

Size	h (in)	b (in)	Moment of Inertia
1x2	0.75	1.50	0.052734375
1x3	0.75	2.50	0.087890625
1x4	0.75	3.50	0.123046875
1x5	0.75	4.50	0.158203125

Sample	Size	Load P (lbs)	Deflection (in.)	Length (in.)	E
1	1x2	2.03	0.3195	90	1832563.38
2	1x2	2.03	0.473	90	1237852.008
3	1x2	2.03	0.422	90	1387450.237
4	1x3	2.03	0.2435	90	1442720.329
5	1x3	2.03	0.232	90	1514234.483
6	1x3	2.03	0.204	90	1722070.588
7	1x4	2.03	0.132	90	1900987.013
8	1x4	2.03	0.161	90	1558573.203
9	1x4	2.03	0.141	90	1779647.416
10	1x5	2.03	0.124	90	1573935.484
11	1x5	2.03	0.148	90	1318702.703
12	1x5	2.03	0.1055	90	1849933.649

Load P (lbs)	a (in)	L (in)	E (SPF Wood)
200.00	36.00	90.00	1593222.541

Orientation	I-beam Inertia	Deflection (in)
1x5 - 1x2	9.00	0.399944128
1x5 - 1x3	19.12	0.188287762
1x4 - 1x2	7.00	0.514213879
1x4 - 1x3	15.09	0.238598512
1x3 - 1x3	11.06	0.3255990187619610
1x3 - 1x4	20.73	0.173662235
1x2 - 1x4	13.51	0.26647151
1x2 - 1x5	21.31	0.168950817
(Ideal)	14.40	0.25

Strain for 1x4 by 1x3 beam
0.000599117

Load required to produce limited design strain ($8 \cdot 10^{-4}$ microstrain)
267.0595028

Load required to produced limited design deflection (0.25 in)
209.5570487

Shape	b (in.)	h (in.)	\bar{x} top (in.)	\bar{I} (in. ⁴)	A (in. ²)	d (in.)	Ad ² (in. ⁴)	$\bar{I} + Ad^2$ (in. ⁴)
1	3.50	0.75	0.38	0.1230	2.6250	-1.6250	6.9316	7.0547
2	0.75	2.50	2.00	0.9766	1.8750	0.0000	0.0000	0.9766
3	3.50	0.75	3.63	0.1230	2.6250	1.6250	6.9316	7.0547
1x4 by 1x3				Sum:	1.2227	Sum:	13.8633	
\bar{x} top, overall (in.) =				2.00	$I_{built-up}$ (in. ⁴)= 15.086			