



Metalcraft
ROOFING

**SUPPLEMENTARY
Technical Manual
and Load Span Tables
for
SINGLE SPAN
FLOOR JOISTS**

Floor Rigidity Considerations

- 1 The span data provided in the following tables is based on limited static deflections of to a 21.5mm maximum of Span/300 for combined dead and live loads.
- 2 Humans sensitivity to floor vibrations varies significantly. Some users will have more demanding expectations and accordingly, for vibration assessment, an Engineer should be consulted to consider the exact configuration and loading scenarios. It is suggested that for normal vibration control, the minimum of the stated allowable span for the given joist spacing, or that for 2mm/1kN point load should be adopted. This assumes that ceiling battens are fixed at regular spacings to the bottom flange of the joists, or in the situation of no ceiling below, standard ceiling batten or top hat installed perpendicular to the joists at a maximum spacing of 3.0m. For situations requiring greater vibration control, specific Engineering design should be undertaken and consideration given to the following steps to improve vibration performance;
 - (a) Use a deeper floor joist section to increase stiffness
 - (b) Reduce the joist spacingNote: Floor Vibration performance tends to improve with added damping through installation of ceilings, partitions walls, floor coverings and furniture.
- 3 Support of joists is assumed to be via web and flange connection to supporting structure. Actual project connection detailing and design to be by Specific Engineering Design carried out by a Chartered Professional Engineer. In situations where support connection capacity is critical, joist sizes and spacing may need to be reduced from that suggested in the above table.
- 4 Durability requirements shall be reviewed on a project by project basis, in accordance with the NZBC and relevant design standards and specifications. Refer to MSS section manual for details on section coatings for corrosion protection.

METALCRAFT MSS SECTIONS
LOAD SPAN TABLES FOR SINGLE SPAN FLOOR JOISTS
DESIGN CASE 1

Total Floor Dead Load 0.5 kPa includes SDL
Floor Live Load 1.5 kPa

NOTE: Dead Load is typical for suspended floor with timber flooring, carpet, and gib ceiling on battens below.

MSS Section	Dynamic Span Limits ^b			Spans (mm) for Joist Spacing Based on Strength and Stiffness ^a		
	Limit Deflection 1mm/1kN	Limit Deflection 2mm/1kN	Limit Deflection 3mm/1kN	300mm	400mm	600mm
MSS150 12	2350	2950	3400	4950	4600	4100
MSS150 15	2500	3200	3650	5200	4850	4400
MSS150 18	2650	3350	3850	5450	5050	4550
MSS150 23	2900	3650	4200	5800	5400	4850
MSS200 12	3050	3800	4400	6000	5550	5050
MSS200 15	3250	4100	4700	6300	5850	5300
MSS200 18	3450	4350	5000	6600	6150	5550
MSS200 23	3750	4700	5400	7000	6500	5900
MSS250 13	3800	4800	5550	7100	6600	6000
MSS250 15	4000	5050	5800	7350	6850	6200
MSS250 18	4250	5350	6150	7700	7150	6500
MSS250 23	4600	5800	6650	8200	7600	6900
MSS300 15	4800	6050	6950	8450	7850	7100
MSS300 18	5100	6400	7350	8800	8200	7400
MSS300 23	5500	6950	8000	9400	8700	7900
MSS350 18	6100	7700	8800	10100	9400	8500
MSS400 20	6700	8400	9650	10800	10050	9100
MSS400 23	7000	8850	10100	11200	10400	9400

Notes

- (a) Dead Load Deflection limited to 12.5mm, Live load Deflection Limited to 9mm, and combined G+0.7Q deflection limit of span/300
- (b) For consideration of floor vibrations, the tabulated data is for single floor joists performance under applied midspan point load. Giving due consideration to load sharing under applied point load (i.e heel drop) the maximum span limits can be adopted. Refer to notes below of floor rigidity

METALCRAFT MSS SECTIONS

LOAD SPAN TABLES FOR SINGLE SPAN FLOOR JOISTS

DESIGN CASE 2

Total Floor Dead Load

Floor Live Load

1 kPa

1.5 kPa

includes SDL

NOTE: Dead Load is typical for suspended floor with timber flooring with tiling, and gib ceiling on battens below and SDL of 0.5kPa.

Buckling Stresses

MSS Section	Buckling Stresses				Weight kg/m	I _g (x10 ⁶)	Eff/Gross Stiffness	Dynamic Span Limits ^b			Spans (mm) for Joist Spacing Based on Strength and Stiffness ^a		
	Folb	Fodb	Folc	Fodc				Limit Deflection 1mm/1kN	Limit Deflection 2mm/1kN	Limit Deflection 3mm/1kN	300mm	400mm	600mm
	MSS150 12	372	540.8	152.2				347.6	3	1.39	0.9	2350	2950
MSS150 15	571.3	681.3	201.3	444.5	3.79	1.72	0.95	2500	3200	3650	5050	4600	4050
MSS150 18	811	828.2	255.4	542.2	4.6	2.04	0.97	2650	3350	3850	5350	4900	4300
MSS150 23	1281	1079	359.7	708.2	5.87	2.59	1	2900	3650	4200	5800	5300	4650
MSS200 12	273.1	306.2	126.6	134.2	3.68	2.97	0.82	3050	3800	4400	5950	5400	4750
MSS200 15	422	388.6	163	173	4.64	3.68	0.91	3250	4100	4700	6300	5850	5200
MSS200 18	601.1	475.3	200.4	211	5.61	4.38	0.96	3450	4350	5000	6600	6150	5550
MSS200 23	958.2	623.9	268.5	278.8	7.2	5.58	1	3750	4700	5400	7000	6500	5900
MSS250 13	243.7	405.2	147.1	222.6	4.8	5.94	0.78	3800	4800	5550	7100	6600	5950
MSS250 15	323.7	470.3	189.7	260.6	5.58	6.83	0.85	4000	5050	5800	7350	6850	6200
MSS250 18	464.1	572.2	244	317.3	6.73	8.14	0.93	4250	5350	6150	7700	7150	6500
MSS250 23	750	543.9	244.7	214.7	8.7	10.4	0.98	4600	5800	6650	8200	7600	6900
MSS300 15	230.8	269.2	110.6	104.9	6.6	11.7	0.8	4800	6050	6950	8450	7850	7100
MSS300 18	332.5	328	153.3	128.4	7.96	13.9	0.87	5100	6400	7350	8800	8200	7400
MSS300 23	540.8	429.3	231.7	170.8	10.3	17.8	0.95	5500	6950	8000	9400	8700	7900
MSS350 18	323.6	314.5	106.2	109.6	8.91	24	0.9	6100	7700	8800	10100	9400	8500
MSS400 20	398.6	303.8	79.72	85.56	10.9	31.4	0.81	6700	8400	9650	10800	10050	9100
MSS400 23	526.1	354.8	101.1	103.9	12.4	36.2	0.89	7000	8850	10100	11200	10400	9400

Notes

(a) Dead Load Deflection limited to 12.5mm, Live load Deflection Limited to 9mm, and combined G+0.7Q deflection limit of span/300

(b) For consideration of floor vibrations, the tabulated data is for single floor joists performance under applied midspan point load. Giving due consideration to load sharing under applied point load (i.e heel drop) the maximum span limits can be adopted. Refer to notes below of floor rigidity

METALCRAFT MSS SECTIONS
LOAD SPAN TABLES FOR SINGLE SPAN FLOOR JOISTS
DESIGN CASE 3

Total Floor Dead Load 0.5 kPa includes SDL
 Floor Live Load 2 kPa

NOTE: Dead Load is typical for suspended residential balcony/deck structures with timber plywood flooring, membrane and allowance for soffit lining

MSS Section	Dynamic Span Limits ^b			Spans (mm) for Joist Spacing Based on Strength and Stiffness ^a		
	Limit Deflection 1mm/1kN	Limit Deflection 2mm/1kN	Limit Deflection 3mm/1kN	300mm	400mm	600mm
MSS150 12	2350	2950	3400	4600	4300	3850
MSS150 15	2500	3200	3650	4850	4500	4100
MSS150 18	2650	3350	3850	5050	4700	4250
MSS150 23	2900	3650	4200	5400	5000	4500
MSS200 12	3050	3800	4400	5550	5200	4700
MSS200 15	3250	4100	4700	5850	5450	4950
MSS200 18	3450	4350	5000	6150	5700	5150
MSS200 23	3750	4700	5400	6500	6050	5500
MSS250 13	3800	4800	5550	6600	6150	5550
MSS250 15	4000	5050	5800	6850	6400	5750
MSS250 18	4250	5350	6150	7150	6650	6000
MSS250 23	4600	5800	6650	7600	7100	6400
MSS300 15	4800	6050	6950	7850	7300	6600
MSS300 18	5100	6400	7350	8200	7650	6900
MSS300 23	5500	6950	8000	8700	8100	7350
MSS350 18	6100	7700	8800	9400	8750	7900
MSS400 20	6700	8400	9650	10050	9350	8450
MSS400 23	7000	8850	10100	10400	9700	8750

Notes

- (a) Dead Load Deflection limited to 12.5mm, Live load Deflection Limited to 9mm, and combined G+0.7Q deflection limit of span/300
- (b) For consideration of floor vibrations, the tabulated data is for single floor joists performance under applied midspan point load. Giving due consideration to load sharing under applied point load (i.e heel drop) the maximum span limits can be adopted. Refer to notes below of floor rigidity

METALCRAFT MSS SECTIONS
LOAD SPAN TABLES FOR SINGLE SPAN FLOOR JOISTS
DESIGN CASE 4

Total Floor Dead Load 1 kPa includes SDL
Floor Live Load 2 kPa

NOTE: Dead Load is typical for suspended residential balcony/deck structures with timber plywood flooring, tiles over membrane

MSS Section	Dynamic Span Limits ^b			Spans (mm) for Joist Spacing Based on Strength and Stiffness ^a		
	Limit Deflection 1mm/1kN	Limit Deflection 2mm/1kN	Limit Deflection 3mm/1kN	300mm	400mm	600mm
MSS150 12	2350	2950	3400	4450	4050	3550
MSS150 15	2500	3200	3650	4800	4400	3850
MSS150 18	2650	3350	3850	5050	4650	4100
MSS150 23	2900	3650	4200	5400	5000	4450
MSS200 12	3050	3800	4400	5550	5150	4500
MSS200 15	3250	4100	4700	5850	5450	4900
MSS200 18	3450	4350	5000	6150	5700	5150
MSS200 23	3750	4700	5400	6500	6050	5500
MSS250 13	3800	4800	5550	6600	6150	5400
MSS250 15	4000	5050	5800	6850	6400	5750
MSS250 18	4250	5350	6150	7150	6650	6000
MSS250 23	4600	5800	6650	7600	7100	6400
MSS300 15	4800	6050	6950	7850	7300	6600
MSS300 18	5100	6400	7350	8200	7650	6900
MSS300 23	5500	6950	8000	8700	8100	7350
MSS350 18	6100	7700	8800	9400	8750	7900
MSS400 20	6700	8400	9650	10050	9350	8450
MSS400 23	7000	8850	10100	10400	9700	8750

Notes

- (a) Dead Load Deflection limited to 12.5mm, Live load Deflection Limited to 9mm, and combined G+0.7Q deflection limit of span/300
- (b) For consideration of floor vibrations, the tabulated data is for single floor joists performance under applied midspan point load. Giving due consideration to load sharing under applied point load (i.e heel drop) the maximum span limits can be adopted. Refer to notes below of floor rigidity

Floor Joist Span Comparisons
MSS Sections and NZS3604 MSG8
1.5kPa Live Load and 0.5kPa DL+SDL

TABLE 5
400c.c

SINGLE SPAN FLOOR JOISTS

Dead Load + SDL = 0.5kPa
 Live Load = 1.5kPa

NOTE: Dead Load is typical for suspended floor with timber flooring, carpet, and gib ceiling on battens below.

SECTION (Timber MSG8 or Steel)		Comparison with NZS3604
MSG 8 Span data from NZS3604 table 7.1. MSS section data from Span Table Design Case 1		Spacing 400mm
90x35	MSG8	1350
90x45	MSG8	1450
140x35	MSG8	2100
140x45	MSG8	2700
190x45	MSG8	3550
240x45	MSG8	4400
MSS150	12	4600
MSS150	15	4850
MSS150	18	5050
290x45	MSG8	5200
MSS150	23	5400
MSS200	12	5550
MSS200	15	5850
MSS200	18	6150
MSS200	23	6500
MSS250	13	6600
MSS250	15	6850
MSS250	18	7150
MSS250	23	7600
MSS300	15	7850
MSS300	18	8200
MSS300	23	8700
MSS350	18	9400
MSS400	23	10400
MSS400	20	10050

Notes

- 1 The above and following tables are based on span table data for MSG8 timber from NZS3604 table 7.1.(a)
- 2 For MSS section span data, the limiting span is taken as the limiting span determined by strength and deflection check from MSS Span Tables Design Case 1.
- 3 **IMPORTANT:** Designers must refer to MSS Floor Joist Design tables to ensure that appropriate level of vibration control is considered in adopting the appropriate span limit for the section size and spacing adopted. Spans noted above for MSS sections will generally be lower when consideration for vibration control is considered.
- 4 Refer to design tables 1 to 4 for other notes relating to selection of MSS sections as floor joist members.

**Floor Joist Span Comparisons
MSS Sections and NZS3604 MSG8
1.5kPa Live Load and 0.5kPa DL+SDL**

**TABLE 6
600c.c**

SINGLE SPAN FLOOR JOISTS

Dead Load + SDL = 0.5kPa
Live Load = 1.5kPa

NOTE: Dead Load is typical for suspended floor with timber flooring, carpet, and gib ceiling on

SECTION (Timber MSG8 or Steel)		Comparison with NZS3604
MSG 8 Span data from NZS3604 table 7.1. MSS section data from Span Table Design Case 1		Spacing 600mm
90x35	MSG8	1200
90x45	MSG8	1250
140x35	MSG8	1800
140x45	MSG8	2000
190x45	MSG8	3150
240x45	MSG8	3900
MSS150	12	4100
MSS150	15	4400
MSS150	18	4550
290x45	MSG8	4600
MSS150	23	4850
MSS200	12	5050
MSS200	15	5300
MSS200	18	5550
MSS200	23	5900
MSS250	13	6000
MSS250	15	6200
MSS250	18	6500
MSS250	23	6900
MSS300	15	7100
MSS300	18	7400
MSS300	23	7900
MSS350	18	8500
MSS400	20	9100
MSS400	23	9400

**Floor Joist Span Comparisons
 MSS Sections and NZS3604 MSG8
 2kPa Live Load and 0.5kPa DL+SDL**

TABLE 7

400c.c

SINGLE SPAN FLOOR JOISTS

Dead Load + SDL = 0.5kPa
 Live Load = 2.0kPa

NOTE: Dead Load is typical for suspended floor with timber flooring, carpet, and gib ceiling on

SECTION (Timber MSG8 or Steel)		Comparison with NZS3604
MSG 8 Span data from NZS3604 table 7.1. MSS section data from Span Table Design Case 1		Spacing 400mm
90x35	MSG8	1350
90x45	MSG8	1550
140x35	MSG8	2100
140x45	MSG8	2450
190x45	MSG8	3300
240x45	MSG8	4150
MSS150	12	4300
MSS150	15	4500
MSS150	18	4700
MSS150	23	5000
290x45	MSG8	5050
MSS200	12	5200
MSS200	15	5450
MSS200	18	5700
MSS200	23	6050
MSS250	13	6150
MSS250	15	6400
MSS250	18	6650
MSS250	23	7100
MSS300	15	7300
MSS300	18	7650
MSS300	23	8100
MSS350	18	8750
MSS400	20	9350
MSS400	23	9700

**Floor Joist Span Comparisons
 MSS Sections and NZS3604 MSG8
 2kPa Live Load and 0.5kPa DL+SDL**

**TABLE 8
 600c.c**

SINGLE SPAN FLOOR JOISTS

Dead Load + SDL = 0.5kPa Live Load = 2.0kPa		NOTE: Dead Load is typical for suspended floor with timber flooring, carpet, and gib ceiling on
SECTION (Timber MSG8 or Steel)		Comparison with NZS3604
MSG 8 Span data from NZS3604 table 7.1. MSS section data from Span Table Design Case 1		Spacing 600mm
90x35	MSG8	1100
90x45	MSG8	1250
140x35	MSG8	1750
140x45	MSG8	2000
MSS150	12	3850
MSS150	15	4100
MSS150	18	4250
190x45	MSG8	2700
MSS150	23	4500
MSS200	12	4700
MSS200	15	4950
240x45	MSG8	3400
MSS200	18	5150
MSS200	23	5500
MSS250	13	5550
MSS250	15	5750
290x45	MSG8	4100
MSS250	18	6000
MSS250	23	6400
MSS300	15	6600
MSS300	18	6900
MSS300	23	7350
MSS350	18	7900
MSS400	20	8450
MSS400	23	8750

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