

# Standards

The Metstrut metal framing system comprises of single and combination channels, assembly brackets, channel nuts and fasteners. The integration of these items in their use, forms the basis of the system and as such should be purchased as a complete system.

The Metstrut metal framing system conforms to BS 6946:1988, the British Standard Specification for Metal channel cable support systems for electrical installations.

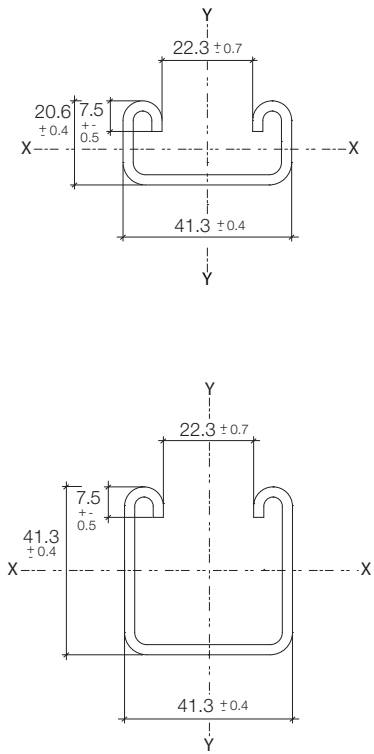
Independent testing has been carried out to verify the load tables for the various channels and to determine pull out and slip performance of the channel nuts when used as a system.

It is this system integrity that needs to be maintained for all installations to meet site safety requirements.

The material used for the Metstrut channels meets and surpasses the minimum yield strength of 250 N/mm<sup>2</sup> and brackets have a minimum yield strength of 170 N/mm<sup>2</sup>.

### Sectional dimensions

The Standard requires channel sections to meet the dimensional requirements stated when measured not less than 150mm from the end. Twist will not be greater than 2.5 degrees per metre and bow shall not exceed 5mm for channel 3m in length and 10mm for channel 6m in length, when measured at the centre of the length.



### Safe working slip and pull-out loads

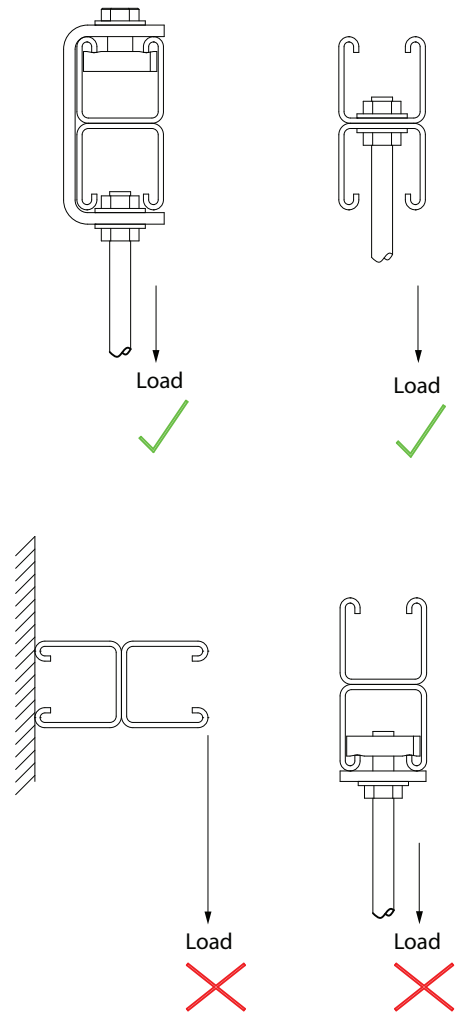
These have been determined by carrying out the tests in accordance with the method stated in section 8 of the standard. It should be noted that the channel nuts are a vital component within the system and the numerous imported products do not necessarily carry the same load and should never be mixed with Metstrut systems.

### Marking

Metstrut channels are marked at regular intervals along their length in the production process. The standard requires the name of the manufacturer and BS 6946:1988 Brackets and other components are marked by labelling the packaging.

### Combination channels

Channels that are required in multiple configurations e.g. back to back channel, are supplied spot welded as standard. These channels should always be fully supported at each end under the bottom face and the load should never be hung from just the lips of the bottom channel. Spot welding should never be loaded in tension or the load applied as a bending moment.



### Material specification

1. Channels: manufactured from steel complying with BS EN 10326:2004 pre galvanised, BS EN 10025-2:2004 mild steel hot dip galvanised after manufacture to BS EN 1461:1999 and BS EN 10088-2:2005 stainless steel grade 316L.

2. Brackets: manufactured from steel complying with BS EN 10025-2:2004 mild steel hot dip galvanised after manufacture to BS EN 1461:1999 and BS EN 10088-2:2005 stainless steel grade 316L.

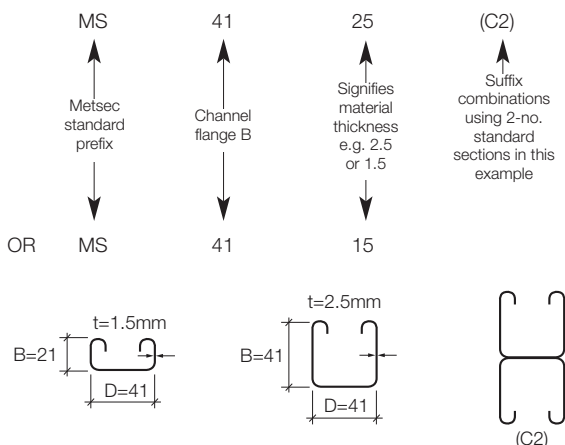
3. Fixings: bolts, hexagon nuts, screws and washers manufactured from steel complying with DIN938/8, DIN 933/8.8, BS4320 and zinc plated and CR3 passivated or hot dip galvanised after manufacture to BS EN 1461:1999. Stainless steel to BS EN 10088-2:2005 grade 316L A4.

### Dimensions and tolerances

In accordance with BS 6946:1988 Metal Channel Cable Support Systems for Electrical Installations.

### Channel notation

Metsec channel references are serialised for easy recognition and use, eg: channel series MS4125 comprises single channel or combinations of channel within the basic section profile thus:



### Load tables

Comprehensive load tables are provided for each channel series:

MS4125 series - page 68

MS2125 series - page 69

MS4115 series - page 70

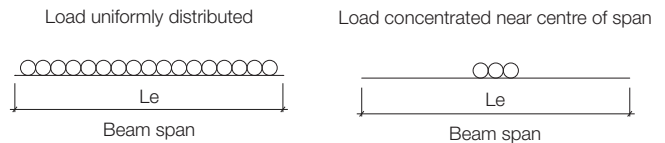
MS2115 series - pages 71

Slotted sections - pages 72-3

### Basis of design and formulation of load tables

- Safe loads calculated in accordance with BS 5950:Part 5:1998 Code of Practice for Design of Cold Formed Sections.
- Minimum Yield Stress ( $Y_s$ ) 280N/mm<sup>2</sup> (Z 28 material).
- Beams assumed simply supported and provided with adequate lateral restraint over the given span.
- Beam loads are applied through the shear centre of the section in the direction indicated in the tables.

5. Alternative beam safe load tables are provided for a uniformly distributed load or load concentrated near the centre of the span.eg:



6. Beam loads and corresponding deflections are calculated at a stress of 175N/mm<sup>2</sup> i.e.: using a global factor of safety of 1.6 to determine safe working loads from limit state analysis (ultimate stress ÷ 1.6 = 175N/mm<sup>2</sup>).

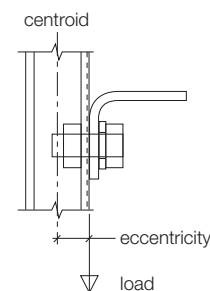
Beam safe loads tabulated with corresponding deflections may be used in the rare case where excessive deflection does not impair the strength or efficiency of the structure or its components or cause damage to the supported work.

Alternative safe loads are tabulated with deflections limited to span/200 or span/360 at the discretion of the designer and recommended where deflections are critical.

It is easily recognisable from the tables whether the design of the beam is governed by deflection or stress on a given span i.e.: the critical load is highlighted in colour.

7. Column effective lengths shall be determined by the designer in accordance with Table 9 of BS 5950: Part 5: 1998.

8. Beam loads are generally applied at the column face via the connection bracket. Therefore column safe load tables are provided allowing for this eccentricity of load from the centroid of the section.



### Alternative combinations

For safe loads on alternative combinations not tabulated please refer to Metsec Technical Department.

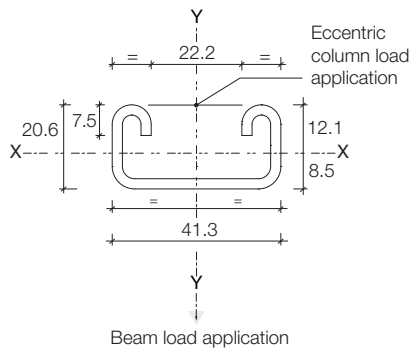
### Stainless steel

The mechanical properties of stainless steel are significantly different from those for carbon steel and safe load tables must not be used for sections in this material. Please consult Metsec Technical Department for advice.



Section properties										Safe load tables									
										Le (m)	Safe working loads in kg		Def. limit	Def. limit	Safe working loads in kg		Def. limit	Def. limit	Safe column loads kg at centroid
uniform (kg) Load	(mm) Def.	span/200 (kg)	span/360 (kg)	concentrated (kg) Load	(kg) Def.	span/200 (kg)	span/360 (kg)												
Area	Wt	lxx	Zxx	Zxx	rxx	lyy	Zyy	ryy	0.6	237	2.64	237	150	118	2.11	118	93	2978	894
cm <sup>2</sup>	kg/m	cm <sup>4</sup>	(top)	(btm)	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm	0.7	203	3.59	198	110	101	2.87	101	69	2471	821
			cm <sup>3</sup>	cm <sup>3</sup>					0.8	177	4.68	151	84	89	3.75	89	53	2019	747
2.35	1.85	1.21	1.00	1.43	0.72	5.44	2.63	1.52	0.9	158	5.94	120	66	79	4.75	75	42	1657	677
									1.0	142	7.33	97	54	71	5.86	61	34	1375	613
									1.1	129	8.87	80	44	65	7.09	50	28	1156	556
									1.2	118	10.55	67	37	59	8.44	42	23	984	505
									1.3	109	12.38	57	32	55	9.91	36	20		
									1.4	101	14.36	49	27	51	11.49	31	17		
									1.5	95	16.49	43	24	47	13.18	27	15		
									1.6	89	18.76	38	21	44	15.00	24	13		
									1.7	84	21.18	34	19	42	16.95	21	12		
									1.8	79	23.74	30	17	39	19.00	19	10		
									1.9	75	26.45	27	15	37	21.16	17	9		
									2.0	71	29.31	24	13	35	23.45	15	8		
									2.1	68	32.31	22	12	34	25.86	14	8		
									2.2	65	35.46	20	11	32	28.38	13	7		
									2.3	62	38.76	18	10	31	31.01	11	6		
									2.4	59	42.20	17	9	30	33.77	11	6		
									2.5	57	45.80	16	9	28	36.63	10	5		
									2.6	55	49.53	14	8	27	39.63	9	5		
									2.7	53	53.42	13	7	26	42.74	8	5		
									2.8	51	57.45	12	7	25	45.95	8	4		
									2.9	49	61.62	12	6	24	49.29	7	4		
									3.0	47	65.95	11	6	24	52.76	7	4		

MS2125

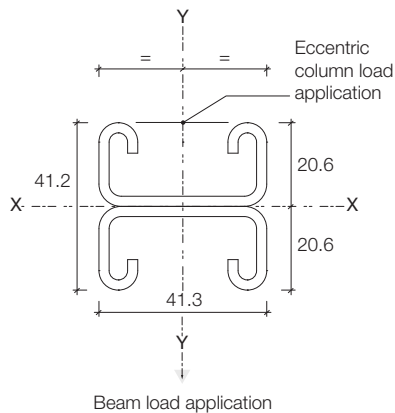


$\propto \frac{Le}{r_{xx}} > 180$

Area	Wt	lxx	Zxx	Zxx	rxx	lyy	Zyy	ryy	0.6	667	1.55	667	667	334	1.24	334	334	7582	1765
cm <sup>2</sup>	kg/m	cm <sup>4</sup>	(top)	(btm)	cm	cm <sup>4</sup>	cm <sup>3</sup>	cm	0.7	572	2.11	572	526	286	1.69	286	286	7214	1720
			cm <sup>3</sup>	cm <sup>3</sup>					0.8	501	2.76	501	403	250	2.21	250	250	6733	1665
4.71	3.70	5.78	2.81	2.81	1.11	10.88	5.27	1.52	0.9	445	3.50	445	318	222	2.80	222	199	6140	1601
									1.0	400	4.32	400	258	200	3.46	200	161	5484	1528
									1.1	364	5.22	364	213	182	4.17	182	133	4835	1451
									1.2	334	6.22	322	179	167	4.97	167	112	4243	1372
									1.3	308	7.29	274	152	154	5.84	154	95	3726	1295
									1.4	286	8.46	237	131	143	6.77	143	82	3284	1221
									1.5	267	9.71	206	115	133	7.77	129	72	2908	1150
									1.6	250	11.05	181	101	125	8.84	113	63	2589	1084
									1.7	236	12.47	161	89	118	9.98	100	56	2317	1022
									1.8	222	13.98	143	80	111	11.19	89	50	2084	964
									1.9	211	15.58	129	71	105	12.47	80	45	1884	910
									2.0	200	17.26	116	64	100	13.81	72	40		
									2.1	191	19.03	105	58	95	15.23	66	37		
									2.2	182	20.89	96	53	91	16.72	60	33		
									2.3	174	22.83	88	49	87	18.27	55	30		
									2.4	167	24.86	81	45	83	19.89	50	28		
									2.5	160	26.98	74	41	80	21.58	46	26		
									2.6	154	29.18	69	38	77	23.35	43	24		
									2.7	148	31.46	64	35	74	25.18	40	22		
									2.8	143	33.84	59	33	72	27.07	37	21		
									2.9	138	36.30	55	31	69	29.04	34	19		
									3.0	133	38.84	52	29	67	31.08	32	18		

MS2125-C2

(Combination comprising two MS2125)



$\propto \frac{Le}{r_{yy}} > 180$

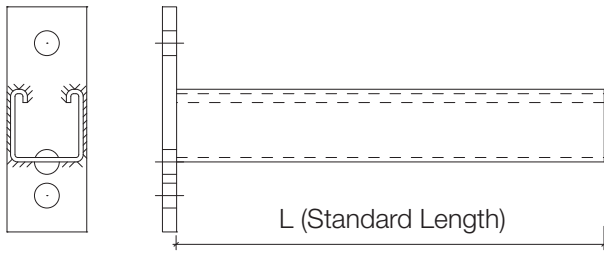
# Metal framing systems

## Cantilever arm details

### Cantilever arms - single

Finish: Post hot dip galvanised as standard, stainless steel grade 316, suffix **SS**

Ref	L (mm)	Wt (kg)
MS150A	150	0.77
MS300A	300	1.16
MS450A	450	1.56
MS600A	600	1.95
MS750A	750	2.35



Recommended safe loads (kg.) for arm bolted to 2.5mm thick channel (M12 bolt torque 65Nm)

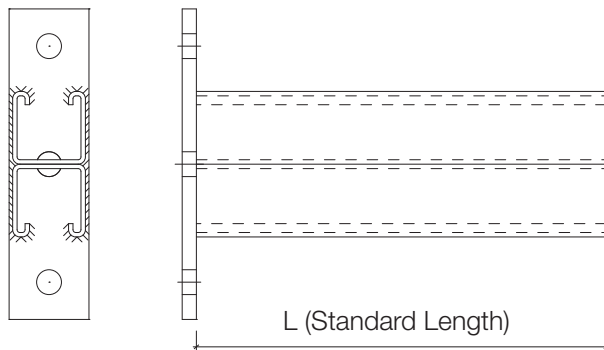
X (m)	Total uniformly distributed load	Concentrated load
0.10	684	542
0.15	608	377
0.20	542	283
0.25	452	226
0.30	377	188
0.35	323	162
0.40	283	141
0.45	251	126
0.50	226	113
0.55	206	103
0.60	188	94
0.65	174	87
0.70	162	81
0.75	151	75

NB: Arms have been independently tested (M12 bolt torque 65 Nm). Tabulated safe loads satisfy minimum factor of safety of 3 on continuous slip and limited design stresses in channel arms and their fixings.

### Cantilever arms - double

Finish: Post hot dip galvanised as standard, stainless steel grade 316, suffix **SS**

Ref	L (mm)	Wt (kg)
MS150E	150	1.26
MS300E	300	2.05
MS450E	450	2.85
MS600E	600	3.64
MS750E	750	4.43



Recommended safe loads (kg.) for arm bolted to 2.5mm thick channel (M12 bolt torque 65Nm)

X (m)	Total uniformly distributed load	Concentrated load
0.10	684	643
0.15	684	552
0.20	643	484
0.25	594	430
0.30	552	388
0.35	516	353
0.40	484	324
0.45	455	299
0.50	430	277
0.55	408	259
0.60	387	243
0.65	369	229
0.70	353	216
0.75	337	205

NB: Arms have been independently tested (M12 bolt torque 65 Nm). Tabulated safe loads satisfy minimum factor of safety of 3 on continuous slip and limited design stresses in channel arms and their fixings.

### Channel - plain

Finish: pre galvanised = **PG**, post galvanised = **HDG**, stainless steel grade 316 = **SS**

Length m		
3	MS4125PG3	
6	MS4125PG6	
3	MS4125PG3C2	
6	MS4125PG6C2	
3	MS2125PG3	
6	MS2125PG6	
3	MS2125PG3C2	
6	MS2125PG6C2	
3	MS4115PG3	
6	MS4115PG6	
3	MS4115PG3C2	
6	MS4115PG6C2	
3	MS2115PG3	
6	MS2115PG6	
3	MS2115PG3C2	
6	MS2115PG6C2	

### Channel - slotted

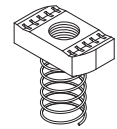
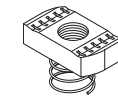
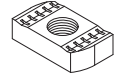
Finish: pre galvanised = **PG**, post galvanised = **HDG**, stainless steel grade 316 = **SS**

Length m		
3	MS4125PG3S11	
6	MS4125PG6S11	
3	MS4125PG3S14	
6	MS4125PG6S14	
3	MS2125PG3S11	
6	MS2125PG6S11	
3	MS2125PG3S14	
6	MS2125PG6S14	
3	MS4115PG3S11	
6	MS4115PG6S11	
3	MS4115PG3S14	
6	MS4115PG6S14	
3	MS2115PG3S11	
6	MS2115PG6S11	
3	MS2115PG3S14	
6	MS2115PG6S14	

### Channel nuts

Finish: **BZP** as standard, post hot dip galvanised suffix **HDG**, stainless steel grade 316, suffix **SS**

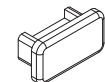
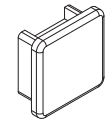
Nut type
Plain channel nuts
MPN06
MPN08
MPN10
MPN12
Short spring channel nuts
MSN06
MSN08
MSN10
MSN12
Long spring channel nuts
MLN06
MLN08
MLN10
MLN12



### PVC end caps

Black = **B**, White = **W**

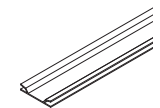
41mm deep channel
PVC41B
PVC41W
21mm deep channel
PVC21B
PVC21W



### Closure strip - 3m long

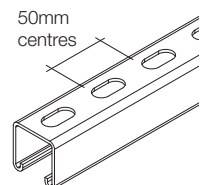
PVC white = **W**, PVC black = **B**, pre galvanised steel = **S**

MS41CLW3
MS41CLB3
MS41CLS3



### Slot sizes in channel

S11 = 11 x 22mm
S14 = 14 x 28mm



# Metal framing systems

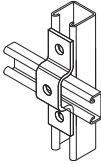
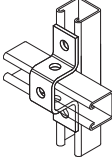
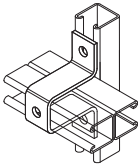
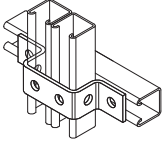
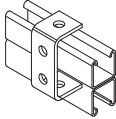
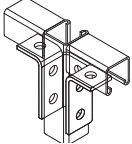
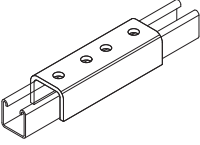
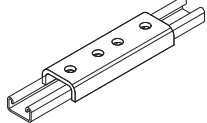
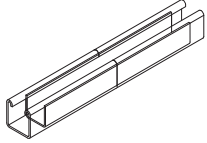
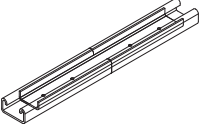
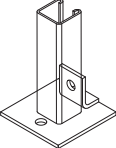
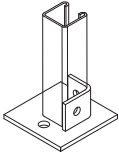
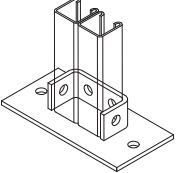
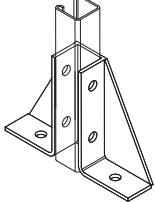
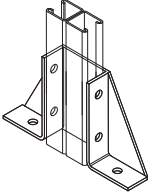
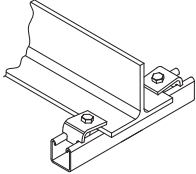
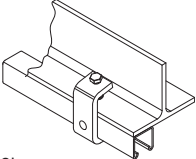
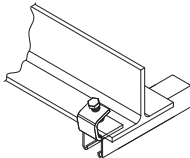
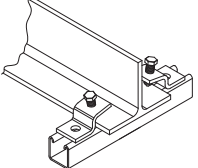
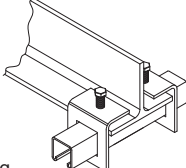
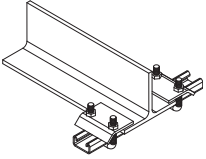
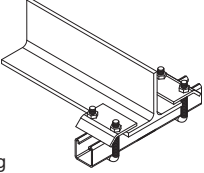
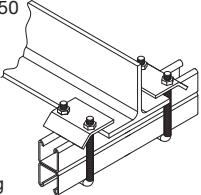
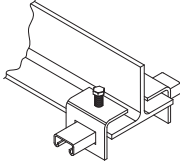
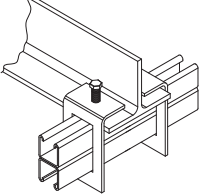
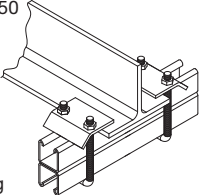
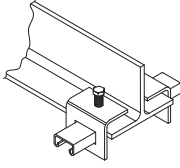
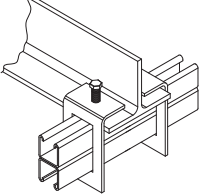
## Brackets

Finish: Post hot dip galvanised as standard, stainless steel grade 316, suffix **SS**

MSF501/06 MSF501/08 MSF501/10 MSF501/12		MSF502		MSF503	
MSF504		MSF505		MSF506	
MSF507		MSA600		MSA601	
MSA602		MSA603		MSA604	
MSA605		MSA606		MSA607	
MSA608		MSA609		MSA610	
MSA611		MSA612		MSA614	
MSA615		MSA616		MSA617	
MSZ700		MSZ701		MSZ702	

**Brackets**

Finish: Post hot dip galvanised as standard, stainless steel grade 316, suffix **SS**

MSU800		MSU801		MSU802	
MSU803		MSU804		MSU805	
MSU806		MSU807		MSU808	
MSU809		MBP304		MBP305	
MBP306		MBP307		MBP308	
MBC400		MBC401CP		MBC402CP	
SWL 270kg MBC403CP		SWL 230kg MBC404CP		SWL 200kg MBC405/65	
SWL 200kg MBC405/110		SWL 220kg MBC405/150		SWL 450kg MBC407	
SWL 450kg MBC408		SWL 450kg		SWL 220kg	
SWL 220kg		<p>Holes in brackets are 14mm in diameter for M12 hexagonal head bolts</p> <p>Beam clamps should be used in pairs. Maximum loadings given are per clamp when used in pairs.</p> <p>Where required, cone pont screws included.</p>			