	0.86	0.99	1.41	1.41	1.32
18.0	0.21	0.25	0.40	0.51	0.29	0.26	0.31	0.53	0.66	0.37	0.35	0.40	0.59	0.65	0.44	0.45	0.54	0.79	0.87	0.57	0.57	0.65	0.95	1.02	0.79	0.79	0.91	1.33	1.35	1.22

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** W_S: Load at a deflection of span/150.

2.3.7 DHS LOAD SPAN TABLES – LAPPED INTERNAL SPANS

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span (m)	DHS 150/12					DHS 150/15					DHS 200/12					DHS 200/15					DHS 200/18					DHS 250/13				
	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S
3.0																														
3.5																														
4.0	5.43	5.43	5.43	5.43	11.72	8.46	8.46	8.46	8.46	15.56	5.04	5.04	5.04	5.04	23.54															
4.5	4.51	4.51	4.51	4.51	8.23	6.68	6.68	6.68	6.68	10.93	4.35	4.35	4.35	4.35	16.53															
5.0	3.80	3.80	3.80	3.80	6.00	5.41	5.41	5.41	5.41	7.96	3.79	3.79	3.79	3.79	12.05	6.60	6.60	6.60	6.60	16.35	9.98	9.98	9.98	9.98	20.89	4.43	4.43	4.43	4.43	23.47
5.5	3.24	3.24	3.24	3.24	4.51	4.47	4.47	4.47	4.47	5.98	3.34	3.34	3.34	3.34	9.05	5.72	5.72	5.72	5.72	12.29	8.55	8.55	8.55	8.55	15.69	3.95	3.95	3.95	3.95	17.63
6.0	2.76	2.76	2.76	2.76	3.47	3.76	3.76	3.76	3.76	4.61	2.96	2.96	2.96	2.96	6.97	5.01	5.01	5.01	5.01	9.46	7.21	7.21	7.21	7.21	12.09	3.55	3.55	3.55	3.55	13.58
6.5	2.35	2.35	2.35	2.35	2.73	3.20	3.20	3.20	3.20	3.62	2.64	2.64	2.64	2.64	5.48	4.41	4.41	4.41	4.41	7.44	6.14	6.14	6.14	6.14	9.51	3.20	3.20	3.20	3.20	10.68
7.0	2.02	2.02	2.02	2.02	2.18	2.76	2.76	2.76	2.76	2.90	2.37	2.37	2.37	2.37	4.39	3.91	3.91	3.91	3.91	5.96	5.29	5.29	5.29	5.29	7.61	2.91	2.91	2.91	2.91	8.55
7.5	1.76	1.76	1.76	1.76	1.77	2.40	2.40	2.40	2.40	2.36	2.14	2.14	2.14	2.14	3.57	3.49	3.49	3.49	3.49	4.84	4.61	4.61	4.61	4.61	6.19	2.65	2.65	2.65	2.65	6.95
8.0	1.55	1.55	1.55	1.55	1.46	2.11	2.11	2.11	2.11	1.94	1.93	1.93	1.93	1.93	2.94	3.13	3.13	3.13	3.13	3.99	4.05	4.05	4.05	4.05	5.10	2.43	2.43	2.43	2.43	5.73
8.5	1.37	1.37	1.37	1.37	1.22	1.87	1.87	1.87	1.87	1.62	1.76	1.76	1.76	1.76	2.45	2.79	2.79	2.79	2.79	3.33	3.59	3.59	3.59	3.59	4.25	2.24	2.24	2.24	2.24	4.77
9.0	1.22	1.22	1.22	1.22	1.02	1.63	1.67	1.67	1.67	1.37	1.61	1.61	1.61	1.61	2.06	2.49	2.49	2.49	2.49	2.80	3.20	3.20	3.20	3.20	3.58	2.06	2.06	2.06	2.06	4.02
9.5	1.06	1.10	1.10	1.10	0.88	1.40	1.50	1.50	1.50	1.17	1.47	1.47	1.47	1.47	1.75	2.23	2.23	2.23	2.23	2.38	2.87	2.87	2.87	2.87	3.04	1.91	1.91	1.91	1.91	3.42
10.0	0.92	0.99	0.99	0.99	0.76	1.22	1.35	1.35	1.35	1.00	1.35	1.35	1.35	1.35	1.50	2.01	2.01	2.01	2.01	2.04	2.59	2.59	2.59	2.59	2.61	1.77	1.77	1.77	1.77	2.93
10.5	0.80	0.90	0.90	0.90	0.66	1.05	1.22	1.22	1.22	0.87	1.25	1.25	1.25	1.25	1.30	1.79	1.83	1.83	1.83	1.76	2.29	2.35	2.35	2.35	2.25	1.64	1.64	1.64	1.64	2.53
11.0	0.69	0.82	0.82	0.82	0.58	0.90	1.11	1.11	1.11	0.76	1.10	1.15	1.15	1.15	1.13	1.59	1.66	1.66	1.66	1.53	2.01	2.14	2.14	2.14	1.96	1.53	1.53	1.53	1.53	2.20
11.5	0.59	0.75	0.75	0.75	0.51	0.78	1.02	1.02	1.02	0.67	0.98	1.07	1.07	1.07	0.99	1.41	1.52	1.52	1.52	1.34	1.76	1.96	1.96	1.96	1.71	1.43	1.43	1.43	1.43	1.93
12.0	0.51	0.69	0.69	0.69	0.45	0.68	0.93	0.94	0.94	0.59	0.86	0.99	0.99	0.99	0.87	1.24	1.40	1.40	1.40	1.18	1.53	1.80	1.80	1.80	1.51	1.34	1.34	1.34	1.34	1.69
12.5	0.45	0.63	0.63	0.63	0.40	0.59	0.84	0.86	0.86	0.52	0.76	0.92	0.92	0.92	0.77	1.08	1.29	1.29	1.29	1.05	1.34	1.66	1.66	1.66	1.34	1.25	1.25	1.25	1.25	1.50
13.0	0.39	0.56	0.58	0.58	0.36	0.52	0.75	0.80	0.80	0.46	0.68	0.86	0.86	0.86	0.68	0.95	1.19	1.19	1.19	0.94	1.18	1.53	1.53	1.53	1.20	1.15	1.18	1.18	1.18	1.33
13.5	0.35	0.51	0.54	0.54	0.32	0.46	0.67	0.74	0.74	0.42	0.61	0.78	0.80	0.80	0.61	0.84	1.10	1.10	1.10	0.85	1.04	1.42	1.42	1.42	1.07	1.03	1.11	1.11	1.11	1.19
14.0	0.31	0.46	0.50	0.50	0.29	0.41	0.60	0.69	0.69	0.37	0.54	0.71	0.75	0.75	0.55	0.74	1.03	1.03	1.03	0.76	0.93	1.32	1.32	1.32	0.96	0.92	1.04	1.04	1.04	1.06
14.5						0.36	0.54	0.63	0.64	0.34	0.49	0.65	0.70	0.70	0.50	0.66	0.94	0.96	0.96	0.69	0.82	1.20	1.23	1.23	0.87	0.83	0.98	0.98	0.98	0.96
15.0						0.32	0.48	0.58	0.60	0.30	0.44	0.59	0.65	0.65	0.46	0.59	0.86	0.89	0.89	0.63	0.73	1.09	1.15	1.15	0.79	0.74	0.93	0.93	0.93	0.87
15.5											0.40	0.54	0.61	0.61	0.42	0.53	0.78	0.84	0.84	0.57	0.65	0.99	1.08	1.08	0.71	0.67	0.88	0.88	0.88	0.78
16.0											0.36	0.50	0.56	0.57	0.38	0.48	0.72	0.78	0.78	0.53	0.59	0.90	1.01	1.01	0.65	0.61	0.82	0.83	0.83	0.71
16.5											0.32	0.45	0.52	0.54	0.35	0.43	0.65	0.74	0.74	0.48	0.52	0.81	0.95	0.95	0.59	0.55	0.76	0.79	0.79	0.65
17.0											0.29	0.41	0.48	0.50	0.32	0.39	0.59	0.69	0.69	0.44	0.47	0.73	0.89	0.89	0.54	0.51	0.70	0.75	0.75	0.60
17.5											0.27	0.38	0.44	0.48	0.29	0.35	0.53	0.64	0.65	0.40	0.43	0.67	0.82	0.84	0.50	0.46	0.64	0.71	0.71	0.55
18.0																0.32	0.48	0.59	0.62	0.37	0.38	0.61	0.76	0.80	0.46	0.42	0.59	0.67	0.68	0.51

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** W_S: Load at a deflection of span/150.

2.3.7 DHS LOAD SPAN TABLES – LAPPED INTERNAL SPANS

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span (m)	DHS 250/15					DHS 250/18					DHS 300/15					DHS 300/18					DHS 350/18					DHS 400/20				
	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S	1B	2B	3B	FR	W_S
3.0																														
3.5																														
4.0																														
4.5																														
5.0																														
5.5	5.76	5.76	5.76	5.76	21.43	9.12	9.12	9.12	9.12	27.47	5.28	5.28	5.28	5.28	34.07															
6.0	5.14	5.14	5.14	5.14	16.50	8.05	8.05	8.05	8.05	21.16	4.77	4.77	4.77	4.77	26.24															
6.5	4.61	4.61	4.61	4.61	12.98	7.16	7.16	7.16	7.16	16.64	4.34	4.34	4.34	4.34	20.64															
7.0	4.16	4.16	4.16	4.16	10.39	6.40	6.40	6.40	6.40	13.32	3.96	3.96	3.96	3.96	16.52	6.37	6.37	6.37	6.37	21.19	5.86	5.86	5.86	5.86	30.26					
7.5	3.77	3.77	3.77	3.77	8.45	5.75	5.75	5.75	5.75	10.83	3.64	3.64	3.64	3.64	13.43	5.81	5.81	5.81	5.81	17.23	5.39	5.39	5.39	5.39	24.61					
8.0	3.43	3.43	3.43	3.43	6.96	5.19	5.19	5.19	5.19	8.92	3.35	3.35	3.35	3.35	11.07	5.31	5.31	5.31	5.31	14.20	4.98	4.98	4.98	4.98	20.27	6.07	6.07	6.07	6.07	31.92
8.5	3.14	3.14	3.14	3.14	5.80	4.71	4.71	4.71	4.71	7.44	3.10	3.10	3.10	3.10	9.23	4.88	4.88	4.88	4.88	11.83	4.62	4.62	4.62	4.62	16.90	5.64	5.64	5.64	5.64	26.61
9.0	2.88	2.88	2.88	2.88	4.89	4.29	4.29	4.29	4.29	6.27	2.87	2.87	2.87	2.87	7.77	4.49	4.49	4.49	4.49	9.97	4.29	4.29	4.29	4.29	14.24	5.27	5.27	5.27	5.27	22.41
9.5	2.65	2.65	2.65	2.65	4.15	3.92	3.92	3.92	3.92	5.33	2.67	2.67	2.67	2.67	6.61	4.15	4.15	4.15	4.15	8.48	4.00	4.00	4.00	4.00	12.10	4.93	4.93	4.93	4.93	19.06
10.0	2.44	2.44	2.44	2.44	3.56	3.60	3.60	3.60	3.60	4.57	2.49	2.49	2.49	2.49	5.66	3.85	3.85	3.85	3.85	7.27	3.74	3.74	3.74	3.74	10.38	4.62	4.62	4.62	4.62	16.34
10.5	2.26	2.26	2.26	2.26	3.08	3.27	3.27	3.27	3.27	3.94	2.33	2.33	2.33	2.33	4.89	3.57	3.57	3.57	3.57	6.28	3.50	3.50	3.50	3.50	8.96	4.34	4.34	4.34	4.34	14.11
11.0	2.10	2.10	2.10	2.10	2.67	2.98	2.98	2.98	2.98	3.43	2.18	2.18	2.18	2.18	4.25	3.33	3.33	3.33	3.33	5.46	3.29	3.29	3.29	3.29	7.80	4.09	4.09	4.09	4.09	12.27
11.5	1.95	1.95	1.95	1.95	2.34	2.69	2.73	2.73	2.73	3.00	2.05	2.05	2.05	2.05	3.72	3.10	3.10	3.10	3.10	4.78	3.09	3.09	3.09	3.09	6.82	3.86	3.86	3.86	3.86	10.74
12.0	1.79	1.82	1.82	1.82	2.06	2.41	2.51	2.51	2.51	2.64	1.92	1.92	1.92	1.92	3.28	2.90	2.90	2.90	2.90	4.20	2.91	2.91	2.91	2.91	6.00	3.65	3.65	3.65	3.65	9.45
12.5	1.61	1.70	1.70	1.70	1.82	2.16	2.31	2.31	2.31	2.34	1.81	1.81	1.81	1.81	2.90	2.72	2.72	2.72	2.72	3.72	2.75	2.75	2.75	2.75	5.31	3.45	3.45	3.45	3.45	8.36
13.0	1.44	1.59	1.59	1.59	1.62	1.93	2.13	2.13	2.13	2.08	1.71	1.71	1.71	1.71	2.58	2.55	2.55	2.55	2.55	3.30	2.60	2.60	2.60	2.60	4.72	3.27	3.27	3.27	3.27	7.43
13.5	1.29	1.49	1.49	1.49	1.44	1.73	1.98	1.98	1.98	1.85	1.61	1.61	1.61	1.61	2.30	2.40	2.40	2.40	2.40	2.95	2.46	2.46	2.46	2.46	4.22	3.11	3.11	3.11	3.11	6.64
14.0	1.15	1.40	1.40	1.40	1.29	1.54	1.84	1.84	1.84	1.66	1.52	1.52	1.52	1.52	2.06	2.20	2.26	2.26	2.26	2.65	2.33	2.33	2.33	2.33	3.78	2.95	2.95	2.95	2.95	5.95
14.5	1.04	1.31	1.31	1.31	1.17	1.37	1.71	1.71	1.71	1.49	1.44	1.44	1.44	1.44	1.85	2.00	2.13	2.13	2.13	2.38	2.21	2.21	2.21	2.21	3.40	2.81	2.81	2.81	2.81	5.36
15.0	0.94	1.22	1.24	1.24	1.05	1.22	1.60	1.60	1.60	1.35	1.36	1.37	1.37	1.37	1.68	1.81	2.01	2.01	2.01	2.15	2.10	2.10	2.10	2.10	3.07	2.68	2.68	2.68	2.68	4.84
15.5	0.85	1.12	1.16	1.16	0.95	1.10	1.50	1.50	1.50	1.23	1.23	1.30	1.30	1.30	1.52	1.64	1.90	1.90	1.90	1.95	1.98	2.00	2.00	2.00	2.78	2.55	2.55	2.55	2.55	4.38
16.0	0.77	1.03	1.09	1.09	0.87	0.99	1.39	1.41	1.41	1.12	1.12	1.23	1.23	1.23	1.38	1.49	1.80	1.80	1.80	1.77	1.79	1.90	1.90	1.90	2.53	2.44	2.44	2.44	2.44	3.99
16.5	0.70	0.95	1.02	1.02	0.80	0.89	1.28	1.32	1.32	1.03	1.02	1.17	1.17	1.17	1.26	1.36	1.71	1.71	1.71	1.61	1.63	1.81	1.81	1.81	2.31	2.26	2.33	2.33	2.33	3.63
17.0	0.64	0.88	0.96	0.96	0.73	0.81	1.18	1.25	1.25	0.95	0.93	1.12	1.12	1.12	1.15	1.24	1.62	1.62	1.62	1.48	1.49	1.73	1.73	1.73	2.11	2.06	2.23	2.23	2.23	3.32
17.5	0.59	0.81	0.91	0.91	0.67	0.73	1.09	1.18	1.18	0.87	0.85	1.07	1.07	1.07	1.05	1.14	1.50	1.54	1.54	1.35	1.37	1.65	1.65	1.65	1.93	1.88	2.13	2.13	2.13	3.04
18.0	0.53	0.75	0.85	0.86	0.62	0.66	1.01	1.11	1.11	0.81	0.78	1.02	1.02	1.02	0.97	1.05	1.40	1.46	1.46	1.24	1.25	1.58	1.58	1.58	1.78	1.73	2.04	2.04	2.04	2.80

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** W_S: Load at a deflection of span/150.

2.3.3 COMBINED BENDING AND COMPRESSION DESIGN

When purlins are designed to act under combined bending and axial loads, for example purlins transmitting end wall loads to braced bays, interaction of combined bending and axial loads may be shown in the following equations:

1. If $N^*/\phi_c N_c \le 0.15$, the following interaction equation may be used:

$$\frac{N^*}{\phi_c N_c} + \frac{W_x^*}{\phi_b W_{bx}} \le 1.0$$

This is usually the case when purlins are used primarily as bending members near capacity and are also required to take a nominal level of axial compression.

If $N^*/\phi_c N_c > 0.15$ then the following equations must be used:

2. $$\frac{N^*}{\phi_c N_c} + \frac{C_{mx} W_x^*}{\phi_b W_{bx} \alpha_{nx}} \le 1.0$$

3. $$\frac{N^*}{\phi_c N_s} + \frac{W_x^*}{\phi_b W_{bx}} \le 1.0$$

where

N^* = Design axial compressive load (kN).

$\phi_c N_c$ = Axial compression member capacity (kN) in the absence of other actions.

$\phi_c N_s$ = Axial compression section capacity (kN). Refer Section 2.3.2 Design Considerations.

W_x^* = Design bending load (kN/m) about the x axis.

$\phi_b W_{bx}$ = Uniformly loaded bending capacity (kN/m) about the x axis.

C_{mx} = Restraint coefficient about the x, y axes respectively.
It is reasonable to assume C_{mx} is 1.0 for unrestrained supports (i.e. simply supported) and 0.85 for restrained supports (end or internal spans).

α_{nx} = $1 - [N^*/\phi_c N_{ex}]$.

$\phi_c N_{ex}$ = Euler buckling capacity (kN) about the major axis of symmetry (X-X).

Flexure about the minor axis of symmetry (Y-Y) is assumed to be zero. If biaxial flexure is expected, specific design is required.

Solution of the interaction equation involves solving for the design axial compressive load (N^*), yielding the remaining axial capacity or directly substituting the known variables. These methods are illustrated in the sample calculations in Section 2.3.11.3.

Where DHS purlins are designed to take solely axial load, the design of the bolted connections must be considered. For example a DHS purlin designed as a load-bearing post, held top and bottom with bolts, will likely be limited by the capacity of bolts used.

2.3.8 DHS LOAD SPAN TABLES – SINGLE SPANS
Axial compression capacities (kN) $\phi_c N_c$

Span (m)	DHS 150/12					DHS 150/15					DHS 200/12					DHS 200/15					DHS 200/18					DHS 250/13				
	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex
3.0	65.4	76.4	77.0	77.1	247.9																									
3.5	57.3	70.8	71.5	71.6	182.1	80.2	99.4	100.5	100.6	227.3	73.2	85.4	86.2	86.2	397.2															
4.0	49.2	64.7	65.6	65.7	139.4	67.9	90.8	92.2	92.3	174.0	66.4	81.1	82.1	82.1	304.1	93.6	114.5	115.9	116.0	380.6	123.3	151.2	153.2	153.3	455.1	91.2	106.4	107.5	107.6	614.5
4.5	41.5	58.5	59.6	59.6	110.1	55.9	82.0	83.4	83.6	137.5	59.5	76.5	77.7	77.7	240.2	83.8	108.0	109.7	109.8	300.7	110.0	142.6	144.9	145.0	359.5	84.2	102.3	103.7	103.8	485.5
5.0	35.2	52.3	53.4	53.5	89.2	46.8	72.7	74.5	74.7	111.4	52.6	71.7	73.0	73.1	194.6	74.1	101.2	103.1	103.2	243.6	95.4	133.4	136.1	136.2	291.2	77.0	98.0	99.6	99.7	393.2
5.5	29.9	46.1	47.3	47.4	73.7	39.9	62.8	64.7	64.9	92.0	45.9	66.7	68.2	68.3	160.8	64.6	94.1	96.3	96.4	201.3	81.7	124.0	126.9	127.1	240.7	69.9	93.4	95.3	95.4	325.0
6.0	25.8	40.3	41.5	41.5	61.9	34.6	53.9	55.6	55.7	77.3	40.4	61.7	63.3	63.4	135.1	55.9	87.0	89.4	89.5	169.1	70.6	114.4	117.6	117.8	202.2	62.8	88.7	90.8	90.9	273.1
6.5	22.5	35.4	36.6	36.7	52.8	30.4	46.9	48.3	48.4	65.9	35.9	56.6	58.4	58.5	115.1	48.8	79.8	82.3	82.5	144.1	61.9	103.8	107.7	107.9	172.3	55.8	83.8	86.1	86.2	232.7
7.0	19.9	31.1	32.1	32.2	45.5	26.9	41.2	42.4	42.6	56.8	32.1	51.6	53.5	53.6	99.3	43.1	72.7	75.3	75.5	124.2	54.8	93.2	97.2	97.4	148.6	50.0	78.8	81.4	81.5	200.6
7.5	17.8	27.6	28.4	28.5	39.6	24.1	36.6	37.6	37.7	49.5	28.7	46.7	48.6	48.8	86.5	38.4	65.6	68.4	68.5	108.2	49.0	82.9	86.9	87.1	129.4	45.0	73.8	76.6	76.7	174.7
8.0						21.8	32.7	33.6	33.7	43.5	25.7	42.4	44.2	44.3	76.0	34.5	59.0	61.8	62.0	95.1	44.2	74.2	77.6	77.8	113.7	40.9	68.8	71.7	71.8	153.6
8.5											23.2	38.7	40.3	40.4	67.3	31.3	53.1	55.6	55.7	84.2	40.2	66.9	69.9	70.1	100.7	37.3	63.9	66.9	67.0	136.0
9.0											21.1	35.5	37.0	37.0	60.0	28.5	48.1	50.3	50.4	75.1	36.7	60.7	63.3	63.5	89.8	34.1	59.0	62.2	62.3	121.3
9.5											19.3	32.7	34.0	34.1	53.9	26.1	43.8	45.8	45.9	67.4	33.8	55.3	57.7	57.8	80.6	31.0	54.4	57.4	57.6	108.9
10.0											17.7	30.1	31.5	31.5	48.6	24.1	40.1	41.9	42.0	60.9	31.2	50.7	52.8	53.0	72.8	28.3	50.4	53.2	53.3	98.3
10.5																22.3	36.9	38.5	38.6	55.2	28.8	46.7	48.6	48.7	66.0	26.0	46.9	49.4	49.6	89.1
11.0																					26.5	43.2	44.8	45.0	60.1	24.0	43.7	46.1	46.2	81.2
11.5																					24.6	40.0	41.6	41.7	55.0	22.3	40.9	43.1	43.2	74.3
12.0																										20.7	38.4	40.4	40.5	68.2
12.5																										19.3	36.1	38.0	38.1	62.9
13.0																														
13.5																														
14.0																														
14.5																														
15.0																														
15.5																														
16.0																														
16.5																														
17.0																														
17.5																														
18.0																														

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** $\phi_c N_{ex}$: Elastic buckling capacity about the x-x axis.

2.3.8 DHS LOAD SPAN TABLES – SINGLE SPANS
Axial compression capacities (kN) $\phi_c N_c$

Span (m)	DHS 250/15					DHS 250/18					DHS 300/15					DHS 300/18					DHS 350/18					DHS 400/20				
	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex
3.0																														
3.5																														
4.0																														
4.5																														
5.0	95.9	122.2	124.3	124.4	453.6	126.3	161.7	164.5	164.6	543.6	114.7	137.8	139.9	139.9	775.1															
5.5	86.9	116.5	118.9	119.0	374.9	114.2	154.2	157.4	157.5	449.2	106.8	133.3	135.6	135.7	640.6															
6.0	78.0	110.6	113.3	113.4	315.0	102.2	146.3	149.9	150.1	377.5	98.7	128.5	131.2	131.3	538.3															
6.5	69.3	104.5	107.5	107.6	268.4	89.7	138.2	142.2	142.4	321.6	90.6	123.5	126.5	126.6	458.6	119.8	163.9	168.0	168.1	550.4										
7.0	61.9	98.3	101.5	101.7	231.4	78.8	130.0	134.3	134.5	277.3	82.7	118.3	121.6	121.8	395.4	109.2	157.0	161.5	161.7	474.5	112.4	162.9	179.0	179.2	692.3					
7.5	55.7	92.1	95.5	95.7	201.6	69.9	121.6	126.3	126.4	241.6	74.8	113.0	116.6	116.8	344.5	98.6	150.0	154.9	155.1	413.4	101.5	155.6	173.4	173.5	603.1	120.9	187.5	217.8	222.0	933.9
8.0	50.0	85.9	89.5	89.6	177.2	62.6	113.3	118.2	118.4	212.3	68.0	107.6	111.5	111.7	302.7	89.5	142.8	148.1	148.3	363.3	92.1	148.1	167.6	167.7	530.0	108.9	178.3	211.5	216.1	820.8
8.5	45.0	79.7	83.5	83.6	156.9	56.4	105.1	110.1	110.3	188.1	62.2	102.1	106.3	106.5	268.2	81.7	135.6	141.2	141.4	321.8	84.0	140.6	161.6	161.8	469.5	98.0	169.0	204.9	210.0	727.0
9.0	40.7	73.5	77.5	77.7	140.0	51.1	96.8	102.1	102.3	167.7	57.1	96.7	101.1	101.2	239.2	74.5	128.3	134.3	134.5	287.0	76.5	133.0	155.5	155.7	418.8	88.8	159.7	198.2	203.8	648.5
9.5	37.1	67.8	71.6	71.7	125.6	46.6	88.2	93.8	94.0	150.5	52.7	91.2	95.8	96.0	214.7	67.8	121.0	127.3	127.5	257.6	69.7	125.5	149.3	149.5	375.9	80.9	150.4	191.3	197.3	582.0
10.0	33.9	62.8	66.2	66.4	113.4	42.7	80.7	85.7	86.0	135.9	48.7	85.8	90.6	90.8	193.7	62.0	113.8	120.3	120.5	232.5	63.8	117.9	143.0	143.2	339.2	74.1	141.1	184.3	190.7	525.3
10.5	31.2	58.3	61.5	61.7	102.8	39.3	74.2	78.8	79.0	123.2	45.3	80.4	85.4	85.6	175.7	57.0	106.6	113.3	113.6	210.9	58.6	110.5	136.7	136.9	307.7	68.2	131.9	177.3	184.1	476.4
11.0	28.8	54.4	57.3	57.4	93.7	36.3	68.5	72.7	72.8	112.3	41.9	75.1	80.2	80.4	160.1	52.6	99.5	106.4	106.6	192.1	54.1	103.0	130.4	130.6	280.3	63.1	122.9	170.1	177.3	434.1
11.5	26.7	50.3	53.4	53.6	85.7	33.6	63.5	67.3	67.4	102.7	38.8	70.4	75.1	75.3	146.5	48.8	93.2	99.6	99.8	175.8	50.2	96.4	124.1	124.3	256.5	58.5	114.8	163.0	170.5	397.2
12.0	24.8	46.8	49.6	49.7	78.7	31.3	59.1	62.5	62.7	94.3	36.0	66.1	70.6	70.7	134.5	45.3	87.5	93.4	93.7	161.4	46.7	90.4	117.8	118.1	235.5	54.4	106.6	155.8	163.7	364.8
12.5	23.2	43.6	46.2	46.3	72.5	29.2	55.2	58.3	58.4	86.9	33.6	62.2	66.4	66.6	124.0	42.3	82.3	87.9	88.1	148.8	43.5	85.0	111.6	111.9	217.1	50.8	99.3	148.7	156.9	336.2
13.0	21.7	40.8	43.1	43.3	67.1	27.3	51.6	54.5	54.6	80.4	31.4	58.7	62.7	62.8	114.6	39.5	77.5	82.8	83.0	137.6	40.7	80.0	105.3	105.6	200.7	47.6	92.8	141.6	150.0	310.8
13.5						25.6	48.5	51.1	51.2	74.5	29.4	55.6	59.3	59.4	106.3	37.1	72.7	78.2	78.4	127.5	38.2	74.9	99.5	99.7	186.1	44.7	87.0	134.5	143.2	288.2
14.0						24.1	45.6	48.0	48.1	69.3	27.6	52.6	56.1	56.3	98.8	34.9	68.3	73.5	73.6	118.6	35.9	70.4	94.2	94.4	173.0	42.1	81.7	127.4	136.5	268.0
14.5											26.0	50.0	53.3	53.4	92.1	32.9	64.3	69.1	69.3	110.6	33.9	66.2	89.3	89.6	161.3	39.7	76.9	120.7	129.7	249.8
15.0											24.6	47.5	50.6	50.7	86.1	31.0	60.7	65.2	65.3	103.3	32.0	62.4	84.9	85.1	150.7	37.5	72.6	114.6	123.1	233.4
15.5											23.2	45.2	48.2	48.3	80.6	29.3	57.4	61.6	61.7	96.7	30.3	59.0	80.7	80.9	141.2	35.5	68.7	108.3	117.1	218.6
16.0																27.8	54.3	58.3	58.4	90.8	28.7	55.9	76.5	76.7	132.5	33.7	65.1	102.5	111.1	205.2
16.5																26.4	51.5	55.3	55.4	85.4	27.3	53.0	72.5	72.7	124.6	32.0	61.8	97.1	105.4	192.9
17.0																					25.9	50.4	68.8	69.0	117.3	30.5	58.7	92.3	100.0	181.7
17.5																					24.7	47.9	65.5	65.6	110.7	29.1	55.9	87.8	95.2	171.5
18.0																					23.6	45.7	62.4	62.5	104.7	27.7	53.3	83.6	90.6	162.1

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** $\phi_c N_{ex}$: Elastic buckling capacity about the x-x axis.

2.3.8 DHS LOAD SPAN TABLES – END SPANS
Axial compression capacities (kN) $\phi_c N_c$

Span (m)	DHS 150/12					DHS 150/15					DHS 200/12					DHS 200/15					DHS 200/18					DHS 250/13				
	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex
3.0	64.5	78.3	85.3	85.6	506.0	90.4	110.1	120.1	120.6	631.5	78.8	89.6	95.1	95.5	1103.3															
3.5	56.2	73.2	82.2	82.6	371.7	78.7	102.8	115.7	116.2	464.0	72.1	85.7	93.0	93.5	810.6	101.7	121.0	131.3	132.1	1014.6	134.0	159.8	173.6	174.7	1213.1	96.2	109.7	116.3	117.1	1638.0
4.0	48.0	67.7	78.7	79.2	284.6	66.0	94.9	110.7	111.5	355.2	65.1	81.5	90.7	91.3	620.6	91.8	115.1	128.0	129.0	776.8	120.8	151.9	169.2	170.6	928.8	89.2	105.8	114.3	115.3	1254.0
4.5	40.4	62.0	74.9	75.5	224.8	54.2	86.8	105.4	106.2	280.6	58.0	77.1	88.1	88.9	490.3	81.7	108.7	124.4	125.5	613.8	106.8	143.4	164.4	166.0	733.8	81.9	101.6	112.0	113.3	990.8
5.0	34.1	56.2	70.9	71.6	182.1	45.4	78.5	99.7	100.7	227.3	51.0	72.3	85.3	86.3	397.2	71.8	102.0	120.4	121.8	497.1	92.1	134.5	159.1	161.1	594.4	74.5	97.1	109.5	111.1	802.6
5.5	29.0	50.4	66.8	67.6	150.5	38.8	69.7	93.8	94.9	187.9	44.4	67.5	82.3	83.4	328.2	62.3	95.2	116.2	117.8	410.8	78.6	125.3	153.5	155.8	491.2	67.1	92.4	106.8	108.7	663.3
6.0	25.0	44.7	62.5	63.4	126.5	33.6	60.7	87.7	88.9	157.8	39.0	62.6	79.2	80.4	275.8	53.7	88.2	111.8	113.6	345.2	68.0	116.0	147.6	150.1	412.8	59.7	87.5	104.0	106.1	557.3
6.5	21.9	39.6	58.2	59.1	107.7	29.6	53.0	81.4	82.8	134.5	34.7	57.6	75.9	77.3	235.0	47.0	81.2	107.2	109.2	294.1	59.6	106.0	141.4	144.2	351.7	53.0	82.5	101.0	103.4	474.9
7.0	19.3	35.2	53.8	54.8	92.9	26.2	46.8	75.2	76.6	116.0	31.0	52.7	72.6	74.1	202.6	41.5	74.2	102.4	104.6	253.6	52.9	95.6	135.1	138.1	303.2	47.4	77.4	97.8	100.6	409.5
7.5	17.3	31.3	49.5	50.5	80.9	23.5	41.7	68.2	69.9	101.0	27.6	47.9	69.1	70.8	176.5	37.0	67.3	97.5	99.9	220.9	47.3	85.6	128.5	131.8	264.1	42.7	72.3	94.5	97.6	356.7
8.0	15.6	28.0	45.1	46.3	71.1	21.3	37.5	61.3	63.1	88.8	24.7	43.5	65.6	67.4	155.1	33.3	60.9	92.6	95.1	194.2	42.7	76.8	121.9	125.4	232.2	38.7	67.2	91.2	94.6	313.5
8.5	14.1	25.3	41.1	42.2	63.0	19.4	33.9	55.1	56.7	78.6	22.3	39.8	62.1	64.0	137.4	30.2	54.9	87.6	90.3	172.0	38.8	69.4	115.2	118.8	205.6	35.3	62.2	87.7	91.4	277.7
9.0	12.9	22.9	37.7	38.6	56.2	17.7	30.9	49.9	51.3	70.1	20.3	36.5	58.6	60.5	122.5	27.5	49.9	82.6	85.4	153.4	35.3	63.2	108.1	112.3	183.4	32.0	57.2	84.2	88.2	247.7
9.5	11.8	21.0	34.3	35.3	50.4	16.3	28.3	45.4	46.6	62.9	18.6	33.7	55.1	57.1	110.0	25.2	45.5	77.6	80.5	137.7	32.2	57.8	100.5	104.9	164.6	29.2	52.8	80.6	84.9	222.3
10.0	10.9	19.2	31.4	32.2	45.5	15.1	26.1	41.5	42.6	56.8	17.1	31.2	51.6	53.7	99.3	23.3	41.8	72.6	75.6	124.2	29.4	53.2	93.2	97.6	148.6	26.7	48.9	77.0	81.5	200.6
10.5						14.0	24.1	38.1	39.2	51.5	15.8	28.8	48.1	50.3	90.0	21.6	38.5	67.6	70.8	112.7	27.1	49.2	85.9	90.4	134.7	24.5	45.4	73.5	78.2	182.0
11.0						13.0	22.4	35.2	36.1	46.9	14.6	26.6	44.9	47.0	82.0	19.9	35.7	63.0	65.9	102.7	25.0	45.6	79.4	83.4	122.8	22.6	42.3	69.9	74.8	165.8
11.5											13.6	24.6	42.0	43.9	75.0	18.5	33.2	58.4	61.4	93.9	23.1	42.5	73.6	77.2	112.3	20.9	39.6	66.3	71.5	151.7
12.0											12.7	22.9	39.4	41.2	68.9	17.1	30.9	54.3	57.0	86.3	21.5	39.7	68.4	71.7	103.2	19.5	37.1	62.8	68.1	139.3
12.5											11.9	21.4	37.1	38.7	63.5	16.0	28.9	50.6	53.1	79.5	20.0	37.3	63.9	66.8	95.1	18.1	34.9	59.2	64.8	128.4
13.0											11.2	20.1	35.0	36.5	58.7	14.9	27.2	47.3	49.6	73.5	18.7	35.0	59.8	62.4	87.9	17.0	32.6	55.8	61.5	118.7
13.5																14.0	25.6	44.3	46.4	68.2	17.5	33.0	56.1	58.5	81.5	15.9	30.5	52.8	58.1	110.0
14.0																13.1	24.1	41.7	43.6	63.4	16.3	31.2	52.8	54.9	75.8	14.9	28.6	50.0	55.0	102.3
14.5																					15.2	29.6	49.7	51.7	70.6	14.1	26.9	47.4	52.2	95.4
15.0																					14.2	28.0	47.0	48.8	66.0	13.3	25.4	45.0	49.6	89.1
15.5																										12.6	24.0	42.9	47.3	83.5
16.0																										11.9	22.7	40.9	45.1	78.3
16.5																														
17.0																														
17.5																														
18.0																														

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** $\phi_c N_{ex}$: Elastic buckling capacity about the x-x axis.

2.3.8 DHS LOAD SPAN TABLES – END SPANS

Axial compression capacities (kN) $\phi_c N_c$

Span (m)	DHS 250/15					DHS 250/18					DHS 300/15					DHS 300/18					DHS 350/18					DHS 400/20				
	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex
3.0																														
3.5																														
4.0	111.1	131.8	142.4	143.7	1446.7	146.7	174.3	188.4	190.3	1733.4	127.7	144.8	153.1	154.6	2471.8															
4.5	102.0	126.6	139.5	141.2	1143.0	134.5	167.4	184.6	187.0	1369.6	120.0	140.5	150.9	152.8	1953.0															
5.0	92.7	121.0	136.4	138.5	925.8	122.0	159.9	180.5	183.4	1109.4	111.9	136.0	148.4	150.7	1581.9	148.2	180.2	196.8	199.9	1898.3	153.0	186.4	203.7	210.7	2769.4					
5.5	83.4	115.2	133.1	135.5	765.1	109.5	152.1	176.0	179.4	916.8	103.6	131.1	145.8	148.5	1307.4	137.2	173.8	193.2	196.9	1568.8	141.5	179.7	200.0	208.3	2288.8					
6.0	74.1	109.1	129.6	132.4	642.9	97.0	143.9	171.3	175.2	770.4	95.2	126.0	142.9	146.1	1098.5	126.0	167.0	189.4	193.8	1318.2	129.9	172.6	196.1	205.7	1923.2	155.8	208.5	237.5	254.0	2978.0
6.5	65.7	102.8	125.8	129.0	547.8	84.4	135.5	166.3	170.8	656.4	86.9	120.6	139.9	143.5	936.0	114.9	159.9	185.4	190.4	1123.2	118.3	165.2	191.8	203.0	1638.7	141.6	199.3	232.3	251.3	2537.5
7.0	58.7	96.4	121.9	125.5	472.3	74.2	127.0	161.1	166.1	566.0	78.6	115.1	136.7	140.8	807.1	103.7	152.6	181.1	186.8	968.5	106.8	157.5	187.4	200.0	1412.9	127.4	189.9	226.8	248.4	2187.9
7.5	52.6	90.0	117.8	121.8	411.5	65.8	118.4	155.6	161.2	493.0	71.0	109.5	133.3	137.9	703.0	93.6	145.1	176.7	183.0	843.7	96.3	149.7	182.7	196.9	1230.8	114.6	180.3	221.0	245.4	1905.9
8.0	47.0	83.6	113.6	118.0	361.6	58.9	109.8	150.0	156.2	433.3	64.6	103.8	129.8	134.9	617.9	84.9	137.5	172.0	179.0	741.5	87.3	141.8	177.9	193.7	1081.8	102.5	170.5	215.0	242.2	1675.1
8.5	42.3	77.3	109.3	114.0	320.3	53.1	101.3	144.2	150.9	383.8	59.0	98.1	126.2	131.8	547.3	77.4	129.8	167.2	174.9	656.8	79.5	133.8	172.8	190.3	958.2	92.3	160.7	208.8	238.8	1483.8
9.0	38.3	71.0	104.9	110.0	285.7	48.1	92.3	138.3	145.6	342.4	54.2	92.4	122.4	128.6	488.2	70.1	122.1	162.2	170.7	585.9	72.0	125.9	167.6	186.7	854.7	83.6	150.9	202.4	235.3	1323.5
9.5	34.9	65.5	100.4	105.9	256.4	43.9	84.0	132.3	140.1	307.3	49.9	86.7	118.6	125.2	438.2	63.8	114.5	157.2	166.3	525.8	65.6	117.9	162.3	183.1	767.1	76.2	141.1	195.8	231.6	1187.9
10.0	31.9	60.6	95.9	101.8	231.4	40.2	76.8	126.3	134.6	277.3	46.2	81.0	114.7	121.8	395.4	58.4	107.0	152.0	161.8	474.5	60.0	110.1	156.9	179.3	692.3	69.8	131.4	189.2	227.8	1072.1
10.5	29.4	56.2	91.4	97.6	209.9	37.0	70.6	120.3	129.0	251.5	42.8	75.4	110.8	118.4	358.7	53.7	99.4	146.7	157.2	430.4	55.2	102.3	151.4	175.4	627.9	64.3	122.0	182.4	223.9	972.4
11.0	27.1	52.1	86.9	93.4	191.2	34.2	65.2	114.2	123.4	229.2	39.4	70.4	106.8	114.8	326.8	49.5	92.8	141.4	152.5	392.2	51.0	95.4	145.9	171.3	572.2	59.4	113.4	175.6	219.8	886.0
11.5	25.1	48.2	82.4	89.2	175.0	31.7	60.3	108.2	117.7	209.7	36.5	65.9	102.7	111.2	299.0	45.9	86.8	136.0	147.7	358.8	47.3	89.2	140.3	167.3	523.5	55.1	105.0	168.7	215.7	810.6
12.0	23.4	44.7	78.0	84.9	160.7	29.5	56.1	102.2	112.1	192.6	33.9	61.9	98.7	107.6	274.6	42.7	81.4	130.6	142.9	329.5	44.0	83.6	134.7	163.1	480.8	51.3	97.5	161.7	211.4	744.5
12.5	21.8	41.7	73.5	80.8	148.1	27.5	52.3	96.1	106.5	177.5	31.6	58.2	94.7	104.0	253.1	39.8	76.2	125.2	138.1	303.7	41.0	78.4	129.1	158.9	443.1	47.9	90.9	154.8	207.1	686.1
13.0	20.4	38.9	69.3	76.6	136.9	25.7	48.9	89.7	100.9	164.1	29.5	54.9	90.6	100.3	234.0	37.3	71.2	119.8	133.2	280.8	38.4	73.2	123.5	154.6	409.6	44.9	85.0	147.9	202.6	634.3
13.5	19.1	36.5	65.4	72.4	127.0	24.1	45.8	84.0	95.1	152.1	27.7	51.9	86.6	96.6	217.0	34.9	66.7	114.5	128.3	260.4	36.0	68.6	117.9	150.3	379.8	42.1	79.7	141.1	198.1	588.2
14.0	18.0	34.3	61.9	68.6	118.0	22.7	43.1	78.8	89.2	141.5	26.0	49.1	82.7	93.0	201.7	32.8	62.6	109.2	123.4	242.1	33.9	64.4	112.4	145.9	353.2	39.7	74.8	134.3	193.5	546.9
14.5	16.9	32.3	58.7	65.0	110.0	21.4	40.6	74.2	83.9	131.9	24.5	46.6	78.6	89.3	188.1	31.0	58.9	103.7	118.6	225.7	31.9	60.6	106.8	141.5	329.3	37.4	70.5	127.4	188.9	509.9
15.0	16.0	30.4	55.7	61.8	102.8	20.2	38.3	69.9	79.1	123.2	23.1	44.3	74.8	85.7	175.7	29.2	55.6	98.6	113.7	210.9	30.2	57.2	101.5	137.1	307.7	35.4	66.6	120.9	184.2	476.4
15.5	15.1	28.8	52.8	58.8	96.3	19.1	36.2	66.1	74.8	115.4	21.9	41.9	71.3	82.1	164.6	27.6	52.5	93.9	108.9	197.5	28.6	54.1	96.6	132.7	288.1	33.5	63.0	115.0	179.5	446.2
16.0	14.3	27.2	50.0	56.0	90.4	18.1	34.3	62.6	70.8	108.3	20.7	39.6	68.0	78.4	154.4	26.2	49.8	89.5	104.0	185.3	27.1	51.2	92.1	128.3	270.4	31.8	59.7	108.9	174.8	418.7
16.5	13.6	25.8	47.4	53.3	85.0	17.1	32.6	59.3	67.1	101.8	19.7	37.5	65.0	75.0	145.2	24.9	47.2	85.5	99.3	174.3	25.7	48.6	87.9	123.9	254.3	30.2	56.6	103.2	170.0	393.7
17.0	12.9	24.6	45.0	50.6	80.0	16.3	31.0	56.4	63.7	95.9	18.7	35.6	62.2	71.7	136.8	23.7	44.8	81.7	95.0	164.2	24.5	46.2	84.0	119.5	239.5	28.8	53.9	98.0	165.3	370.9
17.5						15.5	29.5	53.6	60.6	90.5	17.8	33.9	59.5	68.7	129.1	22.5	42.7	78.2	91.0	154.9	23.3	43.9	80.4	115.1	226.0	27.4	51.3	93.2	160.5	350.0
18.0						14.7	28.1	51.1	57.7	85.6	17.0	32.3	57.1	65.9	122.0	21.5	40.7	74.5	87.2	146.4	22.2	41.9	76.5	110.8	213.6	26.2	48.9	88.8	155.7	330.8

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** $\phi_c N_{ex}$: Elastic buckling capacity about the x-x axis.

2.3.8 DHS LOAD SPAN TABLES – INTERNAL SPANS

Axial compression capacities (kN) $\phi_c N_c$

Span (m)	DHS 150/12					DHS 150/15					DHS 200/12					DHS 200/15					DHS 200/18					DHS 250/13				
	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex
3.0																														
3.5	58.5	75.7	83.5	88.3	728.6	81.9	106.3	117.4	124.3	909.4	73.9	87.5	93.3	97.2	1588.8															
4.0	50.6	70.7	80.3	86.4	557.8	70.0	99.2	112.9	121.7	696.3	67.2	83.8	91.0	96.0	1216.4															
4.5	42.9	65.4	76.9	84.3	440.7	58.0	91.8	108.1	118.7	550.1	60.4	79.7	88.5	94.7	961.1	85.1	112.5	124.8	133.6	1203.0	111.9	148.5	165.0	176.8	1438.3	84.2	103.9	112.0	118.1	1942.1
5.0	36.5	60.1	73.3	82.1	357.0	48.6	84.1	102.9	115.5	445.6	53.7	75.5	85.7	93.2	778.5	75.5	106.4	121.0	131.6	974.4	97.5	140.4	159.8	174.1	1165.0	77.0	99.9	109.5	116.9	1573.1
5.5	31.0	54.7	69.5	79.7	295.0	41.5	76.4	97.5	112.1	368.2	47.0	71.0	82.9	91.6	643.4	66.1	100.2	116.9	129.4	805.3	83.8	132.0	154.4	171.2	962.8	69.9	95.6	106.8	115.6	1300.1
6.0	26.8	49.3	65.5	77.1	247.9	35.9	68.0	91.9	108.5	309.4	41.3	66.5	79.8	89.9	540.6	57.4	93.7	112.6	127.0	676.7	72.5	123.4	148.6	168.0	809.0	62.8	91.1	104.0	114.2	1092.4
6.5	23.4	44.0	61.5	74.4	211.2	31.5	59.7	86.2	104.6	263.6	36.7	61.8	76.6	88.1	460.6	50.1	87.2	108.1	124.5	576.6	63.5	114.6	142.6	164.6	689.4	55.8	86.5	101.0	112.7	930.8
7.0	20.7	39.4	57.5	71.6	182.1	28.0	52.7	80.4	100.6	227.3	32.9	57.2	73.3	86.2	397.2	44.3	80.6	103.4	121.8	497.1	56.3	105.1	136.3	161.0	594.4	50.0	81.7	97.8	111.1	802.6
7.5	18.5	35.3	53.4	68.7	158.6	25.1	46.9	74.6	96.5	198.0	29.5	52.7	70.0	84.2	346.0	39.5	74.2	98.7	118.9	433.1	50.4	95.5	130.0	157.2	517.8	45.0	76.9	94.5	109.4	699.1
8.0	16.6	31.6	49.4	65.7	139.4	22.7	42.1	68.2	92.3	174.0	26.4	48.2	66.5	82.1	304.1	35.5	67.7	93.8	116.0	380.6	45.4	86.1	123.5	153.3	455.1	40.9	72.1	91.2	107.6	614.5
8.5	15.1	28.5	45.4	62.7	123.5	20.6	38.1	61.9	87.9	154.1	23.8	44.0	63.1	80.0	269.3	32.1	61.7	88.9	112.9	337.1	41.3	77.8	117.0	149.2	403.1	37.3	67.4	87.7	105.7	544.3
9.0	13.7	25.8	41.7	59.6	110.1	18.9	34.7	56.2	83.6	137.5	21.7	40.4	59.6	77.7	240.2	29.3	56.0	84.0	109.8	300.7	37.5	70.7	110.3	145.0	359.5	34.1	62.6	84.2	103.8	485.5
9.5	12.6	23.6	38.4	56.6	98.9	17.4	31.7	51.3	79.1	123.4	19.8	37.3	56.2	75.4	215.6	26.9	51.1	79.1	106.5	269.9	34.1	64.7	102.9	140.7	322.7	31.0	57.9	80.6	101.8	435.7
10.0	11.6	21.6	35.4	53.5	89.2	16.1	29.2	47.0	74.7	111.4	18.2	34.6	52.8	73.1	194.6	24.8	46.8	74.3	103.2	243.6	31.3	59.5	95.7	136.2	291.2	28.3	53.6	77.0	99.7	393.2
10.5	10.8	20.0	32.5	50.4	80.9	15.0	27.0	43.3	69.7	101.0	16.8	32.1	49.4	70.7	176.5	22.9	43.2	69.5	99.8	220.9	28.8	54.9	88.7	131.7	264.1	26.0	49.8	73.5	97.6	356.7
11.0	10.0	18.5	30.0	47.4	73.7	13.9	25.1	40.1	64.9	92.0	15.6	29.9	46.1	68.3	160.8	21.2	39.9	64.8	96.4	201.3	26.5	50.9	82.0	127.1	240.7	24.0	46.5	69.9	95.4	325.0
11.5	9.4	17.2	27.8	44.3	67.4	12.9	23.3	37.3	60.1	84.2	14.5	27.7	43.2	65.9	147.1	19.6	37.1	60.3	93.0	184.2	24.6	47.4	76.1	122.4	220.2	22.3	43.5	66.3	93.1	297.3
12.0	8.8	16.0	25.9	41.5	61.9	12.1	21.8	34.8	55.7	77.3	13.5	25.7	40.5	63.4	135.1	18.2	34.6	56.1	89.5	169.1	22.8	44.3	70.9	117.8	202.2	20.7	40.8	62.8	90.9	273.1
12.5	8.2	15.0	24.2	39.0	57.1	11.2	20.5	32.5	51.9	71.3	12.7	24.0	38.2	60.9	124.5	17.0	32.4	52.3	86.0	155.9	21.3	41.5	66.3	113.0	186.4	19.3	38.3	59.2	88.6	251.7
13.0	7.8	14.1	22.6	36.7	52.8	10.4	19.3	30.5	48.4	65.9	11.9	22.5	36.0	58.5	115.1	15.9	30.4	49.0	82.5	144.1	19.9	39.0	62.1	107.9	172.3	18.0	36.1	55.8	86.2	232.7
13.5						9.6	18.2	28.7	45.3	61.1	11.2	21.1	34.0	56.0	106.7	14.9	28.6	46.0	79.0	133.6	18.6	36.8	58.4	102.6	159.8	16.9	34.0	52.8	83.8	215.7
14.0						8.9	17.2	27.1	42.5	56.8	10.5	19.9	32.2	53.6	99.3	14.0	26.9	43.3	75.5	124.2	17.4	34.8	55.0	97.4	148.6	15.9	31.9	50.0	81.5	200.6
14.5											9.9	18.7	30.5	51.2	92.5	13.1	25.5	40.8	72.0	115.8	16.3	32.9	52.0	92.2	138.5	14.9	30.0	47.4	79.1	187.0
15.0											9.3	17.7	28.8	48.7	86.5	12.4	24.1	38.6	68.5	108.2	15.2	31.2	49.2	87.1	129.4	14.1	28.3	45.0	76.7	174.7
15.5											8.8	16.8	27.2	46.4	81.0	11.7	22.9	36.5	65.2	101.4	14.2	29.5	46.7	82.2	121.2	13.3	26.7	42.9	74.2	163.6
16.0											8.4	15.9	25.8	44.2	76.0	11.1	21.8	34.7	62.0	95.1	13.4	27.9	44.4	77.8	113.7	12.6	25.3	40.9	71.8	153.6
16.5											7.9	15.2	24.5	42.2	71.4	10.5	20.8	33.0	58.7	89.4	12.6	26.5	42.3	73.8	106.9	12.0	24.0	39.0	69.4	144.4
17.0																9.9	19.8	31.4	55.7	84.2	11.8	25.1	40.3	70.1	100.7	11.4	22.8	37.3	67.0	136.0
17.5																9.4	18.9	30.0	53.0	79.5	11.2	23.9	38.5	66.6	95.1	10.8	21.6	35.6	64.7	128.4
18.0																8.9	18.1	28.6	50.4	75.1	10.5	22.8	36.9	63.5	89.8	10.3	20.6	34.1	62.3	121.3

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** $\phi_c N_{ex}$: Elastic buckling capacity about the x-x axis.

2.3.8 DHS LOAD SPAN TABLES – INTERNAL SPANS

Axial compression capacities (kN) $\phi_c N_c$

Span (m)	DHS 250/15					DHS 250/18					DHS 300/15					DHS 300/18					DHS 350/18					DHS 400/20				
	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex
3.0																														
3.5																														
4.0																														
4.5	104.9	129.5	139.5	147.1	2240.4	138.3	171.2	184.6	194.7	2684.5	122.4	142.9	150.9	157.2	3827.9															
5.0	95.9	124.4	136.4	145.6	1814.7	126.3	164.5	180.5	192.8	2174.4	114.7	138.7	148.4	156.1	3100.6															
5.5	86.9	119.1	133.1	144.0	1499.7	114.2	157.3	176.0	190.7	1797.0	106.8	134.3	145.8	154.9	2562.5															
6.0	78.0	113.5	129.6	142.3	1260.2	102.2	149.8	171.3	188.4	1510.0	98.7	129.7	142.9	153.6	2153.2	130.6	171.9	189.4	203.6	2583.8	134.7	177.7	196.1	213.7	3769.5					
6.5	69.3	107.7	125.8	140.4	1073.8	89.7	142.1	166.3	185.9	1286.6	90.6	124.8	139.9	152.2	1834.6	119.8	165.4	185.4	201.8	2201.6	123.5	171.0	191.8	212.2	3211.9					
7.0	61.9-	101.8	121.9	138.4	925.8	78.8	134.2	161.1	183.3	1109.4	82.7	119.8	136.7	150.7	1581.9	109.2	158.7	181.1	199.8	1898.3	112.4	164.0	187.4	210.6	2769.4	134.3	197.9	226.8	258.8	4288.4
7.5	55.7	95.8	117.8	136.3	806.5	69.9	126.1	155.6	180.5	966.4	74.8	114.6	133.3	149.1	1378.0	98.6	151.8	176.7	197.8	1653.6	101.5	156.8	182.7	209.0	2412.4	120.9	189.0	221.0	257.1	3735.6
8.0	50.0	89.8	113.6	134.1	708.8	62.6	118.0	150.0	177.6	849.4	68.0	109.3	129.8	147.4	1211.1	89.5	144.8	172.0	195.6	1453.4	92.1	149.4	177.9	207.2	2120.3	108.9	179.9	215.0	255.4	3283.3
8.5	45.0	83.8	109.3	131.8	627.9	56.4	110.0	144.2	174.5	752.4	62.2	103.9	126.2	145.7	1072.8	81.7	137.6	167.2	193.2	1287.4	84.0	142.0	172.8	205.3	1878.2	98.0	170.7	208.8	253.6	2908.3
9.0	40.7	77.8	104.9	129.4	560.1	51.1	102.0	138.3	171.4	671.1	57.1	98.6	122.4	143.8	956.9	74.5	130.4	162.2	190.8	1148.3	76.5	134.5	167.6	203.3	1675.3	88.8	161.5	202.4	251.6	2594.2
9.5	37.1	71.9	100.4	126.9	502.6	46.6	93.6	132.3	168.1	602.3	52.7	93.2	118.6	141.9	858.9	67.8	123.2	157.2	188.3	1030.6	69.7	127.0	162.3	201.3	1503.6	80.9	152.3	195.8	249.6	2328.3
10.0	33.9	66.5	95.9	124.4	453.6	42.7	85.6	126.3	164.6	543.6	48.7	87.8	114.7	139.9	775.1	62.0	116.0	152.0	185.7	930.1	63.8	119.5	156.9	199.1	1357.0	74.1	143.1	189.2	247.5	2101.3
10.5	31.2	61.8	91.4	121.7	411.5	39.3	78.6	120.3	161.1	493.0	45.3	82.5	110.8	137.8	703.0	57.0	108.9	146.7	182.9	843.7	58.6	112.2	151.4	196.9	1230.8	68.2	134.0	182.4	245.3	1905.9
11.0	28.8	57.6	86.9	119.0	374.9	36.3	72.5	114.2	157.5	449.2	41.9	77.2	106.8	135.7	640.6	52.6	101.8	141.4	180.1	768.7	54.1	104.7	145.9	194.6	1121.5	63.1	124.9	175.6	243.0	1736.6
11.5	26.7	53.7	82.4	116.2	343.0	33.6	67.2	108.2	153.8	411.0	38.8	72.3	102.7	133.5	586.1	48.8	95.2	136.0	177.2	703.3	50.2	98.0	140.3	192.2	1026.1	58.5	116.7	168.7	240.7	1588.8
12.0	24.8	49.8	78.0	113.4	315.0	31.3	62.4	102.2	150.1	377.5	36.0	67.8	98.7	131.3	538.3	45.3	89.3	130.6	174.2	645.9	46.7	91.9	134.7	189.7	942.3	54.4	108.6	161.7	238.2	1459.2
12.5	23.2	46.4	73.5	110.5	290.3	29.2	58.2	96.1	146.2	347.9	33.6	63.9	94.7	128.9	496.1	42.3	84.0	125.2	171.2	595.3	43.5	86.4	129.1	187.2	868.4	50.8	101.2	154.8	235.7	1344.8
13.0	21.7	43.4	69.3	107.6	268.4	27.3	54.4	89.7	142.3	321.6	31.4	60.2	90.6	126.6	458.6	39.5	79.1	119.8	168.1	550.4	40.7	81.4	123.5	184.6	802.9	47.6	94.5	147.9	233.1	1243.3
13.5	20.3	40.6	65.4	104.6	248.9	25.6	51.0	84.0	138.4	298.2	29.4	57.0	86.6	124.2	425.3	37.1	74.3	114.5	164.9	510.3	38.2	76.3	117.9	181.9	744.5	44.7	88.6	141.1	230.4	1152.9
14.0	19.1	38.1	61.9	101.7	231.4	24.1	47.9	78.8	134.4	277.3	27.6	53.9	82.7	121.7	395.4	34.9	69.7	109.2	161.7	474.5	35.9	71.7	112.4	179.2	692.3	42.1	83.2	134.3	227.7	1072.1
14.5	18.0	35.9	58.7	98.7	215.7	22.7	45.1	74.2	130.4	258.5	26.0	51.2	78.6	119.3	368.6	32.9	65.6	103.7	158.4	442.4	33.9	67.4	106.8	176.4	645.4	39.7	78.4	127.4	224.9	999.4
15.0	17.0	33.8	55.7	95.7	201.6	21.4	42.6	69.9	126.4	241.6	24.6	48.6	74.8	116.7	344.5	31.0	61.9	98.6	155.0	413.4	32.0	63.6	101.5	173.5	603.1	37.5	74.0	120.9	222.0	933.9
15.5	16.1	32.0	52.8	92.6	188.8	20.3	40.3	66.1	122.4	226.2	23.2	46.3	71.3	114.2	322.6	29.3	58.5	93.9	151.7	387.1	30.3	60.1	96.6	170.7	564.8	35.5	69.9	115.0	219.1	874.6
16.0	15.2	30.3	50.0	89.6	177.2	19.2	38.1	62.6	118.4	212.3	22.0	44.1	68.0	111.6	302.7	27.8	55.3	89.5	148.3	363.3	28.7	56.9	92.1	167.7	530.0	33.7	66.3	108.9	216.1	820.8
16.5	14.4	28.7	47.4	86.6	166.6	18.2	36.2	59.3	114.3	199.6	20.9	41.8	65.0	109.1	284.7	26.4	52.5	85.5	144.8	341.6	27.3	54.0	87.9	164.8	498.4	32.0	62.9	103.2	213.1	771.8
17.0	13.7	27.3	45.0	83.6	156.9	17.3	34.4	56.4	110.3	188.1	19.8	39.7	62.2	106.5	268.2	25.1	49.9	81.7	141.4	321.8	25.9	51.3	84.0	161.8	469.5	30.5	59.8	98.0	210.0	727.0
17.5	13.1	26.0	42.8	80.6	148.1	16.4	32.7	53.6	106.3	177.5	18.9	37.7	59.5	103.8	253.1	23.9	47.5	78.2	137.9	303.7	24.7	48.8	80.4	158.7	443.1	29.1	56.9	93.2	206.9	686.1
18.0	12.4	24.8	40.7	77.7	140.0	15.7	31.2	51.1	102.3	167.7	18.0	35.9	57.1	101.2	239.2	22.8	45.2	74.5	134.4	287.0	23.6	46.5	76.5	155.7	418.8	27.7	54.3	88.8	203.7	648.5

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** $\phi_c N_{ex}$: Elastic buckling capacity about the x-x axis.

2.3.8 DHS LOAD SPAN TABLES – LAPPED END SPAN

Axial compression capacities (kN) $\phi_c N_c$

Span (m)	DHS 150/12					DHS 150/15					DHS 200/12					DHS 200/15					DHS 200/18					DHS 250/13				
	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex
3.0	64.7	78.4	85.8	86.1	536.2	90.7	110.2	120.8	121.3	669.2	78.9	89.6	95.3	95.8	1169.1															
3.5	56.5	73.3	82.8	83.2	393.9	79.1	102.9	116.6	117.2	491.7	72.2	85.8	93.2	94.0	858.9															
4.0	48.3	67.8	79.5	80.0	301.6	66.6	95.1	111.9	112.6	376.4	65.3	81.6	90.9	91.9	657.6	92.1	115.2	128.3	129.7	823.2	121.3	152.0	169.7	171.6	984.2	89.3	105.9	114.4	115.8	1328.9
4.5	40.7	62.1	75.9	76.5	238.3	54.8	87.0	106.7	107.7	297.4	58.2	77.1	88.4	89.6	519.6	82.1	108.8	124.8	126.5	650.4	107.5	143.6	164.9	167.3	777.6	82.0	101.7	112.1	113.9	1050.0
5.0	34.4	56.3	72.1	72.8	193.0	46.0	78.8	101.3	102.4	240.9	51.3	72.4	85.7	87.1	420.9	72.3	102.2	120.9	123.0	526.8	92.9	134.7	159.8	162.6	629.9	74.6	97.2	109.6	111.8	850.5
5.5	29.3	50.5	68.1	68.9	159.5	39.3	70.0	95.6	96.8	199.1	44.7	67.6	82.8	84.4	347.8	62.8	95.3	116.8	119.2	435.4	79.4	125.5	154.3	157.6	520.5	67.2	92.5	107.0	109.5	702.9
6.0	25.3	44.8	63.9	64.9	134.0	34.1	61.0	89.7	91.1	167.3	39.3	62.7	79.7	81.5	292.2	54.2	88.4	112.5	115.2	365.8	68.8	116.2	148.5	152.2	437.4	59.9	87.6	104.2	107.1	590.6
6.5	22.1	39.7	59.7	60.8	114.2	30.0	53.3	83.7	85.2	142.5	34.9	57.8	76.5	78.6	249.0	47.4	81.4	108.0	111.0	311.7	60.4	106.3	142.5	146.6	372.7	53.1	82.6	101.2	104.5	503.2
7.0	19.6	35.3	55.5	56.6	98.4	26.7	47.0	77.6	79.2	122.9	31.2	52.9	73.2	75.5	214.7	41.9	74.5	103.3	106.6	268.8	53.6	96.0	136.2	140.7	321.3	47.5	77.6	98.0	101.8	433.9
7.5	17.5	31.4	51.3	52.4	85.7	24.0	41.9	71.1	73.0	107.0	27.8	48.1	69.8	72.3	187.0	37.5	67.6	98.5	102.1	234.1	48.0	85.9	129.8	134.7	279.9	42.8	72.5	94.8	99.0	378.0
8.0	15.8	28.1	47.1	48.3	75.4	21.7	37.6	64.4	66.3	94.1	25.0	43.7	66.4	69.0	164.4	33.7	61.1	93.7	97.5	205.8	43.3	77.1	123.4	128.5	246.0	38.8	67.4	91.4	96.0	332.2
8.5	14.3	25.4	43.0	44.2	66.7	19.8	34.1	58.0	59.8	83.3	22.6	39.9	63.0	65.7	145.6	30.6	55.1	88.8	92.8	182.3	39.0	69.7	116.8	122.2	217.9	35.4	62.4	88.0	93.0	294.3
9.0	13.1	23.0	39.4	40.5	59.5	18.2	31.0	52.5	54.1	74.3	20.5	36.7	59.5	62.4	129.9	27.9	50.0	83.9	88.0	162.6	35.4	63.4	110.1	115.8	194.4	32.1	57.4	84.5	89.9	262.5
9.5	12.1	21.1	36.1	37.2	53.4	16.8	28.4	47.8	49.2	66.7	18.8	33.8	56.0	59.1	116.5	25.6	45.7	79.0	83.3	145.9	32.3	58.1	102.7	109.1	174.4	29.3	52.9	81.0	86.8	235.6
10.0	11.1	19.3	33.0	34.0	48.2	15.6	26.2	43.7	45.0	60.2	17.3	31.3	52.6	55.7	105.2	23.5	41.9	74.1	78.5	131.7	29.5	53.4	95.5	101.9	157.4	26.8	49.0	77.4	83.6	212.6
10.5	10.3	17.8	30.3	31.2	43.7	14.5	24.2	40.1	41.3	54.6	16.0	28.9	49.2	52.4	95.4	21.6	38.7	69.2	73.8	119.4	27.2	49.4	88.4	94.9	142.8	24.6	45.5	73.8	80.3	192.8
11.0						13.5	22.5	37.0	38.1	49.7	14.8	26.7	45.9	49.2	86.9	20.0	35.8	64.6	69.1	108.8	25.1	45.8	81.7	87.9	130.1	22.7	42.4	70.3	77.0	175.7
11.5						12.4	21.0	34.3	35.2	45.5	13.8	24.7	43.0	46.0	79.5	18.5	33.3	60.1	64.5	99.5	23.2	42.7	75.8	81.4	119.0	21.0	39.7	66.7	73.8	160.7
12.0											12.9	23.0	40.4	43.1	73.0	17.2	31.1	55.9	60.1	91.4	21.6	39.9	70.6	75.6	109.3	19.5	37.2	63.2	70.5	147.6
12.5											12.1	21.5	38.0	40.6	67.3	16.0	29.1	52.1	56.0	84.2	20.1	37.4	66.0	70.4	100.7	18.2	34.9	59.6	67.3	136.0
13.0											11.3	20.1	35.8	38.2	62.2	15.0	27.3	48.8	52.3	77.9	18.7	35.2	61.8	65.8	93.1	17.0	32.7	56.2	64.0	125.8
13.5											10.6	18.9	33.9	36.1	57.7	14.0	25.7	45.7	48.9	72.2	17.5	33.2	58.1	61.6	86.4	16.0	30.6	53.2	60.8	116.6
14.0																13.2	24.2	43.0	45.9	67.2	16.3	31.4	54.7	57.9	80.3	15.0	28.7	50.3	57.6	108.4
14.5																12.4	22.9	40.6	43.2	62.6	15.2	29.7	51.6	54.5	74.9	14.1	27.0	47.8	54.7	101.1
15.0																					14.2	28.1	48.8	51.4	69.9	13.3	25.5	45.4	52.0	94.5
15.5																					13.3	26.6	46.3	48.6	65.5	12.6	24.1	43.2	49.5	88.5
16.0																					12.5	25.2	43.9	46.0	61.5	11.9	22.8	41.2	47.2	83.0
16.5																										11.3	21.6	39.3	45.0	78.1
17.0																														
17.5																														
18.0																														

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** $\phi_c N_{ex}$: Elastic buckling capacity about the x-x axis.

2.3.8 DHS LOAD SPAN TABLES – LAPPED END SPAN

Axial compression capacities (kN) $\phi_c N_c$

Span (m)	DHS 250/15					DHS 250/18					DHS 300/15					DHS 300/18					DHS 350/18					DHS 400/20				
	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex
3.0																														
3.5																														
4.0	111.3	131.9	142.5	144.3	1533.0	146.9	174.4	188.5	191.0	1836.9	127.8	144.8	153.2	155.1	2619.3															
4.5	102.2	126.7	139.7	141.9	1211.3	134.7	167.5	184.8	187.9	1451.4	120.1	140.6	151.0	153.3	2069.6															
5.0	92.9	121.1	136.6	139.3	981.1	122.2	160.1	180.7	184.5	1175.6	112.0	136.0	148.6	151.4	1676.3															
5.5	83.6	115.3	133.3	136.5	810.8	109.7	152.2	176.3	180.8	971.6	103.8	131.2	145.9	149.2	1385.4	137.4	173.9	193.4	197.9	1662.5	141.7	179.8	200.3	209.1	2425.4					
6.0	74.3	109.2	129.8	133.5	681.3	97.2	144.1	171.6	176.8	816.4	95.4	126.1	143.1	147.0	1164.1	126.2	167.1	189.7	194.9	1396.9	130.1	172.7	196.3	206.7	2038.0					
6.5	65.9	102.9	126.1	130.3	580.5	84.6	135.7	166.6	172.6	695.6	87.1	120.7	140.1	144.5	991.9	115.1	160.0	185.7	191.7	1190.3	118.6	165.3	192.1	204.1	1736.5	141.9	199.5	232.6	252.4	2688.9
7.0	58.9	96.6	122.2	127.0	500.5	74.4	127.2	161.4	168.1	599.8	78.9	115.3	136.9	141.9	855.2	104.0	152.7	181.4	188.3	1026.3	107.1	157.7	187.7	201.3	1497.3	127.7	190.1	227.2	249.7	2318.5
7.5	52.8	90.2	118.1	123.5	436.0	66.0	118.6	156.0	163.4	522.5	71.2	109.7	133.5	139.2	745.0	93.8	145.2	177.0	184.7	894.0	96.5	149.9	183.1	198.4	1304.3	114.9	180.5	221.4	246.8	2019.7
8.0	47.2	83.8	113.9	119.8	383.2	59.1	110.0	150.4	158.6	459.2	64.7	104.0	130.1	136.4	654.8	85.2	137.7	172.4	181.0	785.8	87.6	142.0	178.2	195.3	1146.3	102.8	170.8	215.5	243.7	1775.1
8.5	42.4	77.5	109.6	116.1	339.4	53.2	101.5	144.7	153.6	406.7	59.1	98.2	126.5	133.4	580.0	77.6	130.0	167.6	177.1	696.0	79.8	134.0	173.3	192.0	1015.4	92.5	161.0	209.3	240.5	1572.4
9.0	38.4	71.2	105.3	112.2	302.8	48.3	92.6	138.8	148.5	362.8	54.3	92.5	122.8	130.3	517.4	70.3	122.3	162.7	173.0	620.8	72.2	126.1	168.1	188.7	905.7	83.9	151.1	203.0	237.2	1402.5
9.5	35.0	65.6	100.8	108.3	271.7	44.0	84.2	132.9	143.2	325.6	50.1	86.8	119.0	127.1	464.3	64.0	114.7	157.6	168.8	557.2	65.8	118.2	162.8	185.2	812.9	76.5	141.4	196.5	233.7	1258.8
10.0	32.0	60.7	96.4	104.3	245.2	40.3	77.0	126.9	137.9	293.9	46.3	81.2	115.1	123.9	419.0	58.6	107.2	152.5	164.5	502.9	60.2	110.4	157.5	181.5	733.6	70.1	131.7	189.8	230.1	1136.0
10.5	29.5	56.4	91.9	100.2	222.4	37.1	70.8	120.9	132.5	266.5	42.9	75.6	111.2	120.6	380.1	53.8	99.7	147.3	160.1	456.1	55.4	102.6	152.0	177.8	665.4	64.5	122.3	183.1	226.4	1030.4
11.0	27.2	52.2	87.4	96.1	202.7	34.3	65.3	114.9	127.1	242.9	39.6	70.6	107.2	117.2	346.3	49.7	93.0	142.0	155.6	415.6	51.1	95.6	146.5	174.0	606.3	59.6	113.7	176.3	222.5	938.9
11.5	25.2	48.3	82.9	92.1	185.4	31.8	60.5	108.9	121.6	222.2	36.6	66.1	103.2	113.7	316.8	46.1	87.0	136.6	151.0	380.2	47.4	89.4	140.9	170.1	554.7	55.3	105.3	169.4	218.5	859.0
12.0	23.5	44.9	78.5	88.0	170.3	29.6	56.2	102.9	116.1	204.1	34.0	62.0	99.2	110.2	291.0	42.8	81.5	131.3	146.4	349.2	44.1	83.8	135.4	166.1	509.5	51.5	97.8	162.6	214.5	788.9
12.5	21.9	41.8	74.0	83.9	156.9	27.6	52.4	96.8	110.7	188.1	31.7	58.4	95.2	106.7	268.2	39.9	76.4	125.9	141.7	321.8	41.1	78.6	129.8	162.1	469.5	48.1	91.1	155.7	210.3	727.0
13.0	20.5	39.0	69.8	79.9	145.1	25.8	49.0	90.5	105.3	173.9	29.6	55.1	91.2	103.2	247.9	37.4	71.4	120.5	137.0	297.5	38.5	73.4	124.2	157.9	434.1	45.0	85.2	148.8	206.1	672.2
13.5	19.2	36.6	65.9	75.8	134.5	24.2	46.0	84.7	99.8	161.2	27.8	52.0	87.2	99.6	229.9	35.0	66.9	115.2	132.3	275.9	36.1	68.7	118.7	153.8	402.5	42.3	79.9	142.0	201.8	623.3
14.0	18.0	34.4	62.4	71.8	125.1	22.8	43.2	79.5	94.1	149.9	26.1	49.3	83.2	96.1	213.8	32.9	62.8	109.9	127.5	256.5	34.0	64.6	113.2	149.6	374.3	39.8	75.0	135.2	197.4	579.6
14.5	17.0	32.3	59.2	68.1	116.6	21.4	40.7	74.8	88.5	139.7	24.6	46.7	79.2	92.5	199.3	31.0	59.1	104.5	122.8	239.1	32.0	60.8	107.6	145.3	348.9	37.5	70.7	128.3	192.9	540.3
15.0	16.0	30.5	56.2	64.7	109.0	20.2	38.4	70.5	83.4	130.6	23.2	44.4	75.4	89.0	186.2	29.3	55.7	99.4	118.1	223.5	30.3	57.3	102.2	141.1	326.0	35.5	66.7	121.9	188.5	504.9
15.5	15.2	28.8	53.3	61.6	102.0	19.1	36.3	66.7	78.8	122.3	21.9	42.0	71.8	85.5	174.4	27.7	52.7	94.6	113.4	209.3	28.6	54.2	97.3	136.8	305.3	33.6	63.1	115.9	183.9	472.8
16.0	14.4	27.3	50.4	58.7	95.8	18.1	34.4	63.1	74.6	114.8	20.8	39.7	68.5	82.0	163.7	26.3	49.9	90.2	108.7	196.4	27.2	51.3	92.8	132.5	286.5	31.9	59.8	109.8	179.3	443.7
16.5	13.6	25.9	47.8	56.0	90.0	17.2	32.7	59.8	70.7	107.9	19.7	37.6	65.4	78.4	153.9	25.0	47.3	86.1	104.0	184.7	25.8	48.7	88.6	128.2	269.4	30.3	56.8	104.1	174.8	417.2
17.0	13.0	24.6	45.4	53.3	84.8	16.3	31.0	56.8	67.2	101.6	18.7	35.7	62.6	75.0	145.0	23.7	45.0	82.3	99.4	174.0	24.5	46.3	84.6	124.0	253.8	28.8	54.0	98.9	170.1	393.1
17.5	12.3	23.4	43.1	50.7	80.0	15.5	29.6	54.1	63.9	95.9	17.8	34.0	60.0	71.9	136.8	22.6	42.8	78.8	95.2	164.2	23.4	44.1	81.0	119.7	239.5	27.5	51.4	94.0	165.5	370.9
18.0	11.8	22.3	41.1	48.3	75.7	14.8	28.2	51.5	60.9	90.7	17.0	32.4	57.5	69.0	129.3	21.5	40.8	75.1	91.3	155.2	22.3	42.0	77.2	115.5	226.4	26.3	49.1	89.6	160.9	350.6

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** $\phi_c N_{ex}$: Elastic buckling capacity about the x-x axis.

2.3.8 DHS LOAD SPAN TABLES – LAPPED INTERNAL SPANS

Axial compression capacities (kN) $\phi_c N_c$

Span (m)	DHS 150/12					DHS 150/15					DHS 200/12					DHS 200/15					DHS 200/18					DHS 250/13				
	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex
3.0																														
3.5																														
4.0	51.1	70.8	80.1	87.4	605.3	70.9	99.5	112.6	123.0	755.5	67.5	83.8	90.7	96.6	1319.9															
4.5	43.4	65.6	76.6	85.5	478.2	59.0	92.1	107.7	120.4	596.9	60.8	79.8	88.2	95.4	1042.8															
5.0	37.1	60.3	73.0	83.5	387.4	49.5	84.5	102.5	117.5	483.5	54.1	75.5	85.4	94.1	844.7	76.2	106.6	120.5	132.9	1057.3	98.7	140.6	159.2	175.8	1264.2	77.3	99.7	108.9	117.6	1706.9
5.5	31.5	54.9	69.1	81.3	320.1	42.3	76.9	97.1	114.5	399.6	47.5	71.1	82.4	92.7	698.1	66.8	100.3	116.3	130.9	873.8	85.1	132.2	153.6	173.2	1044.7	70.1	95.4	106.1	116.5	1410.7
6.0	27.2	49.6	65.2	79.0	269.0	36.7	68.7	91.5	111.2	335.7	41.8	66.5	79.3	91.2	586.6	58.2	93.9	111.9	128.8	734.2	73.7	123.7	147.8	170.4	877.9	63.0	90.9	103.2	115.2	1185.3
6.5	23.8	44.4	61.2	76.6	229.2	32.3	60.5	85.8	107.7	286.1	37.1	62.0	76.1	89.6	499.8	50.9	87.4	107.4	126.5	625.6	64.7	115.0	141.7	167.3	748.0	56.1	86.2	100.1	113.9	1010.0
7.0	21.1	39.7	57.1	74.0	197.6	28.7	53.4	80.0	104.1	246.7	33.2	57.4	72.8	87.9	430.9	45.0	80.9	102.7	124.1	539.4	57.4	105.7	135.4	164.1	645.0	50.2	81.5	96.8	112.5	870.8
7.5	18.9	35.7	53.1	71.4	172.1	25.8	47.6	74.2	100.3	214.9	29.9	52.8	69.4	86.1	375.4	40.1	74.5	97.9	121.6	469.9	51.4	96.2	129.0	160.7	561.8	45.2	76.7	93.4	110.9	758.6
8.0	17.0	31.9	49.1	68.6	151.3	23.4	42.8	67.8	96.4	188.8	26.8	48.3	65.9	84.2	329.9	36.1	68.1	93.0	118.9	413.0	46.1	86.9	122.5	157.2	493.8	41.0	71.8	89.9	109.3	666.7
8.5	15.4	28.8	45.1	65.9	134.0	21.3	38.8	61.6	92.5	167.3	24.2	44.2	62.4	82.2	292.2	32.8	62.2	88.1	116.1	365.8	41.5	78.6	115.9	153.5	437.4	37.4	67.0	86.4	107.7	590.6
9.0	14.1	26.2	41.4	63.0	119.5	19.6	35.4	55.9	88.4	149.2	22.0	40.6	58.9	80.2	260.7	29.9	56.4	83.1	113.3	326.3	37.7	71.5	109.1	149.7	390.1	34.3	62.3	82.8	105.9	526.8
9.5	13.0	23.9	38.2	60.2	107.3	18.1	32.4	51.1	84.3	133.9	20.1	37.5	55.5	78.1	234.0	27.3	51.5	78.2	110.3	292.9	34.3	65.5	101.8	145.7	350.1	31.2	57.6	79.1	104.1	472.8
10.0	12.0	22.0	35.1	57.3	96.8	16.8	29.9	47.0	80.2	120.8	18.5	34.8	52.1	76.0	211.1	25.0	47.3	73.4	107.3	264.3	31.4	60.3	94.6	141.7	316.0	28.5	53.3	75.4	102.3	426.7
10.5	11.1	20.3	32.3	54.4	87.8	15.6	27.7	43.4	76.0	109.6	17.1	32.3	48.6	73.8	191.5	23.0	43.6	68.5	104.2	239.7	28.9	55.7	87.6	137.5	286.6	26.2	49.5	71.7	100.3	387.0
11.0	10.4	18.8	29.9	51.5	80.0	14.6	25.7	40.2	71.5	99.9	15.9	30.1	45.4	71.6	174.5	21.3	40.4	64.0	101.1	218.4	26.7	51.8	81.1	133.3	261.1	24.2	46.2	68.1	98.3	352.6
11.5	9.7	17.5	27.7	48.7	73.2	13.3	24.0	37.4	66.9	91.4	14.8	27.9	42.5	69.3	159.6	19.7	37.6	59.5	97.9	199.8	24.7	48.3	75.4	129.0	238.9	22.4	43.2	64.4	96.3	322.6
12.0	9.1	16.4	25.8	45.8	67.2	12.2	22.5	34.9	62.3	83.9	13.8	26.0	40.0	67.0	146.6	18.3	35.1	55.4	94.6	183.5	23.0	45.1	70.3	124.7	219.4	20.8	40.5	60.9	94.2	296.3
12.5	8.6	15.3	24.1	43.0	61.9	11.3	21.2	32.7	58.0	77.3	12.8	24.3	37.6	64.7	135.1	17.1	32.8	51.7	91.4	169.1	21.4	42.3	65.8	120.3	202.2	19.4	38.1	57.2	92.1	273.1
13.0	8.1	14.4	22.6	40.5	57.3	10.4	19.9	30.8	54.2	71.5	12.0	22.7	35.5	62.4	124.9	16.0	30.8	48.4	88.1	156.4	20.0	39.6	61.7	115.9	187.0	18.1	35.9	54.0	90.0	252.5
13.5	7.7	13.6	21.3	38.2	53.1	9.7	18.8	29.0	50.7	66.3	11.3	21.3	33.6	60.1	115.8	15.0	29.0	45.5	84.8	145.0	18.7	37.1	58.1	111.5	173.4	17.0	33.7	51.0	87.8	234.1
14.0	7.3	12.8	20.0	36.0	49.4	9.0	17.9	27.4	47.6	61.6	10.6	20.1	31.8	57.8	107.7	14.0	27.4	42.8	81.5	134.8	17.5	34.9	54.8	106.4	161.2	16.0	31.7	48.3	85.6	217.7
14.5						8.4	17.0	25.9	44.7	57.4	10.0	19.0	30.1	55.5	100.4	13.2	25.9	40.4	78.2	125.7	16.4	32.8	51.8	101.5	150.3	15.0	29.8	45.8	83.3	202.9
15.0						7.8	16.1	24.6	42.2	53.7	9.4	18.0	28.4	53.2	93.8	12.5	24.6	38.3	75.0	117.4	15.3	31.0	49.2	96.6	140.4	14.2	28.1	43.5	81.1	189.6
15.5											8.9	17.0	26.9	51.0	87.9	11.8	23.3	36.3	71.7	110.0	14.3	29.3	46.6	91.8	131.5	13.4	26.5	41.4	78.9	177.6
16.0											8.4	16.2	25.5	48.7	82.4	11.1	22.1	34.5	68.4	103.2	13.4	27.7	44.1	86.9	123.4	12.7	25.1	39.5	76.6	166.6
16.5											8.0	15.4	24.2	46.5	77.5	10.5	21.0	32.8	65.3	97.0	12.6	26.3	41.8	82.4	116.0	12.1	23.8	37.7	74.3	156.7
17.0											7.6	14.7	23.0	44.5	73.0	10.0	19.9	31.3	62.3	91.4	11.9	25.0	39.8	78.2	109.3	11.5	22.6	36.0	72.1	147.6
17.5											7.2	14.0	22.0	42.6	68.9	9.5	18.9	29.9	59.2	86.3	11.2	23.8	37.8	74.4	103.2	10.9	21.5	34.4	69.8	139.3
18.0																8.9	18.0	28.6	56.4	81.5	10.6	22.6	36.1	70.9	97.5	10.4	20.5	32.8	67.6	131.7

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** $\phi_c N_{ex}$: Elastic buckling capacity about the x-x axis.

2.3.8 DHS LOAD SPAN TABLES – LAPPED INTERNAL SPANS

Axial compression capacities (kN) $\phi_c N_c$

Span (m)	DHS 250/15					DHS 250/18					DHS 300/15					DHS 300/18					DHS 350/18					DHS 400/20				
	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex	1B	2B	3B	FR	ØcNex
3.0																														
3.5																														
4.0																														
4.5																														
5.0																														
5.5	87.2	118.8	132.2	145.1	1627.3	114.6	157.0	174.9	192.1	1949.9	107.0	134.1	145.1	155.7	2780.4															
6.0	78.3	113.2	128.6	143.6	1367.4	102.6	149.5	170.0	190.1	1638.5	99.0	129.5	142.1	154.5	2336.3															
6.5	69.6	107.4	124.7	141.9	1165.1	90.2	141.7	164.8	187.9	1396.1	91.0	124.6	138.9	153.3	1990.7															
7.0	62.2	101.4	120.6	140.2	1004.6	79.2	133.7	159.3	185.6	1203.8	83.0	119.5	135.6	152.0	1716.5	109.6	158.3	179.8	201.5	2059.8	112.9	163.6	185.9	212.0	3005.0					
7.5	56.0	95.4	116.4	138.3	875.1	70.3	125.6	153.7	183.1	1048.6	75.1	114.3	132.1	150.6	1495.2	99.1	151.4	175.1	199.7	1794.3	101.9	156.3	181.1	210.5	2617.7					
8.0	50.2	89.4	112.0	136.3	769.1	62.9	117.5	147.9	180.5	921.6	68.3	109.0	128.5	149.1	1314.2	89.9	144.3	170.3	197.7	1577.0	92.5	148.9	176.1	208.9	2300.7	109.5	179.3	212.8	257.1	3562.6
8.5	45.2	83.4	107.6	134.3	681.3	56.7	109.4	141.9	177.8	816.4	62.4	103.6	124.7	147.5	1164.1	82.1	137.1	165.3	195.7	1396.9	84.4	141.5	170.8	207.3	2038.0	98.5	170.1	206.3	255.5	3155.8
9.0	40.9	77.4	103.1	132.1	607.7	51.4	101.4	135.9	174.9	728.2	57.3	98.2	120.9	145.9	1038.3	74.9	129.9	160.2	193.5	1246.0	77.0	133.9	165.5	205.5	1817.8	89.3	160.8	199.7	253.8	2814.9
9.5	37.3	71.4	98.5	129.9	545.4	46.8	93.0	129.8	171.9	653.5	52.9	92.8	116.9	144.2	931.9	68.1	122.7	154.9	191.2	1118.3	70.1	126.4	160.0	203.7	1631.5	81.4	151.6	193.0	252.0	2526.3
10.0	34.1	66.1	93.9	127.5	492.2	42.9	85.0	123.6	168.8	589.8	49.0	87.4	112.9	142.4	841.1	62.4	115.5	149.6	188.9	1009.3	64.1	118.9	154.5	201.8	1472.4	74.5	142.3	186.1	250.1	2280.0
10.5	31.4	61.4	89.3	125.1	446.5	39.5	78.1	117.4	165.7	535.0	45.5	82.1	108.9	140.5	762.9	57.3	108.3	144.2	186.4	915.4	58.9	111.5	148.8	199.8	1335.5	68.6	133.2	179.2	248.2	2068.0
11.0	29.0	57.2	84.7	122.7	406.8	36.5	72.0	111.2	162.4	487.4	42.1	76.7	104.8	138.6	695.1	52.9	101.1	138.7	183.9	834.1	54.4	104.1	143.1	197.7	1216.9	63.4	124.1	172.1	246.1	1884.3
11.5	26.8	53.3	80.1	120.1	372.2	33.8	66.7	105.0	159.0	446.0	39.0	71.8	100.6	136.6	635.9	49.0	94.6	133.2	181.3	763.1	50.4	97.4	137.4	195.5	1113.4	58.8	116.0	165.1	244.0	1724.0
12.0	25.0	49.5	75.6	117.6	341.8	31.5	62.0	98.9	155.6	409.6	36.2	67.4	96.5	134.6	584.0	45.6	88.8	127.7	178.6	700.9	46.9	91.3	131.6	193.3	1022.5	54.7	107.8	158.0	241.8	1583.3
12.5	23.3	46.1	71.1	114.9	315.0	29.4	57.8	92.4	152.1	377.5	33.8	63.5	92.4	132.5	538.3	42.5	83.5	122.2	175.9	645.9	43.8	85.8	125.9	191.0	942.3	51.1	100.5	150.9	239.6	1459.2
13.0	21.8	43.1	67.0	112.2	291.2	27.5	54.0	86.3	148.5	349.0	31.6	59.9	88.3	130.4	497.6	39.8	78.7	116.7	173.0	597.2	40.9	80.9	120.2	188.7	871.2	47.8	93.9	143.9	237.2	1349.1
13.5	20.4	40.3	63.3	109.5	270.1	25.8	50.6	80.8	144.9	323.6	29.6	56.6	84.2	128.2	461.5	37.3	73.8	111.2	170.2	553.8	38.4	75.8	114.5	186.3	807.9	44.9	88.0	136.9	234.8	1251.0
14.0	19.2	37.9	59.9	106.8	251.1	24.2	47.6	75.8	141.3	300.9	27.8	53.6	80.1	125.9	429.1	35.0	69.2	105.7	167.2	514.9	36.1	71.2	108.8	183.8	751.2	42.3	82.7	129.8	232.4	1163.3
14.5	18.1	35.6	56.7	104.0	234.1	22.8	44.8	71.3	137.6	280.5	26.2	50.9	76.1	123.7	400.0	33.0	65.1	100.3	164.2	480.0	34.1	67.0	103.2	181.3	700.3	39.9	77.8	123.1	229.9	1084.4
15.0	17.1	33.6	53.8	101.2	218.7	21.5	42.3	67.3	133.8	262.1	24.7	48.3	72.4	121.4	373.8	31.2	61.4	95.4	161.2	448.5	32.2	63.2	98.1	178.7	654.4	37.7	73.4	116.9	227.3	1013.3
15.5	16.1	31.8	50.8	98.4	204.9	20.4	40.0	63.6	130.1	245.5	23.3	46.0	68.9	119.0	350.0	29.5	58.1	90.8	158.1	420.1	30.4	59.7	93.4	176.1	612.8	35.7	69.5	110.7	224.7	949.0
16.0	15.3	30.1	48.1	95.6	192.2	19.3	37.9	60.2	126.3	230.4	22.1	43.8	65.8	116.7	328.5	28.0	55.0	86.6	155.0	394.2	28.9	56.5	89.0	173.5	575.1	33.9	65.8	104.7	222.0	890.6
16.5	14.5	28.5	45.6	92.8	180.8	18.3	35.9	57.1	122.5	216.6	21.0	41.5	62.8	114.3	308.9	26.5	52.1	82.6	151.8	370.7	27.4	53.6	85.0	170.8	540.8	32.2	62.5	99.3	219.2	837.4
17.0	13.8	27.1	43.2	89.9	170.3	17.4	34.2	54.2	118.8	204.1	19.9	39.4	60.1	111.9	291.0	25.2	49.5	79.0	148.6	349.2	26.1	51.0	81.2	168.0	509.5	30.6	59.4	94.3	216.4	788.9
17.5	13.1	25.8	41.1	87.1	160.7	16.5	32.5	51.6	115.0	192.6	19.0	37.5	57.6	109.5	274.6	24.0	47.1	75.2	145.4	329.5	24.8	48.5	77.3	165.2	480.8	29.2	56.6	89.7	213.6	744.5
18.0	12.5	24.6	39.2	84.3	151.9	15.8	31.0	49.2	111.2	182.0	18.1	35.7	55.2	107.0	259.5	22.9	44.9	71.6	142.2	311.5	23.7	46.2	73.6	162.4	454.4	27.9	53.9	85.5	210.7	703.7

1. 1B, 2B & 3B: Load Capacity for 1, 2 and 3 rows of bracing. **2.** FR: Load Capacity for fully restrained compression flange. **3.** $\phi_c N_{ex}$: Elastic buckling capacity about the x-x axis.

2.3.9 DESIGN OF BRACING SYSTEMS

2.3.9.1 INTRODUCTION

Dimond Fastbrace is the preferred bracing system for use with the DHS system for members up to and including DHS 300/18. Continuous bolted channel bracing must be used for DHS 350/18 and DHS 400/20, and it may be used on all other sizes.

We do not recommend the use of brace channel and alternating sag rods as the load capacities for DHS purlins provided in Sections 2.3.7 and 2.3.8 will not necessarily be achieved.

Specific design of the bracing system is required where bracing is used to support additional loads (other than providing rotational and lateral restraint to the purlins), for example sprinkler pipes or ducting. For further advice contact Dimond 0800 Roofspec.

All purlin configurations outlined in this manual require a minimum of one bracing line per bay to achieve the published loads in the load/span tables. Any variation from use of Dimond bracing or its location may result in lower load capacities and/or greater deflections (as purlins may twist out of plane).

Use of Dimond bracing and its compatibility with the load capacities provided in Sections 2.3.7 and 2.3.8 is subject to the following:

1. The Purlins/Girts are bolted to cleats, and lapped members are connected as detailed in Section 2.3.14.
2. The brace length does not exceed 3.20m. For longer lengths, specific design is required as per Section 2.3.9.2. Shortest available fast brace length is 250mm.

2.3.9.2 METHOD FOR BRACE DESIGN CHECK

The bending moment on each brace channel is determined by:

$M^* = 0.75\ \phi_b w_{bx} l_b m$ if roofing or cladding attachment provides sufficient restraint to the outside flange

or $M^* = 1.5\ \phi_b w_{bx} l_b m$ if there is no additional restraint to the outside flange.

Where $\phi_b w_{bx}$ = Uniformly loaded bending capacities from DHS load span tables

$l_b = l \times h$ where l = purlin span, h = contributing length factor from below

m = distance from shear centre to mid plane of DHS purlin web from below.

M^* must not exceed the brace member capacity M_b given below.

Contributing length factor (h)

Span Type	No. of Brace Lines		
	1	2	3
Single	0.50	0.31	0.25
End	0.50	0.31	0.25
Internal	0.50	0.31	0.25
End Lapped	0.475	0.295	0.24
Internal Lapped	0.45	0.28	0.23

Dimension (m)

DHS Member	*m* (mm)
150/12	33.2
150/15	32.9
200/12	36.3
200/15	35.9
200/18	35.6
250/13	38.3
250/15	38.1
250/18	37.8
300/15	42.8
300/18	42.6
350/18	41.6
400/20	40.1

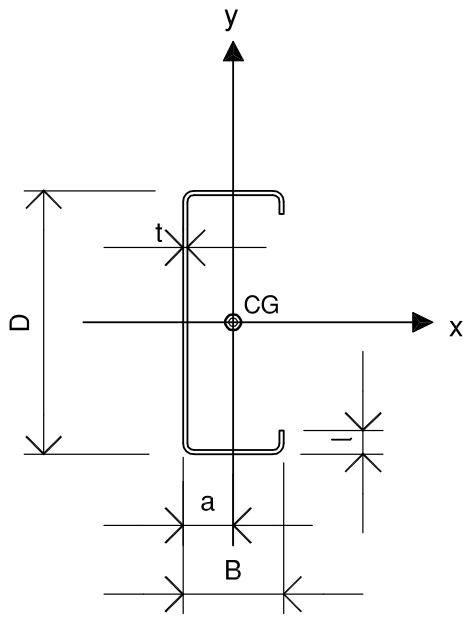
Bracing member moment capacity (M_b)

Maximum Brace Length (m)	less than or equal to 3.2	3.4	3.6	3.8	4.0
M_b (kNm)	0.50	0.48	0.45	0.41	0.38

Noted:

1. For brace lengths less than 3.2m, the brace capacity is limited by cleat connection rather than the brace channel.
2. The moment capacities given above do not apply where additional loads are connected eccentrically to the web of the brace channel. We do not recommend connecting additional loads to the flanges or lips of the brace channel.

2.3.9.3 BRACING CHANNEL SECTION PROPERTIES



Tabulated properties are based on full unreduced sections.

CODE	D x B mm	t mm	Mass kg/m	Weight kN/m	Area mm²	l mm	A mm	I_x (10^6mm^4)	I_y (10^6 mm^4)	Z_x (10^3 mm^3)	COLUMN PROPERTIES	
											J (mm^4)	I_w (10^9mm^6)
DB 89 / 12	89 x 34	1.15	1.49	0.015	186.3	6	9.17	0.223	0.024	5.002	84.13	0.040

NOTE Mass assumes a total coated weight for the standard zinc coating of 275 g/m^2.

2.3.10 DESIGN OF CONNECTION SYSTEMS

The following table sets out the bolt connection capacity for the different steel thicknesses used with DHS Purlins when checked for end tearing and bearing. Bolt shear capacities are also included for grade 4.6 and grade 8.8 bolts.

Details of single bolt connection capacities for DHS Purlins and Girts

Bolt dia. (mm)	Failure mode	Steel capacity (kN) for varying steel thicknesses (mm)					Bolt shear ϕV_{fn} (kN)	
		1.15	1.25	1.45	1.75	1.95	grade 4.6	grade 8.8
12	Tearing ϕV_f	13.6	14.8	17.2	19.2	21.3		
	Bearing ϕV_b	12.9	14.0	16.3	18.1	20.2	15.1	31.4
16	Tearing ϕV_f	13.6	14.8	17.2	19.2	21.3		
	Bearing ϕV_b	17.2	18.7	21.7	24.2	27.0	28.6	59.3
20	Tearing ϕV_f	13.6	14.8	17.2	19.2	21.3		
	Bearing ϕV_b	21.5	23.4	27.1	30.2	33.7	44.6	92.6

Notes:

1. All capacities are in accordance with AS/NZS 4600:1996.
2. Bolts are assumed to comply to AS1111 or AS1252.
3. All connections are assumed to have one washer under each of the bolt head and the nut (or the portal cleat acting as one of the washers).
4. Calculation of tearing capacity assumes a 38mm edge distance.
5. The maximum structural ductility factor used for seismic loads must be less than 1.25.

2.3.11 DESIGN EXAMPLES

2.3.11.1 EXAMPLE: PURLINS, SINGLE AND LAPPED

Loadings

Dead Load, G = 0.12 kPa Live Load, Q = 0.25 kPa Snow Load, S_u = 0.50 kPa
Outward Limit State Wind Loads, W_u = –0.95 kPa and W_s = –0.64 kPa
Inward Wind Loading is not significant for this roof.

Building Constraints

Portal Spacing, L_P = 7.5m Rafter Length, L_R = 16.0m (distance from eaves purlin to ridge purlin)

Roof Pitch = 10 degrees Roofing Profile = BB900 x 0.55mm BMT

Critical Design Load Combinations for the Ultimate Limit State (from AS/NZS 1170)

i)	$W^*_{ULS}\downarrow$	=	1.2G + 1.5Q	=	(1.2 x 0.12) + (1.5 x 0.25)	= 0.52 kPa
ii)	$W^*_{ULS}\downarrow$	=	$1.2G + S_u + \psi_c Q$	=	1.2 x 0.12 + 0.50 + (0.0 x 0.25)	= 0.64 kPa
iii)	$W^*_{ULS}\uparrow$	=	$0.9G + W_u$	=	(0.9 x 0.12) + (– 0.95)	= – 0.84 kPa

Critical Design Load Combinations for the Serviceability Limit State

i)	$W^*_{SLS}\downarrow$	=	$L_P/300$ under G & ψ_ℓ Q	=	(0.12 + 0.0 x 0.25) x 300/150	= 0.24 kPa
ii)	$W^*_{SLS}\uparrow$	=	$L_P/150$ under W_s	=	– 0.64	= – 0.64 kPa

For i) we have converted the load by a factor of 300/150 in order to compare the load directly with W_s in the DHS load span tables as these are based on span/150.

Optimise Roofing Profile Spans

In this case we have a restricted access roof where the point load requirement limits the intermediate span of the BB900 x 0.55mm BMT profile to 3.0m. End spanning capability of the roofing is reduced to 2.1m, i.e. 66% of the intermediate span. Generally these spans will not 'fit' the rafter length exactly, hence the requirement to optimise.

The optimised roofing profile intermediate span is based on the rafter length and the number of purlins, N_P (assuming at least four) and is given by the term: $L_{RI} = L_{RT} / [N_P - 1.67]$

Try 6 Purlins,	$L_{RI} = 16.0/(6 - 1.67)$	=	3.70m	No good
Try 8 Purlins,	$L_{RI} = 16.0/(8 - 1.67)$	=	2.53m	Not controlling
Try 7 Purlins,	$L_{RI} = 16.0/(7 - 1.67)$	=	3.00m	Intermediate spans and 1.98m edge spans

From this, 7 purlins are required and the purlin spacings may be rationalised to 3.0m intermediate spans and 2.0m spans at the sheet ends.

Continued on next page

2.3.11.1 EXAMPLE: PURLINS, SINGLE AND LAPPED *continued*

1. Single Span Purlin Design

Assuming the top flange of the DHS purlin is restrained by screw-fastened roof sheeting. (If the top flange is not fully restrained then use the load capacity for the 1, 2 or 3 brace case as appropriate to check both uplift and gravity combinations).

Try DHS 250/18 Purlin

Check design capacities (using those given in the single span DHS load span tables): $W^*_{ULS} \le \phi_b W_{bx}$

$W^*_{ULS}\downarrow$	=	3.0 x 0.64	=	1.92 kN/m	< FR, 3.01 kN/m	∴ O.K.
$W^*_{ULS}\uparrow$	=	3.0 x – 0.84	=	– 2.52 kN/m	< 2 Braces, 3.01 kN/m	∴ O.K.

Check deflections

$W^*_{SLS}\uparrow$	=	3.0 x – 0.64	=	– 1.92 kN/m	< W_s, 1.94 kN/m	∴ O.K.

Therefore use DHS 250/18 purlins at 3.0m intermediate spacings and 2.0m at sheet ends, with 2 rows of Fastbrace (or standard bolted DB89/12 braces) brace channels per bay.

2. Lapped Span Purlin Design

a) End Bays

Try DHS 200/18 Purlin

Check design capacities (using those given in the lapped end span DHS load span tables): $W^*_{ULS} \le \phi_b W_{bx}$

$W^*_{ULS}\downarrow$	=	3.0 x 0.64	=	1.92 kN/m	< FR, 2.76 kN/m	∴ O.K.
$W^*_{ULS}\uparrow$	=	3.0 x – 0.84	=	– 2.52 kN/m	< 1 Brace, 2.76 kN/m	∴ O.K.

Check deflections

$W^*_{SLS}\uparrow$	=	3.0 x – 0.64	=	– 1.92 kN/m	< W_s, 2.68 kN/m	∴ O.K.

b) Internal Bays

Try DHS 200/15 Purlin

Check design capacities (using those given in the lapped internal span DHS load span tables): $W^*_{ULS} \le \phi_b W_{bx}$

$W^*_{ULS}\downarrow$	=	3.0 x 0.64	=	1.92 kN/m	< FR, 3.49 kN/m	∴ O.K.
$W^*_{ULS}\uparrow$	=	3.0 x – 0.84	=	– 2.52 kN/m	< 1 Brace, 3.49 kN/m	∴ O.K.

Check deflections

$W^*_{SLS}\uparrow$	=	3.0 x – 0.64	=	– 1.92 kN/m	< W_s, 4.84 kN/m	∴ O.K.

Therefore use,

End Bays: DHS 200/18 purlins at 3.0m intermediate spacings and 2.0m at sheet ends, with 1 row of Fastbrace (or standard bolted DB89/12 braces) brace channels per bay.

Internal Bays: DHS 200/15 as per the end bay purlin spacings and bracing layout.

In the calculation of wall elements, optimisation follows the same logic as illustrated for roofing with the exception that foot traffic limitations do not apply, leaving the spanning ability of the cladding dependent on face loads caused by wind.

2.3.11.2 DEFLECTION CHARACTERISTICS

a) The W_s loading for a DHS 250/18 purlin on a 9.0m single span is 1.13 kN/m. It is desired to limit the DHS purlin deflection to span/200.

Therefore the serviceable load in the DHS purlin at a deflection of span/200 is expressed as:

$$\frac{1.13 \times 150}{200} = 0.85 \text{ kN/m}$$

b) The design Linear Load for deflection of a DHS 250/18 on a 9.0m single span has been calculated as 0.94 kN/m.

The relative deflection is shown as, $\frac{0.94 \times \text{span}}{1.13 \times 150} = \frac{\text{span}}{180}$

The actual deflection is then, $\frac{\text{span}}{180} = \frac{9000 \text{ mm}}{180} = 50\text{mm}$

2.3.11.3 COMBINED BENDING AND COMPRESSION

There are three equations governing the design for combined bending and compression. Assuming there is no minor axis component for flexure, where $N^*/\phi_c N_c \le 0.15$.

Using the purlin example, option 2 for a DHS 200/18 on a 7.5m lapped end span with 1 brace, the DHS purlin is required to resist a 4.0 kN axial load (resulting from wind on the end wall) in addition to the $W^*_{ULS}\uparrow$ load combination. The remaining axial capacity is checked given the known flexural loads:

$W_x^* = 2.44$ kN/m (Design uniformly distributed bending load; $W^*_{ULS}\uparrow$)

$\phi_b W_{bx} = 2.76$ kN/m (Uniformly loaded bending capacity from load span tables)

$N^* = 4$ kN (Design axial compressive load as calculated)

$\phi_c N_c = 48.08$ kN (Axial compression capacity from loan/span tables)

Solving for N^*,

$$N^* = \left(1 - \frac{W_x^*}{\phi_b W_{bx}}\right) \phi_c N_c \qquad \text{(solving equation 1 in section 2.3.3)}$$

$$= \left(1 - \frac{2.44}{2.76}\right) .48.08 = 5.57 \text{ kN} > 4.0 \text{ kN} \therefore \text{O.K.}$$

Check $N^*/\phi_c N_c \le 0.15$ for the above formula to remain valid: 5.57/48.08 = 0.12 ∴ O.K.

If the above formula is not valid, i.e. $N^*/\phi_c N_c > 0.15$, then N^* needs to be solved to satisfy whichever of the following equations gives the lowest N^* value.

$$\frac{N^*}{\phi_c N_c} + \frac{C_{mx} W_x^*}{\phi_b W_{bx} \alpha_{nx}} \le 1.0 \qquad \text{(solving equation 2 in section 2.3.3)}$$

$$N^* = \left(1 - \frac{W_x^*}{\phi_b W_{bx}}\right) \phi_c N_s \qquad \text{(solving equation 3 in section 2.3.3)}$$

2.3.11.4 EXAMPLE: BOLT SIZING

Taking the previous purlin example option 1 where we have a single span DHS 250/18 purlin spaced at 3.0m apart, with 2 rows of bracing.

Critical load combination (ULS) = 0.84 kPa

This converts to design shear force at the supports, V^* = 0.84 x 3.0 x 7.5/2 = 9.45 kN per end connection.

As there are 2 bolts at each end V^* = 9.45 = 4.73 kN per bolt.

From the connection capacities given in Section 2.3.10 for 1.75m thickness.

Try 12mm diameter bolts

End tearing	ϕV_f	=	19.2 kN per bolt
Bearing	ϕV_b	=	18.1 kN per bolt
Bolt shear	ϕV_{fn}	=	15.1 per grade 4.6 bolt > 4.73kN ∴ O.K.

2.3.11.5 EXAMPLE: SPECIFIC BRACE DESIGN

Consider a design case with purlin span 10m.
Ultimate uplift design load 1.0 kPa.
Desired purlin spacing 3.6m on internal spans.

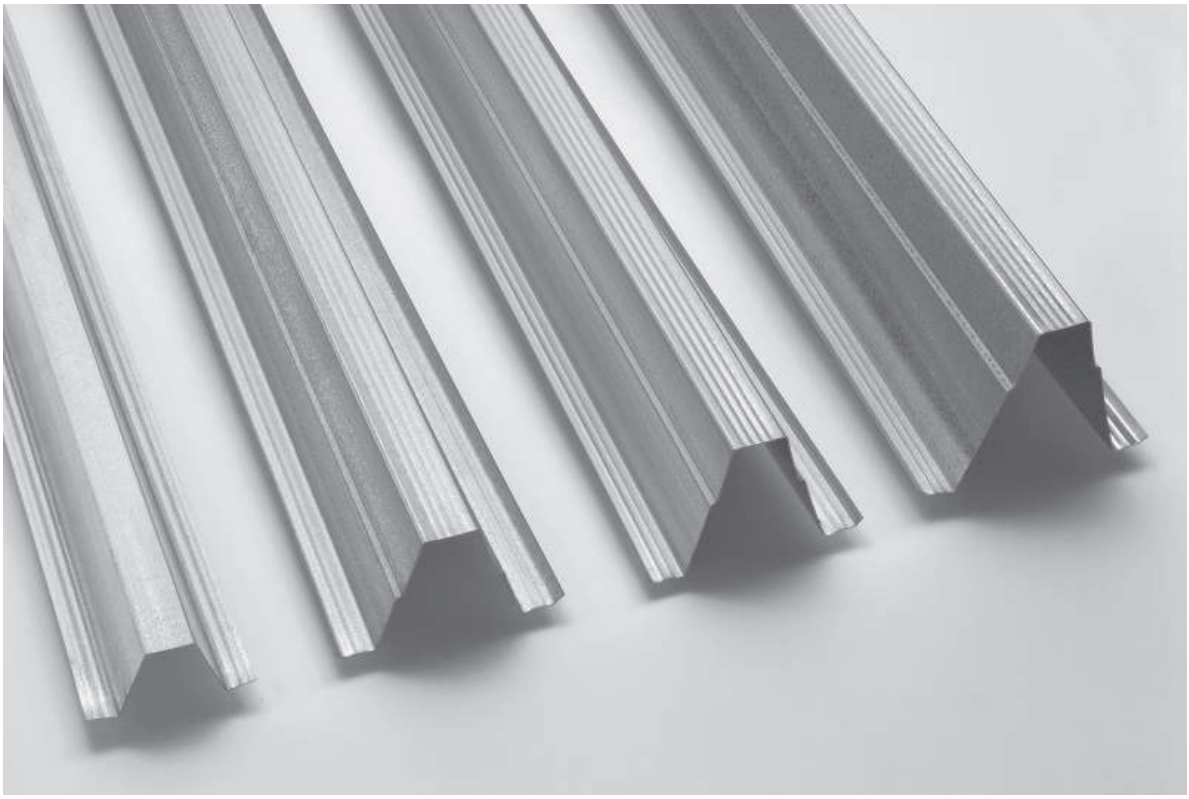
Proposed purlin design
DHS 300/18 on internal lapped spans. 1 row bracing using Fastbrace.
Design load = 1.0 kPa x 3.6m = 3.6 kN/m
This is less than $\phi_b w_{bx}$ = 3.85 kN/m from DHS load span tables. ∴ O.K.

Check brace capacity.
From Section 2.3.9.2.
Bending moment on the brace channel.
$M^* = 0.75\ \phi_b w_{bx}\ l_b$ m, assuming screw fixings of the roof sheets will restrain the top flange, where $\phi_b w_{bx}$ is the purlin capacity. (Note: The designer may choose to use the design load instead of $\phi_b w_{bx}$, although it is recommended that brace strength is designed to match the purlin capacity.)

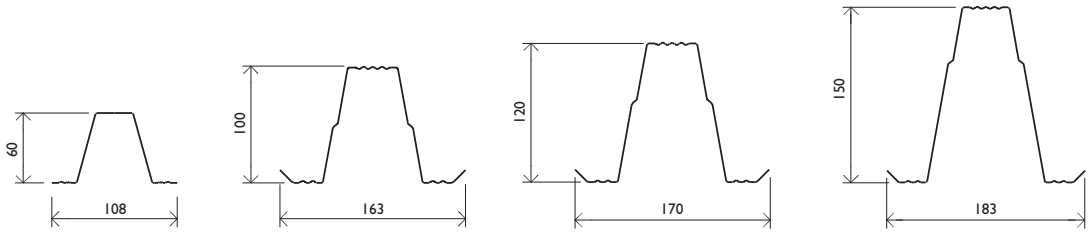
In this example, use $\phi_b w_{bx}$ = 3.85 kN/m.
l_b = 10 x 0.5m (contributing length factor table)
m = 42.6mm (distance from shear centre to mid plane table)
Therefore, M* = 0.75 x 3.85 x 5 x 0.0426
= 0.61 kNm
Brace member moment capacity
M_b = 0.45 kN/m < 0.61 kN/m (bracing member moment capacity table)
Therefore, either reduce purlin spacing or use 2 rows bracing.

Check for 2 rows bracing
l_b = 10 x 0.31 (contributing length factor table)
M*= 0.75 x 3.85 x 3.1 x 0.0426 = 0.38 kN/m < 0.45 kNm. ∴ O.K.

DESIGN GUIDE – TOP NOTCH



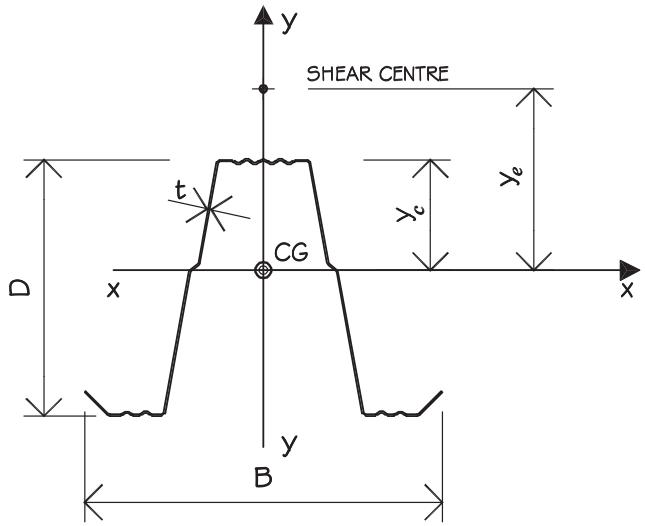
Top Notch – Nominal Dimensions



TOP NOTCH 60 TOP NOTCH 100 TOP NOTCH 120 TOP NOTCH 150

Dimond

2.4.3 TOP NOTCH SECTION PROPERTIES



Top Notch Section	Depth D mm	Width B mm	Thickness t mm	Area A mm^2	Mass per unit length kg/m	Second Moment of Area (Full Section) I_x 10^6mm^4	Second Moment of Area (Full Section) I_y 10^6mm^4	Section Modulus (Full Section) z_x 10^3mm^3	Section Modulus (Full Section) z_y 10^3mm^3	Radius of Gyration r_x mm	Radius of Gyration r_y mm	Centre of Gravity y_c mm	Shear Centre y_e mm	Torsion Constant J mm^4	Warping Constant I_w 10^6mm^6	Monosymmetry Constant β_x mm
60 x 0.75	60	108	0.75	150	1.24	0.077	0.122	2.57	2.26	22.6	28.5	31.5	44.2	28.2	16.0	111
60 x 0.95	60	108	0.95	191	1.56	0.097	0.155	3.23	2.87	22.6	28.5	31.5	44.2	57.3	20.3	111
100 x 0.75	100	163	0.75	248	2.04	0.340	0.450	6.80	5.52	37.0	42.6	55.2	67.4	46.5	238.6	163
100 x 0.95	100	163	0.95	314	2.56	0.430	0.570	8.60	6.99	37.0	42.6	55.2	67.4	94.5	302.2	163
120 x 0.75	120	170	0.75	278	2.28	0.530	0.546	8.83	6.42	43.7	44.3	65.6	82.3	52.1	363.3	190
120 x 0.95	120	170	0.95	352	2.86	0.671	0.691	11.18	8.13	43.6	44.3	65.6	82.3	106.0	460.2	190
150 x 0.95	150	183	0.95	411	3.34	1.166	0.920	15.55	10.05	53.3	47.3	81.0	103.9	123.5	758.4	231
150 x 1.15	150	183	1.15	497	4.02	1.411	1.114	18.81	12.17	53.3	47.3	81.0	103.9	219.1	918.0	231

Note: Mass assumes a total coated weight for the standard zinc coating of 275 g/m^2.

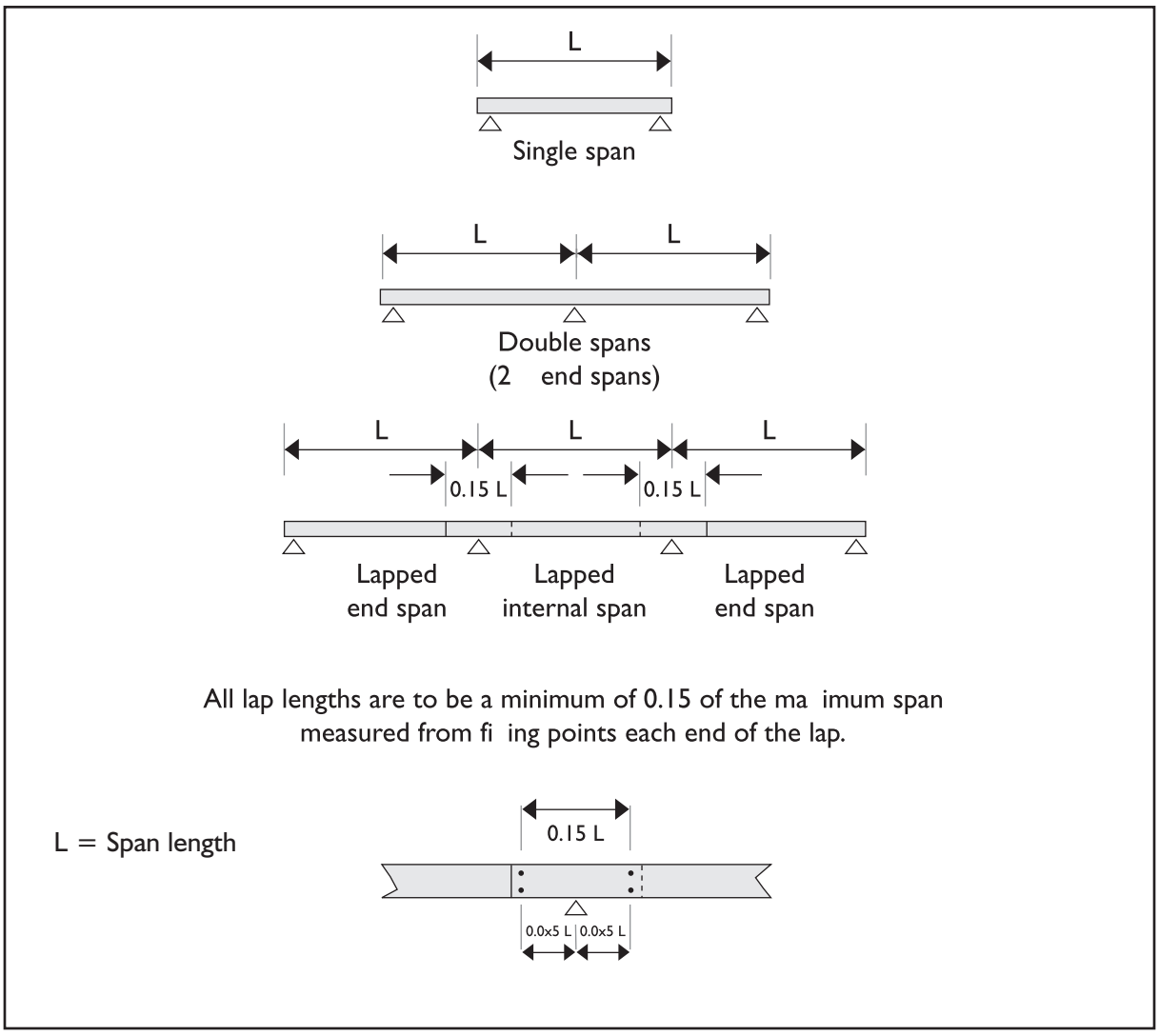
2.4.5 INTRODUCTION TO TOP NOTCH PURLINS CAPACITY TABLES

The capacity tables given in 2.4.6 relate to the following span configurations.

When using Top Notch over more than two spans better performance can be achieved by lapping the sections over the supports.

Single span – pinned at both ends.
Lapped end span – pinned at one end and lapped at the other.
Lapped internal span – lapped at both ends.

Note: Use of lapped end span tables with corresponding lapped internal span tables assumes that the end span is within plus 5% or minus 25% of the internal span, otherwise specific design to AS/NZS 4600 is required.

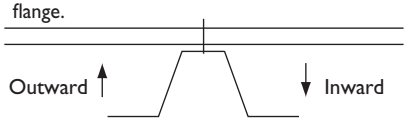


2.4.6 TOP NOTCH PURLINS & GIRTS – SINGLE SPAN

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span	60x0.75			60x0.95			100x0.75			100x0.95			120x0.75			120x0.95			150x0.95			150x1.15		
(m)	Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s	-Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s
1.00																								
1.25	5.90	4.00	3.59																					
1.50	4.10	2.78	2.08	5.48	3.76	2.75																		
1.75	3.01	2.04	1.31	4.03	2.76	1.73																		
2.00	2.30	1.56	0.88	3.08	2.11	1.16	4.54	3.22	3.90															
2.25	1.82	1.23	0.62	2.44	1.67	0.81	3.59	2.55	2.74	5.37	3.56	3.74												
2.50	1.47	1.00	0.45	1.97	1.35	0.59	2.91	2.06	2.00	4.35	2.88	2.73	3.52	2.46	2.95	5.24	3.68	4.20						
2.75	1.22	0.83	0.34	1.63	1.12	0.45	2.40	1.70	1.50	3.60	2.38	2.05	2.91	2.03	2.22	4.33	3.07	3.15						
3.00				1.37	0.94	0.34	2.02	1.43	1.16	3.02	2.00	1.58	2.45	1.71	1.71	3.64	2.58	2.43	4.57	3.07	3.91			
3.25							1.72	1.22	0.91	2.57	1.70	1.24	2.08	1.45	1.34	3.10	2.19	1.91	3.90	2.70	3.08	5.39	2.83	4.09
3.50							1.48	1.05	0.73	2.22	1.47	0.99	1.80	1.25	1.08	2.68	1.89	1.53	3.36	2.33	2.46	4.65	2.63	3.28
3.75							1.29	0.92	0.59	1.93	1.28	0.81	1.57	1.09	0.87	2.33	1.65	1.24	2.93	2.03	2.00	4.05	2.45	2.66
4.00							1.14	0.81	0.49	1.70	1.13	0.67	1.38	0.96	0.72	2.05	1.45	1.02	2.57	1.78	1.65	3.56	2.30	2.19
4.25							1.01	0.71	0.41	1.51	1.00	0.56	1.22	0.85	0.60	1.81	1.28	0.85	2.28	1.58	1.38	3.15	2.16	1.83
4.50							0.90	0.64	0.34	1.34	0.89	0.47	1.09	0.76	0.51	1.62	1.14	0.72	2.03	1.41	1.16	2.81	2.00	1.54
4.75										1.21	0.80	0.40	0.98	0.68	0.43	1.45	1.03	0.61	1.82	1.26	0.99	2.52	1.79	1.31
5.00										1.09	0.72	0.34	0.88	0.61	0.37	1.31	0.93	0.52	1.65	1.14	0.85	2.28	1.62	1.12
5.25													0.80	0.56	0.32	1.19	0.84	0.45	1.49	1.03	0.73	2.07	1.47	0.97
5.50																1.08	0.77	0.39	1.36	0.94	0.63	1.88	1.34	0.84
5.75																0.99	0.70	0.34	1.25	0.86	0.56	1.72	1.22	0.74
6.00																0.91	0.64	0.30	1.14	0.79	0.49	1.58	1.12	0.65
6.25																			1.05	0.73	0.43	1.46	1.04	0.58
6.50																			0.97	0.67	0.38	1.35	0.96	0.51
6.75																			0.90	0.63	0.34	1.25	0.89	0.46
7.00																			0.84	0.58	0.31	1.16	0.83	0.41
7.25																						1.08	0.77	0.37
7.50																						1.01	0.72	0.33
7.75																						0.95	0.67	0.30
8.00																								
8.25																								
8.50																								
8.75																								
9.00																								
9.25																								
9.50																								
9.75																								
10.00																								

1. W_s = Load at deflection of span/150
2. Outward loads shown are based on the screw fixings and minimum thickness shown in Section 2.4.7 Fasteners.
3. Roofing/cladding assumed to fully restrain top flange.



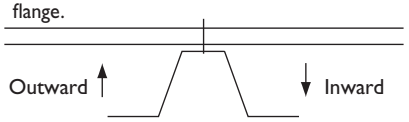
4. Shaded areas of the table relate to spans which will not support a point load of 1.4 kN (refer AS/NZS 1170.1). This assumes no load sharing between purlins.

2.4.6 TOP NOTCH PURLINS & GIRTS – DOUBLE SPAN

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span	60x0.75			60x0.95			100x0.75			100x0.95			120x0.75			120x0.95			150x0.95			150x1.15		
(m)	Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s	-Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s
1.00																								
1.25	5.90	3.73	7.88																					
1.50	4.10	3.11	4.56	5.48	3.55	5.95																		
1.75	3.01	2.66	2.87	4.03	3.04	3.75																		
2.00	2.30	2.30	1.92	3.08	2.66	2.51																		
2.25	1.82	1.82	1.35	2.44	2.37	1.76	5.09	2.99	5.92															
2.50	1.47	1.47	0.98	1.97	1.97	1.29	4.12	2.69	4.32	5.42	4.03	5.80	4.19	2.94	6.55									
2.75	1.22	1.22	0.74	1.63	1.63	0.97	3.41	2.40	3.24	4.48	3.60	4.35	3.81	2.68	4.92	5.82	4.01	6.73						
3.00	1.02	1.02	0.57	1.37	1.37	0.74	2.85	2.02	2.50	3.77	3.02	3.35	3.41	2.45	3.79	4.89	3.64	5.18	5.60	3.68	8.64			
3.25	0.87	0.87	0.45	1.17	1.17	0.59	2.38	1.72	1.97	3.21	2.57	2.64	2.91	2.08	2.98	4.17	3.10	4.08	5.17	3.40	6.79			
3.50	0.75	0.75	0.36	1.01	1.01	0.47	2.01	1.48	1.57	2.77	2.22	2.11	2.49	1.80	2.39	3.60	2.68	3.26	4.49	3.15	5.44			
3.75				0.88	0.88	0.38	1.71	1.29	1.28	2.39	1.93	1.72	2.13	1.57	1.94	3.13	2.33	2.65	3.82	2.93	4.42	5.35	3.93	5.67
4.00				0.77	0.77	0.31	1.46	1.14	1.05	2.05	1.70	1.42	1.84	1.38	1.60	2.75	2.05	2.19	3.28	2.57	3.64	4.66	3.56	4.67
4.25							1.26	1.01	0.88	1.76	1.51	1.18	1.59	1.22	1.33	2.41	1.81	1.82	2.83	2.28	3.04	4.02	3.15	3.89
4.50							1.09	0.90	0.74	1.52	1.34	0.99	1.39	1.09	1.12	2.10	1.62	1.54	2.45	2.03	2.56	3.48	2.81	3.28
4.75							0.94	0.81	0.63	1.32	1.21	0.85	1.22	0.98	0.95	1.84	1.45	1.31	2.13	1.82	2.18	3.03	2.52	2.79
5.00							0.82	0.73	0.54	1.15	1.09	0.72	1.07	0.88	0.82	1.62	1.31	1.12	1.86	1.65	1.87	2.64	2.28	2.39
5.25							0.72	0.66	0.47	1.00	0.99	0.63	0.94	0.80	0.71	1.43	1.19	0.97	1.62	1.49	1.61	2.31	2.07	2.07
5.50							0.64	0.60	0.41	0.90	0.90	0.54	0.83	0.73	0.62	1.26	1.08	0.84	1.42	1.36	1.40	2.02	1.88	1.80
5.75							0.58	0.55	0.35	0.82	0.82	0.48	0.74	0.67	0.54	1.12	0.99	0.74	1.29	1.25	1.23	1.83	1.72	1.57
6.00							0.54	0.50	0.31	0.76	0.76	0.42	0.65	0.61	0.47	0.99	0.91	0.65	1.19	1.14	1.08	1.68	1.58	1.38
6.25										0.70	0.70	0.37	0.59	0.56	0.42	0.88	0.84	0.57	1.09	1.05	0.96	1.55	1.46	1.22
6.50										0.64	0.64	0.33	0.55	0.52	0.37	0.78	0.78	0.51	1.01	0.97	0.85	1.44	1.35	1.09
6.75													0.51	0.48	0.33	0.73	0.72	0.45	0.94	0.90	0.76	1.33	1.25	0.97
7.00													0.47	0.45	0.30	0.67	0.67	0.41	0.87	0.84	0.68	1.24	1.16	0.87
7.25																0.63	0.62	0.37	0.81	0.78	0.61	1.15	1.08	0.78
7.50																0.59	0.58	0.33	0.76	0.73	0.55	1.08	1.01	0.71
7.75																0.55	0.55	0.30	0.71	0.69	0.50	1.01	0.95	0.64
8.00																			0.67	0.64	0.46	0.95	0.89	0.58
8.25																			0.63	0.60	0.42	0.89	0.84	0.53
8.50																			0.59	0.57	0.38	0.84	0.79	0.49
8.75																			0.56	0.54	0.35	0.79	0.74	0.45
9.00																			0.53	0.51	0.32	0.75	0.70	0.41
9.25																						0.71	0.67	0.38
9.50																						0.67	0.63	0.35
9.75																						0.64	0.60	0.32
10.00																						0.61	0.57	0.30

1. W_s = Load at deflection of span/150
2. Outward loads shown are based on the screw fixings and minimum thickness shown in Section 2.4.7 Fasteners.
3. Roofing/cladding assumed to fully restrain top flange.



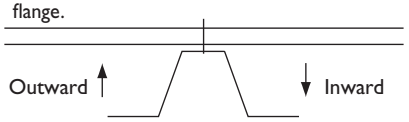
4. Shaded areas of the table relate to spans which will not support a point load of 1.4 kN (refer AS/NZS 1170.1). This assumes no load sharing between purlins.

2.4.6 TOP NOTCH PURLINS & GIRTS – LAPPED END SPAN

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span	60x0.75			60x0.95			100x0.75			100x0.95			120x0.75			120x0.95			150x0.95			150x1.15		
(m)	Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s	-Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s
1.00																								
1.25																								
1.50	6.00	3.55	4.70																					
1.75	4.34	3.04	2.96	5.88	3.04	3.87																		
2.00	3.19	2.54	1.98	4.33	2.66	2.59																		
2.25	2.40	2.00	1.39	3.26	2.37	1.82	5.84	4.48	5.50															
2.50	1.84	1.62	1.02	2.51	2.13	1.33	4.73	4.26	4.45															
2.75	1.43	1.34	0.76	1.95	1.82	1.00	3.91	3.67	3.34	5.84	3.67	4.49	4.49	4.01	4.42									
3.00	1.13	1.13	0.59	1.53	1.53	0.77	3.28	3.28	2.58	4.91	3.36	3.46	3.97	3.97	3.91	5.92	4.27	5.34						
3.25	0.96	0.96	0.46	1.30	1.30	0.60	2.80	2.80	2.03	4.18	3.10	2.72	3.39	3.39	3.07	5.04	3.40	4.20						
3.50	0.83	0.83	0.37	1.12	1.12	0.48	2.41	2.41	1.62	3.61	2.88	2.18	2.92	2.92	2.46	4.35	3.15	3.37	5.46	3.66	5.23			
3.75				0.98	0.98	0.39	2.10	2.10	1.32	3.14	2.69	1.77	2.54	2.54	2.00	3.79	2.94	2.74	4.76	2.94	4.56			
4.00				0.86	0.86	0.32	1.85	1.85	1.09	2.76	2.52	1.46	2.24	2.24	1.65	3.33	2.76	2.25	4.18	2.76	3.76	5.78	3.68	4.82
4.25							1.64	1.64	0.91	2.45	2.37	1.22	1.98	1.98	1.37	2.95	2.60	1.88	3.70	2.60	3.13	5.12	3.46	4.02
4.50							1.46	1.46	0.76	2.18	2.17	1.02	1.77	1.77	1.16	2.63	2.45	1.58	3.30	2.45	2.64	4.57	3.27	3.38
4.75							1.31	1.31	0.65	1.96	1.95	0.87	1.59	1.59	0.98	2.36	2.32	1.35	2.96	2.32	2.24	4.10	3.10	2.88
5.00							1.18	1.18	0.56	1.77	1.76	0.75	1.43	1.43	0.84	2.13	2.13	1.15	2.68	2.21	1.92	3.70	2.94	2.47
5.25							1.07	1.07	0.48	1.60	1.59	0.65	1.30	1.30	0.73	1.93	1.93	1.00	2.43	2.10	1.66	3.36	2.80	2.13
5.50							0.98	0.98	0.42	1.45	1.45	0.56	1.18	1.18	0.63	1.76	1.76	0.87	2.21	2.01	1.45	3.06	2.68	1.85
5.75							0.89	0.89	0.37	1.33	1.33	0.49	1.08	1.08	0.56	1.61	1.61	0.76	2.02	1.92	1.26	2.80	2.56	1.62
6.00							0.82	0.82	0.32	1.22	1.22	0.43	0.99	0.99	0.49	1.48	1.48	0.67	1.86	1.84	1.11	2.57	2.45	1.43
6.25										1.12	1.12	0.38	0.92	0.92	0.43	1.36	1.36	0.59	1.71	1.71	0.99	2.37	2.36	1.26
6.50										1.04	1.04	0.34	0.85	0.85	0.38	1.26	1.26	0.53	1.58	1.58	0.88	2.19	2.19	1.12
6.75										0.96	0.96	0.30	0.79	0.79	0.34	1.17	1.17	0.47	1.47	1.47	0.78	2.03	2.03	1.00
7.00													0.73	0.73	0.31	1.09	1.09	0.42	1.37	1.37	0.70	1.89	1.89	0.90
7.25																1.01	1.01	0.38	1.27	1.27	0.63	1.76	1.76	0.81
7.50																0.95	0.95	0.34	1.19	1.19	0.57	1.65	1.65	0.73
7.75																0.89	0.89	0.31	1.11	1.11	0.52	1.54	1.54	0.66
8.00																			1.05	1.05	0.47	1.45	1.45	0.60
8.25																			0.98	0.98	0.43	1.36	1.36	0.55
8.50																			0.93	0.93	0.39	1.28	1.28	0.50
8.75																			0.87	0.87	0.36	1.21	1.21	0.46
9.00																			0.83	0.83	0.33	1.14	1.14	0.42
9.25																			0.78	0.78	0.30	1.08	1.08	0.39
9.50																						1.03	1.03	0.36
9.75																						0.97	0.97	0.33
10.00																						0.93	0.93	0.31

1. W_s = Load at deflection of span/150
2. Outward loads shown are based on the screw fixings and minimum thickness shown in Section 2.4.7 Fasteners.
3. Roofing/cladding assumed to fully restrain top flange.



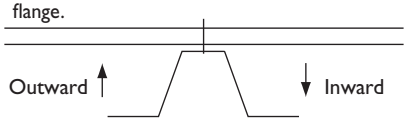
4. Shaded areas of the table relate to spans which will not support a point load of 1.4 kN (refer AS/NZS 1170.1). This assumes no load sharing between purlins.

2.4.6 TOP NOTCH PURLINS & GIRTS – LAPPED INTERNAL SPAN

Uniformly loaded bending capacities (kN/m) $\phi_b W_{bx}$

Span	60x0.75			60x0.95			100x0.75			100x0.95			120x0.75			120x0.95			150x0.95			150x1.15		
(m)	Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s	-Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s	Inward	Outward	W_s
1.00																								
1.25																								
1.50																								
1.75	6.00	3.81	5.38																					
2.00	4.42	3.33	3.61	5.99	3.33	4.71																		
2.25	3.33	2.78	2.53	4.52	2.96	3.31																		
2.50	2.55	2.25	1.85	3.47	2.66	2.41																		
2.75	1.98	1.86	1.39	2.69	2.42	1.81	5.41	4.58	5.41															
3.00	1.56	1.56	1.07	2.11	2.11	1.39	4.54	4.20	4.54															
3.25	1.33	1.33	0.84	1.80	1.80	1.10	3.87	3.87	3.68	5.79	3.88	4.95	4.03	4.03	4.03									
3.50	1.15	1.15	0.67	1.55	1.55	0.88	3.34	3.34	2.95	4.99	3.60	3.96	3.74	3.74	3.96	6.00	3.94	6.00						
3.75	1.00	1.00	0.55	1.35	1.35	0.71	2.91	2.91	2.40	4.35	3.36	3.22	3.50	3.50	3.50	5.24	3.68	4.97	5.60	3.68	5.60			
4.00	0.88	0.88	0.45	1.19	1.19	0.59	2.56	2.56	1.98	3.82	3.15	2.65	3.10	3.10	3.00	4.61	3.45	4.10	5.25	3.45	5.25			
4.25	0.78	0.78	0.38	1.05	1.05	0.49	2.26	2.26	1.65	3.39	2.96	2.21	2.74	2.74	2.50	4.08	3.25	3.42	4.94	3.25	4.94			
4.50				0.94	0.94	0.41	2.02	2.02	1.39	3.02	2.80	1.86	2.45	2.45	2.11	3.64	3.07	2.88	4.57	3.07	4.57			
4.75				0.84	0.84	0.35	1.81	1.81	1.18	2.71	2.65	1.58	2.20	2.20	1.79	3.27	2.91	2.45	4.10	2.91	4.08	5.68	3.87	5.23
5.00				0.76	0.76	0.30	1.64	1.64	1.01	2.45	2.43	1.36	1.98	1.98	1.54	2.95	2.76	2.10	3.70	2.76	3.50	5.13	3.68	4.48
5.25							1.48	1.48	0.87	2.22	2.20	1.17	1.80	1.80	1.33	2.68	2.63	1.81	3.36	2.63	3.02	4.65	3.50	3.87
5.50							1.35	1.35	0.76	2.01	2.01	1.02	1.64	1.64	1.15	2.44	2.44	1.58	3.06	2.51	2.63	4.24	3.35	3.37
5.75							1.24	1.24	0.67	1.84	1.84	0.89	1.50	1.50	1.01	2.23	2.23	1.38	2.80	2.40	2.30	3.88	3.20	2.95
6.00							1.14	1.14	0.59	1.69	1.69	0.79	1.38	1.38	0.89	2.05	2.05	1.21	2.57	2.30	2.02	3.56	3.07	2.59
6.25							1.05	1.05	0.52	1.56	1.56	0.70	1.27	1.27	0.79	1.89	1.89	1.07	2.37	2.21	1.79	3.28	2.94	2.30
6.50							0.97	0.97	0.46	1.44	1.44	0.62	1.17	1.17	0.70	1.75	1.75	0.96	2.19	2.12	1.59	3.03	2.83	2.04
6.75							0.90	0.90	0.41	1.33	1.33	0.55	1.09	1.09	0.62	1.62	1.62	0.85	2.03	2.03	1.42	2.81	2.73	1.82
7.00							0.83	0.83	0.37	1.24	1.24	0.50	1.01	1.01	0.56	1.50	1.50	0.76	1.89	1.89	1.27	2.62	2.62	1.63
7.25							0.78	0.78	0.33	1.16	1.16	0.45	0.94	0.94	0.50	1.40	1.40	0.69	1.76	1.76	1.15	2.44	2.44	1.47
7.50							0.73	0.73	0.30	1.08	1.08	0.40	0.88	0.88	0.45	1.31	1.31	0.62	1.65	1.65	1.04	2.28	2.28	1.33
7.75										1.01	1.01	0.36	0.82	0.82	0.41	1.23	1.23	0.56	1.54	1.54	0.94	2.13	2.13	1.20
8.00										0.95	0.95	0.33	0.77	0.77	0.37	1.15	1.15	0.51	1.45	1.45	0.85	2.00	2.00	1.09
8.25										0.89	0.89	0.30	0.73	0.73	0.34	1.08	1.08	0.47	1.36	1.36	0.78	1.88	1.88	1.00
8.50													0.69	0.69	0.31	1.02	1.02	0.43	1.28	1.28	0.71	1.77	1.77	0.91
8.75																0.96	0.96	0.39	1.21	1.21	0.65	1.67	1.67	0.84
9.00																0.91	0.91	0.36	1.14	1.14	0.60	1.58	1.58	0.77
9.25																0.86	0.86	0.33	1.08	1.08	0.55	1.50	1.50	0.71
9.50																0.82	0.82	0.31	1.03	1.03	0.51	1.42	1.42	0.65
9.75																			0.97	0.97	0.47	1.35	1.35	0.60
10.00																			0.93	0.93	0.44	1.28	1.28	0.56

1. W_s = Load at deflection of span/150
2. Outward loads shown are based on the screw fixings and minimum thickness shown in Section 2.4.7 Fasteners.
3. Roofing/cladding assumed to fully restrain top flange.



4. Shaded areas of the table relate to spans which will not support a point load of 1.4 kN (refer AS/NZS 1170.1). This assumes no load sharing between purlins.

2.4.7 FASTENERS

In order to achieve the loads shown in the Top Notch design tables, the following size and number of self-drilling screws are required for the support condition and type of material.

FIXINGS

				Number of Screws/Screw Gauge				
	Support Member			Top Notch Purlin Size				
Support Condition	Material	Grade	Min. Thickness (mm)	60x0.75 60x0.95	100x0.75 100x0.95	120x0.75 120x0.95	150x0.95	150x1.15
End	Cold-formed Steel	G450	1.45	2/12g	2/12g	2/14g	2/14g	2/14g
	Steel	G300	3	2/12g	2/12g	2/14g	2/14g	2/14g
	Timber		37*					
Internal	Cold-formed Steel	G450	1.45	4/12g	6/12g	6/14g	6/14g	8/14g
	Steel	G300	3	2/12g	4/12g	4/14g	4/14g	6/14g
	Timber		37*					

*Minimum screw embedment into timber support.

Notes to table

- *Cold-formed option* – 2/14g indicates 2 off 14 gauge self-drilling screws fastened into a cold-formed steel (Grade G450) support member of 1.45mm minimum thickness. The same rationale applies where 12 gauge screws are required.
- *Steel/timber option* – 2/12g indicates 2 off 12 gauge self-drilling screws fastened into a Grade 300 hot-rolled steel support member of 3mm minimum thickness or 2 off 12g x 50mm long Type 17 screws fastened into timber to achieve a minimum embedment length of 37mm. The same rationale applies where 14 gauge screws are required.
- Outward loads shall be adjusted to a lower value if less screws or thinner support members are used.
- When the number of specified fixings above cannot be fixed into the Top Notch and/or Top Notch is being installed in cyclonic regions, an additional hold-down strap should be used. Refer detail A in Section 2.4.11 (strap capacity 20 kN).
- Lap end fasteners shall be:

  – 2 screws for the 60 and 100 Top Notch, or
  – 4 screws for the 120 and 150 Top Notch

  positioned at each end. Refer drawing 2.4.11, detail D.
- A minimum distance of 20mm from the fastener to the end of the Top Notch purlin is required.

2.4.8 DESIGN EXAMPLE – TOP NOTCH PURLINS

Selected Loadings

Dead Load, G = 0.12 kPa Live Load, Q = 0.25 kPa Snow Load, S_u = 0.5 kPa
Outward Limit State Wind Loads, W_u = –0.95 kPa (ultimate state) and W_s = –0.64 kPa (serviceability state).
Inward Wind Loading is not significant for this roof.

Building Constraints

Portal Spacing, L_P = 5 m Rafter Length, L_R = 10.0 m (distance from eaves purlin to ridge purlin)
Roof Pitch, α = 10 degrees Cladding Profile = Styleline x 0.40 mm BMT

Critical Design Load Combinations for the Ultimate Limit State (AS/NZS 1170.0, clause 4.2)

i)	W^*_{ULS}	=	1.2G + 1.5Q	=	(1.2 x 0.12) + (1.5 x 0.25)	=	0.52 kPa
ii)	W^*_{ULS}	=	$1.2G + S_u + \psi_c Q$	=	(1.2 x 0.12) + 0.5 + (0.0 x 0.25)	=	0.64 kPa
iii)	W^*_{ULS}	=	$0.9G + W_u$	=	(0.9 x 0.12) – 0.95	=	– 0.84 kPa (outward)

Critical Design Load Combinations for the Serviceability Limit State (AS/NZS 1170.0, clause 4.3)

i)	W^*_{SLS}	=	$L_P/300$ under $G + \psi_l Q$	=	[0.12 + (0.0 x 0.25)] x 300/150	=	0.24 kPa
ii)	W^*_{SLS}	=	$L_P/150$ under W_s	=	– 0.64	=	– 0.64 kPa (outward)

For i) we have converted the load by a factor of 300/150 in order to compare the load directly with W_s in the Top Notch load span tables as these are based on span/150.

Optimise Roofing Profile Spans

In this case we have a restricted access roof where the point load requirement limits the intermediate span of the Styleline x 0.40 mm BMT profile to 1.6 m. End spanning capability of the roofing is reduced to 1.1 m, i.e. 66% of the intermediate span. Generally these spans will not 'fit' the rafter length exactly, hence the requirement to Optimise.

The optimised roofing profile intermediate span is based on the rafter length and the number of purlins, N_P (assuming at least four) and is given by $L_{RI} = L_{RT} / [N_P - 1.67]$

Try 7 Purlins,	L_{RI} = 10.0/(7 – 1.67)	=	1.88 m	No good
Try 9 Purlins,	L_{RI} = 10.0/(9 – 1.67)	=	1.36 m	Not controlling
Try 8 Purlins,	L_{RI} = 10.0/(8 – 1.67)	=	1.58 m	Intermediate spans and 1.04 m edge spans

From this, 8 purlins are required and the purlin spacings may be rationalised to 1.6 m intermediate spans and 1.0 m spans at the sheet ends.

Continued on next page

2.4.8 DESIGN EXAMPLE – TOP NOTCH PURLINS *continued*

Optimise Purlin Size

The Top Notch load span tables assume that the top flange of the Top Notch purlin is continuously restrained by screw fastened roof sheeting. (The tables shall not be used if the top flange is not fully restrained).

Check design capacities $W^*_{ULS} < \phi_b W_{bx}$

1. Single Span Purlin Design

a) All Bays (5 m span)

Check design capacities (using those given in the simple span Top Notch load span tables):

$W^*_{ULS}\downarrow$	=	1.6 x 0.64	= 1.02 kN/m	c.f 1.31 kN/m for a 120 x 0.95
$W^*_{ULS}\uparrow$	=	1.6 x –0.84	= –1.34 kN/m	c.f 1.62 kN/m for a 150 x 1.15

Check deflections

W^*_{SLS}	=	1.6 x –0.64	= –1.02 kN/m	c.f 1.12 kN/m for a 150 x 1.15

Therefore both wind load outward and deflection govern and a 150 x 1.15 Top Notch purlin is required.

Therefore use,
150 x 1.15 Top Notch purlins single span at 1.6 m intermediate spacings and 1.0 m at sheet ends.

Typically for multiple bay structures it would be more efficient to use a lapped purlin system as shown below.

2. Lapped Span Purlin Design

a) Check End Bays (5 m span)

Check design capacities (using those given in the lapped end span Top Notch load span tables):

$W^*_{ULS}\downarrow$	=	1.6 x 0.64	= 1.02 kN/m	c.f 1.18 kN/m for a 100 x 0.75
$W^*_{ULS}\uparrow$	=	1.6 x –0.84	= –1.34 kN/m	c.f 1.76 kN/m for a 100 x 0.95

Check deflections

W^*_{SLS}	=	1.6 x –0.64	= –1.02 kN/m	c.f 1.15 kN/m for a 120 x 0.95

Therefore wind load deflection governs the end span and a 120 x 0.95 lapped Top Notch is required.

b) Check Internal Bays (5 m span)

Check design capacities (using those given in the lapped internal span Top Notch load span tables):

$W^*_{ULS}\downarrow$	=	1.6 x 0.64	= 1.02 kN/m	c.f 1.64 kN/m for a 100 x 0.75
$W^*_{ULS}\uparrow$	=	1.6 x –0.84	= –1.34 kN/m	c.f 1.64 kN/m for a 100 x 0.75

Check deflections

W^*_{SLS}	=	1.6 x –0.64	= –1.02 kN/m	c.f 1.36 kN/m for a 100 x 0.95

Therefore wind load deflection governs the internal span and a 100 x 0.95 lapped Top Notch is required.

Therefore use,
Top Notch 120 x 0.95 lapped purlins at 1.6 m intermediate spacings and 1.0 m at sheet ends.
(The size is governed by the end bays).

Typically, Top Notch purlins must have the same depth on all bays and different thicknesses are not mixed when specifying Top Notch purlins for practical reasons.

2.4.8 DESIGN EXAMPLE – TOP NOTCH PURLINS *continued*

3. Lapped Reduced-End Span Purlin Design

The dependable strength characteristics are higher for internal spans on continuously lapped span purlin systems. Therefore typically a reduction in the end bay spacings of 20% to 30% will result in a more efficient purlin optimisation. Try reducing the end bay span by 20% to 4 metres.

a) Check End Bays (4 m span)

Check design capacities (using those given in the lapped end span Top Notch load span tables):

$W^*_{ULS\downarrow}$	=	1.6 x 0.64	=	1.02 kN/m	c.f 1.85 kN/m for a 100 x 0.75
$W^*_{ULS\uparrow}$	=	1.6 x – 0.84	=	– 1.34 kN/m	c.f 1.85 kN/m for a 100 x 0.75

Check deflections

W^*_{SLS}	=	1.6 x – 0.64	=	– 1.02 kN/m	c.f 1.09 kN/m for a 100 x 0.75

Therefore all design cases require a 100 x 0.75 lapped Top Notch.

b) Check Internal Bays (5 m span)

As for example 2b) above.
A 100 x 0.95 lapped Top Notch is required.

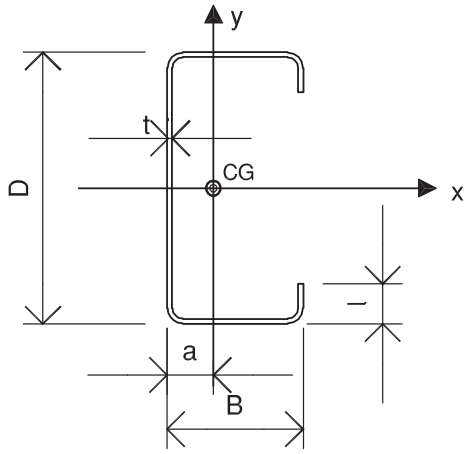
Therefore use,
Top Notch 100 x 0.95 lapped purlins at 1.6 m intermediate spacings and 1.0 m at sheet ends, on end and internal bays.

The above examples use the same wind load on the end bays and the internal bays. However a more rigorous wind load analysis is likely to have different wind loads on the end and internal bays.

In the calculation of wall elements, optimisation follows the same logic as illustrated above except the wind loading is typically lower on wall elements and the cladding spans (therefore the purlin spacings) are not limited by foot traffic criteria. Typically girts can be spaced approximately 20% further apart than purlins.

2.5.1 DIMOND 100/19 PURLIN

Dimond manufacture the 100/19 C section which provides economy as a small section purlin or girt. Any limitation placed on the design and use of the Dimond Purlin Systems as detailed in this manual also apply to the Dimond 100/19 Purlin. Sag rods are used as the bracing system for the 100/19 Purlin.



Tabulated properties are based on full unreduced sections.

CODE	D x B mm	t mm	Mass kg/m	Weight kN/m	Area mm²	l mm	a mm	I_{xx} (10^6mm^4)	I_{yy} (10^6mm^4)	Z_{xx} (10^3 mm^3)
100 / 19	102 x 51	1.85	3.24	0.032	403	15	17.4	0.668	0.143	13.09

NOTE Mass assumes a total coated weight for the standard zinc coating of 275 g/m.^{2}

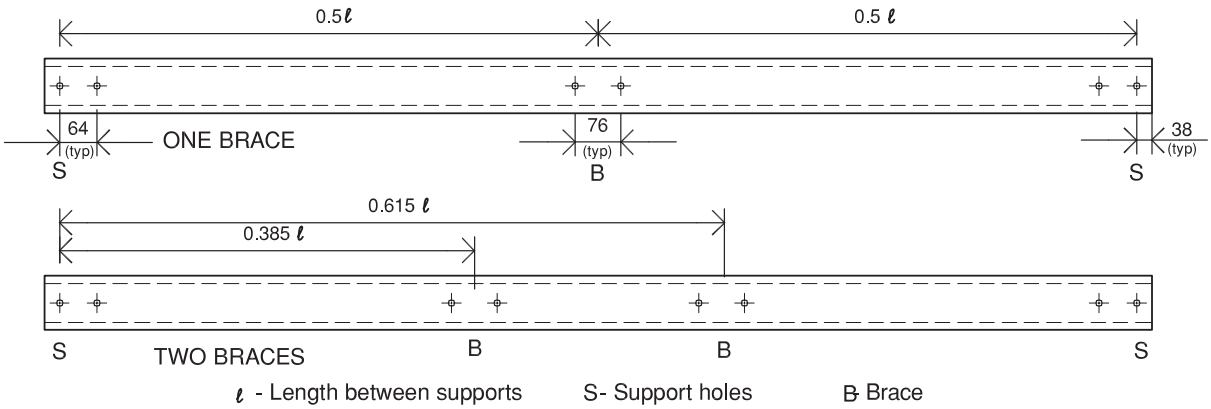
Design linear load capacities in kilonewtons per metre of span (kN/m), $\Phi_b w_{bx}$

SPAN m	BRACE 1	BRACE 2	FR	W_S
3.0	4.44	4.71	4.71	2.52
3.5	2.91	3.47	3.47	1.58
4.0	1.96	2.66	2.66	1.06
4.5	1.31	2.00	2.10	0.74
5.0	0.90	1.50	1.69	.54
5.5	0.65	1.15	1.40	0.41
6.0	0.47	0.90	1.19	0.31
6.5	0.36	0.68	1.01	0.24
7.0	0.27	0.52	0.87	0.20
7.5		0.42	0.75	0.17
8.0		0.33	0.66	0.13

FR Assumes compression flange fully restrained.

W_S Linear load at a deflection of span / 150.

STANDARD HOLE PUNCHING FOR 100/19 PURLIN
SIMPLE SPANS



ℓ - Length between supports S- Support holes B- Brace

Dimond

2.2.4 ROOFING QUICK REFERENCE GUIDE

This table is taken from the Roofing and Cladding Systems Manual and should be used as a quick reference guide on span and curvature limitations for all Dimond Roofing and Wall Cladding profiles.

For detailed Serviceability and Ultimate Limit State design, please refer to Section 2.1.4 – Specific Design by Profile, of the Roofing and Cladding Systems Manual.

Basis to the tables:

Roofing – the spans are based on restricted access foot traffic limits only or where the Ultimate Wind Load does not exceed 1.5kPa. A restricted access roof is where there is occasional foot traffic, that is educated to walk on the purlin lines, in the profile pans, or carefully across two profile ribs. Walkways will be installed where regular traffic is expected and "Restricted Access" signs placed at access points.

Refer to section 2.1.4 - Specific Design by Profile of the Roofing and Cladding Systems Manual to check the Load/Span Capability in the Ultimate and Serviceability tables.

Walls – spans are limited by acceptable appearance or an ultimate wind load of 2 kPa.

Roofing Fasteners – average of 4 screw fasteners per sheet per purlin. Based on hex-head screws without washers. The number of fasteners can be reduced by specific design (refer to Section 2.1.4 – Specific Design by Profile, in the Roofing and Cladding Systems Manual).

Drape Curve – radii are limited by acceptable roof appearance, refer to Section 2.4.2 of the Roofing and Cladding Systems Manual.

Crimp and Roll Curve – radii are limited by machine capabilities.

Overhang – for restricted access roofs. The unsupported area is not intended to be used as an access way.

2.2.4 ROOFING QUICK REFERENCE GUIDE *continued*

Product		Thickness BMT	Nominal sheet weight per square metre	Maximum Span**				Minimum radius for drape curve	Minimum radius for crimp or roll curve	Maximum overhang unsupported
				Restricted Access Roofing		Walls				
				End Span	Internal	End Span	Internal			
		(mm)	(kg/m²)	(m)	(m)	(m)	(m)	(m)	(mm)	(mm)
Steelspan 900 Minimum pitch 3 degrees	Steel (G550)	0.4+	4.6	2.0	3.0	2.4	3.7	N/R	N/A	250
		0.55	6.2	2.9	4.3	3.3	5.0	120	N/A	450
		0.75+	8.3	4.0	6.0	N/A	N/A	120	N/A	600
	Aluminium H36	0.7+	2.6	1.6	2.5	1.7	2.6	N/R	N/A	250
		0.9	3.3	2.5	3.8	2.6	3.9	120	N/A	350
	Duraclad	1.7	2.8	1.0	1.5	1.4	2.1	30	N/A	250
Topspan Minimum pitch 3 degrees	Steel (G550)	0.4+	4.6	2.0	3.0	2.4	3.7	N/A	N/A	250
		0.55	6.2	2.9	4.3	3.3	5.0	120	N/A	450
		0.75+	8.3	4.0	6.0	N/A	N/A	120	N/A	600
	Aluminium H36	0.7+	2.6	1.6	2.5	1.7	2.6	N/R	N/A	250
		0.9	3.3	2.5	3.8	2.6	3.9	120	N/A	350
	Duraclad	1.7	2.8	1.0	1.5	1.4	2.1	30	N/A	250
BB900 Minimum pitch 3 degrees	Steel (G550)	0.4	4.6	1.5	2.2	1.9	2.9	N/R	N/A	250
		0.55	6.2	2.3	3.4	2.7	4.1	90	N/A	350
		0.75	8.3	2.7	4.0	N/A	N/A	90	N/A	500
	Aluminium H36	0.7	2.6	1.1	1.7	1.6	2.4	N/R	N/A	200
		0.9	3.3	1.9	2.8	2.8	3.7	90	N/A	300
	Duraclad	1.7	2.8	0.8	1.2	1.8	2.1	24	N/A	200
DP955 Minimum pitch 3 degrees	Steel (G550)	0.4	4.6	1.6	2.4	2.0	3.0	N/R	N/A	250
		0.55	6.2	2.7	4.0	2.9	4.3	70	N/A	350
LT7 Minimum pitch 3 degrees	Steel (G550)	0.4	4.6	1.2	1.8	1.6	2.4	80	900	250
		0.55	6.2	1.9	2.9	1.9	2.9	50	400	350
	Aluminium H36	0.7	2.6	0.9	1.3	1.2	1.8	80	N/A	200
		0.9	3.3	1.5	2.3	1.9	2.9	50	400	300
	Duraclad	1.7	2.8	0.8	1.2	1.3	2.0	24	N/A	200
V-Rib Minimum pitch 4 degrees	Steel (G550)	0.4	4.5	1.2	1.8	1.9	2.9	20	400	200
		0.55	6.1	1.7	2.5	2.3	3.5	16	400	300
	Aluminium H36	0.7	2.5	0.9	1.2	1.6	2.4	20	N/A	150
		0.9	3.2	1.4	2.1	1.9	2.9	16	N/A	250
	Duraclad	1.7	2.8	0.8	1.2	0.9	1.4	20	N/A	150

Note: N/A = not available, N/R = not recommended, *= roll curve only
** Maximum spans are based on restricted access foot traffic limits only. Refer to section 2.1.4 - Specific Design by Profile of the Roofing and Cladding Systems Manual to check load/span capability for wind loads in the Ultimate and Serviceability tables along with manufacturing locality for each profile.
+ = Available only on request, subject to minimum order quantities. Check availability with Dimond

2.2.4 ROOFING QUICK REFERENCE GUIDE *continued*

Product		Thickness BMT	Nominal sheet weight per square metre	Maximum Span**				Minimum radius for drape curve	Minimum radius for crimp or roll curve	Maximum overhang unsupported
				Restricted Access Roofing		Walls				
				End Span	Internal	End Span	Internal			
		(mm)	(kg/m²)	(m)	(m)	(m)	(m)	(m)	(mm)	(mm)
Styleline Min pitch 3°	Steel (G550)	0.4	4.2	1.0	1.6	1.6	2.4	80	900	200
		0.55	5.7	1.5	2.2	2.0	3	40	400	250
	Aluminium H36	0.7	2.4	0.8	1.2	1.2	1.8	80	N/A	100
		0.9	3.0	1.1	1.7	1.7	2.6	40	400	200
	Duraclad	1.7	2.8	0.7	1.1	1.1	1.7	12	N/A	100
Veedek™ Min pitch 3°	Steel (G550)	0.4	4.2	1.0	1.6	1.6	2.4	N/R	N/A	200
		0.55	5.7	1.5	2.2	2.0	3	N/R	N/A	250
	Aluminium H36	0.7	2.4	0.8	1.2	1.2	1.8	N/R	N/A	100
		0.9	3.0	1.1	1.7	1.7	2.6	N/R	N/A	200
	Duraclad	1.7	2.8	0.7	1.1	1.1	1.7	N/R	N/A	100
Corrugate Min pitch 8°	Steel (G550)	0.4	4.2	0.8	1.2	1.0	1.5	12	450*	100
		0.55	5.6	1.0	1.5	1.2	1.9	10	450*	150
	Aluminium H36	0.7	2.3	0.5	0.8	0.8	1.2	12	450*	75
		0.9	3.0	0.8	1.2	1.4	2.1	10	450*	150
	Duraclad	1.7	2.8	0.6	0.9	0.9	1.3	8	N/A	100
Dimondek 630 Min pitch 3°	Steel (G550)	0.48	6.1	2.2	3.3	1.4	2.1	250	N/A	150
		0.55	6.7	2.4	3.6	1.7	2.6	250	N/A	250
Dimondek 400 Min pitch 3°	Steel (G300)	0.55	6.8	1.1	1.6	1.0	1.3	70	N/A	250
		0.75	9.2	1.5	2.2	1.3	1.9	70	N/A	300
	Aluminium H36	0.9	3.6	0.9	1.3	0.7	1.0	70	N/A	200
	Copper 1/2 Hard	0.55	7.4	0.9	1.4	0.7	1.1	70	N/A	200
Dimondek 300 Min pitch 3°	Steel (G300)	0.55	7.6	1.3	2	1.2	1.9	N/R	N/A	250
		0.75	10.2	1.5	2.3	1.5	2.3	N/R	N/A	350
	Aluminium H36	0.9	4.1	1.1	1.6	1.0	1.5	N/R	N/A	200
	Copper 1/2 Hard	0.55	8.2	1.1	1.8	1.1	1.7	N/R	N/A	200
Super Six Min pitch 3°	Duraclad	1.7	2.8	1	1.2	1.8	2	28	N/A	250
Dimondclad Wall cladding only	Steel (G550)	0.4	4.1	N/R	N/R	0.9	1.4	N/R	N/A	100
	Aluminium H36	0.7	2.3	N/R	N/R	0.9	1.4	N/R	N/A	75
		0.9	2.9	N/R	N/R	0.9	1.4	N/R	N/A	100
Baby Corrugate Wall cladding only	Steel (G550)	0.4	3.9	N/R	N/R	0.4	0.6	N/R	N/A	75
		0.55	5.2	N/R	N/R	0.4	0.8	N/R	N/A	75
Fineline Wall cladding only	Steel (G550)	0.55	4.8	N/R	N/R	0.3	0.3	N/R	N/A	N/R
	Aluminium H36	0.9	2.6	N/R	N/R	0.3	0.3	N/R	N/A	N/R

Note: N/A = not available, N/R = not recommended, *= roll curve only

** Maximum spans are based on restricted access foot traffic limits only. Refer to section 2.1.4 - Specific Design by Profile of the Roofing and Cladding Systems Manual to check load/span capability for wind loads in the Ultimate and Serviceability tables along with manufacturing locality for each profile.

2.3.12.1 OPTIMISATION SERVICE FAX FORM

To: Dimond, Fax: **(09) 634 6231**

Attention: **ROOFING/PURLIN OPTIMISATION SERVICE**

From: ..... (Design Engineer)

Company: .....

Telephone: ..... Facsimile: .....

Job Name/Location: .....

Code Variables to AS/NZS 1170

Terrain Category: ..... Internal Pressure Coefficients: .....

Wind Region: ..... Dead Load: .....

Elevation (above sea level): ..... Live Load: .....

Misc. Code Multipliers: ..... Snow Load: .....

Purlin Deflection Limit and Loading Regime: .....

Geometry

Building Type: Gable ☐ Monoslope ☐ Other (sketch) ☐ Bay Centre Options: .....

Overall Dimensions..... Preferred Purlin Centres Max:..... Min:.....

Roof Pitch: ..... Purlin Size Limitation: .....

Ridge Height: ..... Roofing Profile Options: .....

Foot Traffic Requirements for Roofing

Service Category	Description	(please tick)
1. Unrestricted-access roof	Expect regular foot traffic to access the roof for maintenance work and able to walk anywhere on the roof. No congregation of foot traffic expected.	☐
2. Restricted-access roof	Expect occasional foot traffic educated to walk only on the purlin lines, in the profile pans, or carefully across two profile ribs. Walkways installed where regular traffic is expected, and "Restricted Access" signs placed at access points.	☐

Sketches and Comments