

BCI® Joist Specifications

Materials and Manufacture

BCI® Joists are manufactured with VERSA-LAM® LVL flanges, oriented strand board (OSB) webs and waterproof structural adhesives. The OSB web sections are glued together at 1220mm centres to form a continuous web. The webs are glued into a 12mm deep groove in the centre of the wide face of the flange members. All components are machine-assembled and pressed in one continuous operation. Boise operates the two largest and fastest I-joist plants in the world.

Quality Assurance

BCI® Joists are approved for use in the UK by the British Board of Agrément and are manufactured under a factory production control system audited on a monthly basis by a third-party inspection agency.

Sizes

Five joist series, BCI® 5000s, 6000s, 6500s, 60s and 90s, are available. Each joist is available in a range of depths as detailed in the product profile illustration above. Joists are manufactured up to 20m long.

Tolerances

The tolerances (in mm) on member sizes are:

Joist length	±3.2
Joist height	±0.76
Flange thickness	±1.27
Flange width	-0.51 to +0.38

Moisture Content

BCI® Joists will arrive on-site with a moisture content of 8% to 10%. In a service class 1 environment (as defined in BS5268-2:2002), BCI® Joists will remain at an equilibrium moisture content of approximately 10%, whilst in a service class 2 environment, they will absorb a little moisture from the atmosphere and attain a final equilibrium moisture content of 12% to 14%.

NOTE: The corresponding equilibrium moisture contents of solid timber in service classes 1 and 2 will be approximately 12% and 18%, respectively, having typically been delivered to site at a moisture content of 18% to 24%.

Preservative Treatment

BCI® Joists are untreated products with a natural durability sufficient to ensure a minimum design life of 60 years when installed in a service class 1 or 2 environment and not subject to mechanical damage or insect attack. Differences in the swelling characteristics of the materials used in BCI® Joists mean that preservative treatment should not be undertaken without consulting Boise Engineered Wood Products s as this may affect the structural integrity of the component.



BCI® Joists are approved for use under the UK Building Regulations by British Board of Agrément BBA Certificate No. 99/3620.

BBA certification is recognised by:
 N.H.B.C. Zurich Municipal
 UKTFA TRA
 Building Contractors Building Control Officers

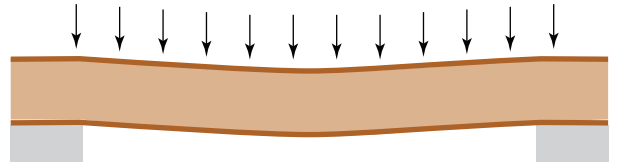


Engineered Wood Products
 Certificate Number 036/007

BCI® Joists — Design Properties

BCI® Joists are intended for use as structural members such as floor or roof joists, beams, rafters, wall studs or ceiling ties, in service class 1 or 2 environments as defined in BS5268-2:2002.

Design properties for BCI® Joists in these internal conditions are given in the table below for long-term loading. Design properties for shorter load durations may be determined by applying the appropriate value of the k_3 modification factor given in BS5268-2:2002.



BCI® Joists Used as Joists / Beams

Long-Term Design Properties of BCI® Joists in Bending ($k_3 = 1.0$)^{1, 2}

Service Class 1 Conditions — (20°C / 65% rh)																							
Joist Depth	Joist Type	Bending Moment Capacity (kNm)		Flexural Rigidity (EI) (Nmm ² x 10 ⁹)	Shear Resistance (kN)		Shear Rigidity (GA) (Nx10 ⁶)	End Reaction (kN)								Intermediate Reaction (kN)							
		Load Sharing	Non-Load Sharing		Load Sharing	Non-Load Sharing		45mm Bearing				89mm Bearing				89mm Bearing				133mm Bearing			
								Web Stiffeners		Web Stiffeners		Web Stiffeners		Web Stiffeners		Web Stiffeners		Web Stiffeners		Web Stiffeners			
		No	Yes		No	Yes		No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Load Sharing		Non-Load Sharing		Load Sharing		Non-Load Sharing		Load Sharing		Non-Load Sharing		Load Sharing		Non-Load Sharing		Load Sharing		Non-Load Sharing					
241	5000s	3.55	3.42	433	6.01	5.78	1.82	4.59	5.04	4.41	4.85	5.25	5.56	5.05	5.35	10.06	10.52	9.67	10.12	10.06	10.52	9.67	10.12
	6000s	4.11	3.95	498	6.01	5.78	1.82	4.59	5.04	4.41	4.85	5.25	5.56	5.05	5.35	10.06	10.52	9.67	10.12	10.06	10.52	9.67	10.12
	6500s	4.58	4.40	552	6.01	5.78	1.82	4.59	5.04	4.41	4.85	5.25	5.56	5.05	5.35	10.06	10.52	9.67	10.12	10.06	10.52	9.67	10.12
	60s	5.69	5.48	645	5.39	5.39	1.75	4.15	4.86	4.15	4.86	5.12	5.39	5.12	5.39	9.19	10.17	9.19	10.17	10.80	10.95	10.80	10.95
	90s	8.76	8.43	979	5.39	5.39	1.75	4.15	4.86	4.15	4.86	5.12	5.39	5.12	5.39	9.19	10.17	9.19	10.17	10.80	10.95	10.80	10.95
302	5000s	4.54	4.37	725	7.05	6.78	2.28	4.76	5.56	4.58	5.34	5.54	6.52	5.33	6.27	10.01	10.70	9.63	10.29	10.01	10.70	9.63	10.29
	6000s	5.26	5.06	832	7.05	6.78	2.28	4.76	5.56	4.58	5.34	5.54	6.52	5.33	6.27	10.01	10.70	9.63	10.29	10.01	10.70	9.63	10.29
	6500s	5.86	5.63	922	7.05	6.78	2.28	4.76	5.56	4.58	5.34	5.54	6.52	5.33	6.27	10.01	10.70	9.63	10.29	10.01	10.70	9.63	10.29
	60s	7.43	7.15	1100	6.55	6.55	2.34	4.21	4.95	4.21	4.95	5.55	6.55	5.55	6.55	9.29	11.94	9.29	11.94	11.25	12.31	11.25	12.31
	90s	11.42	10.99	1663	6.55	6.55	2.34	4.21	4.95	4.21	4.95	5.55	6.55	5.55	6.55	9.29	11.94	9.29	11.94	11.25	12.31	11.25	12.31
356	5000s	5.40	5.19	1050	7.91	7.61	2.69	4.92	6.02	4.73	5.79	5.80	7.32	5.58	7.03	11.03	12.43	10.60	11.95	11.03	12.43	10.60	11.95
	6000s	6.25	6.01	1200	7.91	7.61	2.69	4.92	6.02	4.73	5.79	5.80	7.32	5.58	7.03	11.03	12.43	10.60	11.95	11.03	12.43	10.60	11.95
	6500s	6.97	6.70	1330	7.91	7.61	2.69	4.92	6.02	4.73	5.79	5.80	7.32	5.58	7.03	11.03	12.43	10.60	11.95	11.03	12.43	10.60	11.95
	60s	8.93	8.59	1610	6.85	6.85	2.86	4.67	5.28	4.67	5.28	5.85	6.85	5.85	6.85	9.29	13.41	9.29	13.41	11.42	15.03	11.42	15.03
	90s	13.73	13.21	2426	6.85	6.85	2.86	4.67	5.28	4.67	5.28	5.85	6.85	5.85	6.85	9.29	13.41	9.29	13.41	11.42	15.03	11.42	15.03
406	6000s	7.15	6.88	1610	8.71	8.37	3.06	5.20	6.43	5.00	6.18	6.12	8.06	5.89	7.75	12.40	12.97	11.92	12.47	12.40	12.97	11.92	12.47
	6500s	7.97	7.67	1790	8.71	8.37	3.06	5.20	6.43	5.00	6.18	6.12	8.06	5.89	7.75	12.40	12.97	11.92	12.47	12.40	12.97	11.92	12.47
	60s	10.30	9.90	2180	8.34	8.34	3.34	5.17	6.24	5.17	6.24	6.48	8.34	6.48	8.34	9.38	15.10	9.38	15.10	12.62	16.42	12.62	16.42
	90s	15.84	15.24	3270	8.34	8.34	3.34	5.17	6.24	5.17	6.24	6.48	8.34	6.48	8.34	9.38	15.10	9.38	15.10	12.62	16.42	12.62	16.42

Long-Term Design Properties of BCI® Joists in Bending ($k_3 = 1.0$)^{1, 2}

Service Class 2 Conditions — (20°C / 85% rh)																							
Joist Depth	Joist Type	Bending Moment Capacity (kNm)		Flexural Rigidity (EI) (Nmm ² x 10 ⁹)	Shear Resistance (kN)		Shear Rigidity (GA) (Nx10 ⁶)	End Reaction (kN)								Intermediate Reaction (kN)							
		Load Sharing	Non-Load Sharing		Load Sharing	Non-Load Sharing		45mm Bearing				89mm Bearing				89mm Bearing				133mm Bearing			
								Web Stiffeners		Web Stiffeners		Web Stiffeners		Web Stiffeners		Web Stiffeners		Web Stiffeners		Web Stiffeners			
		No	Yes		No	Yes		No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Load Sharing		Non-Load Sharing		Load Sharing		Non-Load Sharing		Load Sharing		Non-Load Sharing		Load Sharing		Non-Load Sharing		Load Sharing		Non-Load Sharing					
241	5000s	3.20	3.07	401	5.23	5.03	1.49	3.67	4.03	3.53	3.88	4.20	4.45	4.04	4.28	8.05	8.42	7.74	8.09	8.05	8.42	7.74	8.09
	6000s	3.70	3.56	461	5.23	5.03	1.49	3.67	4.03	3.53	3.88	4.20	4.45	4.04	4.28	8.05	8.42	7.74	8.09	8.05	8.42	7.74	8.09
	6500s	4.12	3.96	511	5.23	5.03	1.49	3.67	4.03	3.53	3.88	4.20	4.45	4.04	4.28	8.05	8.42	7.74	8.09	8.05	8.42	7.74	8.09
	60s	5.13	4.94	591	5.39	5.39	1.45	4.15	4.86	4.15	4.86	5.12	5.39	5.12	5.39	9.19	10.17	9.19	10.17	10.80	10.95	10.80	10.95
	90s	7.89	7.59	896	5.39	5.39	1.45	4.15	4.86	4.15	4.86	5.12	5.39	5.12	5.39	9.19	10.17	9.19	10.17	10.80	10.95	10.80	10.95
302	5000s	4.09	3.93	671	6.13	5.89	1.87	3.81	4.45	3.67	4.28	4.43	5.21	4.26	5.01	8.01	8.56	7.70	8.23	8.01	8.56	7.70	8.23
	6000s	4.73	4.55	770	6.13	5.89	1.87	3.81	4.45	3.67	4.28	4.43	5.21	4.26	5.01	8.01	8.56	7.70	8.23	8.01	8.56	7.70	8.23
	6500s	5.27	5.07	853	6.13	5.89	1.87	3.81	4.45	3.67	4.28	4.43	5.21	4.26	5.01	8.01	8.56	7.70	8.23	8.01	8.56	7.70	8.23
	60s	6.68	6.43	1010	6.55	6.55	1.94	4.21	4.95	4.21	4.95	5.55	6.55	5.55	6.55	9.29	11.94	9.29	11.94	11.25	12.31	11.25	12.31
	90s	10.28	9.89	1520	6.55	6.55	1.94	4.21	4.95	4.21	4.95	5.55	6.55	5.55	6.55	9.29	11.94	9.29	11.94	11.25	12.31	11.25	12.31
356	5000s	4.86	4.68	972	6.88	6.61	2.20	3.94	4.81	3.79	4.63	4.64	5.85	4.46	5.63	8.82	9.94	8.48	9.56	8.82	9.94	8.48	9.56
	6000s	5.63	5.41	1110	6.88	6.61	2.20	3.94	4.81	3.79	4.63	4.64	5.85	4.46	5.63	8.82	9.94	8.48	9.56	8.82	9.94	8.48	9.56
	6500s	6.27	6.03	1230	6.88	6.61	2.20	3.94	4.81	3.79	4.63	4.64	5.85	4.46	5.63	8.82	9.94	8.48	9.56	8.82	9.94	8.48	9.56
	60s	8.03	7.73	1480	6.85	6.85	2.37	4.67	5.28	4.67	5.28	5.85	6.85	5.85	6.85	9.29	13.41	9.29	13.41	11.42	15.03	11.42	15.03
	90s	12.37	11.90	2220	6.85	6.85	2.37	4.67	5.28	4.67	5.28	5.85	6.85	5.85	6.85	9.29	13.41	9.29	13.41	11.42	15.03	11.42	15.03
406	6000s	6.44	6.19	1490	7.57	7.28	2.51	4.16	5.15	4.00	4.95	4.90	6.44	4.71	6.20	9.92	10.37	9.54	9.97	9.92	10.37	9.54	9.97
	6500s	7.18	6.90	1650	7.57	7.28	2.51	4.16	5.15	4.00	4.95	4.90	6.44	4.71	6.20	9.92	10.37	9.54	9.97	9.92	10.37	9.54	9.97
	60s	9.26	8.91	2000	8.34	8.34	2.77	5.17	6.24	5.17	6.24	6.48	8.34	6.48	8.34	9.38	15.10	9.38	15.10	12.62	16.42	12.62	16.42
	90s	14.26	13.72	2990	8.34	8.34	2.77	5.17	6.24	5.17	6.24	6.48	8.34	6.48	8.34	9.38	15.10	9.38	15.10	12.62	16.42	12.62	16.42

Joist Depth	Joist Weight (kg/m)				
	5000s	6000s	6500s	60s	90s
241	3.43	3.73	4.03	4.47	6.11
302	3.88	4.18	4.47	4.92	6.41
356	4.32	4.62	4.92	5.22	6.86
406	-	5.07	5.22	5.67	7.31

Notes

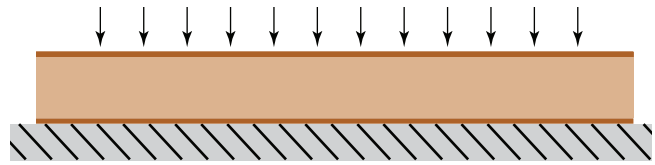
- ¹ The properties given above are applicable to long-term load duration. Permissible strength values for other load durations may be obtained by multiplying by 1.25 for medium-term loading or 1.5 for short-term loading as detailed in BS5268-2:2002.
- ² The properties given above presuppose adequate lateral restraint is provided to the compression flange via continuous boarding or discrete restraints applied at maximum centres of 400mm.

- ³ For web stiffener specifications and fixing details, see page 18.
- ⁴ The maximum deflection of a uniformly loaded joist can be calculated from the following equation :
 $d = (5wL^4/384EI) + (wL^2/8GA)$ where :
w is the uniform load (kN/m)
L is the span (m)
EI is the flexural rigidity obtained from the table
GA is the shear rigidity obtained from the table

BCI® Joists Used as Rim Joists / Bearers

Maximum Long-Term Load on BCI® Joists Subject to Uniform Compression Perpendicular to the Joist Direction (Service Classes 1 and 2)

Joist Depth	Maximum Load per Metre Run (kN/m)
241	42.3
302	38.0
356	34.2
406	32.0



BCI® Joists Used as Columns / Studs

The maximum axial compression capacity of BCI® Joists used as struts should be based upon the capacity of the flange cross-section only:

$$P_c = \sigma_{c,adm} \times A_f \times k_{12} \times k_3$$

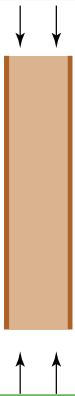
Where: P_c = maximum axial compression load (N)

$\sigma_{c,adm}$ = 19.5 N/mm² for Service Class 1
 = 17.5 N/mm² for Service Class 2

A_f = Total cross-sectional area of the flanges (mm²)

k_{12} = Slenderness modification factor from BS5268–2:2002

k_3 = Load duration modification factor from BS5268–2:2002



BCI® Joists Used as Ties

The maximum axial tensile capacity of BCI® Joists used as struts, where both flanges are equally loaded, should be based upon the capacity of the flange cross-section only:

$$P_t = \sigma_{t,adm} \times A_f \times k_3 \times \left(\frac{2440}{L}\right)^{0.125}$$



Where: P_t = maximum axial tension load (N)

$\sigma_{t,adm}$ = 15.0 N/mm² for Service Class 1
 = 13.5 N/mm² for Service Class 2

A_f = Total cross-sectional area of the flanges (mm²)

k_3 = Load duration modification factor from BS5268–2:2002

L = Member length (mm) [min. value = 2440 mm]

Allowable Nail Spacings

Nailed joints in VERSA-LAM® flanges of BCI® Joists should be designed using the permissible nail values given in BS 5268-2: 2002 for C27 timber. Nails should be spaced in accordance with the following table:

Nailing in Wide Face (Perpendicular to Glue Lines)				
Nail Diameter (mm)	End Distance (mm)	Edge Distance (mm)	Along Face - Parallel to Grain (mm)	Across Face - Perpendicular to Grain (mm)
3.0	48	15	48	24
3.35	54	17	54	27
3.75	60	19	60	30

Nailing in Narrow Face (Parallel to Glue Lines)				
Nail Diameter (mm)	End Distance (mm)	Edge Distance (mm)	Along Face - Parallel to Grain (mm)	Across Face - Perpendicular to Grain (mm)
3.0	60	15	60	15
3.35	67	17	67	17
3.75	75	19	75	19

