Christchurch, 25th of July 2024

Juken New Zealand Ltd. – Beam Span Tables

The following beam span tables are intended to be used by designers to select the appropriate J-Frame member for use as rafters, roof lintels, floor lintels, bearers and joists for the use in residential self-contained dwellings and meeting the requirements and intent of NZS 3604.

The design has been carried out to the AS/NZS 1170.1 suite and NZS AS 1720.1:2022 and assuming loadings in line with the document "Engineering Basis of NZS 3604:2011". Detailed information about all design and loading assumptions can be found in the document 1132NZL – E001_B – Beams, available on request.

It remains the sole responsibility of the individual design professional to ensure the tables are applied in accordance with their intended use.

Rafters - Extra High Wind Zone:

0.25kPa live load, 1.1kN live point load, 1kPa ground snow load
Light or heavy roof, roof angle 0-45˚, 1kPa ground snow load
max. 750mm cantilever
Deflection limit between supports: L/300 or 25mm under live loading combinations, L/200 or 25mm under wind or snow loading combinations
Deflection limit at cantilever: 10mm under all load combinations

J-Frame 8 Rafters - Light Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.10	1.09	1.08	1.07	1.06	1.04
140x45	3.07	2.96	2.85	2.69	2.32	2.08
190x45	4.57	4.24	3.88	3.66	3.16	2.82
240x45	5.92	5.27	4.80	4.58	3.96	3.53

J-Frame 11 Rafters - Light Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.53	1.54	1.54	1.54	1.54	1.54
140x45	3.53	3.40	3.18	3.06	2.78	2.57
190x44	5.23	4.67	4.27	4.12	3.77	3.50
240x45	6.42	5.77	5.30	5.11	4.66	4.35

J-Frame 8 Rafters - Heavy Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.07	1.05	1.03	1.02	0.99	0.97
140x45	2.82	2.66	2.53	2.48	2.29	2.13
190x44	4.11	3.83	3.51	3.38	3.09	2.88
240x45	5.39	4.80	4.41	4.25	3.89	3.59

J-Frame 11 Rafters - Heavy Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.54	1.54	1.55	1.55	1.56	1.50
140x45	3.22	3.03	2.88	2.79	2.54	2.37
190x44	4.68	4.25	3.90	3.76	3.44	3.20
240x45	5.94	5.32	4.89	4.72	4.32	4.03

Rafters - Very High Wind Zone:

0.25kPa live load, 1.1kN live point load, 1kPa ground snow load
Light or heavy roof, roof angle 0-45˚, 1kPa ground snow load
max. 750mm cantilever
Deflection limit between supports: L/300 or 25mm under live loading combinations, L/200 or 25mm under wind or snow loading combinations
Deflection limit at cantilever: 10mm under all load combinations

J-Frame 8 Rafters - Light Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.10	1.09	1.08	1.07	1.06	1.04
140x45	3.07	2.96	2.87	2.83	2.57	2.29
190x45	4.57	4.37	4.12	3.98	3.49	3.12
240x45	6.10	5.61	5.11	4.93	4.37	3.90

J-Frame 11 Rafters - Light Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.53	1.54	1.54	1.54	1.54	1.54
140x45	3.53	3.40	3.29	3.24	2.97	2.75
190x44	5.23	4.97	4.54	4.38	4.01	3.74
240x45	6.66	6.08	5.64	5.44	4.96	4.63

J-Frame 8 Rafters - Heavy Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.07	1.05	1.03	1.02	0.99	0.97
140x45	2.82	2.66	2.53	2.48	2.29	2.13
190x44	4.11	3.83	3.51	3.38	3.09	2.88
240x45	5.39	4.80	4.41	4.25	3.89	3.63

J-Frame 11 Rafters - Heavy Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.54	1.54	1.55	1.55	1.56	1.50
140x45	3.22	3.03	2.88	2.79	2.54	2.37
190x44	4.68	4.25	3.90	3.76	3.44	3.20
240x45	5.94	5.32	4.89	4.72	4.32	4.03

Rafters - High Wind Zone:

0.25kPa live load, 1.1kN live point load, 1kPa ground snow load
Light or heavy roof, roof angle 0-45˚, 1kPa ground snow load
max. 750mm cantilever
Deflection limit between supports: L/300 or 25mm under live loading combinations, L/200 or 25mm under wind or snow loading combinations
Deflection limit at cantilever: 10mm under all load combinations

J-Frame 8 Rafters - Light Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.10	1.09	1.08	1.07	1.06	1.04
140x45	3.07	2.96	2.87	2.83	2.72	2.62
190x45	4.57	4.37	4.21	4.07	3.75	3.51
240x45	6.10	5.65	5.22	5.04	4.64	4.35

J-Frame 11 Rafters - Light Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.53	1.54	1.54	1.54	1.54	1.54
140x45	3.53	3.40	3.29	3.24	3.11	2.95
190x44	5.23	4.99	4.64	4.49	4.13	3.87
240x45	6.66	6.13	5.76	5.57	5.13	4.80

J-Frame 8 Rafters - Heavy Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.07	1.05	1.03	1.02	0.99	0.97
140x45	2.82	2.66	2.53	2.48	2.29	2.13
190x44	4.11	3.83	3.51	3.38	3.09	2.88
240x45	5.39	4.80	4.41	4.25	3.89	3.63

J-Frame 11 Rafters - Heavy Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.54	1.54	1.55	1.55	1.56	1.50
140x45	3.22	3.03	2.88	2.79	2.54	2.37
190x44	4.68	4.25	3.90	3.76	3.44	3.20
240x45	5.94	5.32	4.89	4.72	4.32	4.03

Rafters - Medium Wind Zone:

0.25kPa live load, 1.1kN live point load, 1kPa ground snow load
Light or heavy roof, roof angle 0-45˚, 1kPa ground snow load
max. 750mm cantilever
Deflection limit between supports: L/300 or 25mm under live loading combinations, L/200 or 25mm under wind or snow loading combinations
Deflection limit at cantilever: 10mm under all load combinations

J-Frame 8 Rafters - Light Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.10	1.09	1.08	1.07	1.06	1.04
140x45	3.07	2.96	2.87	2.83	2.72	2.63
190x45	4.57	4.37	4.21	4.07	3.75	3.51
240x45	6.10	5.65	5.22	5.04	4.64	4.35

J-Frame 11 Rafters - Light Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.53	1.54	1.54	1.54	1.54	1.54
140x45	3.53	3.40	3.29	3.24	3.11	2.95
190x44	5.23	4.99	4.64	4.49	4.13	3.87
240x45	6.66	6.13	5.76	5.57	5.13	4.80

J-Frame 8 Rafters - Heavy Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.07	1.05	1.03	1.02	0.99	0.97
140x45	2.82	2.66	2.53	2.48	2.29	2.13
190x44	4.11	3.83	3.51	3.38	3.09	2.88
240x45	5.39	4.80	4.41	4.25	3.89	3.63

J-Frame 11 Rafters - Heavy Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.54	1.54	1.55	1.55	1.56	1.50
140x45	3.22	3.03	2.88	2.79	2.54	2.37
190x44	4.68	4.25	3.90	3.76	3.44	3.20
240x45	5.94	5.32	4.89	4.72	4.32	4.03

Rafters - Low Wind Zone:

0.25kPa live load, 1.1kN live point load, 1kPa ground snow load
Light or heavy roof, roof angle 0-45˚, 1kPa ground snow load
max. 750mm cantilever
Deflection limit between supports: L/300 or 25mm under live loading combinations, L/200 or 25mm under wind or snow loading combinations
Deflection limit at cantilever: 10mm under all load combinations

J-Frame 8 Rafters - Light Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.10	1.09	1.08	1.07	1.06	1.04
140x45	3.07	2.96	2.87	2.83	2.72	2.63
190x45	4.57	4.37	4.21	4.07	3.75	3.51
240x45	6.10	5.65	5.22	5.04	4.64	4.35

J-Frame 11 Rafters - Light Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.53	1.54	1.54	1.54	1.54	1.54
140x45	3.53	3.40	3.29	3.24	3.11	2.95
190x44	5.23	4.99	4.64	4.49	4.13	3.87
240x45	6.66	6.13	5.76	5.57	5.13	4.80

J-Frame 8 Rafters - Heavy Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.07	1.05	1.03	1.02	0.99	0.97
140x45	2.82	2.66	2.53	2.48	2.29	2.13
190x44	4.11	3.83	3.51	3.38	3.09	2.88
240x45	5.39	4.80	4.41	4.25	3.89	3.63

J-Frame 11 Rafters - Heavy Roof

Size (mm)	Rafter Spacing (mm)					
	400	600	800	900	1200	1500
	Maxiumum Single Span (m)					
90x45	1.54	1.54	1.55	1.55	1.56	1.50
140x45	3.22	3.03	2.88	2.79	2.54	2.37
190x44	4.68	4.25	3.90	3.76	3.44	3.20
240x45	5.94	5.32	4.89	4.72	4.32	4.03

Roof Lintel span tables:

0.25kPa live load, 1.1kN live point load

Light or heavy roof, roof angle 0-45˚, 1kPa ground snow load

Very High wind zone

Deflection limit: L/300 or 12mm under live or snow loading combinations, L/200 or 12mm under wind loading combinations

J-Frame 8 Roof Lintels - Light Roof

Loaded dimension of lintel (m)	Maximum span for lintel sizes listed below (m)			
	2/90x45	2/140x45	2/190x45	2/240x45
1	1.62	2.50	3.25	3.88
2	1.33	2.08	2.83	3.46
3	1.14	1.78	2.42	3.06
4	1.01	1.58	2.14	2.71
5	0.92	1.43	1.95	2.23
6	0.85	1.32	1.80	1.90

J-Frame 11 Roof Lintels - Light Roof

Loaded dimension of lintel (m)	Maximum span for lintel sizes listed below (m)			
	2/90x45	2/140x45	2/190x45	2/240x45
1	1.84	2.85	3.59	4.29
2	1.57	2.44	3.20	3.82
3	1.42	2.20	2.96	3.44
4	1.31	2.03	2.70	2.71
5	1.22	1.90	2.23	2.23
6	1.16	1.80	1.90	1.90

J-Frame 8 Roof Lintels - Heavy Roof

Loaded dimension of lintel (m)	Maximum span for lintel sizes listed below (m)			
	2/90x45	2/140x45	2/190x45	2/240x45
1	1.35	2.09	2.83	3.57
2	1.15	1.78	2.42	3.05
3	1.03	1.6	2.17	2.74
4	0.95	1.48	2	2.53
5	0.89	1.38	1.88	2.37
6	0.84	1.31	1.78	2.11

J-Frame 11 Roof Lintels - Heavy Roof

Loaded dimension of lintel (m)	Maximum span for lintel sizes listed below (m)			
	2/90x45	2/140x45	2/190x45	2/240x45
1	1.54	2.39	3.23	3.94
2	1.31	2.04	2.76	3.47
3	1.18	1.83	2.48	3.12
4	1.08	1.68	2.28	2.88
5	1.01	1.58	2.14	2.48
6	0.96	1.49	2.03	2.11

Floor Lintel Span Tables:

Roof loads: 0.25kPa live load, 1.1kN live point load
Floor loads: 1.5kPa live load, 1.8kN live point load
Floor Span: 6m (loaded dimension of 3m), roof loaded dimension as below
Light or heavy roof, roof angle 0-45˚, 1kPa ground snow load
Light, medium, or heavy wall cladding
Very High wind zone
Deflection limit: L/300 or 12mm under live or snow loading combinations,
L/200 or 12mm under wind loading combinations

J-Frame 8 Floor Lintels

	Loaded dimension of	Maximum span for lintel sizes (m)			
		2/90x45	2/140x45	2/190x45	2/240x45
Light Roof	1	0.94	1.46	1.99	2.51
	2	0.90	1.40	1.90	2.40
	3	0.87	1.35	1.83	2.31
Light Wall	4	0.84	1.30	1.77	2.23
	5	0.81	1.26	1.71	2.14
	6	0.78	1.22	1.65	2.01
Light Roof	1	0.89	1.39	1.89	2.38
	2	0.86	1.34	1.82	2.30
	3	0.83	1.29	1.75	2.21
Medium Wall	4	0.80	1.25	1.70	2.11
	5	0.78	1.21	1.64	1.99
	6	0.75	1.18	1.60	1.87
Light Roof	1	0.77	1.21	1.64	1.97
	2	0.75	1.17	1.59	1.86
	3	0.73	1.14	1.55	1.76
Heavy Wall	4	0.71	1.11	1.51	1.67
	5	0.69	1.08	1.47	1.59
	6	0.68	1.06	1.44	1.51
Heavy Roof	1	0.90	1.40	1.90	2.40
	2	0.84	1.31	1.78	2.25
	3	0.80	1.24	1.68	2.08
Light Wall	4	0.76	1.18	1.60	1.87
	5	0.72	1.12	1.53	1.71
	6	0.69	1.08	1.46	1.57
Heavy Roof	1	0.86	1.34	1.81	2.29
	2	0.81	1.26	1.71	2.14
	3	0.77	1.19	1.62	1.93
Medium Wall	4	0.73	1.14	1.55	1.76
	5	0.70	1.09	1.48	1.61
	6	0.67	1.05	1.42	1.48
Heavy Roof	1	0.75	1.17	1.59	1.85
	2	0.72	1.12	1.52	1.69
	3	0.69	1.07	1.45	1.55
Heavy Wall	4	0.66	1.03	1.40	1.44
	5	0.64	0.99	1.34	1.34
	6	0.62	0.96	1.25	1.25

J-Frame 11 Floor Lintels

	Loaded dimension of	Maximum span for lintel sizes (m)			
		2/90x45	2/140x45	2/190x45	2/240x45
Light Roof	1	1.17	1.82	2.46	2.89
	2	1.13	1.76	2.38	2.66
	3	1.10	1.71	2.31	2.46
Light Wall	4	1.07	1.66	2.25	2.29
	5	1.04	1.62	2.14	2.14
	6	1.02	1.58	2.01	2.01
Light Roof	1	1.10	1.71	2.32	2.62
	2	1.07	1.66	2.26	2.42
	3	1.04	1.62	2.20	2.26
Medium Wall	4	1.02	1.58	2.12	2.11
	5	0.99	1.55	1.99	1.99
	6	0.97	1.52	1.87	1.87
Light Roof	1	0.94	1.47	1.97	1.97
	2	0.92	1.44	1.86	1.86
	3	0.91	1.42	1.76	1.76
Heavy Wall	4	0.89	1.39	1.67	1.67
	5	0.88	1.37	1.59	1.59
	6	0.87	1.35	1.51	1.51
Heavy Roof	1	1.10	1.72	2.33	2.64
	2	1.04	1.62	2.20	2.32
	3	0.99	1.54	2.08	2.08
Light Wall	4	0.95	1.48	1.88	1.87
	5	0.92	1.43	1.71	1.71
	6	0.88	1.38	1.57	1.57
Heavy Roof	1	1.05	1.63	2.21	2.41
	2	1.00	1.55	2.11	2.14
	3	0.95	1.49	1.93	1.93
Medium Wall	4	0.92	1.43	1.76	1.76
	5	0.89	1.38	1.61	1.61
	6	0.86	1.34	1.49	1.48
Heavy Roof	1	0.91	1.42	1.85	1.85
	2	0.88	1.37	1.69	1.69
	3	0.86	1.33	1.55	1.55
Heavy Wall	4	0.83	1.30	1.44	1.44
	5	0.81	1.26	1.34	1.34
	6	0.79	1.23	1.25	1.25

Bearer span tables:

1.5kPa live load, 0.35kPa dead load

Vibration limits: frequency ≥ 8Hz or 0.5mm deflection under 1kN point load

Deflection limit: L/300

Values assume that min. 140x45 SG8 joists are installed on top of bearers @ 600mm ctrs.

J-Frame 8 Double-Span Bearers

Size (mm)	Floor Load Width				
	1200	1500	1800	2100	2400
	Maximum Continous Span (mm)				
2/90x45	1.09	1.09	1.09	1.09	1.09
2/140x45	1.69	1.69	1.69	1.69	1.58
2/190x45	2.27	2.27	2.09	1.79	1.57
2/240x45	2.83	2.48	2.08	1.79	1.57

J-Frame 11 Double-Span Bearers

Size (mm)	Floor Load Width				
	1200	1500	1800	2100	2400
	Maximum Continous Span (mm)				
2/90x45	1.25	1.25	1.25	1.25	1.25
2/140x45	1.92	1.92	1.92	1.80	1.58
2/190x45	2.58	2.49	2.08	1.79	1.57
2/240x45	3.08	2.48	2.07	1.78	1.56

Bearer span tables:

1.5kPa live load, 0.35kPa dead load

Vibration limits: frequency ≥ 8Hz or 2mm deflection under 1kN point load

Deflection limit: L/300

Values assume that min. 140x45 SG8 joists are installed on top of bearers @ 600mm ctrs.

J-Frame 8 Double-Span Bearers

Size (mm)	Floor Load Width				
	1200	1500	1800	2100	2400
	Maximum Continous Span (mm)				
2/90x45	1.55	1.39	1.27	1.17	1.10
2/140x45	2.40	2.15	1.97	1.80	1.58
2/190x45	3.11	2.50	2.09	1.79	1.57
2/240x45	3.08	2.48	2.08	1.79	1.57

J-Frame 11 Double-Span Bearers

Size (mm)	Floor Load Width				
	1200	1500	1800	2100	2400
	Maximum Continous Span (mm)				
2/90x45	1.98	1.98	1.97	1.81	1.58
2/140x45	3.00	2.51	2.10	1.80	1.58
2/190x45	3.10	2.49	2.08	1.79	1.57
2/240x45	3.08	2.48	2.07	1.78	1.56

Joist span tables

1.5kPa live load, 0.4kPa dead load

Vibration limits: frequency ≥ 8Hz or 2mm deflection under 1kN point load

Deflection limit: L/300

Values assume that flooring as per NZS 3604 tables 7.3 or 7.4 are installed on top of joists

J-Frame 8 Single Span Joists

Size (mm)	Joist Spacing (mm)		
	400	450	600
	Maximum Single Span (mm)		
90x45	1.02	1.01	1.00
140x45	2.32	2.25	2.21
190x45	3.16	3.06	3.00
240x45	3.94	3.82	3.75

J-Frame 11 Single Span Joist Span Tables

Size (mm)	Joist Spacing (mm)		
	400	450	600
	Maximum Single Span (mm)		
90x45	1.64	1.59	1.56
140x45	2.60	2.51	2.46
190x45	3.51	3.39	3.33
240x45	4.34	4.22	4.14

J-Frame 8 Double-Span Floor Joists

Size (mm)	Joist Spacing (mm)		
	400	450	600
	Maximum Continous Span (m)		
90x45	1.26	1.25	1.24
140x45	2.78	2.65	2.59
190x45	3.74	3.64	3.41
240x45	4.42	4.31	4.04

J-Frame 11 Double-Span Floor Joists

Size (mm)	Joist Spacing (mm)		
	400	450	600
	Maximum Continous Span (m)		
90x45	1.93	1.85	1.81
140x45	3.12	2.97	2.90
190x45	4.04	3.94	3.69
240x45	4.78	4.66	4.37

Joist span tables

1.5kPa live load, 0.4kPa dead load

Vibration limits: frequency ≥ 8Hz or 1mm deflection under 1kN point load

Deflection limit: L/300

Values assume that flooring as per NZS 3604 tables 7.3 or 7.4 are installed on top of joists

J-Frame 8 Single Span Joists

Size (mm)	Joist Spacing (mm)		
	400	450	600
	Maximum Single Span (mm)		
90x45	1.02	1.01	1.00
140x45	1.72	1.68	1.66
190x45	2.34	2.29	2.26
240x45	2.95	2.88	2.84

J-Frame 11 Single Span Joist Span Tables

Size (mm)	Joist Spacing (mm)		
	400	450	600
	Maximum Single Span (mm)		
90x45	1.21	1.19	1.18
140x45	1.92	1.88	1.85
190x45	2.61	2.55	2.51
240x45	3.27	3.19	3.15

J-Frame 8 Double-Span Floor Joists

Size (mm)	Joist Spacing (mm)		
	400	450	600
	Maximum Continous Span (m)		
90x45	1.25	1.22	1.20
140x45	2.00	1.94	1.91
190x45	2.75	2.67	2.62
240x45	3.49	3.38	3.32

J-Frame 11 Double-Span Floor Joists

Size (mm)	Joist Spacing (mm)		
	400	450	600
	Maximum Continous Span (m)		
90x45	1.40	1.37	1.35
140x45	2.24	2.17	2.14
190x45	3.07	2.98	2.92
240x45	3.88	3.76	3.69

PO Box 8415
Christchurch 8041
New Zealand

T: +64 3 925 9173
info@ptlnz.com

Beam span tables Producer Statement

Christchurch, 25th of July 2024

Producer Statement: Juken New Zealand Ltd. – Beam Span Tables

PreStressed Timber Limited (PTL) has been engaged by Juken New Zealand Limited to provide structural engineering for the development of the J-Frame 8 and J-Frame 11 span tables. Span tables have been provided for rafters, roof lintels, floor lintels, bearers and joists for the use in residential self-contained dwellings and meeting the requirements and intent of NZS 3604.

The design has been carried out to the AS/NZS 1170.1 suite and NZS AS 1720.1:2022 and assuming loadings in line with the document "Engineering Basis of NZS 3604:2011". The design used common and widely accepted engineering principles for LVL produced by Juken New Zealand Ltd.

I believe on reasonable grounds that the correct use of these tables for rafter, roof lintel, floor lintel, bearer and joist design will meet the requirements of clause B1/VM1 of the NZ Building Code.

It remains the sole responsibility of the individual design professional to ensure the tables are applied in accordance with their intended use.

On behalf of PTL:

Francesco Sarti PhD CMEngNZ CPEng

Technical Director
CPEng no. 1024631
PSA no. 125420

Author
EON