Boise Cascade
Engineered Wood Products

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Toll Free 888-234-0056
http://www.bcewp.com

June 13, 2019

TO: Building Design and Code Enforcement Professionals

FROM: Boise Cascade EWP Engineering

RE: Placement (Layout) Plans for Engineered Wood Products

Placement or layout plans may be provided to a contractor to aid in the installation of engineered wood products, including I-joists, laminated veneer lumber (LVL), wood trusses, etc. These plans are typically generated by a building material distributor or dealer, using software typically supplied by the component manufacturer. The intent of placement plans is to show product location and orientation for installation. This documentation is not a structural drawing, since it only shows a few of the components within a building's structural system. Placement plans are not intended to replace construction design documents provided by the project's design professional of record and/or building designer. Design professional of record and/or building designer is responsible for review and incorporation of all building components into the design of the structure and building plans. Building designer may be the owner of the building or any individual or organization that has an agreement with the building owner(s) and provides the construction documents.

Boise Cascade EWP placement plans, generated by BC Framer®, are intended for aid of installation only and thus are labeled as "Sales Presentation Drawings". Since placement plans are not structural plans or engineering documents, they may not be stamped by a licensed architect or engineer.

Further guidance on this subject is found in the building code. Per section 2303.4.2 of the 2015 IBC: "*…Truss placement diagrams that serve only as a guide for installation and do not deviate from the permit submittal drawings shall not be required to bear the seal or signature of the truss designer.*". Though specifically referencing wood trusses, the same or similar software is used for I-joist and LVL layouts.

A licensed engineer can only stamp someone else's work if it was conducted under the engineer's direct supervision, known as responsible charge. Though each state's engineering laws differ slightly, the following excerpt from the State of Washington provides typical guidance: "*..under no circumstances, can a licensee stamp a plan prepared by a non-licensee that was not supervised regardless of how detailed a review was made.*". Since placement plans are typically generated by building material distributor or dealer staff not under the direct supervision of an engineer, such plans may not be sealed.

In addition to aforementioned information, there are additional reasons why Boise Cascade EWP Engineering does not provide sealing of placement plans. In residential projects, stamping a placement plan may imply that the licensed engineer is the project's design professional of record, since in most residential markets there is no architect or engineer of record. A component manufacturer cannot take on such responsibility. In commercial projects, a placement plan cannot be submitted as a shop drawing as it does not show details of individual members, connection detailing, etc.

If there are any questions regarding this matter, please contact Boise Cascade EWP Engineering at 800.232.0788.

Boise Cascade ENGINEERED WOOD PRODUCTS

Single 11-7/8" BCI® 5000-1.7 DF

PASSED

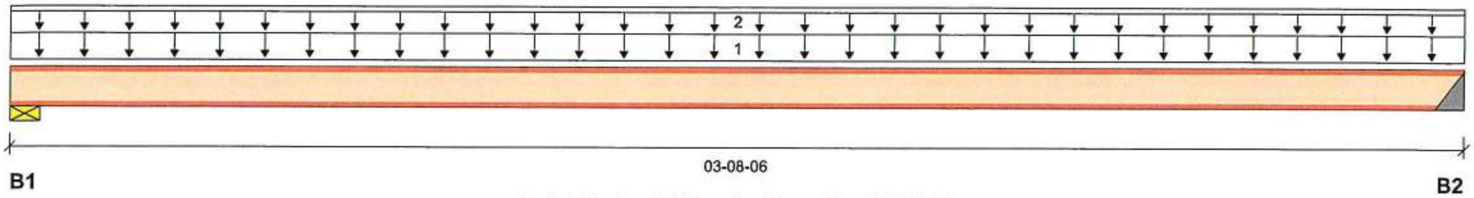
J0104 (Joist)

BC CALC® Member Report
Build 16959

Dry | 1 span | No cant. | 24" OCS | Repetitive | Glued & nailed

October 30, 2023 13:31:20

Job name:	BMD Vancouver	File name:	2023_10_29_GardenParkEstates
Address:	SE 136th Ave	Description:	Stair Closure
City, State, Zip:	Portland, OR, 97236	Specifier:	Froelich Consulting Engineers, Inc.
Customer:	Matheus Lumber - Van...ver - Larry Tommerup	Designer:	Alaina Dahl
Code reports:	ESR-1336	Company:	Boise Cascade - Lathrop



Total Horizontal Product Length = 03-08-06

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B1, 1-3/4"	147 / 0	211 / 0			
B2, 2"	149 / 0	214 / 0			

Load Summary

Tag	Description	Load Type	Ref.	Start	End	Loc.	Live 100%	Dead 90%	Snow 115%	Wind 160%	Roof Live 125%	OCS
1	Standard Load	Unf. Area (lb/ft²)	L	00-00-00	03-08-06	Top	40	25				24"
2	Int Wall	Unf. Lin. (lb/ft)	L	00-00-00	03-08-06	Top		65				n\a

Controls Summary

Controls Summary	Value	% Allowable	Duration	Case	Location
Pos. Moment	300 ft-lbs	9.5%	100%	1	01-10-01
End Reaction	359 lbs	35.5%	100%	1	00-00-00
End Shear	330 lbs	20.3%	100%	1	00-01-12
Total Load Deflection	L/999 (0.006")	n\a	n\a	1	01-10-01
Live Load Deflection	L/999 (0.003")	n\a	n\a	2	01-10-01
Max Defl.	0.006"	n\a	n\a	1	01-10-01
Span / Depth	3.5				

Bearing Supports

Bearing Supports		Dim. (LxW)	Value	% Allow Support	% Allow Member	Material
B1	Wall/Plate	1-3/4" x 2"	359 lbs	n\a	35.5%	Unspecified
B2	Hanger	2" x 2"	363 lbs	n\a	33.9%	Hanger

Notes

Design meets User specified (L/360) Total load deflection criteria.
Design meets User specified (L/480) Live load deflection criteria.
Composite EI value based on 3/4" thick OSB sheathing glued and nailed to member.
Design based on Dry Service Condition.
BC CALC® analysis is based on IBC 2018.
Calculations assume member is fully braced.

☒ REVIEWED ☐ REVISE AND RESUBMIT
☐ REJECTED ☐ FURNISH AS CORRECTED
Corrections or comments made on the shop drawings during this review do not relieve contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. This contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all other trades; and performing his work in a safe and satisfactory manner.
FROELICH ENGINEERS, INC.
DATE: 11/09/2023 BY: BJH

User Notes

- 11 7/8" BCI 5000 1.7 is structurally adequate to support the design loads according to the information shown on this design report.
- Loads and dimensions shall be verified by the project's design professional(s) of record.
- This certification is for a Boise Cascade individual building component only and not for the building system as a whole. The component design as shown on this report is based upon loadings and dimensions provided by others. Building designer is responsible for determining that the dimensions and loads for each component match those required by the plans and by the actual end use of the component. Verification of framing methods, bracing design, support conditions, connections, etc. is the responsibility of the building designer.

Disclosure

Use of the Boise Cascade Software is subject to the terms of the End User License Agreement (EULA). Completeness and accuracy of input must be reviewed and verified by a qualified engineer or other appropriate expert to assure its adequacy, prior to anyone relying on such output as evidence of suitability for a particular application. The output here is based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

Single 11-7/8" BCI® 5000-1.7 DF

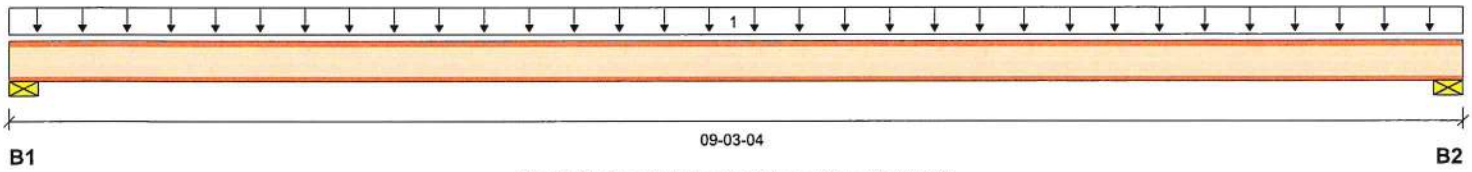
PASSED

J0110 (Joist)

BC CALC® Member Report | Dry | 1 span | No cant. | 24" OCS | Repetitive | Glued & nailed | October 30, 2023 13:31:20

Build 16959

Job name:	BMD Vancouver	File name:	2023_10_29_GardenParkEstates
Address:	SE 136th Ave	Description:	Building A 3rd Floor
City, State, Zip:	Portland, OR, 97236	Specifier:	Froelich Consulting Engineers, Inc.
Customer:	Matheus Lumber - Van...ver - Larry Tommerup	Designer:	Alaina Dahl
Code reports:	ESR-1336	Company:	Boise Cascade - Lathrop



Total Horizontal Product Length = 09-03-04

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B1, 3-1/2"	377 / 0	235 / 0			
B2, 1-3/4"	365 / 0	228 / 0			

Load Summary

Tag	Description	Load Type	Ref.	Start	End	Loc.	Live 100%	Dead 90%	Snow 115%	Wind 160%	Roof Live 125%	OCS
1	Standard Load	Unf. Area (lb/ft²)	L	00-00-00	09-03-04	Top	40	25				24"

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	1304 ft-lbs	41.4%	100%	1	04-08-08
End Reaction	593 lbs	58.8%	100%	1	09-03-04
End Shear	574 lbs	35.3%	100%	1	00-03-08
Total Load Deflection	L/999 (0.072")	n\a	n\a	1	04-08-08
Live Load Deflection	L/999 (0.045")	n\a	n\a	2	04-08-08
Max Defl.	0.072"	n\a	n\a	1	04-08-08
Span / Depth	9.1				

Bearing Supports

		Dim. (LxW)	Value	% Allow Support	% Allow Member	Material
B1	Wall/Plate	3-1/2" x 2"	612 lbs	n\a	43.0%	Unspecified
B2	Wall/Plate	1-3/4" x 2"	593 lbs	n\a	58.8%	Unspecified

REGISTERED PROFESSIONAL ENGINEER 19271PE OREGON JULY 15, 1997 10/30/23 JEFFREY K. OLSON

RENEWS: 12/31/23

Notes

Design meets User specified (L/360) Total load deflection criteria.
Design meets User specified (L/480) Live load deflection criteria.
Composite EI value based on 3/4" thick OSB sheathing glued and nailed to member.
Design based on Dry Service Condition.
BC CALC® analysis is based on IBC 2018.
Calculations assume member is fully braced.

User Notes

- 11 7/8" BCI 5000 1.7 is structurally adequate to support the design loads according to the information shown on this design report.
- Loads and dimensions shall be verified by the project's design professional(s) of record.
- This certification is for a Boise Cascade individual building component only and not for the building system as a whole. The component design as shown on this report is based upon loadings and dimensions provided by others. Building designer is responsible for determining that the dimensions and loads for each component match those required by the plans and by the actual end use of the component. Verification of framing methods, bracing design, support conditions, connections, etc. is the responsibility of the building designer.

Disclosure

Single 11-7/8" BCI® 5000-1.7 DF

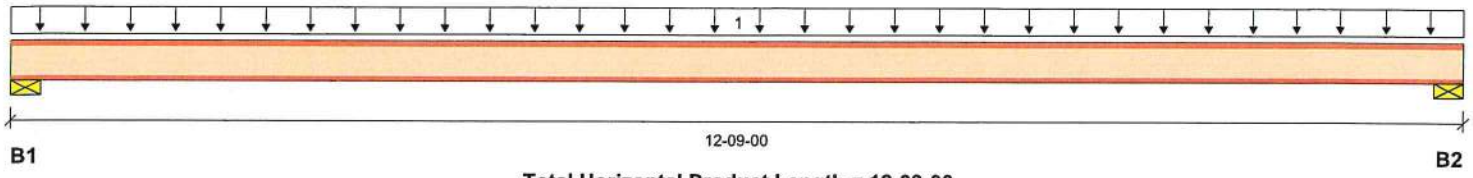
PASSED

J0113 (Joist)

BC CALC® Member Report — Dry | 1 span | No cant. | 24" OCS | Repetitive | Glued & nailed — October 30, 2023 13:31:20

Build 16959

Job name:	BMD Vancouver	File name:	2023_10_29_GardenParkEstates
Address:	SE 136th Ave	Description:	Worst Case Unit BCI 5000
City, State, Zip:	Portland, OR, 97236	Specifier:	Froelich Consulting Engineers, Inc.
Customer:	Matheus Lumber - Van...ver - Larry Tommerup	Designer:	Alaina Dahl
Code reports:	ESR-1336	Company:	Boise Cascade - Lathrop



Total Horizontal Product Length = 12-09-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B1, 3-1/2"	510 / 0	319 / 0			
B2, 3-1/2"	510 / 0	319 / 0			

Load Summary

Tag	Description	Load Type	Ref.	Start	End	Loc.	Live 100%	Dead 90%	Snow 115%	Wind 160%	Roof Live 125%	OCS
1	Standard Load	Unf. Area (lb/ft²)	L	00-00-00	12-09-00	Top	40	25				24"

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	2455 ft-lbs	77.9%	100%	1	06-04-08
End Reaction	829 lbs	58.2%	100%	1	12-09-00
End Shear	791 lbs	48.7%	100%	1	00-03-08
Total Load Deflection	L/658 (0.224")	54.7%	n\a	1	06-04-08
Live Load Deflection	L/1070 (0.138")	44.9%	n\a	2	06-04-08
Max Defl.	0.224"	n\a	n\a	1	06-04-08
Span / Depth	12.4				

Bearing Supports

		Dim. (LxW)	Value	% Allow Support	% Allow Member	Material
B1	Wall/Plate	3-1/2" x 2"	829 lbs	n\a	58.2%	Unspecified
B2	Wall/Plate	3-1/2" x 2"	829 lbs	n\a	58.2%	Unspecified

Notes

Design meets User specified (L/360) Total load deflection criteria.
Design meets User specified (L/480) Live load deflection criteria.
Composite EI value based on 3/4" thick OSB sheathing glued and nailed to member.
Design based on Dry Service Condition.
BC CALC® analysis is based on IBC 2018.
Calculations assume member is fully braced.

User Notes

- 11 7/8" BCI 5000 1.7 is structurally adequate to support the design loads according to the information shown on this design report.
- Loads and dimensions shall be verified by the project's design professional(s) of record.
- This certification is for a Boise Cascade individual building component only and not for the building system as a whole. The component design as shown on this report is based upon loadings and dimensions provided by others. Building designer is responsible for determining that the dimensions and loads for each component match those required by the plans and by the actual end use of the component. Verification of framing methods, bracing design, support conditions, connections, etc. is the responsibility of the building designer.

Disclosure

Boise Cascade ENGINEERED WOOD PRODUCTS

Single 11-7/8" BCI® 60-2.0 DF

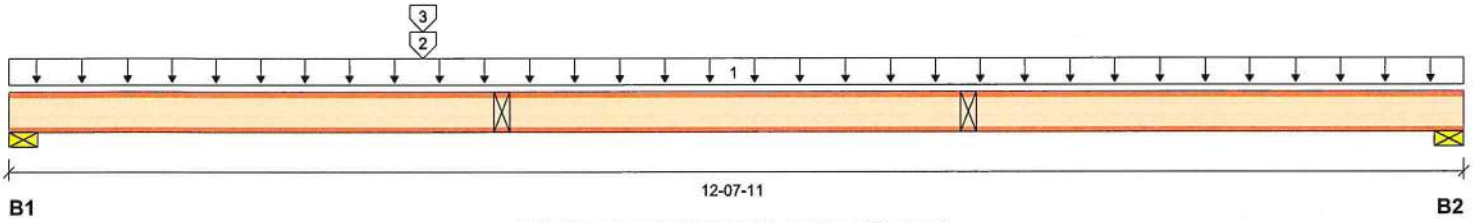
PASSED

J0413 (Joist)

BC CALC® Member Report | Dry | 1 span | No cant. | 24" OCS | Repetitive | Glued & nailed | October 30, 2023 13:31:20

Build 16959

Job name:	BMD Vancouver	File name:	2023_10_29_GardenParkEstates
Address:	SE 136th Ave	Description:	Building A 2nd Floor
City, State, Zip:	Portland, OR, 97236	Specifier:	Froelich Consulting Engineers, Inc.
Customer:	Matheus Lumber - Van...ver - Larry Tommerup	Designer:	Alaina Dahl
Code reports:	ESR-1336	Company:	Boise Cascade - Lathrop



Total Horizontal Product Length = 12-07-11

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B1, 3-1/2"	786 / 0	595 / 0			
B2, 1-3/4"	604 / 0	417 / 0			

Load Summary

Tag	Description	Load Type	Ref.	Start	End	Loc.	Live 100%	Dead 90%	Snow 115%	Wind 160%	Roof Live 125%	OCS
1	Standard Load	Unf. Area (lb/ft²)	L	00-00-00	12-07-11	Top	40	25				24"
2	3rd Floor Load	Conc. Lin. (lb/ft)	L	03-07-06	03-07-06	Top	189	118				24"
3	Bearing Wall	Conc. Lin. (lb/ft)	L	03-07-06	03-07-06	Top		72				24"

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	3919 ft-lbs	62.9%	100%	1	04-10-03
End Reaction	1381 lbs	96.9%	100%	1	00-00-00
End Shear	1343 lbs	80.2%	100%	1	00-03-08
Total Load Deflection	L/606 (0.244")	59.4%	n\a	1	05-11-08
Live Load Deflection	L/1057 (0.14")	45.4%	n\a	2	06-01-00
Max Defl.	0.244"	n\a	n\a	1	05-11-08
Span / Depth	12.5				

Bearing Supports

		Dim. (LxW)	Value	% Allow Support	% Allow Member	Material
B1	Wall/Plate	3-1/2" x 2-5/16"	1381 lbs	n\a	96.9%	Unspecified
B2	Wall/Plate	1-3/4" x 2-5/16"	1020 lbs	n\a	84.6%	Unspecified

RENEWS: 12/31/23

Notes

Design meets User specified (L/360) Total load deflection criteria.
Design meets User specified (L/480) Live load deflection criteria.
Composite EI value based on 3/4" thick OSB sheathing glued and nailed to member.
Design based on Dry Service Condition.
BC CALC® analysis is based on IBC 2018.
Calculations assume member is fully braced.

User Notes

- 11 7/8" BCI 60 2.0 is structurally adequate to support the design loads according to the information shown on this design report.
- Loads and dimensions shall be verified by the project's design professional(s) of record.
- This certification is for a Boise Cascade individual building component only and not for the building system as a whole. The component design as shown on this report is based upon loadings and dimensions provided by others. Building designer is responsible for determining that the dimensions and loads for each component match those required by the plans and by the actual end use of the component. Verification of framing methods, bracing design, support conditions, connections, etc. is the responsibility of the building designer.

Disclosure

Single 11-7/8" BCI® 60-2.0 DF

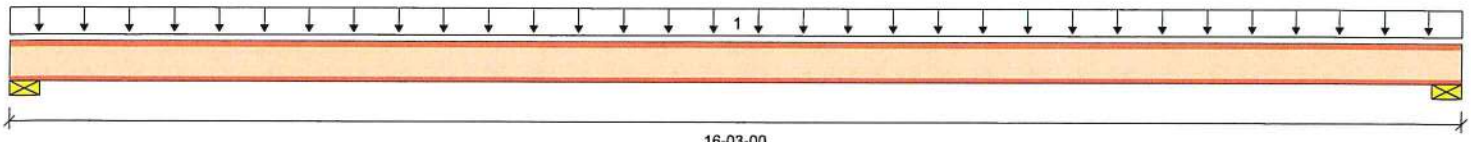
PASSED

J0417 (Joist)

BC CALC® Member Report — Dry | 1 span | No cant. | 24" OCS | Repetitive | Glued & nailed — October 30, 2023 13:31:20

Build 16959

Job name:	BMD Vancouver	File name:	2023_10_29_GardenParkEstates
Address:	SE 136th Ave	Description:	Worst Case Unit BCI 60
City, State, Zip:	Portland, OR, 97236	Specifier:	Froelich Consulting Engineers, Inc.
Customer:	Matheus Lumber - Van...ver - Larry Tommerup	Designer:	Alaina Dahl
Code reports:	ESR-1336	Company:	Boise Cascade - Lathrop



Total Horizontal Product Length = 16-03-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B1, 3-1/2"	650 / 0	406 / 0			
B2, 3-1/2"	650 / 0	406 / 0			

Load Summary

Tag	Description	Load Type	Ref.	Start	End	Loc.	Live 100%	Dead 90%	Snow 115%	Wind 160%	Roof Live 125%	OCS
1	Standard Load	Unf. Area (lb/ft²)	L	00-00-00	16-03-00	Top	40	25				24"

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	4052 ft-lbs	65.0%	100%	1	08-01-08
End Reaction	1056 lbs	74.1%	100%	1	00-00-00
End Shear	1018 lbs	60.8%	100%	1	00-03-08
Total Load Deflection	L/489 (0.388")	73.7%	n\a	1	08-01-08
Live Load Deflection	L/794 (0.239")	60.4%	n\a	2	08-01-08
Max Defl.	0.388"	n\a	n\a	1	08-01-08
Span / Depth	16.0				

Bearing Supports

		Dim. (LxW)	Value	% Allow Support	% Allow Member	Material
B1	Wall/Plate	3-1/2" x 2-5/16"	1056 lbs	n\a	74.1%	Unspecified
B2	Wall/Plate	3-1/2" x 2-5/16"	1056 lbs	n\a	74.1%	Unspecified

REGISTERED PROFESSIONAL ENGINEER 19271PE OREGON JULY 15, 1997 JEFFREY K. OLSON 10/30/23

RENEWS: 12/31/23

Notes

Design meets User specified (L/360) Total load deflection criteria.
Design meets User specified (L/480) Live load deflection criteria.
Composite EI value based on 3/4" thick OSB sheathing glued and nailed to member.
Design based on Dry Service Condition.
BC CALC® analysis is based on IBC 2018.
Calculations assume member is fully braced.

User Notes

- 11 7/8" BCI 60 2.0 is structurally adequate to support the design loads according to the information shown on this design report.
- Loads and dimensions shall be verified by the project's design professional(s) of record.
- This certification is for a Boise Cascade individual building component only and not for the building system as a whole. The component design as shown on this report is based upon loadings and dimensions provided by others. Building designer is responsible for determining that the dimensions and loads for each component match those required by the plans and by the actual end use of the component. Verification of framing methods, bracing design, support conditions, connections, etc. is the responsibility of the building designer.

Disclosure

Boise Cascade ENGINEERED WOOD PRODUCTS

Single 11-7/8" BCI® 60-2.0 DF

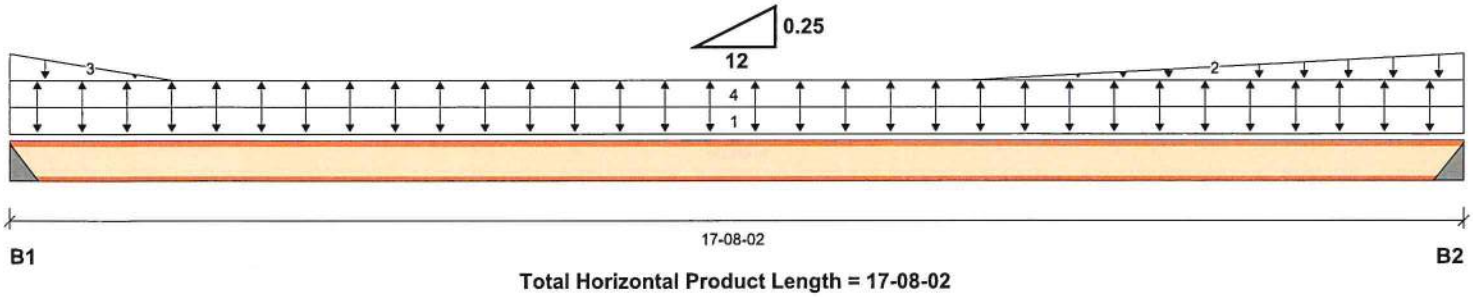
PASSED

J0419 (Rafter)

BC CALC® Member Report | Dry | 1 span | No cant. | 24" OCS | Repetitive | 0.25/12 | October 30, 2023 13:31:20

Build 16959

Job name:	BMD Vancouver	File name:	2023_10_29_GardenParkEstates
Address:	SE 136th Ave	Description:	Bldg C Worst Case Roof BCI 60
City, State, Zip:	Portland, OR, 97236	Specifier:	Froelich Consulting Engineers, Inc.
Customer:	Matheus Lumber - Van...ver - Larry Tommerup	Designer:	Alaina Dahl
Code reports:	ESR-1336	Company:	Boise Cascade - Lathrop



Total Horizontal Product Length = 17-08-02

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B1, 2"		265 / 0	466 / 0	0 / 689	
B2, 2"		265 / 0	560 / 0	0 / 689	

Load Summary

Tag	Description	Load Type	Ref.	Start	End	Loc.	Live 100%	Dead 90%	Snow 115%	Wind 160%	Roof Live 125%	Tributary
1	Standard Load	Unf. Area (lb/ft²)	L	00-00-00	17-08-02	Top		15	25			02-00-00
2	End Snow Drift	Trapezoidal (lb/ft)	R	00-00-00		Top			44			n\a
					06-00-00				0			
3	End Snow Drift	Trapezoidal (lb/ft)	L	00-00-00		Top			10			n\a
					02-00-00				0			
4	Max. Wind Uplift per Structural Notes (Ultimate)	Unf. Area (lb/ft²)	L	00-00-00	17-08-02	Top				-39		02-00-00

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	3180 ft-lbs	44.4%	115%	4	09-01-12
Neg. Moment	-1099 ft-lbs	11.0%	160%	10	08-10-01
End Reaction	825 lbs	58.0%	115%	4	17-08-02
End Shear	804 lbs	41.8%	115%	4	17-06-02
Total Load Deflection	L/466 (0.45")	51.5%	n\a	4	08-10-01
Live Load Deflection	L/715 (-0.293")	50.3%	n\a	12	08-10-01
Total Neg. Defl.	L/999 (-0.079")	n\a	n\a	9	08-10-01
Max Defl.	0.45"	n\a	n\a	4	08-10-01
Span / Depth	17.7				

Bearing Supports

		Dim. (LxW)	Value	% Allow Support	% Allow Member	Material
B1	Hanger	2" x 2-5/16"	731 lbs	n\a	51.4%	Hanger
B1	Uplift		255 lbs			
B2	Hanger	2" x 2-5/16"	825 lbs	n\a	58.0%	Hanger
B2	Uplift		255 lbs			

Slope and Cut Length

	Slope	Fascia Depth	Horiz. Length	Product Length
Plumb Cut with Hanger to dbl. top plate	0.25/12	11-7/8"	17-08-02	17-08-07

Boise Cascade ENGINEERED WOOD PRODUCTS

Single 11-7/8" BCI® 60-2.0 DF

PASSED

J0419 (Rafter)

BC CALC® Member Report | Dry | 1 span | No cant. | 24" OCS | Repetitive | 0.25/12 | October 30, 2023 13:31:20

Build 16959

Job name:	BMD Vancouver	File name:	2023_10_29_GardenParkEstates
Address:	SE 136th Ave	Description:	Bldg C Worst Case Roof BCI 60
City, State, Zip:	Portland, OR, 97236	Specifier:	Froelich Consulting Engineers, Inc.
Customer:	Matheus Lumber - Van...ver - Larry Tommerup	Designer:	Alaina Dahl
Code reports:	ESR-1336	Company:	Boise Cascade - Lathrop

Cautions

Uplift = -255 lb at bearings B1, B2

For roof members with slope (1/4)/12 or less final design must ensure that ponding instability will not occur.

For roof members with slope (1/2)/12 or less final design must account for Rain-on-Snow surcharge load.

Hangers have not been analyzed for capacity.

Notes

Design meets User specified (L/240) Total load deflection criteria.

Design meets User specified (L/360) Live load deflection criteria.

Design based on Dry Service Condition.

BC CALC® analysis is based on IBC 2018.

Calculations assume member is fully braced.

Blocking required at 1/3rd points along span length if bottom flanges are not braced, due to wind uplift.

User Notes

- 11 7/8" BCI 60 2.0 is structurally adequate to support the design loads according to the information shown on this design report.
- Loads and dimensions shall be verified by the project's design professional(s) of record.
- This certification is for a Boise Cascade individual building component only and not for the building system as a whole. The component design as shown on this report is based upon loadings and dimensions provided by others. Building designer is responsible for determining that the dimensions and loads for each component match those required by the plans and by the actual end use of the component. Verification of framing methods, bracing design, support conditions, connections, etc. is the responsibility of the building designer.

Disclosure

Use of the Boise Cascade Software is subject to the terms of the End User License Agreement (EULA). Completeness and accuracy of input must be reviewed and verified by a qualified engineer or other appropriate expert to assure its adequacy, prior to anyone relying on such output as evidence of suitability for a particular application. The output here is based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

BC CALC®, BC FRAMER® , AJS™, ALLJOIST® , BC RIM BOARD™, BCI® , BOISE GLULAM™, BC FloorValue® , VERSA-LAM®, VERSA-RIM PLUS® ,

Single 11-7/8" BCI® 60-2.0 DF

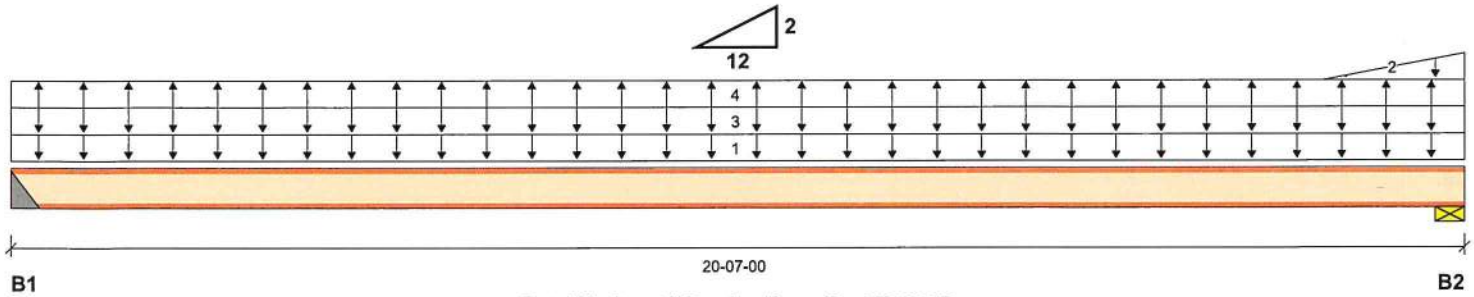
PASSED

J0422 (Rafter)

BC CALC® Member Report | Dry | 1 span | No cant. | 24" OCS | Repetitive | 2/12 | October 30, 2023 13:31:20

Build 16959

Job name:	BMD Vancouver	File name:	2023_10_29_GardenParkEstates
Address:	SE 136th Ave	Description:	Bldg B Worst Case Roof BCI 60
City, State, Zip:	Portland, OR, 97236	Specifier:	Froelich Consulting Engineers, Inc.
Customer:	Matheus Lumber - Van...ver - Larry Tommerup	Designer:	Alaina Dahl
Code reports:	ESR-1336	Company:	Boise Cascade - Lathrop



Total Horizontal Product Length = 20-07-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B1, 2"		311 / 0	768 / 0	0 / 798	
B2, 3-1/2"		315 / 0	787 / 0	0 / 808	

Load Summary

Tag	Description	Load Type	Ref.	Start	End	Loc.	Live 100%	Dead 90%	Snow 115%	Wind 160%	Roof Live 125%	Tributary
1	Standard Load	Unf. Area (lb/ft²)	L	00-00-00	20-07-00	Top		15	25			02-00-00
2	End Snow Drift	Trapezoidal (lb/ft)	R	00-00-00		Top			10			n\a
					02-00-00				0			
3	Side Drift	Unf. Area (lb/ft²)	L	00-00-00	20-07-00	Top		0	13			02-00-00
4	Max. Wind Uplift per Structural Notes (Ultimate)	Unf. Area (lb/ft²)	L	00-00-00	20-07-00	Top				-39		02-00-00

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	5405 ft-lbs	75.4%	115%	4	10-01-01
Neg. Moment	-1530 ft-lbs	15.3%	160%	10	10-01-01
End Reaction	1079 lbs	75.8%	115%	4	00-00-00
End Shear	1068 lbs	55.4%	115%	4	20-03-08
Total Load Deflection	L/241 (1.023")	74.8%	n\a	4	10-01-01
Live Load Deflection	L/338 (0.728")	71.0%	n\a	11	10-01-01
Total Neg. Defl.	L/1646 (-0.15")	10.9%	n\a	9	10-01-01
Max Defl.	1.023"	n\a	n\a	4	10-01-01
Span / Depth	20.5				

Bearing Supports

		Dim. (LxW)	Value	% Allow Support	% Allow Member	Material
B1	Hanger	2" x 2-5/16"	1079 lbs	n\a	75.8%	Hanger
B1	Uplift		292 lbs			
B2	Wall/Plate	3-1/2" x 2-5/16"	1102 lbs	n\a	67.2%	Unspecified
B2	Uplift		296 lbs			

Slope and Cut Length

	Slope	Fascia Depth	Horiz. Length	Product Length
Plumb Cut with Hanger to dbl. top plate	2/12	12-1/16"	20-07-00	21-00-06

Cautions

Uplift = -296 lb at bearings B1, B2

Hangers have not been analyzed for capacity.

Boise Cascade® ENGINEERED WOOD PRODUCTS

Single 11-7/8" BCI® 60-2.0 DF

PASSED

J0422 (Rafter)

BC CALC® Member Report | Dry | 1 span | No cant. | 24" OCS | Repetitive | 2/12 | October 30, 2023 13:31:20

Build 16959

Job name:	BMD Vancouver	File name:	2023_10_29_GardenParkEstates
Address:	SE 136th Ave	Description:	Bldg B Worst Case Roof BCI 60
City, State, Zip:	Portland, OR, 97236	Specifier:	Froelich Consulting Engineers, Inc.
Customer:	Matheus Lumber - Van...ver - Larry Tommerup	Designer:	Alaina Dahl
Code reports:	ESR-1336	Company:	Boise Cascade - Lathrop

Notes

Design meets Code minimum (L/180) Total load deflection criteria.
Design meets Code minimum (L/240) Live load deflection criteria.
Design based on Dry Service Condition.
BC CALC® analysis is based on IBC 2018.
Calculations assume member is fully braced.
Blocking required at 1/4rd points along span length if bottom flanges are not braced, due to wind uplift.

User Notes

- 11 7/8" BCI 60 2.0 is structurally adequate to support the design loads according to the information shown on this design report.
- Loads and dimensions shall be verified by the project's design professional(s) of record.
- This certification is for a Boise Cascade individual building component only and not for the building system as a whole. The component design as shown on this report is based upon loadings and dimensions provided by others. Building designer is responsible for determining that the dimensions and loads for each component match those required by the plans and by the actual end use of the component. Verification of framing methods, bracing design, support conditions, connections, etc. is the responsibility of the building designer.

RENEWS: 12/31/23

Disclosure

Use of the Boise Cascade Software is subject to the terms of the End User License Agreement (EULA). Completeness and accuracy of input must be reviewed and verified by a qualified engineer or other appropriate expert to assure its adequacy, prior to anyone relying on such output as evidence of suitability for a particular application. The output here is based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

BC CALC®, BC FRAMER® , AJS™, ALLJOIST® , BC RIM BOARD™, BCI® , BOISE GLULAM™, BC FloorValue® , VERSA-LAM®, VERSA-RIM PLUS® ,

Single 5-1/2" x 12" BOISE GLULAM® 24F-V4/DF

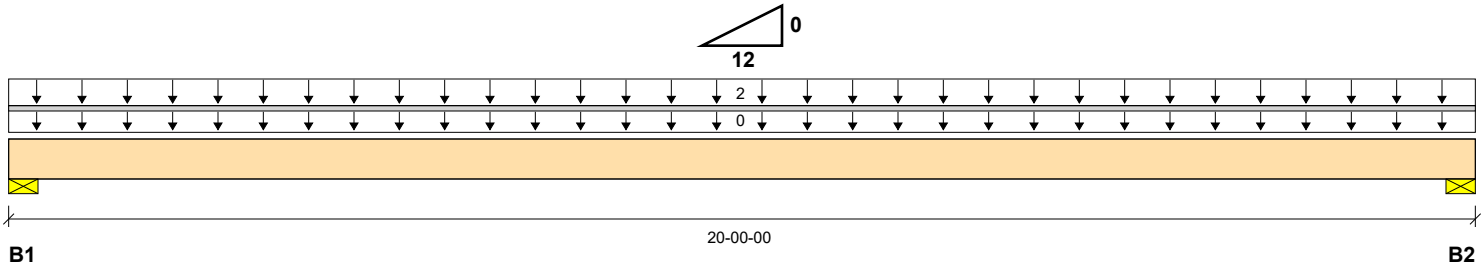
PASSED

FB0220 (Roof Drop Beam)

BC CALC® Member Report — Dry | 1 span | No cant. — October 31, 2023 13:42:32

Build 16959

Job name:	Garden Park Estates	File name:	Garden Park Estates
Address:	SE 136th Ave	Description:	Bike Shelter Beam
City, State, Zip:	Portland, OR, 97236	Specifier:	Froelich Consulting Engineers, Inc.
Customer:		Designer:	AD
Code reports:	PR-L313	Company:	Boise Cascade - Vancouver



Total Horizontal Product Length = 20-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B1, 3-1/2"		1585 / 0	2375 / 0		
B2, 3-1/2"		1585 / 0	2375 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	Loc.	Live 100%	Dead 90%	Snow 115%	Wind 160%	Roof Live 125%	Tributary
0	Self-Weight	Unf. Lin. (lb/ft)	L	00-00-00	20-00-00	Top		16				00-00-00
2	ROOF LOADING	Unf. Area (lb/ft²)	L	00-00-00	20-00-00	Top		15	25			09-06-00

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	18905 ft-lbs	62.4%	115%	4	10-00-00
End Shear	3449 lbs	25.7%	115%	4	01-03-08
Total Load Deflection	L/257 (0.912")	70.0%	n\a	4	10-00-00
Live Load Deflection	L/429 (0.547")	55.9%	n\a	5	10-00-00
Max Defl.	0.912"	91.2%	n\a	4	10-00-00
Span / Depth	19.5				

Bearing Supports

		Dim. (LxW)	Value	% Allow Support	% Allow Member	Material
B1	Wall/Plate	3-1/2" x 5-1/2"	3960 lbs	n\a	31.7%	Unspecified
B2	Wall/Plate	3-1/2" x 5-1/2"	3960 lbs	n\a	31.7%	Unspecified

Cautions

For roof members with slope (1/4)/12 or less final design must ensure that ponding instability will not occur.

For roof members with slope (1/2)/12 or less final design must account for Rain-on-Snow surcharge load.

Notes

Design meets Code minimum (L/180) Total load deflection criteria.

Design meets Code minimum (L/240) Live load deflection criteria.

Design meets arbitrary (1") Maximum Total load deflection criteria.

Design based on Dry Service Condition.

BC CALC® analysis is based on IBC 2009.

Calculations assume member is fully braced.

Disclosure

ICC EVALUATION SERVICE®

ICC-ES Evaluation Report

ESR-1940

Reissued January 2022
Revised March 2023
This report is subject to renewal January 2024.

www.icc-es.org | (800) 423-6587 | (562) 699-0543 *A Subsidiary of the International Code Council®*

DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 02 00—Design Information

REPORT HOLDER:

APA—THE ENGINEERED WOOD ASSOCIATION

EVALUATION SUBJECT:

GLUED-LAMINATED TIMBER COMBINATIONS AND THE GAP COMPUTER PROGRAM

ADDITIONAL LISTEES:

ANTHONY FOREST PRODUCTS CO.

ROSBORO, LLC

WFP ENGINEERED PRODUCTS, LLC

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015 and 2012 *International Building Code®* (IBC)
- 2021, 2018, 2015 and 2012 *International Residential Code®* (IRC)

Property evaluated:

Structural

2.0 USES

The GAP computer program is utilized to determine design stresses for the specific layups of glued-laminated timbers listed in Tables 1 and 2 of this report.

Glued-laminated timbers manufactured to the glued-laminated timber combinations or single grade layups that have been developed using the GAP program, and that are produced at the facilities listed in Table 3, are recognized as being in compliance with the design parameters indicated in Section 3.0 of this report.

3.0 DESCRIPTION

The GAP computer program is based on the principles of ASTM D3737. It is an alternative method for determining associated allowable design stresses for a given layup combination of glued-laminated timber. The GAP computer program complies with the IBC and the IRC for allowable stress design. The design assumptions discussed in Sections 3.1 through 3.4 of this report are basic parameters utilized with the development of the allowable design stresses for the combinations listed in Table 1 or single grade layups listed in Table 2. See Section 5.4 for requirements applicable to these parameters.

3.1 Adhesive:

Face and end-joint bonding adhesives comply with ASTM D2559 for exterior or wet use.

3.2 End Joints:

End joints comply with ANSI A190.1 and ASTM D3737.

3.3 Lumber:

Lumber having a nominal thickness of 2 inches or less is glued-laminated into rectangular cross sections complying with industry standards for depth, width, and appearance. Lumber that is E-rated or visually graded complies with rules of applicable approved lumber grading agencies and the procedures set forth in the manufacturer's quality control documentation. Quality control for E-rating and beam fabrication is conducted under the supervision of an approved third-party inspection agency. Grade specifications are included in rules of the applicable approved lumber grading agencies and follow industry classifications and nomenclature as provided in the applicable code.

3.4 Layup:

Beams are fabricated in accordance with ANSI A190.1 using the grade combinations noted in Table 1 or single grade layups noted in Table 2 of this report. Combinations are in accordance with ASTM D3737 requirements. Resawn purlin beams, manufactured by ripping nominally 6-inch beams vertically through their depth into two members of equal width, are permitted to be produced from Canadian spruce-pine (CSP) and spruce-pine-fir (SPF) combinations in this width without any variation in basic grade description or layup procedures.

4.0 DESIGN

The design requirements of structural glued-laminated timber must comply with Section 2306 or 2307 of the IBC, or Sections R502.2 and R802.2 of the IRC, as applicable. Modifications of values for duration of load must comply with the IBC or the IRC, as applicable.

5.0 CONDITIONS OF USE

The specific layups for the glued-laminated timbers described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The application of the GAP computer program is limited to the layup combinations shown in Tables 1 or 2. Design stresses for normal conditions of loading must not exceed those set forth in Tables 1 or 2.

5.2 Design stresses for combinations noted in Table 1 are for members with four or more laminations stressed primarily in bending due to loads applied perpendicular to the wide faces of the laminations. Design values are included, however, for axial stresses and stresses from bending due to loads applied parallel to the wide faces of the laminations.

5.3 Design stresses for combinations noted in Table 2 are for members with two or more laminations stressed primarily axially or in bending due to loads applied parallel to the wide faces of the laminations. Design values are included, however, for stresses from bending due to loads applied perpendicular to the wide faces of the laminations.

5.4 The effects of checking of the members are outside the scope of this report.

5.5 Glued-laminated timber manufactured to the glued-laminated timber combinations or single grade layups that have been developed using the GAP program, listed in Tables 1 and 2, and that are produced at the facilities listed in Table 3, are recognized as being in compliance with the design parameters indicated in Section 3.0 of this report.

Evaluation of glue-laminated timber manufactured in accordance with this report but produced by manufacturers not listed in Table 3 must be recognized in a current ICC-ES report as being in compliance with the design parameters indicated in Section 3.0 of this report.

5.6 The quality program for monitoring the use of the GAP computer program must be in accordance with "Quality Control Requirements for the GAP Computer Program," dated July 26, 2006.

6.0 EVIDENCE SUBMITTED

6.1 Program Guide for the GAP Computer Program.

6.2 Data in accordance with ASTM D3737.

6.3 Quality system documentation.

7.0 IDENTIFICATION

7.1 Each glued-laminated beam manufactured using layup combinations determined in accordance with this report and produced at the facilities listed in Table 3 must be identified with the ICC-ES evaluation report number (ESR-1940).

7.2 The report holder's contact information is the following:

APA—THE ENGINEERED WOOD ASSOCIATION
7011 SOUTH 19TH STREET
TACOMA, WASHINGTON 98466
(253) 565-6600
www.apawood.org

7.3 The additional listees' contact information is the following:

ANTHONY FOREST PRODUCTS CO.
309 NORTH WASHINGTON
EL DORADO, ARKANSAS 71730

ROSBORO, LLC
POST OFFICE BOX 20
SPRINGFIELD, OREGON 97477

WFP ENGINEERED PRODUCTS, LLC
POST OFFICE BOX 11122
800-1055 WEST GEORGIA STREET
VANCOUVER, BRITISH COLUMBIA V6E 3P3
CANADA

Table 1 – Reference Design Values for Structural Glued Laminated Softwood Timber Combinations[a]
(Members stressed primarily in bending) (Tabulated design values are for normal load duration and dry service conditions.)

Combination Symbol	Species[b] Outer/Core	Bending About X-X Axis (Loaded Perpendicular to Wide Faces of Laminations)								Bending About Y-Y Axis (Loaded Parallel to Wide Faces of Laminations)						Axially Loaded		Fasteners	
		Extreme Fiber in Bending[c]		Compression Perpendicular to Grain		Shear Parallel to Grain	Modulus of Elasticity[f]			Extreme Fiber in Bending[g]	Compression Perpendicular to Grain	Shear Parallel to Grain	Modulus of Elasticity[f]			Tension Parallel to Grain	Compression Parallel to Grain	Specific Gravity for Fastener Design	
		Bottom of Beam Stressed in tension (Positive Bending)	Top of Beam Stressed in Tension (Negative Bending)	Tension Face	Compression Face													Top or Bottom Face	Side Face
		F_{bx}^{+} (psi)	F_{bx}^{-} (psi)	$F_{c\perp x}$ (psi)		F_{vx}[d] (psi)	$E_{x\,true}$ (10^6 psi)	$E_{x\,app}$ (10^6 psi)	$E_{x\,min}$ (10^6 psi)	F_{by} (psi)	$F_{c\perp y}$ (psi)	F_{vy}[d,e] (psi)	$E_{y\,true}$ (10^6 psi)	$E_{y\,app}$ (10^6 psi)	$E_{y\,min}$ (10^6 psi)	F_t (psi)	F_c (psi)	G	
16F-V3	DF/DF	1600	1250	560	560	265	1.6	1.5	0.79	1450	560	230	1.6	1.5	0.79	975	1500	0.50	0.50
20F-E/ES1[h]	ES/ES	2000	2000	560	560	200	1.9	1.8	0.95	1100	300	175	1.6	1.5	0.79	1050	1150	0.41	0.41
20F-E/SPF1[i]	SPF/SPF	2000	2000	425	425	215	1.6	1.5	0.79	875	425	190	1.5	1.4	0.74	425	1100	0.42	0.42
20F-E8	ES/ES	2000	1300	450	450	200	1.6	1.5	0.79	1000	315	175	1.5	1.4	0.74	825	1100	0.41	0.41
20F-E8M1	ES/ES	2000	2000	450	450	200	1.6	1.5	0.79	1400	315	175	1.5	1.4	0.74	825	1100	0.41	0.41
20F-V4	DF/DF	2000	1450	590	560	265	1.7	1.6	0.85	1450	560	230	1.7	1.6	0.85	975	1550	0.50	0.50
20F-V8	DF/DF	2000	2000	590	590	265	1.7	1.6	0.85	1450	560	230	1.7	1.6	0.85	975	1600	0.50	0.50
20F-V12	AC/AC	2000	1400	560	560	265	1.6	1.5	0.79	1250	470	230	1.5	1.4	0.74	925	1500	0.46	0.46
20F-V13	AC/AC	2000	2000	560	560	265	1.6	1.5	0.79	1250	470	230	1.5	1.4	0.74	950	1550	0.46	0.46
22F-V/POC1	POC/POC	2200	2200	560	560	265	1.9	1.8	0.95	1500	375	230	1.7	1.6	0.79	1150	1950	0.45	0.45
22F-V/POC2	POC/POC	2200	1600	560	560	265	1.9	1.8	0.95	1500	375	230	1.7	1.8	0.79	1150	1900	0.45	0.45
24F-E/CSP1	CSP/CSP	2400	2400	560	580	215	1.7	1.8	0.85	1150	470	190	1.7	1.6	0.85	1150	2000	0.42	0.42
24F-E/CSP2	CSP/CSP	2400	2400	580	560	215	1.9	1.8	0.95	1500	470	190	1.7	1.6	0.85	1150	2000	0.42	0.42
24F-E/CSP3	CSP/CSP	2400	1550	560	650	215	1.7	1.6	0.85	1200	470	195	1.6	1.5	0.79	900	1750	0.42	0.42
24F-E/CSP4	CSP/CSP	2400	1700	560	650	215	1.9	1.8	0.95	1400	470	200	1.7	1.6	0.85	1150	1900	0.42	0.42
24F-E/SPF1	SPF/SPF	2400	2400	560	560	215	1.7	1.6	0.85	1150	470	190	1.7	1.6	0.85	1150	2000	0.42	0.42
24F-E/SPF2	SPF/SPF	2400	2400	560	560	215	1.9	1.8	0.95	1500	470	190	1.7	1.6	0.85	1150	2000	0.42	0.42
24F-E/SPF3	SPF/SPF	2400	1550	560	650	215	1.7	1.6	0.85	1200	470	195	1.6	1.5	0.79	900	1750	0.42	0.42
24F-E/SPF4	SPF/SPF	2400	1700	560	650	215	1.9	1.8	0.95	1400	470	200	1.7	1.6	0.85	1150	1900	0.42	0.42
24F-E/ES1	ES/ES	2400	1700	560	560	200	1.8	1.7	0.90	1100	300	175	1.6	1.5	0.79	1050	1150	0.41	0.41
24F-E/ES1M1	ES/ES	2400	2400	560	560	200	1.9	1.8	0.95	1100	300	175	1.6	1.5	0.79	1050	1150	0.41	0.41
24F-E15M1	HF/HF	2400	1800	500	500	215	1.9	1.8	0.95	1200	375	190	1.6	1.5	0.79	975	1500	0.43	0.43
24F-V4	DF/DF	2400	1850	650	650	265	1.9	1.8	0.95	1450	560	230	1.7	1.6	0.85	1100	1650	0.50	0.50
24F-V4M1[j]	DF/DF	2400	1850	650	650	265	1.9	1.8	0.95	1450	560	230	1.7	1.6	0.85	1100	1650	0.50	0.50
24F-V4M2[j]	DF/DF	2400	1850	650	650	220	1.9	1.8	0.95	1450	560	230	1.7	1.6	0.85	1100	1650	0.50	0.50
24F-V5	DF/HF	2400	1800	650	650	215	1.8	1.7	0.90	1350	375	200	1.6	1.5	0.79	1100	1450	0.50	0.43
24F-V5M1	DF/SPF	2400	1600	650	650	215	1.9	1.8	0.95	1200	375	200	1.6	1.5	0.79	1050	1450	0.50	0.42
24F-V5M2[h]	DF/HF	2400	1600	650	650	215	1.9	1.8	0.95	1200	375	200	1.6	1.5	0.79	1150	1450	0.50	0.43
24F-V5M3[h]	DF/HF	2400	1600	650	650	215	1.9	1.8	0.95	1200	375	200	1.6	1.5	0.79	1150	1450	0.50	0.43
24F-V8	DF/DF	2400	2400	650	650	265	1.9	1.8	0.95	1550	560	230	1.7	1.6	0.85	1100	1650	0.50	0.50
24F-V8M1[j]	DF/DF	2400	2400	650	650	265	1.9	1.8	0.95	1550	560	230	1.7	1.6	0.85	1100	1650	0.50	0.50
24F-V8M2[j]	DF/DF	2400	2400	650	650	220	1.9	1.8	0.95	1550	560	230	1.7	1.6	0.85	1100	1650	0.50	0.50
24F-V10	DF/HF	2400	2400	650	650	215	1.9	1.8	0.95	1450	375	200	1.6	1.5	0.79	1150	1550	0.50	0.43
24F-V/DF1[h]	DF/SW	2400	1600	650	650	195	1.9	1.8	0.95	900[k]	255	205	1.5	1.4	0.74	1000	1250	0.50	0.42
26F-E/DF1[h]	DF/DF	2600	1950[k]	650	650	265	2.1	2.0	1.06	1850	560	230	1.9	1.8	0.95	1400	1800	0.50	0.50
26F-E/DF1M1[h]	DF/DF	2600	2600	650	650	265	2.1	2.0	1.06	1850	560	230	1.9	1.8	0.95	1400	1800	0.50	0.50
24F-1.8E Glulam Header[l]	WS,SP/WS, SP	2400	1800	500	500	215	1.9	1.8	0.95	1300	375	200	1.6	1.5	0.79	950	1200	0.42	0.42
16F-V5M1[j]	SP/SP	1600	1600	650	650	300	1.5	1.4	0.74	1750	650	260	1.5	1.4	0.74	1000	1500	0.55	0.55
24F-E/SP1[i]	SP/SP	2400	2400	740	740	300	1.9	1.8	0.95	1650	650	260	1.7	1.6	0.85	1150	1650	0.55	0.55
24F-V1	SP/SP	2400	1750	740	650	300	1.8	1.7	0.90	1450	650	260	1.6	1.5	0.79	1100	1500	0.55	0.55
24F-V3	SP/SP	2400	2000	740	740	300	1.9	1.8	0.95	1700	650	260	1.7	1.6	0.85	1150	1650	0.55	0.55
24F-V3M1[j]	SP/SP	2400	2000	740	740	300	1.9	1.8	0.95	1750	650	280	1.7	1.6	0.85	1150	1650	0.55	0.55
24F-V3M2[j]	SP/SP	2400	2000	740	740	250	1.9	1.8	0.95	1750	650	260	1.7	1.6	0.85	1150	1650	0.55	0.55
24F-V4[f]	SP/SP	2400	1650	740	850	210	1.8	1.7	0.90	1350	470	230	1.6	1.5	0.79	975	1350	0.55	0.55
24F-V5	SP/SP	2400	2400	740	740	300	1.8	1.7	0.90	1700	650	265	1.6	1.5	0.79	1150	1600	0.55	0.55
24F-V5M1	SP/SP	2400	2400	740	740	300	1.9	1.8	0.95	1700	650	260	1.6	1.5	0.79	1150	1600	0.55	0.55
24F-V5M2	SP/SP	2400	2400	740	740	300	1.9	1.8	0.95	1700	650	260	1.6	1.5	0.79	1150	1600	0.55	0.55
24F-V5M3	SP/SP	2400	2400	740	740	250	1.9	1.8	0.95	1700	650	260	1.6	1.5	0.79	1150	1600	0.55	0.55
Wet-use factors		0.8		0.53		0.875	0.833			0.8	0.53	0.875	0.833			0.8	0.73	See NDS	

Table 1 (Continued)– Reference Design Values for Structural Glued Laminated Softwood Timber Combinations[a]
(Members stressed primarily in bending) (Tabulated design values are for normal load duration and dry service conditions.)

Combination Symbol	Species[b] Outer/Core	Bending About X-X Axis (Loaded Perpendicular to Wide Faces of Laminations)								Bending About Y-Y Axis (Loaded Parallel to Wide Faces of Laminations)						Axially Loaded		Fasteners	
		Extreme Fiber in Bending[c]		Compression Perpendicular to Grain		Shear Parallel to Grain	Modulus of Elasticity[f]			Extreme Fiber in Bending[g]	Compression Perpendicular to Grain	Shear Parallel to Grain	Modulus of Elasticity[f]			Tension Parallel to Grain	Compression Parallel to Grain	Specific Gravity for Fastener Design	
		Bottom of Beam Stressed in tension (Positive Bending)	Top of Beam Stressed in Tension (Negative Bending)	Tension Face	Compression Face													Top or Bottom Face	Side Face
		F_{bx}^+ (psi)	F_{bx}^- (psi)	$F_{c\perp x}$ (psi)		F_{vx}[d] (psi)	$E_{x\,true}$ (10^6 psi)	$E_{x\,app}$ (10^6 psi)	$E_{x\,min}$ (10^6 psi)	F_{by} (psi)	$F_{c\perp y}$ (psi)	F_{vy}[d,e] (psi)	$E_{y\,true}$ (10^6 psi)	$E_{y\,app}$ (10^6 psi)	$E_{y\,min}$ (10^6 psi)	F_t (psi)	F_c (psi)	G	
26F-V1	SP/SP	2600	2000	740	740	300	1.9	1.8	0.95	1700	650	260	1.7	1.6	0.85	1150	1600	0.55	0.55
26F-V2	SP/SP	2600	2100	740	740	300	2.0	1.9	1.00	1950	740	260	1.9	1.8	0.95	1300	1850	0.55	0.55
26F-V3	SP/SP	2600	2100	740	740	300	2.0	1.9	1.00	1950	650	260	1.9	1.8	0.95	1250	1800	0.55	0.55
26F-V3M1[j]	SP/SP	2600	2100	740	740	300	2.0	1.9	1.00	1950	650	260	1.9	1.8	0.95	1250	1800	0.55	0.55
26F-V3M2[j]	SP/SP	2600	2100	740	740	250	2.0	1.9	1.00	1950	650	260	1.9	1.8	0.95	1250	1800	0.55	0.55
26F-V4	SP/SP	2600	2600	740	740	300	2.0	1.9	1.00	1700	650	260	1.9	1.8	0.95	1200	1600	0.55	0.55
26F-V4M1[j]	SP/SP	2600	2600	740	740	300	2.0	1.9	1.00	1700	650	260	1.9	1.8	0.95	1200	1600	0.55	0.55
26F-V4M2[j]	SP/SP	2600	2600	740	740	250	2.0	1.9	1.00	1700	650	260	1.9	1.8	0.95	1200	1600	0.55	0.55
28F-E1	SP/SP	2800	2300	805	805	300	2.2[q]	2.1[q]	1.11[q]	1600	650	260	1.8	1.7	0.90	1300	1850	0.55	0.55
28F-E1M1	SP/SP	2800	2300	805	805	300	2.2	2.1	1.11	1600	650	260	1.8	1.7	0.90	1300	1850	0.55	0.55
28F-E2	SP/SP	2800	2800	805	805	300	2.2[q]	2.1[q]	1.11[q]	2000	650	260	1.8	1.7	0.90	1300	1850	0.55	0.55
28F-E2M1	SP/SP	2800	2800	805	805	300	2.2	2.1	1.11	2000	650	260	1.8	1.7	0.90	1300	1850	0.55	0.55
30F-E1[m]	SP/SP	3000	2400	805	805	300	2.2[q]	2.1[q]	1.11[q]	1750	650	260	1.8	1.7	0.90	1250	1750	0.55	0.55
30F-E1M1[m]	SP/SP	3000	2400	805	805	300	2.2	2.1	1.11	1750	650	260	1.8	1.7	0.90	1250	1750	0.55	0.55
30F-E1M2[n]	LVL/SP	3000[o]	2400	650[p]	740	300	2.2	2.1	1.11	1750	650	260	1.8	1.7	0.90	1250	1750	0.50	0.50
30F-E2[m]	SP/SP	3000	3000	805	805	300	2.2[q]	2.1[q]	1.11[q]	1750	650	260	1.8	1.7	0.90	1350	1750	0.55	0.55
30F-E2M1[m]	SP/SP	3000	3000	805	805	300	2.2	2.1	1.11	1750	650	260	1.8	1.7	0.90	1350	1750	0.55	0.55
30F-E2M2[n]	LVL/SP	3000[o]	3000[o]	650[p]	650[p]	300	2.2	2.1	1.11	1750	650	260	1.8	1.7	0.90	1350	1750	0.50	0.50
30F-E2M3[n]	LVL/SP	3000[o]	3000[o]	650[p]	650[p]	300	2.2	2.1	1.11	1750	650	260	1.8	1.7	0.90	1350	1750	0.50	0.50
Wet-use factors		0.8		0.53		0.875	0.833			0.8	0.53	0.875	0.833			0.8	0.73	See NDS	

For SI: 1 psi = 6.895 Pa

(a) The combinations in this table are applicable to members consisting of 4 or more laminations and are intended primarily for members stressed in bending due to loads applied perpendicular to the wide faces of the laminations. However, design values are tabulated for loading both perpendicular and parallel to the wide faces of the laminations. For combinations and design values applicable to members loaded primarily axially or parallel to the wide faces of the laminations, see Table 2. For members of 2 or 3 laminations, see Table 2. The tabulated design values are for dry conditions of use. For wet conditions of use, multiply the tabulated values by the factors shown at the bottom of the table. The tabulated design values are for normal duration of loading. For other durations of loading, see applicable building code.

(b) The symbols used for species are AC = Alaska cedar, CSP = Canadian spruce-pine, DF = Douglas fir-larch, ES = Eastern spruce, HF = Hem-fir, POC = Port Orford cedar; SP = Southern pine, SPF = Spruce-pine-fir, and SW = Softwood species.

(c) The tabulated design values in bending, F_{bx}, are based on members 5-1/8 inches in width by 12 inches in depth by 21 feet in length. For members with a larger volume, F_{bx} must be multiplied by a volume factor, C_v, determined in accordance with applicable building code. The tabulated F_{bx} values require the use of special tension laminations. If these special tension laminations are omitted, the F_{bx} values must be multiplied by 0.75 for members greater than or equal to 15 inches or by 0.85 for members less than 15 inches in depth. 20F-E/ES1 does not require special tension laminations.

(d) The design values for shear, F_{vx} and F_{vy} shall be decreased by multiplying by a factor of 0.72 for non-prismatic members, notched members, and for all members subject to impact or cyclic loading. The reduced design value shall be used for design of members at connections that transfer shear by mechanical fasteners. The reduced design value shall also be used for determination of design values for radial tension and torsion. F_{vx} and F_{vy} values do not include adjustments for checking.

(e) Design values are for timbers with laminations made from a single piece of lumber across the width or multiple pieces that have been edge bonded. For timber manufactured from multiple piece laminations (across width) that are not edge-bonded, value shall be multiplied by 0.4 for members with 5, 7, or 9 laminations or by 0.5 for all other members. This reduction shall be cumulative with the adjustment in footnote (d).

(f) See Section 2.5 of ANSI 117 (www.apawood.org) for the E_{true}, E_{app}, and E_{min}.

(g) The values of F_{by} were calculated based on members 12 inches in depth (bending about Y-Y axis). For depths other than 12 inches, the F_{by} values are permitted to be increased by multiplying by the size factor, $(12/d)^{1/9}$, where d is the beam depth in inches. When d is less than 3 inches, use the size adjustment factor for 3 inches.

(h) The beam depth limitation is as follows - 20F-E/ES1: 15 inches; 24F-V5M2/DF: 27 inches; 24F-V5M3/DF and 24F-V/DF1: 24 inches; 26F-E/DF1 and 26F-E/DF1M1: 9-1/2, 11-7/8, 14, and 16 inches.

(i) 20F-E/SPF1 is limited to 1-1/2 to 3-1/2 inches in width, and 7-1/2, 9, 9-1/2, 11-7/8, and 14 inches in depth. 24F-E/SP1 is limited to 9-1/2, 11-7/8, 14, 16, and 18 inches in depth.

(j) When containing wane, this combination must be used in dry conditions only. In this case, wet-use factors must not be applied. Because of the wane, this combination is available only for an industrial appearance characteristic. If wane is omitted, these restrictions must not apply. This combination is limited to 9 to 20 laminations in depth except for 16F-V5M1/SP, which contains a maximum of 1/6 wane on each side and must be 4 laminations or more in depth.

(k) For 26F-E/DF1, the F_{bx}^- value is permitted to be increased to 2,200 psi for beam depths less than 16 inches. For 24F-V/DF1, the F_{by} value is permitted to be increased to 1,300 psi for beam depths of at least 10-1/2 inches.

(l) This combination must be manufactured from either 24F-V4/WS, 24F-V5M1/WS, 24F-V5M2/WS, 24F-V5M3/WS, 24F-E15M1/WS, 24F-E/SPF4, or 24F-V3/SP, and is intended primarily for use in header applications.

(m) This layup combination is limited to nominal 6 inches or less in width. In addition, 30F-E1M1/SP and 30F-E2M1/SP are limited to 18 inches or less in depth.

(n) The beam depth is limited to 16 inches or less for 30F-E2M2/SP, and 30 inches or less for 30F-E1M2/SP and 30F-E2M3/SP. The tension lamination requirements for these layups must not be omitted.

(o) The tabulated design values in bending, F_{bx}, must be multiplied by a volume factor, C_v, determined in accordance with applicable building code using 1/10 as the exponent.

(p) The allowable compressive stress perpendicular to grain of the beam must be permitted to be increased to the published allowable compressive stress perpendicular to grain of the outermost laminated veneer lumber.

(q) For 28F and 30F members with more than 15 laminations, $E_{x\,true} = 2.1 \times 10^6$ psi, $E_{x\,app} = 2.0 \times 10^6$ psi, and $E_{x\,min} = 1.06 \times 10^6$ psi.

(r) This combination may contain lumber with wane. If lumber with wane is used, the design value for shear parallel to grain, F_{vx}, shall be multiplied by 0.67 if wane is allowed on both sides. If wane is limited to one side, F_{vx} shall be multiplied by 0.83. This reduction shall be cumulative with the adjustment in footnote (d).

Table 2 – Reference Design Values for Structural Glued Laminated Softwood Timber
(Members stressed primarily in axial tension or compression) (Tabulated design values are for normal load duration and dry service conditions.)

Combination Symbol	Species	Grade	All Loading: Modulus of Elasticity			Axially Loaded: Compression Perpendicular to Grain	Axially Loaded: Tension Parallel to Grain	Axially Loaded: Compression Parallel to Grain		Bending about Y-Y Axis (Loaded Parallel to Wide Faces of Laminations): Bending			Bending about Y-Y Axis: Shear Parallel to Grain[a,b]	Bending About X-X Axis (Loaded Perpendicular to Wide Faces of Laminations): Bending	Bending About X-X Axis: Shear Parallel to Grain[c]	Fasteners
			E_{axial} (10^6 psi)	$0.95\ E_{axial}$ (10^6 psi)	$E_{axial\ min}$ (10^6 psi)	$F_{c\perp}$ (psi)	2 or More Laminations F_t (psi)	4 or More Laminations F_c (psi)	2 or 3 Laminations F_c (psi)	4 or More Laminations F_{by} (psi)	3 Laminations F_{by} (psi)	2 Laminations F_{by} (psi)	F_{vy} (psi)	2 Laminations to 15 in. Deep[d] F_{bx} (psi)	F_{vx} (psi)	Specific Gravity for Fastener Design
Visually Graded Western Species																
1	DF	L3	1.6	1.5	0.79	560	950	1550	1250	1450	1250	1000	230	1250	265	0.50
2	DF	L2	1.7	1.6	0.85	560	1250	1950	1600	1800	1600	1300	230	1700	265	0.50
3	DF	L2D	2.0	1.9	1.00	650	1450	2300	1900	2100	1850	1550	230	2000	265	0.50
5	DF	L1	2.1	2.0	1.06	650	1650	2400	2100	2400	2100	1800	230	2200	265	0.50
22[e]	SW	L3	1.1	1.0	0.53	315	525	850	725	800	700	575	170	725	195	0.35
70	AC	L2	1.4	1.3	0.89	470	975	1450	1450	1400	1250	1000	230	1350	265	0.46
Visually Graded Southern Pine																
47	SP	N2M12	1.5	1.4	0.74	650	1200	1900	1150	1750	1550	1300	260	1400	300	0.55
48	SP	N2D12	1.8	1.7	0.90	740	1400	2200	1350	2000	1800	1500	260	1600	300	0.55
49	SP	N1M16	1.8	1.7	0.90	650	1350	2100	1450	1950	1750	1500	260	1800	300	0.55
50	SP	N1D14	2.0	1.9	1.00	740	1550	2300	1700	2300	2100	1750	260	2100	300	0.55
Wet-use factors			0.833			0.53	0.8	0.73		0.8			0.875	0.8	0.875	See NDS

For SI: 1 psi = 6.895 Pa

(a) For members with 2 or 3 laminations, the shear design value for transverse loads parallel to the wide faces of the laminations, F_{vy}, shall be reduced by multiplying by a factor of 0.84 or 0.95, respectively.

(b) The shear design value for transverse loads applied parallel to the wide faces of the laminations, F_{vy}, shall be multiplied by 0.4 for members with 5, 7, or 9 laminations manufactured from multiple piece laminations (across width) that are not edge bonded. The shear design value, F_{vy}, shall be multiplied by 0.5 for all other members manufactured from multiple piece laminations with unbonded edge joints. This reduction shall be cumulative with the adjustment in footnote (a).

(c) The design values for shear, F_{vx} and F_{vy}, shall be decreased by multiplying by a factor of 0.72 for non-prismatic members, notched members, and for all members subject to impact or cyclic loading. The reduced design value shall be used for design of members at connections that transfer shear by mechanical fasteners. The reduced design value shall also be used for determination of design values for radial tension and torsion.

(d) The tabulated F_{bx} values are for members without special tension lams up to 15 inches in depth. If the member depth is greater than 15 inches without special tension lams, the tabulated F_{bx} values must be multiplied by a factor of 0.88. If special tension lams are used, the tabulated F_{bx} values are permitted to be increased by a factor of 1.18 regardless of the member depth.

(e) When Western Cedars, Western Cedars (North), Western Woods, and Redwood (open grain) are used in combinations for Softwood Species (SW), the design value for modulus of elasticity shall be reduced by 100,000 psi. When Coast Sitka Spruce, Coast Species, Western White Pine, and Eastern White Pine are used in combinations for Softwood Species (SW) tabulated design values for shear parallel to grain, F_{vx} and F_{vy}, shall be reduced by 10 psi, before applying any other adjustments.

Table 3 – Manufacturing Locations

Manufacturer	Location
Anthony Forest Products Co.	295 Cooper Drive, El Dorado, AR 71730
Anthony Forest Products Co.	256 Edison Road, Washington, GA 30676
WFP Engineered Products, LLC	218 V Street, Vancouver, WA 98661
WFP Engineered Products, LLC	3559 Truman Road, Washougal, WA 98671
Rosboro	22833 Vaughn Road, Veneta, OR 97487
Rosboro	2509 Main Street, Springfield, OR 97477

ICC EVALUATION SERVICE

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Joint Evaluation Report

ESR-1040

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 17 13—Laminated Veneer Lumber

REPORT HOLDER:

BOISE CASCADE WOOD PRODUCTS, LLC

EVALUATION SUBJECT:

VERSA-LAM® LAMINATED VENEER LUMBER

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, 2012, 2009 and 2006 *International Building Code®* (IBC)
- 2021, 2018, 2015, 2012, 2009 and 2006 *International Residential Code®* (IRC)

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see ESR-1040 LABC and LARC Supplement.

Properties evaluated:

- Structural
- Fire resistance
- Fireblocking material

2.0 USES

Versa-Lam® Laminated Veneer Lumber (LVL) is used for structural applications such as beams, headers, joists, rafters, wall studs and rim joists.

3.0 DESCRIPTION

Versa-Lam® LVL is structural composite lumber products complying with ASTM D5456 and is manufactured with the wood fibers primarily oriented parallel to the length of the member, such that the veneers are vertical when the member is installed in its primary application (joist orientation). Qualified adhesives, veneer species and veneer grades are as specified in the approved Quality Control Manual.

Versa-Lam® LVL is available in various grades as indicated in Table 1. Versa-Lam® LVL is produced in thicknesses from minimum 1 inch (25.4 mm) up to 7 inches (178 mm), with depths up to 48 inches (1219 mm) and lengths up to 66 feet (20.1 m).

Versa-Lam® LVL is also distributed under the proprietary name of Versa-Stud® and Versa-Lam Plus® that are manufactured to match commonly available solid-sawn lumber sizes.

4.0 DESIGN AND INSTALLATION

4.1 General:

The design provisions for structural composite lumber in the ANSI/AWC *National Design Specification® for Wood Construction* (NDS) are applicable to Versa-Lam® LVL unless otherwise noted in this report. Reference design values for dry conditions of use of Versa-Lam® LVL are indicated in Table 1.

4.2 Connections:

The design of connections for Versa-Lam® LVL must be in accordance with the NDS as for solid wood members using an equivalent specific gravity for nail or bolt design for dry-use conditions given in Table 4. Allowable nail spacing is indicated in Table 3.

4.3 Fire Blocking:

Versa-Lam® LVL may be substituted for solid-sawn lumber fireblocking provided the minimum sizes of Versa-Lam® LVL, as indicated in this report, are as specified by the applicable code for solid-sawn material.

4.4 Rim Board:

For the purposes of this evaluation report, rim boards are defined as continuously supported structural members (except as noted in the last sentence of Section 4.4 of this report), located at the joist elevation either perpendicular to, or parallel to the joist framing, that are the full depth of the joist space and that are used for the following purposes:

1. Transfer, from above to below, of vertical loads at the rim board location. Allowable vertical loads are noted in Table 2.
2. Providing diaphragm attachment (sheathing to top edge of rim board).
3. Transferring in-plane lateral loads from the diaphragm to the wall plate below.
4. Providing lateral support to the joist or rafter (resistance against rotation) through attachments to the joist or rafter.
5. Providing closure for ends of joists or rafters.
6. Providing an attachment base for siding or exterior deck ledger.

Allowable vertical and lateral load transfer capacities for Versa-Lam® LVL are provided in Table 2. Rim board must be installed in accordance with the prescriptive provisions of the applicable code. Design of rim board installed over wall openings must be based on the reference design values noted in Table 1.

4.5 Calculated Fire Resistance:

For applications under the 2021, 2018, 2015, 2012 and 2009 IBC, the fire resistance of exposed Versa-Lam® LVL members may be calculated in accordance with Chapter 16 of the NDS.

4.6 Wall Studs:

4.6.1 General: Versa-Lam® LVL manufactured in White City, Oregon, and Alexandria, Louisiana may be used as wall stud material in accordance with the prescriptive requirements in Section 2308.5 of the 2021, 2018 and 2015 IBC, Section 2308.9 of the 2012, 2009 and 2006 IBC and Section R602 of the IRC, subject to the following conditions:

1. Versa-Lam® LVL used as wall studs must have a thickness of $1^1/_2$ inches (38 mm) or greater.
2. Cutting, notching and boring of nominally 2-by-4 and 2-by-6 Versa-Lam® LVL studs is permitted in accordance with Sections 2308.5.9 and 2308.5.10 of the 2021, 2018 and 2015 IBC, Sections 2308.9.10 and 2308.9.11 of the 2012, 2009 and 2006 IBC and Section R602.6 of the IRC.

Allowable shear values for nailed wood structural panel shear walls utilizing Versa-Lam® LVL framing members may be determined using Section 2306.3 of the 2021, 2018, 2015 and 2012 IBC, Table 2306.3 of the 2009 IBC or Table 2306.4.1 of the 2006 IBC, for shear walls with framing of Douglas fir-Larch, subject to the following conditions:

1. For Versa-Lam® LVL studs with thickness less than $3^1/_2$ inches (89 mm), a double Versa-Lam® LVL stud must be used at adjoining wood structural panel edges. Studs must be stitch nailed together with two staggered rows of 0.148 inch (3.8 mm) diameter (10d common) nails spaced at 8 inches on center in each row.
2. Nails at panel edges must be staggered along two nailing lines spaced approximately $^1/_2$ inch (12.7 mm) apart. Nails at panel edges must also be at least $^3/_8$ inch (9.5 mm) from the edges of the Versa-Lam® LVL stud and the wood structural panel.
3. The tabulated shear values for nailed wood structural panel shear walls using 8d or 10d box or common nails at a panel edge nail spacing of 2 inches (51 mm) must be multiplied by a factor of 0.90.
4. The tabulated shear values for nailed wood structural panel shear walls using 10d box or common nails at a panel edge nail spacing of 3 inches (76 mm) must be multiplied by a factor of 0.90.

4.6.2 Fire-resistance-rated Wall Construction: Versa-Lam® LVL is permitted to be used in fire-resistance-rated wall construction as follows:

1. For conventional light-frame construction, Versa-Lam® LVL is permitted to be used as a direct replacement for solid-sawn lumber in any 1-hour fire-resistance-rated wall assembly listed in Table 721.1(2) of the 2021, 2018, 2015, 2012 IBC, and Table 720.1(2) of the 2009 and 2006 IBC, provided the following conditions are met:
   a. The Versa-Lam® LVL studs have a minimum depth of $3^1/_2$ inches (89 mm) (nominal 2-by-4).
   b. Tape and joint compound must be applied to fastener heads and gypsum wallboard joints on the exposed surface(s).
2. For engineered, load-bearing wall construction, Versa-Lam® LVL is permitted to be used in 1-hour fire-resistance-rated wall assemblies provided the following conditions are met:
   a. The Versa-Lam® LVL studs have a minimum depth of $5^1/_2$ inches (140 mm) (nominal 2-by-6).
   b. Studs must be spaced no more than 16 inches (406 mm) on center.
   c. Minimum $^5/_8$-inch (15.9 mm) Type X gypsum wallboard must be attached with $2^1/_4$-inch-long (57 mm) Type S drywall screws spaced 7 inches (178 mm) on center along each stud.
   d. Tape and joint compound must be applied to fastener heads and gypsum wallboard joints on the exposed surface(s).
   e. The design axial compressive stress within the studs must not exceed the least of the following:
      i. 525 psi (3620 kPa).
      ii. $0.46F_c'$, where F_c' is the compression design value parallel-to-grain, adjusted by all applicable adjustment factors in accordance with the NDS, including the column stability factor, C_P.
      iii. $0.46\ F_c'$, where F_c' is calculated in accordance with the NDS assuming a slenderness ratio, l_e/d, of 21.

4.7 Installation:

Versa-Lam® LVL products must comply with this report and the wood construction requirements noted in the applicable code, as indicated in this report.

5.0 CONDITIONS OF USE

The Versa-Lam® LVL products described in this report comply with, or are suitable alternatives to what is specified in those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Versa-Lam® LVL products are manufactured by Boise Cascade Wood Products, LLC, in White City, Oregon, Alexandria, Louisiana and Thorsby, Alabama, under a quality-control program with inspections by ICC-ES and APA—The Engineered Wood Association (AA-649).

5.2 The service conditions for the Versa-Lam® LVL products described in this report must be a covered, dry condition of use. Dry conditions of use are those conditions of use represented by sawn lumber at which the moisture content is less than 16 percent.

5.3 Calculations and details for specific applications, demonstrating that the use of Versa-Lam® LVL products comply with this report, must be submitted to the code official upon request. The documents in question must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.4 Duration-of-load adjustments, as provided for wood members and their connections, may be applied in accordance with the limitations specified in the applicable code, as indicated in this report.

5.5 The use of treatments on the products listed in this report, such as preservatives and fire retardants, is outside the scope of this report.

5.6 Cutting and notching of Versa-Lam® LVL products is outside the scope of this report except when used as wall studs.

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with ICC-ES Acceptance Criteria for Structural Wood-based Products (AC47), dated June 2017 (editorially revised February 2021).

6.2 Data in accordance with ICC-ES Acceptance Criteria for Rim Board Products (AC124), dated October 2019 (editorially revised February 2021).

6.3 Data in accordance with ICC-ES Acceptance Criteria for Wood-based Studs (AC202), dated June 2009 (editorially revised February 2021).

6.4 Reports of fire tests conducted in accordance with ASTM E119.

7.0 IDENTIFICATION

7.1 Versa-Lam® LVL products are identified with a stamp noting the manufacturer's name (Boise Cascade) and plant location, the product name (including MOE, design flexural stress and design axial tensile stress, as applicable), the species, the date of manufacture, the evaluation report number (ESR-1040), and the name of the inspection agency (APA-The Engineered Wood Association). Unless otherwise identified, all products from White City, Oregon, are manufactured from primarily Douglas fir and all products from Alexandria, Louisiana and Thorsby, Alabama are manufactured from primarily southern yellow pine.

7.2 The report holder's contact information is the following:

BOISE CASCADE WOOD PRODUCTS, LLC
POST OFFICE BOX 2400
WHITE CITY, OREGON 97503-0400
(541) 826-0200
www.bc.com/ewp

TABLE 1—REFERENCE DESIGN VALUES FOR Versa-Lam® LVL (pounds per square inch)[1,2]

TRUE E		APPARENT E		FLEXURAL STRESS, F_b		TENSION PARALLEL TO GRAIN[4], F_t	COMP. PARALLEL TO GRAIN, F_C	COMPRESSION PERPENDICULAR TO GRAIN, $F_{c\perp}$		HORIZONTAL SHEAR, F_v	
PRODUCT GRADE[6]	MOE[5] E (×10⁶ psi)	PRODUCT GRADE[7]	MOE[5] E (×10⁶ psi)	Joist[3]	Plank			Perp. to Narrow Face (Plank)	Parallel to Narrow Face (Joist)	Parallel to Narrow Face (Plank)	Perp. to Narrow Face (Joist)
1.4E 1600/1100	1.4	1.3E 1600[8]	1.3	1,600	1,600	1,100	2,500	450	525	150	225
1.4E 1750/1100	1.4	1.3 1750[8]	1.3	1,750	1,600	1,100	2,500	450	525	150	225
1.5E 1800	1.5	1.4 1800/1100	1.4	1,800	1,800	1,100	2,500	450	525	150	225
1.5E 1800_{Plank}	1.5	1.4 1800/1200	1.4	1,500	1,800	1,200	2,500	450	525	150	225
1.5E 1950	1.5	1.4 1950/1100	1.4	1,950	1,800	1,100	2,500	450	525	150	225
1.5E 1800/1250	1.5	1.4 1800[8]	1.4	1,800	1,800	1,250	2,500	450	525	150	225
1.5E 1950/1250	1.5	1.4 1950[8]	1.4	1,950	1,800	1,250	2,500	450	525	150	225
1.6E 2050	1.6	1.5 2050/1250	1.5	2,050	2,050	1,250	2,500	450	525	150	225
1.6E 2250	1.6	1.5 2250/1250	1.5	2,250	2,050	1,250	2,500	450	525	150	225
1.6E 2050/1400	1.6	1.5 2050[8]	1.5	2,050	2,050	1,400	2,500	450	525	150	225
1.6E 2250/1400	1.6	1.5 2250[8]	1.5	2,250	2,050	1,400	2,500	450	525	150	225
1.7E 2250	1.7	1.6 2250/1400	1.6	2,250	2,250	1,400	2,500	450	525	150	225
1.7E 2450	1.7	1.6 2450/1400	1.6	2,450	2,250	1,400	2,500	450	525	150	225
1.7E 2250/1500	1.7	1.6 2250[8]	1.6	2,250	2,250	1,500	2,500	450	525	150	225
1.7E 2450/1500	1.7	1.6 2450[8]	1.6	2,450	2,250	1,500	2,500	450	525	150	225
1.8E 2400	1.8	1.7 2400/1500	1.7	2,400	2,400	1,500	3,000	610[9]	750	190	285
1.8E 2650	1.8	1.7 2650/1500	1.7	2,650	2,400	1,500	3,000	610[9]	750	190	285
1.8E 2400/1650	1.8	1.7 2400[8]	1.7	2,400	2,400	1,650	3,000	610[9]	750	190	285
1.8E 2650/1650	1.8	1.7 2650[8]	1.7	2,650	2,400	1,650	3,000	610[9]	750	190	285
1.9E 2500	1.9	1.8 2500/1650	1.8	2,500	2,500	1,650	3,000	610[9]	750	190	285
1.9E 2750	1.9	1.8 2750/1650	1.8	2,750	2,500	1,650	3,000	610[9]	750	190	285
1.9E 2500/1825	1.9	1.8 2500[8]	1.8	2,500	2,500	1,825	3,000	610[9]	750	190	285
1.9E 2750/1825	1.9	1.8 2750[8]	1.8	2,750	2,500	1,825	3,000	610[9]	750	190	285
2.0E 2600	2.0	1.9 2600/1825	1.9	2,600	2,600	1,825	3,000	610[9]	750	190	285
2.0E 2850	2.0	1.9 2850/1825	1.9	2,850	2,600	1,825	3,000	610[9]	750	190	285
2.0E 2600/1950	2.0	1.9 2600[8]	1.9	2,600	2,600	1,950	3,000	610[9]	750	190	285
2.0E 2850/1950	2.0	1.9 2850[8]	1.9	2,850	2,600	1,950	3,000	610[9]	750	190	285
2.1E 2800	2.1	2.0 2800/1950	2.0	2,800	2,800	1,950	3,000	610[9]	750	190	285
2.1E 3100	2.1	2.0 3100/1950	2.0	3,100	2,800	1,950	3,000	610[9]	750	190	285
2.1E 2800/2150	2.1	2.0 2800[8]	2.0	2,800	2,800	2,150	3,000	610[9]	750	190	285
2.1E 3100/2150	2.1	2.0 3100[8]	2.0	3,100	2,800	2,150	3,000	610[9]	750	190	285
2.2E 2900	2.2	2.1 2900/2150	2.1	2,900	2,900	2,150	3,000	610[9]	750	190	285
2.2E 3200	2.2	2.1 3200/2150	2.1	3,200	2,900	2,150	3,000	610[9]	750	190	285
2.2E 2900/2250	2.2	2.1 2900[8]	2.1	2,900	2,900	2,250	3,000	610[9]	750	190	285
2.2E 3200/2250	2.2	2.1 3200[8]	2.1	3,200	2,900	2,250	3,000	610[9]	750	190	285
2.3E 3100	2.3	2.2 3100/2250	2.2	3,100	3,100	2,250	3,000	610[9]	750	190	285
2.3E 3400	2.3	2.2 3400/2250	2.2	3,400	3,100	2,250	3,000	610[9]	750	190	285
2.3E 3100/2425	2.3	2.2 3100[8]	2.2	3,100	3,100	2,425	3,000	610[9]	750	190	285
2.3E 3400/2425	2.3	2.2 3400[8]	2.2	3,400	3,100	2,425	3,000	610[9]	750	190	285

For **SI:** 1 psi=0.00689 MPa.,

[1]Reference design values are based on dry conditions of use where the in-service moisture content of the Versa-Lam® LVL is less than 16 percent.
[2]Reference design values must be adjusted, as applicable, in accordance with Section 8.3 of the NDS.
[3]The tabulated reference flexural stress, F_b, is for Versa-Lam® LVL with a 12-inch (305 mm) depth. For other depths, multiply by the volume factor $Cv = (12/d)^{1/9}$, where d is the member depth in inches.
[4]The tabulated reference tension stress, F_t, is for Versa-Lam® LVL with a 4-foot (1219 mm) length. For lengths longer than 4 feet (1219 mm), multiply F_t by the length factor of $(4/L)^{1/8}$, where L is the member length in feet.
[5]The reference modulus of elasticity for beam stability and column stability calculations, E_{min}, must be calculated using $E_{apparent}$ in accordance with Appendix D of the NDS. When calculating E_{min}, the coefficient of variation of modulus of elasticity, COV_E, may be taken as 0.10.
[6]Values are true E (E_{true}).
[7]Values are apparent E ($E_{apparent}$).
[8]Product may also be labeled according to both F_b and F_t. Example: 2.0 2800 is equivalent to 2.0 2800/2150.
[9]Minimum thickness = 1½ inches (38.1 mm). For thickness less than 1½ inches (38.1 mm) use 450 psi.
[10]For uniformly loaded, simple span beams, deflection is calculated as follows:

$$D_{true} = \frac{270WL^4}{E_{true}bd^3} + \frac{28.8WL^2}{E_{true}bd} \qquad D_{apparent} = \frac{270WL^4}{E_{apparent}bd^3}$$

where:
D = Deflection (inches)
W = Uniform load (plf)
L = Span (feet)
E = Modulus of elasticity (psi)
b = Beam width (inches)
d = Beam depth (inches)

TABLE 2— Versa-Lam® LVL ALLOWABLE RIM BOARD DESIGN CAPACITIES

MODULUS OF ELASTICITY, E (x10^6 psi)		MINIMUM THICKNESS (inches)	ALLOWABLE VERTICAL LOAD[1]						LATERAL CAPACITY[5,6,7] (lb/ft)	CONTAINS CROSS-PLY VENEER
			Distributed Load (lbf/ft)			Concentrated Load (lbf) (4$^1/_2$ in. Min. Width)				
True	Apparent		$d^2 \le 16$	$16 < d^2 \le 20$	$20 < d^2 \le 24$	$d^2 \le 16$	$16 < d^2 \le 20$	$20 < d^2 \le 24$		
1.4–1.7	1.3-1.6	1	2,000	N/A	-	N/A	N/A	-	190	No
		$1^1/_{16}$	2,000	N/A	-	N/A	N/A	-	205	No
		$1^1/_8$	2,000	N/A	-	N/A	N/A	-	220	No
		$1^3/_{16}$	2,000	N/A	-	N/A	N/A	-	230	No
		$1^1/_4$	3,250	3,250	-	2,250	2,250	-	See Note 3	No
		$1^5/_{16}$	6,000	5,450	5,200	4,450	4,450	3,850	See Note 3	Yes
		$1^1/_2$	6,480	5,600	5,600	4,600	4,450	4,450	See Note 3	Yes
		$2^1/_4$	3,250	3,250	-	2,250	2,250	-	See Note 4	No
1.8–2.3	1.7-2.2	1	4,250	3,700	-	3,700	3,500	-	190	No
		$1^1/_{16}$	4,250	3,700	-	3,700	3,500	-	205	No
		$1^1/_8$	4,250	3,700	-	3,700	3,500	-	220	No
		$1^3/_{16}$	4,250	3,700	-	3,700	3,500	-	230	No
		$1^1/_4$	4,250	3,700	-	3,700	3,500	-	See Note 3	No
		1½	4,250	3,700	1,490	3,700	3,500	3,300	See Note 3	No
		1¾	4,250	3,700	2,350	3,700	3,500	3,500	See Note 3	No
		3½	4,250	3,700	3,700	6,000	6,000	6,000	See Note 4	No
2.1–2.3	2.0-2.2	$1^1/_2$	5,450	4,300	1,490	4,300	3,900	3,300	See Note 3	No
		$1^3/_4$	5,700	4,300	2,350	4,300	3,900	3,630	See Note 3	No
		$2^1/_4$	5,700	4,300	2,350	4,300	3,900	3,630	See Note 4	No
		3½	5,700	4,300	4,300	6,000	6,000	6,000	See Note 4	No

For **SI:** 1 inch = 25.4 mm, 1 lbf = 4.45 N, 1 lbf/ft = 0.0146 kN/m.

[1]Allowable loads given in this table are not permitted to be increased by the load duration factor, C_D.
[2]d = member depth (inches).
[3]The lateral capacity (in-plane shear) is as permitted in the applicable code for solid-sawn lumber framing in horizontal wood diaphragms with nominally 2-inch-thick framing.
[4]The lateral capacity (in-plane shear) is as permitted in the applicable code for solid-sawn lumber framing in horizontal wood diaphragms with nominally 3-inch-thick framing.
[5] Versa-Lam® LVL used as rim joist may be substituted for solid-sawn framing in horizontal wood diaphragms as shown in Tables 4.2A, 4.2B and 4.2C of the 2021 and 2015 ANSI/AWC SDPWS, Tables 2306.2(1) and 2306.2(2) of the 2021, 2018, 2015, 2012 and 2009 IBC and Table 2306.3.1 of the 2006 IBC (maximum horizontal shear values must be limited as noted).
[6]Toe-nailed connections are not limited by the 150 plf lateral load capacity noted for Seismic Design Categories D, E, and F in Section 4.1.10 and Section 4.1.7 of the 2021 and 2015 ANSI/AWC SDPWS respectively, and Section 2305.1.4 of the 2006 IBC.
[7]See Table 3 for minimum nail spacing requirements.

TABLE 3—ALLOWABLE NAIL SPACING FOR Versa-Lam® LVL (inches)[1,2]

CONNECTOR SIZE	NAILS PARALLEL TO THE GLUE LINE										NAILS PERP. TO THE GLUE LINE	
	Minimum Thickness 1 inch		Minimum Thickness $1^1/_4$ inches		Minimum Thickness[3] $1^1/_2$ inches		Minimum Thickness[3] $1^3/_4$ inches		Minimum Thickness[3] $3^1/_2$ inches		All Thicknesses[3]	
	o.c.	End[4]	o.c.	End[4]	o.c.	End[4]	o.c.	End[4]	o.c.	End[4]	o.c.	End[4]
8d box	3	$1^1/_2$	3	$1^1/_2$	3	$1^1/_2$	2	1	2	$^1/_2$	2	1
8d common	4	3	3	2	3	2	3	2	2	1	2	1
10d & 12d box	4	3	3	2	3	2	3	2	2	1	2	1
16d box	4 (5)[5]	3	3 (5)[5]	2 ($2^1/_2$)[5]	3 (5)[5]	2 ($2^1/_2$)[5]	3 (5)[5]	2 ($2^1/_2$)[5]	2 (3)[5]	1 ($2^1/_2$)[5]	2	2
10d & 12d common	6	4	4 (5)[5]	3	4 (5)[5]	3	4 (5)[5]	3	2 (3)[5]	2 (3)[5]	2	2
16d sinker	6	4	4 (6)[5]	3	4 (6)[5]	3	4 (6)[5]	3	2 (4)[5]	2 (3)[5]	2	2
16d common	6 (8)[5]	4	6 (8)[5]	4	6 (8)[5]	4	6 (8)[5]	3 (4)[5]	2 (4)[5]	2 (3)[5]	2 (3)[5]	2 ($2^1/_2$)[5]

For **SI:** 1 inch = 25.4 mm.

[1]Spacing requirements and maximum nail size for panel edge nailing of wall sheathing at adjoining panels must also be in accordance with Section 4.6.
[2]Edge distances must be sufficient to prevent splitting.
[3]For multiple rows of fasteners, the rows must be offset $^1/_2$ inch or more from each other, equally spaced from the centerline of the Versa-Lam® LVL member and staggered.
[4]"End" refers to the minimum distance between the nail and the end(s) of the piece(s) being connected.
[5]Nail spacing in the parenthese are applicable only to Versa-Lam LVL manufactured in Thorsby, Alabama. All other spacings without parenthese are also applicable to Thorsby LVL.

TABLE 4—EQUIVALENT SPECIFIC GRAVITIES FOR CONNECTOR DESIGN

PRODUCT	MODULUS OF ELASTICITY, E[1] ($x10^6$ psi)	NAILS AND WOOD SCREWS					
		Lateral Installed into Wide Face		Lateral Installed into Narrow Face		Withdrawal	
		Loaded Parallel to Length	Loaded Perpendicular to Length	Loaded Parallel to Length	Loaded Perpendicular to Length	Installed into Wide Face	Installed into Narrow Face
Versa-Lam®	1.3 – 2.3	0.50	0.50	0.50	0.50	0.50	0.50 (0.43)[2]

PRODUCT	MODULUS OF ELASTICITY, E[1] ($x10^6$ psi)	BOLTS AND WOOD SCREWS			
		Lateral Installed into Wide face		Lateral Installed into Narrow Face	
		Loaded Parallel to Length	Loaded Perpendicular to Length	Loaded Parallel to Length	Loaded Perpendicular to Length
Versa-Lam®	1.3 – 2.3	0.50	0.50	0.50	0.50

[1]Values are true E (E_{true}) or apparent E ($E_{apparent}$).
[2]Equivalent specific gravity in the parenthese are applicable only to Versa-Lam LVL manufactured in Thorsby, Alabama. All other equivalent specific gravities without parenthese are also applicable to Thorsby LVL.

ICC-ES Evaluation Report

ESR-1040 LABC and LARC Supplement

Reissued September 2021
Revised August 2022
This report is subject to renewal September 2023.

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 17 13—Laminated Veneer Lumber

REPORT HOLDER:

BOISE CASCADE WOOD PRODUCTS, LLC

EVALUATION SUBJECT:

VERSA-LAM® LAMINATED VENEER LUMBER

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that VERSA-LAM® laminated veneer lumber, described in ICC-ES evaluation report ESR-1040, has also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The VERSA-LAM® laminated veneer lumber, described in Sections 2.0 through 7.0 of the master evaluation report ESR-1040, complies with the LABC Chapter 23, and the LARC, and is subjected to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The VERSA-LAM® laminated veneer lumber, described in this evaluation report supplement, must comply with all of the following conditions:

- All applicable sections in the master evaluation report ESR-1040.
- The design, installation, conditions of use and identification are in accordance with the 2018 *International Building Code®* (IBC) and 2018 *International Residential Code®* (IRC) provisions noted in the evaluation report ESR-1040, as applicable.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Cutting, notching and boring of members used as wall studs in accordance with Section 4.5.1 of the evaluation report ESR-1040 must also comply with the additional requirements in the City of Los Angeles Department of Building and Safety Information Bulletin P/BC 2020-007.

This supplement expires concurrently with the evaluation report ESR-1040, reissued September 2021 and revised August 2022.

ICC-ES Evaluation Report

ESR-1040 FBC Supplement

Issued November 2021
Revised August 2022
This report is subject to renewal September 2023.

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DIVISION: 06 00 00—WOOD, PLASTICS, AND COMPOSITES
Section: 06 17 13—Laminated Veneer Lumber

REPORT HOLDER:

BOISE CASCADE WOOD PRODUCTS, LLC

EVALUATION SUBJECT:

VERSA-LAM® LAMINATED VENEER LUMBER

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that VERSA-LAM® Laminated Veneer Lumber (LVL) described in ICC-ES evaluation report ESR-1040, has also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2020 *Florida Building Code—Building*
- 2020 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The VERSA-LAM® LVL, described in Sections 2.0 through 7.0 of the ICC-ES evaluation report ESR-1040, complies with the *Florida Building Code—Building* and the *Florida Building Code-Residential*. The design requirements must be determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code-Residential,* as applicable. The installation requirements noted in ICC-ES evaluation report ESR-1040 for the 2018 *International Building Code®* meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code-Residential,* as applicable.

Use of the VERSA-LAM® LVL for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential* has not been evaluated and is outside the scope of this evaluation report.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality-assurance program is audited by a quality-assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report ESR-1040, reissued September 2021 and revised August 2022.

ICC EVALUATION SERVICE

APA www.apawood.org

Joint Evaluation Report

ESR-1336

Reissued September 2021

This report is subject to renewal September 2023.

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 17 33—Wood I-joists

REPORT HOLDER:

BOISE CASCADE WOOD PRODUCTS, LLC

EVALUATION SUBJECT:

BCI PREFABRICATED WOOD I-JOISTS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015, 2012, 2009 and 2006 *International Building Code®* (IBC)
- 2018, 2015, 2012, 2009 and 2006 *International Residential Code®* (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

For evaluation for compliance with codes adopted by the Los Angeles Department of Building and Safety (LADBS), see ESR-1336 LABC and LARC Supplement.

Properties evaluated:

- Structural
- Sound ratings
- Fire-resistance ratings
- Floor and roof spans

2.0 USES

BCI prefabricated wood I-joists are prefabricated wood I-joists used as floor joists, roof rafters, blocking panels and rim boards to support code-required loads. Prefabricated wood I-joists described in this report comply with Section 2303.1.2 of the IBC and Section R502.1.2 of the IRC (Section R502.1.4 for the 2009 and 2006 IRC) for allowable stress design.

3.0 DESCRIPTION

3.1 General:

The BCI joists are prefabricated wood I-joists with laminated veneer lumber flanges and oriented strand board (OSB) webs. The I-joists have parallel top and bottom flanges, resulting in a constant-depth joist. The web-to-web joints are glued joints and conform to the specifications in the approved quality control manual. The BCI joists are available in various lengths and depths. See Table 1 for joist dimensions and material specifications.

3.2 Material Specifications:

3.2.1 Flanges: The flanges of the BCI I-joists are laminated veneer lumber that is currently recognized in the approved quality control manual. Flange width, depth and grade requirements are noted in Table 1.

3.2.2 Web: OSB web material is either $^{3}/_{8}$-inch-thick (9.5 mm) or $^{7}/_{16}$-inch-thick (11 mm) Exposure I with a span rating of 24/0.

3.2.3 Adhesive: Adhesives used in the fabrication of the I-joists are exterior-type, heat durable adhesives complying with ASTM D2559 and ASTM D5055 and are specified in the approved quality control manual and the Boise Cascade manufacturing standards.

4.0 DESIGN AND INSTALLATION

4.1 General:

Design and installation of the BCI prefabricated wood I-joists described in this report must comply with the conditions described in Sections 4.2 through 4.16 of this report.

4.2 Allowable Structural Capacity:

Table 2 specifies reference design moments, shears, deflection coefficients and I-joist stiffness (*EI*). Reference design reactions are given in Table 3 and are based on a minimum bearing length of $1^{1}/_{2}$ inches (38.1 mm) for end supports and $3^{1}/_{2}$ inches (89 mm) at intermediate supports for continuous spans. Other bearing conditions are also shown in the Table 3. Linear interpolation between tabulated values in Table 3 is permitted. When joists are used as simple span members, the design shear is equal to the end reaction. When joists are used as multiple span members, the maximum interior reaction is as noted in Table 3. Table 4 specifies allowable vertical load capacities for joists used as blocking panels or rim boards.

4.3 Fasteners:

The equivalent specific gravities and the spacing of fasteners installed in the laminated veneer lumber flanges must comply with this report.

See Table 5 for the equivalent specific gravities for use in determining the design values of fasteners installed into the flanges of BCI joists. Table 6 specifies the minimum allowable spacing for fasteners installed into the flanges of BCI joists. See Table 7 for limitations on the allowable lateral design values of BCI joists when used as framing members in horizontal wood diaphragms.

4.4 Web Stiffeners:

Web stiffener requirements for reactions and concentrated loads must be as noted in Figure 1.

4.5 Lateral Support:

The compression flange must be continuously laterally supported, and the joist ends restrained to prevent rotation. Code-recognized methods specified for solid-sawn lumber are acceptable. Bridging is not required for BCI floor and roof joist applications.

4.6 Holes in the I-Joist Web:

The allowable location of holes in the web material of BCI joists must be determined in one of the following ways:

1. An analytical approach can be used, provided the calculations are reviewed and approved by a registered design professional.
2. Boise Cascade Wood Products, LLC, design software can be used to determine the allowable location of web holes in BCI joists.
3. Size and location of allowable web holes in BCI joists for specific conditions comply with the details noted in Tables 8, 9, 10, 11, 12 and 13 of this report.
4. The allowable location of holes can be determined by calculating the allowable shear capacity (based on the reduction in shear capacity) of BCI joists at web holes, V_{hole}, using the equations shown below. All dimensions and shear values are in units of inches and pounds, respectively:

   BCI Joists with OSB web, circular hole:

   $$V_{hole} = V_r\left[B_C - M_C\left(\frac{holediameter}{joistdepth - 2\times flangedepth}\right)\right]$$

   BCI Joists with OSB web, square, rectangular or obround hole:

   $$V_{hole} = V_r\left[B_R - M_D\left(\frac{hole\ depth}{joist\ depth - 2\times flange\ depth}\right) - M_L\left(\frac{hole\ length}{18}\right)\right]$$

   where:

   V_r = Shear value, for the joist, provided in Table 2;

   B_C = 0.88 (except for BCI 90e joists with depth >16")

   = 0.91 for BCI 90e joists with depths > 16";

   M_C = 0.69 (except for BCI 90e joists with depth >16")

   = 0.84 for BCI 90e joists with depths > 16";

   M_D = 0.28 for all BCI joists;

   M_L = 0.29 (except at obround hole) for all BCI '1000 (XXOO)' series joists; 0.25 for all obround holes and BCI '100(XXO)' and '10(XX)' series joists;

   B_R = 0.60 (except for BCI 90e joists with depth >16")

   = 0.57 for BCI 90e joists with depths > 16".

   Note: Square or rectangular holes may be cut 4" longer when using 2" radius cuts at the corners. The original hole length, in the original location, shall be used to calculate Vhole (B_R=0.60, M_D=0.28, M_L=0.25).
5. Knockout holes installed during the manufacturing process may be utilized wherever present.

4.7 Duration of Load:

Adjustments for duration of load must be in accordance with Sections 7.3.2 and 10.3.2 of the ANSI/AWC *National Design Specification® for Wood Construction* (NDS).

4.8 In-service Moisture Conditions:

I-joists must be installed in dry, covered conditions where the in-service moisture content of the wood does not exceed 16 percent.

4.9 Repetitive-member Use:

The repetitive-member use factors applicable to the reference design moments listed in Table 2 of this report must be limited to 1.0.

4.10 Member Spans:

I-joist spans must be determined in accordance with Section 3.2.1 of the NDS. Vertical shear calculations include all loads within the span from face to face of supports. Allowable floor spans for specific conditions are shown in Table 14.

4.11 Deflection:

Total I-joist deflection is caused by two types of stresses: bending and shear. Bending deflection must be calculated using standard engineering formulae. Shear deflection must be calculated using the following formula:

$$\Delta = \frac{8M}{K}$$

Example: Total deflection of a uniformly loaded, simple-span joist is determined using the following formula:

$$\Delta = \frac{5wL^4}{384EI} + \frac{wL^2}{K}$$

Example: Total deflection of a simple-span joist with a concentrated load at mid-span is determined using the following formula:

$$\Delta = \frac{PL^3}{48EI} + \frac{2PL}{K}$$

EI = I-joist stiffness from Table 2.

K = Shear stiffness coefficient from Table 2.

L = I-joist span (inches).

M = Design moment (inch-pounds).

P = Applied concentration load (pounds).

w = Applied uniform load (pounds per linear inch).

Δ = Total I-joist mid-span deflection (inches).

4.12 Blocking Panels and Rim Boards:

I-joists under bearing walls that are perpendicular to the joists require full-depth blocking. Joists used as blocking panels or rim board members have the maximum vertical and horizontal load transfer capacities shown in Tables 4 and 7, respectively.

4.13 Cantilevered Joists:

I-joists are permitted to be installed with cantilevers, provided the cantilevers have a maximum length equal to one third of the adjacent span and support uniform loads only. Alternately, design calculations showing compliance with the design properties in Table 2 of this report can be submitted to the building official for approval.

4.14 Fire-resistance-rated Roof-ceiling and Floor-ceiling Assemblies:

BCI joists are permitted as components of roof/ceiling or floor/ceiling assemblies required to have a fire-resistance rating of one hour in accordance with the code when constructed in accordance with Figure 2, 3, 4, 5 or 6 of this report. BCI joists are permitted as components of roof/ceiling or floor/ceiling assemblies required to have a fire-resistance rating of two hours in accordance with the code when constructed in accordance with Figure 7.

In addition to the fire-resistive-rated assemblies shown in Figures 2 through 7 of this report, the BCI joists described in this report may be used in the assemblies described in 2018, 2015 and 2012 IBC Table 721.1(3), Item Numbers 21-1.1., 23-1.1, 24-1.1, 25-1.1, 26-1.1, 27-1.1 and 28-1.1; 2009 IBC Table 720.1(3), Item Numbers 21-1.1, 23-1.1, 24-1.1, 25-1.1, 26-1.1, 27-1.1 and 28-1.1; or in the assemblies described in the 2006 IBC Table 720.1(3), Item Numbers 21-1.1, 23-1.1, 25-1.1, 26-1.1, 27-1.1, 28-1.1 and 29-1.1, provided the I-joists used meet the required criteria as described in the "Floor or Roof Construction" column.

4.15 Sound-rated Floor-ceiling Assemblies:

BCI joists are permitted as components of floor/ceiling assemblies required to have acoustical ratings in accordance with the code when constructed in accordance with Figure 2, 3, 4, or 6 of this report. Sound transmission class (STC) and impact insulation class (IIC) ratings are as given in Figures 2, 3, 4 and 6, for the listed floor topping components.

4.16 Fire Protection of Floors:

BCI series I-joists installed and protected as specified in Figures 8, 9, 10, 11, 12 and 13 are alternatives to the 2-by-10 dimension lumber prescribed in 2018 and 2015 IRC Section R302.13 and 2012 IRC Section R501.3, Exceptions 1 and 2, and Exception 4, and have met the requirements for a floor assembly demonstrating equivalent fire performance. BCI series I-joists installed and protected as specified in Figure 14 meet the provisions of 2018 and 2015 IRC Section R302.13 and 2012 IRC Section R501.3.

5.0 CONDITIONS OF USE

The BCI Prefabricated Wood I-joists described in this report comply with, or are suitable alternatives to joists and rafters specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 BCI joists must be installed in accordance with this report and the manufacturer's installation details.

5.2 Drawings and design details verifying compliance with this report must be submitted to the code official when requested. The drawings and calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.3 Where one-hour or two-hour fire-resistance-rated construction is required, the construction must comply with this report.

5.4 Cutting or notching of BCI joist flanges is beyond the scope of this report.

5.5 Sound-rated assemblies noted in Section 4.15 of this report, with STC and or IIC ratings of less than 50, are only applicable in jurisdictions using the IRC.

5.6 BCI and BCI FMJ™ Joists are manufactured by Boise Cascade Wood Products, LLC, at their White City, Oregon; Lena, Louisiana; and St. Jacques, New Brunswick, facilities, under an approved quality-control program with inspections by ICC-ES and APA—The Engineered Wood Association (AA 649).

6.0 EVIDENCE SUBMITTED

6.1 Manufacturer's installation instructions.

6.2 Data in accordance with the ICC-ES Acceptance Criteria for Prefabricated Wood I-joists (AC14), dated June 2019, and the ICC-ES Acceptance Criteria for Rim Board Products (AC124) dated June 2019 (editorially revised February 2020).

6.3 Reports of fire tests conducted in accordance with ASTM E119.

6.4 Reports of sound transmission tests conducted in accordance with ASTM E90, E413 and E492.

7.0 IDENTIFICATION

7.1 Each joist panel is stamped with the Boise Cascade Wood Products, LLC, logo; plant location and product designation; evaluation report number (ESR-1336); and the logo of the inspection agency (APA—The Engineered Wood Association).

7.2 The report holder's contact information is the following:

BOISE CASCADE WOOD PRODUCTS, LLC
POST OFFICE BOX 2400
WHITE CITY, OREGON 97503-0400
(541) 826-0200
www.bc.com/ewp

TABLE 1—JOIST DESCRIPTIONS FOR BCI JOISTS

JOIST SERIES	FLANGE				WEB MATERIAL	RANGE OF JOIST DEPTHS (inches)
	MATERIAL	XX00 Series	XX0 Series	XX Series		
		Depth x Width (inches)				
BCI 40, 400, 4000 - 1.3 BCI 40S, 400S, 4000S - 1.3	VERSA-LAM[1]	1.125 x 1.5	1.31 x 1.5	1.5 x 1.5	3/8" OSB	9 1/2 to 14
BCI 40, 400, 4000 - 1.4 BCI 40S, 400S, 4000S - 1.4	VERSA-LAM[1]	1.125 x 1.5	1.31 x 1.5	1.5 x 1.5	3/8" OSB	9 1/2 to 14
BCI 40, 400, 4000 - 1.5 BCI 40S, 400S, 4000S - 1.5	VERSA-LAM[1]	1.125 x 1.5	1.31 x 1.5	1.5 x 1.5	3/8" OSB	9 1/2 to 14
BCI 40, 400, 4000 - 1.6 BCI 40S, 400S, 4000S - 1.6	VERSA-LAM[1]	1.125 x 1.5	1.31 x 1.5	1.5 x 1.5	3/8" OSB	9 1/2 to 14
BCI 40, 400, 4000 - 1.7 BCI 40S, 400S, 4000S - 1.7	VERSA-LAM[1]	1.125 x 1.5	1.31 x 1.5	1.5 x 1.5	3/8" OSB	9 1/2 to 14
BCI 40, 400, 4000 - 1.8 BCI 40S, 400S, 4000S - 1.8	VERSA-LAM[1]	1.125 x 1.5	1.31 x 1.5	1.5 x 1.5	3/8" OSB	9 1/2 to 14
BCI 40, 400, 4000 - 1.9 BCI 40S, 400S, 4000S - 1.9	VERSA-LAM[1]	1.125 x 1.5	1.31 x 1.5	1.5 x 1.5	3/8" OSB	9 1/2 to 14
BCI 40, 400, 4000 - 2.0 BCI 40S, 400S, 4000S - 2.0	VERSA-LAM[1]	1.125 x 1.5	1.31 x 1.5	1.5 x 1.5	3/8" OSB	9 1/2 to 14
BCI 40, 400, 4000 - 2.1 BCI 40S, 400S, 4000S - 2.1	VERSA-LAM[1]	1.125 x 1.5	1.31 x 1.5	1.5 x 1.5	3/8" OSB	9 1/2 to 14
BCI 40, 400, 4000 - 2.2 BCI 40S, 400S, 4000S - 2.2	VERSA-LAM[1]	1.125 x 1.5	1.31 x 1.5	1.5 x 1.5	3/8" OSB	9 1/2 to 14
BCI 45, 450, 4500 - 1.3 BCI 45S, 450S, 4500S - 1.3	VERSA-LAM[1]	1.125 x 1.75	1.31 x 1.75	1.5 x 1.75	3/8" OSB	9 1/2 to 16
BCI 45, 450, 4500 - 1.4 BCI 45S, 450S, 4500S - 1.4	VERSA-LAM[1]	1.125 x 1.75	1.31 x 1.75	1.5 x 1.75	3/8" OSB	9 1/2 to 16
BCI 45, 450, 4500 - 1.5 BCI 45S, 450S, 4500S - 1.5	VERSA-LAM[1]	1.125 x 1.75	1.31 x 1.75	1.5 x 1.75	3/8" OSB	9 1/2 to 16
BCI 45, 450, 4500 - 1.6 BCI 45S, 450S, 4500S - 1.6	VERSA-LAM[1]	1.125 x 1.75	1.31 x 1.75	1.5 x 1.75	3/8" OSB	9 1/2 to 16
BCI 45, 450, 4500 - 1.7 BCI 45S, 450S, 4500S - 1.7	VERSA-LAM[1]	1.125 x 1.75	1.31 x 1.75	1.5 x 1.75	3/8" OSB	9 1/2 to 16
BCI 45, 450, 4500 - 1.8 BCI 45S, 450S, 4500S - 1.8	VERSA-LAM[1]	1.125 x 1.75	1.31 x 1.75	1.5 x 1.75	3/8" OSB	9 1/2 to 16
BCI 45, 450, 4500 - 1.9 BCI 45S, 450S, 4500S - 1.9	VERSA-LAM[1]	1.125 x 1.75	1.31 x 1.75	1.5 x 1.75	3/8" OSB	9 1/2 to 16
BCI 45, 450, 4500 - 2.0 BCI 45S, 450S, 4500S - 2.0	VERSA-LAM[1]	1.125 x 1.75	1.31 x 1.75	1.5 x 1.75	3/8" OSB	9 1/2 to 16
BCI 45, 450, 4500 - 2.1 BCI 45S, 450S, 4500S - 2.1	VERSA-LAM[1]	1.125 x 1.75	1.31 x 1.75	1.5 x 1.75	3/8" OSB	9 1/2 to 16
BCI 45, 450, 4500 - 2.2 BCI 45S, 450S, 4500S - 2.2	VERSA-LAM[1]	1.125 x 1.75	1.31 x 1.75	1.5 x 1.75	3/8" OSB	9 1/2 to 16
BCI 50, 500, 5000 - 1.3 BCI 50S, 500S, 5000S - 1.3	VERSA-LAM[1]	1.125 x 2.0	1.31 x 2.0	1.5 x 2.0	3/8" OSB	9 1/2 to 16
BCI 50, 500, 5000 - 1.4 BCI 50S, 500S, 5000S - 1.4	VERSA-LAM[1]	1.125 x 2.0	1.31 x 2.0	1.5 x 2.0	3/8" OSB	9 1/2 to 16
BCI 50, 500, 5000 - 1.5 BCI 50S, 500S, 5000S - 1.5	VERSA-LAM[1]	1.125 x 2.0	1.31 x 2.0	1.5 x 2.0	3/8" OSB	9 1/2 to 16
BCI 50, 500, 5000 - 1.6 BCI 50S, 500S, 5000S - 1.6	VERSA-LAM[1]	1.125 x 2.0	1.31 x 2.0	1.5 x 2.0	3/8" OSB	9 1/2 to 16
BCI 50, 500, 5000 - 1.7 BCI 50S, 500S, 5000S - 1.7	VERSA-LAM[1]	1.125 x 2.0	1.31 x 2.0	1.5 x 2.0	3/8" OSB	9 1/2 to 16
BCI 50, 500, 5000 - 1.8 BCI 50S, 500S, 5000S - 1.8	VERSA-LAM[1]	1.125 x 2.0	1.31 x 2.0	1.5 x 2.0	3/8" OSB	9 1/2 to 16
BCI 50, 500, 5000 - 1.9 BCI 50S, 500S, 5000S - 1.9	VERSA-LAM[1]	1.125 x 2.0	1.31 x 2.0	1.5 x 2.0	3/8" OSB	9 1/2 to 16
BCI 50, 500, 5000 - 2.0 BCI 50S, 500S, 5000S - 2.0	VERSA-LAM[1]	1.125 x 2.0	1.31 x 2.0	1.5 x 2.0	3/8" OSB	9 1/2 to 16
BCI 50, 500, 5000 - 2.1 BCI 50S, 500S, 5000S - 2.1	VERSA-LAM[1]	1.125 x 2.0	1.31 x 2.0	1.5 x 2.0	3/8" OSB	9 1/2 to 16
BCI 50, 500, 5000 - 2.2 BCI 50S, 500S, 5000S - 2.2	VERSA-LAM[1]	1.125 x 2.0	1.31 x 2.0	1.5 x 2.0	3/8" OSB	9 1/2 to 16

For **SI:** 1 inch = 25.4 mm.

[1]VERSA-LAM LVL with proprietary grading as described in the Quality Control Manual associated with this report.

TABLE 1—JOIST DESCRIPTIONS FOR BCI JOISTS (Continued)

JOIST SERIES	FLANGE				WEB MATERIAL	RANGE OF JOIST DEPTHS (inches)
	MATERIAL	XX00 Series	XX0 Series	XX Series		
		Depth x Width (inches)				
BCI 60, 600, 6000 - 1.3 BCI 60S, 600S, 6000S - 1.3	VERSA-LAM[1]	1.125 x 2.31	1.31 x 2.31	1.5 x 2.31	3/8" OSB	9 1/2 to 20
BCI 60, 600, 6000 - 1.4 BCI 60S, 600S, 6000S - 1.4	VERSA-LAM[1]	1.125 x 2.31	1.31 x 2.31	1.5 x 2.31	3/8" OSB	9 1/2 to 20
BCI 60, 600, 6000 - 1.5 BCI 60S, 600S, 6000S - 1.5	VERSA-LAM[1]	1.125 x 2.31	1.31 x 2.31	1.5 x 2.31	3/8" OSB	9 1/2 to 20
BCI 60, 600, 6000 - 1.6 BCI 60S, 600S, 6000S - 1.6	VERSA-LAM[1]	1.125 x 2.31	1.31 x 2.31	1.5 x 2.31	3/8" OSB	9 1/2 to 20
BCI 60, 600, 6000 - 1.7 BCI 60S, 600S, 6000S - 1.7	VERSA-LAM[1]	1.125 x 2.31	1.31 x 2.31	1.5 x 2.31	3/8" OSB	9 1/2 to 20
BCI 60, 600, 6000 - 1.8 BCI 60S, 600S, 6000S - 1.8	VERSA-LAM[1]	1.125 x 2.31	1.31 x 2.31	1.5 x 2.31	3/8" OSB	9 1/2 to 20
BCI 60, 600, 6000 - 1.9 BCI 60S, 600S, 6000S - 1.9	VERSA-LAM[1]	1.125 x 2.31	1.31 x 2.31	1.5 x 2.31	3/8" OSB	9 1/2 to 20
BCI 60, 600, 6000 - 2.0 BCI 60S, 600S, 6000S - 2.0	VERSA-LAM[1]	1.125 x 2.31	1.31 x 2.31	1.5 x 2.31	3/8" OSB	9 1/2 to 20
BCI 60, 600, 6000 - 2.1 BCI 60S, 600S, 6000S - 2.1	VERSA-LAM[1]	1.125 x 2.31	1.31 x 2.31	1.5 x 2.31	3/8" OSB	9 1/2 to 20
BCI 60, 600, 6000 - 2.2 BCI 60S, 600S, 6000S - 2.2	VERSA-LAM[1]	1.125 x 2.31	1.31 x 2.31	1.5 x 2.31	3/8" OSB	9 1/2 to 20
BCI 65, 650, 6500 - 1.3 BCI 65S, 650S, 6500S - 1.3	VERSA-LAM[1]	1.125 x 2.55	1.31 x 2.55	1.5 x 2.55	3/8" OSB	9 1/2 to 20
BCI 65, 650, 6500 - 1.4 BCI 65S, 650S, 6500S - 1.4	VERSA-LAM[1]	1.125 x 2.55	1.31 x 2.55	1.5 x 2.55	3/8" OSB	9 1/2 to 20
BCI 65, 650, 6500 - 1.5 BCI 65S, 650S, 6500S - 1.5	VERSA-LAM[1]	1.125 x 2.55	1.31 x 2.55	1.5 x 2.55	3/8" OSB	9 1/2 to 20
BCI 65, 650, 6500 - 1.6 BCI 65S, 650S, 6500S - 1.6	VERSA-LAM[1]	1.125 x 2.55	1.31 x 2.55	1.5 x 2.55	3/8" OSB	9 1/2 to 20
BCI 65, 650, 6500 - 1.7 BCI 65S, 650S, 6500S - 1.7	VERSA-LAM[1]	1.125 x 2.55	1.31 x 2.55	1.5 x 2.55	3/8" OSB	9 1/2 to 20
BCI 65, 650, 6500 - 1.8 BCI 65S, 650S, 6500S - 1.8	VERSA-LAM[1]	1.125 x 2.55	1.31 x 2.55	1.5 x 2.55	3/8" OSB	9 1/2 to 20
BCI 65, 650, 6500 - 1.9 BCI 65S, 650S, 6500S - 1.9	VERSA-LAM[1]	1.125 x 2.55	1.31 x 2.55	1.5 x 2.55	3/8" OSB	9 1/2 to 20
BCI 65, 650, 6500 - 2.0 BCI 65S, 650S, 6500S - 2.0	VERSA-LAM[1]	1.125 x 2.55	1.31 x 2.55	1.5 x 2.55	3/8" OSB	9 1/2 to 20
BCI 65, 650, 6500 - 2.1 BCI 65S, 650S, 6500S - 2.1	VERSA-LAM[1]	1.125 x 2.55	1.31 x 2.55	1.5 x 2.55	3/8" OSB	9 1/2 to 20
BCI 65, 650, 6500 - 2.2 BCI 65S, 650S, 6500S - 2.2	VERSA-LAM[1]	1.125 x 2.55	1.31 x 2.55	1.5 x 2.55	3/8" OSB	9 1/2 to 20
BCI 90, 900, 9000 - 1.3 BCI 90S, 900S, 9000S - 1.3	VERSA-LAM[1]	1.125 x 3.5	1.31 x 3.5	1.5 x 3.5	3/8" OSB	9 1/2 to 20
BCI 90, 900, 9000 - 1.4 BCI 90S, 900S, 9000S - 1.4	VERSA-LAM[1]	1.125 x 3.5	1.31 x 3.5	1.5 x 3.5	3/8" OSB	9 1/2 to 20
BCI 90, 900, 9000 - 1.5 BCI 90S, 900S, 9000S - 1.5	VERSA-LAM[1]	1.125 x 3.5	1.31 x 3.5	1.5 x 3.5	3/8" OSB	9 1/2 to 20
BCI 90, 900, 9000 - 1.6 BCI 90S, 900S, 9000S - 1.6	VERSA-LAM[1]	1.125 x 3.5	1.31 x 3.5	1.5 x 3.5	3/8" OSB	9 1/2 to 20
BCI 90, 900, 9000 - 1.7 BCI 90S, 900S, 9000S - 1.7	VERSA-LAM[1]	1.125 x 3.5	1.31 x 3.5	1.5 x 3.5	3/8" OSB	9 1/2 to 20
BCI 90, 900, 9000 - 1.8 BCI 90S, 900S, 9000S - 1.8	VERSA-LAM[1]	1.125 x 3.5	1.31 x 3.5	1.5 x 3.5	3/8" OSB	9 1/2 to 20
BCI 90, 900, 9000 - 1.9 BCI 90S, 900S, 9000S - 1.9	VERSA-LAM[1]	1.125 x 3.5	1.31 x 3.5	1.5 x 3.5	3/8" OSB	9 1/2 to 20
BCI 90, 900, 9000 - 2.0 BCI 90S, 900S, 9000S - 2.0	VERSA-LAM[1]	1.125 x 3.5	1.31 x 3.5	1.5 x 3.5	3/8" OSB	9 1/2 to 20
BCI 90, 900, 9000 - 2.1 BCI 90S, 900S, 9000S - 2.1	VERSA-LAM[1]	1.125 x 3.5	1.31 x 3.5	1.5 x 3.5	3/8" OSB	9 1/2 to 20
BCI 90, 900, 9000 - 2.2 BCI 90S, 900S, 9000S - 2.2	VERSA-LAM[1]	1.125 x 3.5	1.31 x 3.5	1.5 x 3.5	3/8" OSB	9 1/2 to 20
BCI 90e - 2.0	VERSA-LAM[1]			1.5 x 3.5	7/16" OSB	9 1/2 to 24

For **SI:** 1 inch = 25.4 mm.

[1]VERSA-LAM LVL with proprietary grading as described in the Quality Control Manual associated with this report.

TABLE 2—REFERENCE DESIGN VALUES FOR BCI JOISTS[1], [4]

DEPTH (in)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)
9 1/2	40-1.3	1570	110	6	1450	400-1.3	1395	105	6	1450	4000-1.3	1210	95	5	1450
11 7/8		2035	195	7	1625		1795	180	7	1625		1545	165	6	1600
14		2425	285	8	1825		2135	265	8	1825		1835	240	7	1750
9 1/2	45-1.3	1845	130	6	1475	450-1.3	1640	120	6	1475	4500-1.3	1425	110	5	1475
11 7/8		2390	220	7	1625		2115	205	7	1625		1825	185	6	1625
14		2850	330	8	1825		2510	300	8	1825		2160	275	8	1825
16		3265	450	9	1975		2870	415	9	1975		2465	375	9	1975
9 1/2	50-1.3	2120	145	6	1475	500-1.3	1885	135	6	1475	5000-1.3	1640	125	5	1475
11 7/8		2745	250	7	1625		2430	230	7	1625		2100	210	6	1625
14		3275	370	8	1825		2890	340	8	1825		2490	310	8	1825
16		3750	505	9	1975		3305	465	9	1975		2840	420	9	1975
9 1/2	60-1.3	2465	170	6	1575	600-1.3	2195	155	6	1575	6000-1.3	1910	140	5	1575
11 7/8		3190	285	7	1675		2830	265	7	1675		2450	240	6	1675
14		3805	425	8	1925		3360	385	8	1925		2900	350	8	1925
16		4360	580	9	2175		3845	530	9	2175		3310	475	9	2175
18		4910	760	10	2375		4320	695	10	2375		3715	625	10	2375
20		5450	970	11	2450		4790	885	11	2450		4115	800	11	2450
9 1/2	65-1.3	2725	185	6	1575	650-1.3	2430	170	6	1575	6500-1.3	2115	155	5	1575
11 7/8		3530	315	7	1675		3130	290	7	1675		2710	260	7	1675
14		4210	465	8	1925		3720	425	8	1925		3215	380	8	1925
16		4825	630	9	2175		4255	575	9	2175		3670	520	9	2175
18		5430	830	10	2375		4780	755	10	2375		4115	680	10	2375
20		6030	1060	11	2450		5300	965	11	2450		4560	870	11	2450
9 1/2	90-1.3	3770	250	6	1675	900-1.3	3365	230	6	1675	9000-1.3	2935	210	5	1675
11 7/8		4885	425	7	2150		4335	390	7	2150		3765	350	7	2150
14		5830	625	8	2350		5155	570	8	2350		4465	510	8	2350
16		6680	845	9	2550		5895	770	9	2550		5095	690	9	2550
18		7515	1105	10	2750		6630	1005	10	2750		5715	900	10	2750
20		8345	1405	11	2850		7350	1275	11	2850		6335	1140	11	2850
9 1/2	40-1.4	1785	120	6	1450	400-1.4	1585	110	6	1450	4000-1.4	1370	100	5	1450
11 7/8		2310	205	7	1625		2040	190	7	1625		1760	175	6	1600
14		2755	305	8	1825		2425	280	8	1825		2085	255	7	1750
9 1/2	45-1.4	2100	140	6	1475	450-1.4	1865	130	6	1475	4500-1.4	1620	120	5	1475
11 7/8		2715	235	7	1625		2400	220	7	1625		2075	200	6	1625
14		3235	350	8	1825		2855	325	8	1825		2455	290	8	1825
16		3710	480	9	1975		3260	440	9	1975		2805	400	9	1975
9 1/2	50-1.4	2410	160	6	1475	500-1.4	2145	145	6	1475	5000-1.4	1865	135	5	1475
11 7/8		3120	270	7	1625		2760	245	7	1625		2390	225	6	1625
14		3720	395	8	1825		3285	365	8	1825		2830	330	8	1825
16		4260	540	9	1975		3755	495	9	1975		3230	450	9	1975
9 1/2	60-1.4	2800	180	6	1575	600-1.4	2495	165	6	1575	6000-1.4	2170	150	5	1575
11 7/8		3625	310	7	1675		3215	285	7	1675		2780	255	6	1675
14		4325	455	8	1925		3820	415	8	1925		3300	375	8	1925
16		4955	620	9	2175		4365	565	9	2175		3765	510	9	2175
18		5575	810	10	2375		4910	740	10	2375		4220	665	10	2375
20		6190	1035	11	2450		5440	945	11	2450		4675	850	11	2450
9 1/2	65-1.4	3100	200	6	1575	650-1.4	2760	185	6	1575	6500-1.4	2405	165	5	1575
11 7/8		4010	340	7	1675		3555	310	7	1675		3080	280	7	1675
14		4785	495	8	1925		4230	455	8	1925		3655	410	8	1925
16		5480	675	9	2175		4835	615	9	2175		4170	555	9	2175
18		6170	885	10	2375		5430	810	10	2375		4675	725	10	2375
20		6850	1130	11	2450		6025	1030	11	2450		5180	925	11	2450
9 1/2	90-1.4	4285	270	6	1675	900-1.4	3825	250	6	1675	9000-1.4	3335	225	5	1675
11 7/8		5550	455	7	2150		4930	415	7	2150		4280	375	7	2150
14		6625	670	8	2350		5860	610	8	2350		5070	545	8	2350
16		7590	905	9	2550		6700	825	9	2550		5790	735	9	2550
18		8540	1185	10	2750		7530	1075	10	2750		6495	960	10	2750
20		9485	1505	11	2850		8355	1365	11	2850		7195	1220	11	2850

For **SI**: 1 inch = 25.4 mm; 1 ft-lb = 1.36 N-m; 1 in^2-lb = [illegible]79 mm^2-N; 1 in-lb/in = 4.4 N-mm/mm; 1 lb = 4.45 N; 1 lb/ft = 14.6 N/m.

[1] For joist descriptions see Table 1.

[2] Calculate bending and shear deflection as described in Section 4.11 "Deflection".

[3] Repetitive member use factors are limited to 1.0

[4] For reference design reaction values, see Table 3.

TABLE 2 (CONT.)—REFERENCE DESIGN VALUES FOR BCI JOISTS[1], [4]

DEPTH (in)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)
9 1/2		2000	130	6	1450		1775	120	6	1450		1535	110	5	1450
11 7/8	40-1.5	2585	220	7	1625	400-1.5	2285	205	7	1625	4000-1.5	1970	185	6	1600
14		3085	325	8	1825		2715	300	8	1825		2335	270	7	1750
9 1/2		2350	150	6	1475		2085	135	6	1475		1810	125	5	1475
11 7/8	45-1.5	3040	255	7	1625	450-1.5	2690	235	7	1625	4500-1.5	2320	210	6	1625
14		3625	375	8	1825		3195	345	8	1825		2750	310	8	1825
16		4150	510	9	1975		3655	470	9	1975		3140	425	9	1975
9 1/2		2700	170	6	1475		2400	155	6	1475		2085	140	5	1475
11 7/8	50-1.5	3495	285	7	1625	500-1.5	3095	265	7	1625	5000-1.5	2675	240	6	1625
14		4165	420	8	1825		3675	385	8	1825		3170	350	8	1825
16		4775	575	9	1975		4205	525	9	1975		3615	475	9	1975
9 1/2		3135	195	6	1575		2795	180	6	1575		2430	160	5	1575
11 7/8		4060	330	7	1675		3600	300	7	1675		3115	270	6	1675
14	60-1.5	4845	485	8	1925	600-1.5	4280	440	8	1925	6000-1.5	3695	395	8	1925
16		5550	660	9	2175		4890	600	9	2175		4215	540	9	2175
18		6245	865	10	2375		5495	790	10	2375		4730	710	10	2375
20		6935	1100	11	2450		6095	1005	11	2450		5240	900	11	2450
9 1/2		3470	210	6	1575		3090	195	6	1575		2690	180	5	1575
11 7/8		4495	360	7	1675		3980	330	7	1675		3450	295	7	1675
14	65-1.5	5360	530	8	1925	650-1.5	4735	485	8	1925	6500-1.5	4090	435	8	1925
16		6140	720	9	2175		5415	655	9	2175		4670	590	9	2175
18		6910	945	10	2375		6085	860	10	2375		5240	770	10	2375
20		7670	1200	11	2450		6745	1095	11	2450		5800	980	11	2450
9 1/2		4800	290	6	1675		4280	265	6	1675		3735	240	5	1675
11 7/8		6220	490	7	2150		5520	445	7	2150		4790	400	7	2150
14	90-1.5	7415	715	8	2350	900-1.5	6565	650	8	2350	9000-1.5	5680	580	8	2350
16		8500	970	9	2550		7505	880	9	2550		6485	785	9	2550
18		9565	1265	10	2750		8435	1145	10	2750		7275	1020	10	2750
20		10625	1605	11	2850		9355	1455	11	2850		8060	1295	11	2850
9 1/2		2140	135	6	1450		1900	125	6	1450		1645	115	5	1450
11 7/8	40-1.6	2770	235	7	1625	400-1.6	2445	215	7	1625	4000-1.6	2110	195	6	1600
14		3305	345	8	1825		2910	315	8	1825		2500	285	7	1750
9 1/2		2515	160	6	1475		2235	145	6	1475		1940	135	5	1475
11 7/8	45-1.6	3260	270	7	1625	450-1.6	2880	245	7	1625	4500-1.6	2485	225	6	1625
14		3885	395	8	1825		3425	365	8	1825		2950	330	8	1825
16		4450	540	9	1975		3915	495	9	1975		3365	450	9	1975
9 1/2		2890	180	6	1475		2570	165	6	1475		2235	150	5	1475
11 7/8	50-1.6	3745	305	7	1625	500-1.6	3315	280	7	1625	5000-1.6	2865	255	6	1625
14		4465	450	8	1825		3940	410	8	1825		3395	370	8	1825
16		5115	610	9	1975		4505	560	9	1975		3875	505	9	1975
9 1/2		3360	205	6	1575		2990	190	6	1575		2605	170	5	1575
11 7/8		4350	350	7	1675		3855	320	7	1675		3335	290	6	1675
14	60-1.6	5190	515	8	1925	600-1.6	4585	470	8	1925	6000-1.6	3955	420	8	1925
16		5945	700	9	2175		5240	635	9	2175		4515	570	9	2175
18		6690	915	10	2375		5890	835	10	2375		5065	750	10	2375
20		7430	1165	11	2450		6530	1060	11	2450		5610	955	11	2450
9 1/2		3715	225	6	1575		3310	210	6	1575		2885	190	5	1575
11 7/8		4815	385	7	1675		4265	350	7	1675		3695	315	7	1675
14	65-1.6	5740	560	8	1925	650-1.6	5075	515	8	1925	6500-1.6	4385	460	8	1925
16		6580	765	9	2175		5800	695	9	2175		5000	625	9	2175
18		7405	1000	10	2375		6520	910	10	2375		5610	815	10	2375
20		8220	1275	11	2450		7230	1160	11	2450		6215	1035	11	2450
9 1/2		5140	305	6	1675		4585	285	6	1675		4000	255	5	1675
11 7/8		6660	520	7	2150		5915	475	7	2150		5135	425	7	2150
14	90-1.6	7945	760	8	2350	900-1.6	7030	690	8	2350	9000-1.6	6085	615	8	2350
16		9105	1030	9	2550		8040	935	9	2550		6945	830	9	2550
18		10250	1345	10	2750		9035	1215	10	2750		7795	1085	10	2750
20		11380	1705	11	2850		10025	1540	11	2850		8635	1370	11	2850

For **SI**: 1 inch = 25.4 mm; 1 ft-lb = 1.36 N-m; 1 in^2-lb = 179 mm^2-N; 1 in-lb/in = 4.4 N-mm/mm; 1 lb = 4.45 N; 1 lb/ft = 14.6 N/m.

[1] For joist descriptions see TABLE 1.

[2] Calculate bending and shear deflection as described in Section 4.11 "Deflection".

[3] Repetitive member use factors are limited to 1.0

[4] For reference design reaction values, see Table 3.

TABLE 2 (CONT.)—REFERENCE DESIGN VALUES FOR BCI JOISTS[1], [4]

DEPTH (in)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)
9 1/2	40-1.7	2355	145	6	1450	400-1.7	2090	135	6	1450	4000-1.7	1810	120	5	1450
11 7/8		3050	245	7	1625		2690	225	7	1625		2320	205	6	1600
14		3635	365	8	1825		3200	335	8	1825		2750	305	7	1750
9 1/2	45-1.7	2770	165	6	1475	450-1.7	2460	155	6	1475	4500-1.7	2135	140	5	1475
11 7/8		3585	285	7	1625		3170	260	7	1625		2735	235	6	1625
14		4270	420	8	1825		3765	385	8	1825		3245	345	8	1825
16		4895	570	9	1975		4305	525	9	1975		3700	470	9	1975
9 1/2	50-1.7	3180	190	6	1475	500-1.7	2830	175	6	1475	5000-1.7	2460	160	5	1475
11 7/8		4120	320	7	1625		3645	295	7	1625		3150	265	6	1625
14		4910	475	8	1825		4335	435	8	1825		3735	390	8	1825
16		5625	645	9	1975		4955	560	9	1975		4260	530	9	1975
9 1/2	60-1.7	3695	220	6	1575	600-1.7	3290	200	6	1575	6000-1.7	2865	180	5	1575
11 7/8		4785	370	7	1675		4240	340	7	1675		3670	305	6	1675
14		5710	545	8	1925		5040	495	8	1925		4350	445	8	1925
16		6540	740	9	2175		5765	675	9	2175		4965	605	9	2175
18		7360	970	10	2375		6475	880	10	2375		5575	790	10	2375
20		8175	1230	11	2450		7185	1120	11	2450		6170	1005	11	2450
9 1/2	65-1.7	4090	240	6	1575	650-1.7	3640	220	6	1575	6500-1.7	3170	200	5	1575
11 7/8		5295	405	7	1675		4695	370	7	1675		4065	335	7	1675
14		6315	595	8	1925		5580	540	8	1925		4820	485	8	1925
16		7235	810	9	2175		6380	735	9	2175		5500	660	9	2175
18		8145	1060	10	2375		7170	960	10	2375		6175	860	10	2375
20		9040	1345	11	2450		7950	1220	11	2450		6840	1095	11	2450
9 1/2	90-1.7	5655	325	6	1675	900-1.7	5045	300	6	1675	9000-1.7	4400	270	5	1675
11 7/8		7330	550	7	2150		6505	500	7	2150		5645	450	7	2150
14		8740	805	8	2350		7735	730	8	2350		6695	650	8	2350
16		10015	1090	9	2550		8845	990	9	2550		7640	880	9	2550
18		11275	1425	10	2750		9940	1290	10	2750		8575	1145	10	2750
20		12520	1805	11	2850		11025	1630	11	2850		9500	1450	11	2850
9 1/2	40-1.8	2605	150	6	1450	400-1.8	2310	140	6	1450	4000-1.8	2000	130	5	1450
11 7/8		3370	260	7	1625		2975	240	7	1625		2565	215	6	1600
14		4020	385	8	1825		3540	350	8	1825		3040	320	7	1750
9 1/2	45-1.8	3060	175	6	1475	450-1.8	2720	165	6	1475	4500-1.8	2360	150	5	1475
11 7/8		3965	300	7	1625		3505	275	7	1625		3025	250	6	1625
14		4725	440	8	1825		4165	405	8	1825		3585	365	8	1825
16		5410	605	9	1975		4760	550	9	1975		4090	495	9	1975
9 1/2	50-1.8	3520	200	6	1475	500-1.8	3130	185	6	1475	5000-1.8	2725	170	5	1475
11 7/8		4555	340	7	1625		4030	310	7	1625		3485	280	6	1625
14		5430	500	8	1825		4790	455	8	1825		4130	410	8	1825
16		6220	680	9	1975		5480	620	9	1975		4715	560	9	1975
9 1/2	60-1.8	4090	230	6	1575	600-1.8	3640	210	6	1575	6000-1.8	3165	190	5	1575
11 7/8		5295	390	7	1675		4690	360	7	1675		4060	320	6	1675
14		6315	575	8	1925		5575	520	8	1925		4815	470	8	1925
16		7235	780	9	2175		6375	710	9	2175		5495	635	9	2175
18		8140	1020	10	2375		7165	925	10	2375		6165	830	10	2375
20		9040	1300	11	2450		7945	1180	11	2450		6825	1055	11	2450
9 1/2	65-1.8	4520	255	6	1575	650-1.8	4030	235	6	1575	6500-1.8	3505	210	5	1575
11 7/8		5855	430	7	1675		5190	390	7	1675		4495	350	7	1675
14		6985	630	8	1925		6170	570	8	1925		5330	515	8	1925
16		8000	855	9	2175		7055	775	9	2175		6085	695	9	2175
18		9005	1115	10	2375		7930	1015	10	2375		6825	905	10	2375
20		10000	1420	11	2450		8795	1285	11	2450		7565	1150	11	2450
9 1/2	90-1.8	6255	345	6	1675	900-1.8	5580	315	6	1675	9000-1.8	4870	285	5	1675
11 7/8		8105	580	7	2150		7195	530	7	2150		6245	475	7	2150
14		9670	850	8	2350		8555	770	8	2350		7405	690	8	2350
16		11080	1150	9	2550		9780	1045	9	2550		8450	930	9	2550
18		12470	1500	10	2750		10995	1360	10	2750		9485	1205	10	2750
20		13845	1900	11	2850		12195	1720	11	2850		10505	1525	11	2850

For **SI**: 1 inch = 25.4 mm; 1 ft-lb = 1.36 N-m; 1 in^2-lb = 179 mm^2-N; 1 in-lb/in = 4.4 N-mm/mm; 1 lb = 4.45 N; 1 lb/ft = 14.6 N/m.

(1) For joist descriptions see TABLE 1.

(2) Calculate bending and shear deflection as described in Section 4.11 "Deflection".

(3) Repetitive member use factors are limited to 1.0

(4) For reference design reaction values, see Table 3.

TABLE 2 (CONT.)—REFERENCE DESIGN VALUES FOR BCI JOISTS[1], [4]

DEPTH (in)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)
9 1/2		2785	160	6	1450		2470	150	6	1450		2140	135	5	1450
11 7/8	40-1.9	3600	275	7	1625	400-1.9	3180	250	7	1625	4000-1.9	2740	225	6	1600
14		4295	405	8	1825		3780	370	8	1825		3250	335	7	1750
9 1/2		3270	185	6	1475		2905	170	6	1475		2520	155	5	1475
11 7/8	45-1.9	4235	315	7	1625	450-1.9	3745	290	7	1625	4500-1.9	3235	260	6	1625
14		5050	465	8	1825		4450	425	8	1825		3830	380	8	1825
16		5785	635	9	1975		5085	580	9	1975		4370	520	9	1975
9 1/2		3760	210	6	1475		3345	195	6	1475		2905	175	5	1475
11 7/8	50-1.9	4865	360	7	1625	500-1.9	4305	330	7	1625	5000-1.9	3725	295	6	1625
14		5805	525	8	1825		5120	480	8	1825		4415	430	8	1825
16		6650	715	9	1975		5855	650	9	1975		5035	585	9	1975
9 1/2		4370	245	6	1575		3890	225	6	1575		3385	205	5	1575
11 7/8		5655	410	7	1675		5010	375	7	1675		4340	340	6	1675
14	60-1.9	6745	605	8	1925	600-1.9	5960	550	8	1925	6000-1.9	5145	490	8	1925
16		7730	820	9	2175		6810	745	9	2175		5870	665	9	2175
18		8700	1070	10	2375		7655	975	10	2375		6585	870	10	2375
20		9660	1365	11	2450		8490	1235	11	2450		7295	1105	11	2450
9 1/2		4830	265	6	1575		4305	245	6	1575		3745	220	5	1575
11 7/8		6260	450	7	1675		5545	415	7	1675		4805	370	7	1675
14	65-1.9	7465	660	8	1925	650-1.9	6595	600	8	1925	6500-1.9	5695	540	8	1925
16		8550	900	9	2175		7540	815	9	2175		6500	730	9	2175
18		9625	1175	10	2375		8475	1065	10	2375		7295	950	10	2375
20		10685	1490	11	2450		9395	1350	11	2450		8080	1205	11	2450
9 1/2		6685	365	6	1675		5965	335	6	1675		5200	300	5	1675
11 7/8		8660	615	7	2150		7685	560	7	2150		6670	500	7	2150
14	90-1.9	10330	895	8	2350	900-1.9	9140	810	8	2350	9000-1.9	7910	725	8	2350
16		11835	1210	9	2550		10450	1095	9	2550		9030	975	9	2550
18		13325	1580	10	2750		11750	1430	10	2750		10135	1270	10	2750
20		14795	2000	11	2850		13030	1805	11	2850		11225	1605	11	2850
9 1/2		3070	170	6	1450		2725	155	6	1450		2360	140	5	1450
11 7/8	40-2.0	3970	285	7	1625	400-2.0	3505	265	7	1625	4000-2.0	3020	240	6	1600
14		4735	420	8	1825		4170	385	8	1825		3580	350	7	1750
9 1/2		3605	195	6	1475		3205	180	6	1475		2780	165	5	1475
11 7/8	45-2.0	4670	330	7	1625	450-2.0	4125	305	7	1625	4500-2.0	3565	275	6	1625
14		5565	485	8	1825		4905	445	8	1825		4225	400	8	1825
16		6375	665	9	1975		5610	605	9	1975		4825	545	9	1975
9 1/2		4145	220	6	1475		3685	205	6	1475		3205	185	5	1475
11 7/8	50-2.0	5365	375	7	1625	500-2.0	4750	345	7	1625	5000-2.0	4105	310	6	1625
14		6400	550	8	1825		5645	505	8	1825		4865	450	8	1825
16		7330	750	9	1975		6455	685	9	1975		5555	615	9	1975
9 1/2		4815	255	6	1575		4290	235	6	1575		3730	215	5	1575
11 7/8		6235	430	7	1675		5525	395	7	1675		4785	355	6	1675
14	60-2.0	7440	635	8	1925	600-2.0	6570	575	8	1925	6000-2.0	5670	515	8	1925
16		8520	860	9	2175		7510	780	9	2175		6470	700	9	2175
18		9590	1125	10	2375		8440	1020	10	2375		7260	910	10	2375
20		10650	1430	11	2450		9360	1295	11	2450		8040	1155	11	2450
9 1/2		5325	280	6	1575		4745	260	6	1575		4130	235	5	1575
11 7/8		6900	475	7	1675		6115	435	7	1675		5295	390	7	1675
14	65-2.0	8230	695	8	1925	650-2.0	7270	630	8	1925	6500-2.0	6280	565	8	1925
16		9425	940	9	2175		8315	855	9	2175		7165	765	9	2175
18		10610	1230	10	2375		9340	1115	10	2375		8045	995	10	2375
20		11780	1565	11	2450		10360	1415	11	2450		8910	1260	11	2450
9 1/2		7370	380	6	1675		6575	350	6	1675		5735	315	5	1675
11 7/8		9550	645	7	2150		8475	585	7	2150		7355	525	7	2150
14	90-2.0	11390	940	8	2350	900-2.0	10080	855	8	2350	9000-2.0	8725	760	8	2350
16		13050	1275	9	2550		11525	1150	9	2550		9955	1025	9	2550
18		14690	1660	10	2750		12950	1500	10	2750		11170	1330	10	2750
20		16310	2100	11	2850		14365	1895	11	2850		12375	1680	11	2850

For **SI**: 1 inch = 25.4 mm; 1 ft-lb = 1.36 N-m; 1 in^2-lb = 179 mm^2-N; 1 in-lb/in = 4.4 N-mm/mm; 1 lb = 4.45 N; 1 lb/ft = 14.6 N/m.

[1] For joist descriptions see TABLE 1.

[2] Calculate bending and shear deflection as described in Section 4.11 "Deflection".

[3] Repetitive member use factors are limited to 1.0

[4] For reference design reaction values, see Table 3.

TABLE 2 (CONT.)—REFERENCE DESIGN VALUES FOR BCI JOISTS[1], [4]

DEPTH (in)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)
9 1/2		3210	175	6	1450		2850	165	6	1450		2470	150	5	1450
11 7/8	40-2.1	4155	300	7	1625	400-2.1	3670	275	7	1625	4000-2.1	3165	250	6	1600
14		4955	440	8	1825		4360	405	8	1825		3750	365	7	1750
9 1/2		3775	205	6	1475		3355	190	6	1475		2910	170	5	1475
11 7/8	45-2.1	4885	345	7	1625	450-2.1	4320	320	7	1625	4500-2.1	3730	285	6	1625
14		5825	510	8	1825		5135	465	8	1825		4420	420	8	1825
16		6670	695	9	1975		5870	635	9	1975		5045	570	9	1975
9 1/2		4335	230	6	1475		3855	215	6	1475		3350	195	5	1475
11 7/8	50-2.1	5615	395	7	1625	500-2.1	4970	360	7	1625	5000-2.1	4295	325	6	1625
14		6695	580	8	1825		5910	525	8	1825		5095	470	8	1825
16		7670	785	9	1975		6755	715	9	1975		5810	640	9	1975
9 1/2		5040	270	6	1575		4485	245	6	1575		3905	225	5	1575
11 7/8		6525	455	7	1675		5780	415	7	1675		5005	370	6	1675
14	60-2.1	7785	665	8	1925	600-2.1	6875	605	8	1925	6000-2.1	5935	540	8	1925
16		8915	890	9	2175		7860	815	9	2175		6770	730	9	2175
18		10035	1175	10	2375		8830	1065	10	2375		7600	950	10	2375
20		11145	1495	11	2450		9795	1355	11	2450		8415	1210	11	2450
9 1/2		5575	295	6	1575		4965	270	6	1575		4325	245	5	1575
11 7/8		7220	495	7	1675		6400	455	7	1675		5545	405	7	1675
14	65-2.1	8610	725	8	1925	650-2.1	7610	660	8	1925	6500-2.1	6575	590	8	1925
16		9865	985	9	2175		8700	895	9	2175		7500	800	9	2175
18		11105	1290	10	2375		9775	1170	10	2375		8415	1040	10	2375
20		12330	1635	11	2450		10840	1480	11	2450		9325	1320	11	2450
9 1/2		7710	400	6	1675		6880	370	6	1675		6000	330	5	1675
11 7/8		9990	675	7	2150		8870	615	7	2150		7700	550	7	2150
14	90-2.1	11920	985	8	2350	900-2.1	10545	895	8	2350	9000-2.1	9130	795	8	2350
16		13655	1335	9	2550		12060	1205	9	2550		10420	1070	9	2550
18		15375	1740	10	2750		13555	1570	10	2750		11690	1390	10	2750
20		17070	2200	11	2850		15035	1985	11	2850		12950	1760	11	2850
9 1/2		3460	185	6	1450		3070	170	6	1450		2660	155	5	1450
11 7/8	40-2.2	4480	315	7	1625	400-2.2	3955	290	7	1625	4000-2.2	3410	260	6	1600
14		5340	460	8	1825		4700	420	8	1825		4040	380	7	1750
9 1/2		4065	215	6	1475		3615	195	6	1475		3135	180	5	1475
11 7/8	45-2.2	5265	365	7	1625	450-2.2	4655	330	7	1625	4500-2.2	4020	300	6	1625
14		6280	530	8	1825		5535	485	8	1825		4765	435	8	1825
16		7190	725	9	1975		6325	660	9	1975		5435	590	9	1975
9 1/2		4675	245	6	1475		4155	225	6	1475		3610	205	5	1475
11 7/8	50-2.2	6050	410	7	1625	500-2.2	5355	375	7	1625	5000-2.2	4630	340	6	1625
14		7215	605	8	1825		6365	550	8	1825		5490	495	8	1825
16		8265	820	9	1975		7280	745	9	1975		6265	670	9	1975
9 1/2		5430	280	6	1575		4835	260	6	1575		4205	235	5	1575
11 7/8		7035	475	7	1675		6230	430	7	1675		5395	390	6	1675
14	60-2.2	8390	690	8	1925	600-2.2	7410	630	8	1925	6000-2.2	6395	565	8	1925
16		9610	940	9	2175		8470	855	9	2175		7300	760	9	2175
18		10815	1230	10	2375		9520	1115	10	2375		8190	995	10	2375
20		12010	1560	11	2450		10555	1410	11	2450		9070	1260	11	2450
9 1/2		6005	310	6	1575		5350	285	6	1575		4660	255	5	1575
11 7/8		7780	520	7	1675		6895	475	7	1675		5975	425	7	1675
14	65-2.2	9280	760	8	1925	650-2.2	8200	690	8	1925	6500-2.2	7090	615	8	1925
16		10630	1030	9	2175		9375	935	9	2175		8090	835	9	2175
18		11965	1345	10	2375		10535	1220	10	2375		9070	1085	10	2375
20		13290	1705	11	2450		11685	1545	11	2450		10050	1375	11	2450
9 1/2		8310	420	6	1675		7415	385	6	1675		6470	345	5	1675
11 7/8		10770	705	7	2150		9560	645	7	2150		8295	575	7	2150
14	90-2.2	12845	1030	8	2350	900-2.2	11365	935	8	2350	9000-2.2	9840	830	8	2350
16		14720	1395	9	2550		13000	1260	9	2550		11230	1120	9	2550
18		16570	1815	10	2750		14610	1640	10	2750		12600	1455	10	2750
20		18400	2300	11	2850		16200	2070	11	2850		13960	1835	11	2850

For **SI**: 1 inch = 25.4 mm; 1 ft-lb = 1.36 N-m; 1 in^2-lb = 179 mm^2-N; 1 in-lb/in = 4.4 N-mm/mm; 1 lb = 4.45 N; 1 lb/ft = 14.6 N/m.

[1] For joist descriptions see TABLE 1.

[2] Calculate bending and shear deflection as described in Section 4.11 "Deflection".

[3] Repetitive member use factors are limited to 1.0

[4] For reference design reaction values, see Table 3.

TABLE 2 (CONT.)—REFERENCE DESIGN VALUES FOR BCI JOISTS[1], [4]

DEPTH (in)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)
9 1/2	40S-1.3	1570	115	6	1450	400S-1.3	1440	110	6	1450	4000S-1.3	1210	100	5	1450
11 7/8		2035	200	7	1625		1855	190	7	1625		1545	170	6	1600
14		2425	300	8	1825		2210	280	8	1825		1835	250	7	1750
9 1/2	45S-1.3	1845	135	6	1475	450S-1.3	1695	130	6	1475	4500S-1.3	1425	115	5	1475
11 7/8		2390	230	7	1625		2185	220	7	1625		1825	195	6	1625
14		2850	340	8	1825		2600	320	8	1825		2160	285	8	1825
16		3265	470	9	1975		2970	440	9	1975		2465	390	9	1975
9 1/2	50S-1.3	2120	155	6	1475	500S-1.3	1945	145	6	1475	5000S-1.3	1640	130	5	1475
11 7/8		2745	260	7	1625		2510	245	7	1625		2100	220	6	1625
14		3275	385	8	1825		2990	360	8	1825		2490	320	8	1825
16		3750	530	9	1975		3420	495	9	1975		2840	435	9	1975
9 1/2	60S-1.3	2465	175	6	1575	600S-1.3	2265	165	6	1575	6000S-1.3	1910	150	5	1575
11 7/8		3190	300	7	1675		2920	280	7	1675		2450	250	6	1675
14		3805	440	8	1925		3475	415	8	1925		2900	365	8	1925
16		4360	600	9	2175		3975	565	9	2175		3310	495	9	2175
18		4910	790	10	2375		4470	740	10	2375		3715	650	10	2375
20		5450	1010	11	2450		4960	945	11	2450		4115	830	11	2450
9 1/2	65S-1.3	2725	195	6	1575	650S-1.3	2505	180	6	1575	6500S-1.3	2115	160	5	1575
11 7/8		3530	330	7	1675		3235	310	7	1675		2710	270	7	1675
14		4210	480	8	1925		3845	450	8	1925		3215	395	8	1925
16		4825	660	9	2175		4400	615	9	2175		3670	540	9	2175
18		5430	865	10	2375		4945	805	10	2375		4115	705	10	2375
20		6030	1100	11	2450		5485	1030	11	2450		4560	900	11	2450
9 1/2	90S-1.3	3770	260	6	1675	900S-1.3	3470	245	6	1675	9000S-1.3	2935	220	5	1675
11 7/8		4885	445	7	2150		4480	415	7	2150		3765	365	7	2150
14		5830	650	8	2350		5330	605	8	2350		4465	530	8	2350
16		6680	880	9	2550		6095	825	9	2550		5095	715	9	2550
18		7515	1155	10	2750		6855	1075	10	2750		5715	935	10	2750
20		8345	1465	11	2850		7605	1365	11	2850		6335	1185	11	2850
9 1/2	40S-1.4	1785	125	6	1450	400S-1.4	1635	120	6	1450	4000S-1.4	1370	105	5	1450
11 7/8		2310	215	7	1625		2110	205	7	1625		1760	180	6	1600
14		2755	320	8	1825		2510	300	8	1825		2085	265	7	1750
9 1/2	45S-1.4	2100	145	6	1475	450S-1.4	1925	135	6	1475	4500S-1.4	1620	125	5	1475
11 7/8		2715	245	7	1625		2480	235	7	1625		2075	205	6	1625
14		3235	365	8	1825		2950	345	8	1825		2455	305	8	1825
16		3710	500	9	1975		3375	470	9	1975		2805	415	9	1975
9 1/2	50S-1.4	2410	165	6	1475	500S-1.4	2215	155	6	1475	5000S-1.4	1865	140	5	1475
11 7/8		3120	280	7	1625		2855	265	7	1625		2390	235	6	1625
14		3720	415	8	1825		3395	385	8	1825		2830	340	8	1825
16		4260	565	9	1975		3885	530	9	1975		3230	465	9	1975
9 1/2	60S-1.4	2800	190	6	1575	600S-1.4	2575	180	6	1575	6000S-1.4	2170	160	5	1575
11 7/8		3625	320	7	1675		3320	300	7	1675		2780	265	6	1675
14		4325	470	8	1925		3950	440	8	1925		3300	390	8	1925
16		4955	645	9	2175		4520	600	9	2175		3765	530	9	2175
18		5575	845	10	2375		5080	790	10	2375		4220	695	10	2375
20		6190	1075	11	2450		5635	1005	11	2450		4675	885	11	2450
9 1/2	65S-1.4	3100	205	6	1575	650S-1.4	2845	195	6	1575	6500S-1.4	2405	175	5	1575
11 7/8		4010	350	7	1675		3675	330	7	1675		3080	290	7	1675
14		4785	515	8	1925		4370	485	8	1925		3655	425	8	1925
16		5480	705	9	2175		5000	660	9	2175		4170	575	9	2175
18		6170	925	10	2375		5620	860	10	2375		4675	755	10	2375
20		6850	1175	11	2450		6235	1095	11	2450		5180	960	11	2450
9 1/2	90S-1.4	4285	280	6	1675	900S-1.4	3940	265	6	1675	9000S-1.4	3335	235	5	1675
11 7/8		5550	475	7	2150		5090	445	7	2150		4280	390	7	2150
14		6625	695	8	2350		6055	650	8	2350		5070	565	8	2350
16		7590	945	9	2550		6930	880	9	2550		5790	765	9	2550
18		8540	1235	10	2750		7790	1150	10	2750		6495	1000	10	2750
20		9485	1570	11	2850		8640	1460	11	2850		7195	1265	11	2850

For **SI**: 1 inch = 25.4 mm; 1 ft-lb = 1.36 N-m; 1 in^2-lb = 179 mm^2-N; 1 in-lb/in = 4.4 N-mm/mm; 1 lb = 4.45 N; 1 lb/ft = 14.6 N/m.

[1] For joist descriptions see TABLE 1.

[2] Calculate bending and shear deflection as described in Section 4.11 "Deflection".

[3] Repetitive member use factors are limited to 1.0

[4] For reference design reaction values, see Table 3.

TABLE 2 (CONT.)—REFERENCE DESIGN VALUES FOR BCI JOISTS[1], [4]

DEPTH (in)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)
9 1/2	40S-1.5	2000	135	6	1450	400S-1.5	1830	125	6	1450	4000S-1.5	1535	115	5	1450
11 7/8		2585	230	7	1625		2360	215	7	1625		1970	190	6	1600
14		3085	340	8	1825		2810	320	8	1825		2335	280	7	1750
9 1/2	45S-1.5	2350	155	6	1475	450S-1.5	2155	145	6	1475	4500S-1.5	1810	130	5	1475
11 7/8		3040	265	7	1625		2780	250	7	1625		2320	220	6	1625
14		3625	390	8	1825		3305	365	8	1825		2750	325	8	1825
16		4150	530	9	1975		3780	500	9	1975		3140	440	9	1975
9 1/2	50S-1.5	2700	175	6	1475	500S-1.5	2480	165	6	1475	5000S-1.5	2085	150	5	1475
11 7/8		3495	300	7	1625		3195	280	7	1625		2675	250	6	1625
14		4165	440	8	1825		3800	410	8	1825		3170	365	8	1825
16		4775	600	9	1975		4350	560	9	1975		3615	495	9	1975
9 1/2	60S-1.5	3135	200	6	1575	600S-1.5	2880	190	6	1575	6000S-1.5	2430	170	5	1575
11 7/8		4060	345	7	1675		3715	320	7	1675		3115	285	6	1675
14		4845	505	8	1925		4425	470	8	1925		3695	415	8	1925
16		5550	685	9	2175		5060	640	9	2175		4215	560	9	2175
18		6245	900	10	2375		5690	840	10	2375		4730	735	10	2375
20		6935	1145	11	2450		6310	1070	11	2450		5240	935	11	2450
9 1/2	65S-1.5	3470	220	6	1575	650S-1.5	3190	210	6	1575	6500S-1.5	2690	185	5	1575
11 7/8		4495	375	7	1675		4115	355	7	1675		3450	310	7	1675
14		5360	550	8	1925		4895	515	8	1925		4090	450	8	1925
16		6140	750	9	2175		5600	700	9	2175		4670	615	9	2175
18		6910	985	10	2375		6295	915	10	2375		5240	800	10	2375
20		7670	1250	11	2450		6985	1165	11	2450		5800	1020	11	2450
9 1/2	90S-1.5	4800	300	6	1675	900S-1.5	4415	285	6	1675	9000S-1.5	3735	250	5	1675
11 7/8		6220	510	7	2150		5700	475	7	2150		4790	415	7	2150
14		7415	745	8	2350		6780	695	8	2350		5680	605	8	2350
16		8500	1010	9	2550		7760	940	9	2550		6485	815	9	2550
18		9565	1320	10	2750		8725	1225	10	2750		7275	1065	10	2750
20		10625	1675	11	2850		9680	1555	11	2850		8060	1345	11	2850
9 1/2	40S-1.6	2140	140	6	1450	400S-1.6	1965	135	6	1450	4000S-1.6	1645	120	5	1450
11 7/8		2770	245	7	1625		2530	230	7	1625		2110	205	6	1600
14		3305	360	8	1825		3010	335	8	1825		2500	300	7	1750
9 1/2	45S-1.6	2515	165	6	1475	450S-1.6	2310	155	6	1475	4500S-1.6	1940	140	5	1475
11 7/8		3260	280	7	1625		2975	265	7	1625		2485	235	6	1625
14		3885	415	8	1825		3540	385	8	1825		2950	340	8	1825
16		4450	565	9	1975		4050	530	9	1975		3365	465	9	1975
9 1/2	50S-1.6	2890	185	6	1475	500S-1.6	2655	175	6	1475	5000S-1.6	2235	155	5	1475
11 7/8		3745	315	7	1625		3425	300	7	1625		2865	265	6	1625
14		4465	465	8	1825		4075	435	8	1825		3395	385	8	1825
16		5115	635	9	1975		4660	595	9	1975		3875	525	9	1975
9 1/2	60S-1.6	3360	215	6	1575	600S-1.6	3085	205	6	1575	6000S-1.6	2605	180	5	1575
11 7/8		4350	365	7	1675		3985	340	7	1675		3335	300	6	1675
14		5190	535	8	1925		4740	500	8	1925		3955	440	8	1925
16		5945	730	9	2175		5420	680	9	2175		4515	595	9	2175
18		6690	955	10	2375		6095	890	10	2375		5065	780	10	2375
20		7430	1215	11	2450		6760	1135	11	2450		5610	990	11	2450
9 1/2	65S-1.6	3715	235	6	1575	650S-1.6	3415	220	6	1575	6500S-1.6	2885	195	5	1575
11 7/8		4815	400	7	1675		4405	375	7	1675		3695	330	7	1675
14		5740	585	8	1925		5245	550	8	1925		4385	480	8	1925
16		6580	795	9	2175		6000	745	9	2175		5000	650	9	2175
18		7405	1045	10	2375		6745	975	10	2375		5610	850	10	2375
20		8220	1325	11	2450		7480	1235	11	2450		6215	1075	11	2450
9 1/2	90S-1.6	5140	320	6	1675	900S-1.6	4730	300	6	1675	9000S-1.6	4000	265	5	1675
11 7/8		6660	540	7	2150		6105	505	7	2150		5135	445	7	2150
14		7945	790	8	2350		7265	740	8	2350		6085	645	8	2350
16		9105	1075	9	2550		8315	1000	9	2550		6945	865	9	2550
18		10250	1400	10	2750		9345	1305	10	2750		7795	1130	10	2750
20		11380	1775	11	2850		10370	1650	11	2850		8635	1430	11	2850

For **SI**: 1 inch = 25.4 mm; 1 ft-lb = 1.36 N-m; 1 in^2-lb = 179 mm^2-N; 1 in-lb/in = 4.4 N-mm/mm; 1 lb = 4.45 N; 1 lb/ft = 14.6 N/m.

[1] For joist descriptions see TABLE 1.

[2] Calculate bending and shear deflection as described in Section 4.11 "Deflection".

[3] Repetitive member use factors are limited to 1.0

[4] For reference design reaction values, see Table 3.

TABLE 2 (CONT.)—REFERENCE DESIGN VALUES FOR BCI JOISTS[1], [4]

DEPTH (in)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)
9 1/2	40S-1.7	2355	150	6	1450	400S-1.7	2160	140	6	1450	4000S-1.7	1810	125	5	1450
11 7/8		3050	255	7	1625		2785	240	7	1625		2320	215	6	1600
14		3635	380	8	1825		3310	355	8	1825		2750	315	7	1750
9 1/2	45S-1.7	2770	175	6	1475	450S-1.7	2540	165	6	1475	4500S-1.7	2135	145	5	1475
11 7/8		3585	295	7	1625		3275	280	7	1625		2735	245	6	1625
14		4270	435	8	1825		3895	410	8	1825		3245	360	8	1825
16		4895	595	9	1975		4455	560	9	1975		3700	490	9	1975
9 1/2	50S-1.7	3180	200	6	1475	500S-1.7	2920	185	6	1475	5000S-1.7	2460	165	5	1475
11 7/8		4120	335	7	1625		3765	315	7	1625		3150	280	6	1625
14		4910	495	8	1825		4480	460	8	1825		3735	405	8	1825
16		5625	675	9	1975		5125	630	9	1975		4260	550	9	1975
9 1/2	60S-1.7	3695	230	6	1575	600S-1.7	3395	215	6	1575	6000S-1.7	2865	190	5	1575
11 7/8		4785	385	7	1675		4380	360	7	1675		3670	320	6	1675
14		5710	565	8	1925		5215	530	8	1925		4350	465	8	1925
16		6540	770	9	2175		5965	720	9	2175		4965	630	9	2175
18		7360	1010	10	2375		6705	940	10	2375		5575	820	10	2375
20		8175	1285	11	2450		7435	1195	11	2450		6170	1045	11	2450
9 1/2	65S-1.7	4090	250	6	1575	650S-1.7	3755	235	6	1575	6500S-1.7	3170	210	5	1575
11 7/8		5295	425	7	1675		4850	395	7	1675		4065	350	7	1675
14		6315	620	8	1925		5770	580	8	1925		4820	505	8	1925
16		7235	845	9	2175		6600	785	9	2175		5500	685	9	2175
18		8145	1105	10	2375		7420	1030	10	2375		6175	895	10	2375
20		9040	1400	11	2450		8230	1305	11	2450		6840	1135	11	2450
9 1/2	90S-1.7	5655	340	6	1675	900S-1.7	5205	320	6	1675	9000S-1.7	4400	280	5	1675
11 7/8		7330	575	7	2150		6715	535	7	2150		5645	470	7	2150
14		8740	840	8	2350		7995	780	8	2350		6695	680	8	2350
16		10015	1135	9	2550		9145	1060	9	2550		7640	915	9	2550
18		11275	1485	10	2750		10280	1380	10	2750		8575	1195	10	2750
20		12520	1880	11	2850		11405	1745	11	2850		9500	1510	11	2850
9 1/2	40S-1.8	2605	160	6	1450	400S-1.8	2390	150	6	1450	4000S-1.8	2000	135	5	1450
11 7/8		3370	270	7	1625		3080	255	7	1625		2565	225	6	1600
14		4020	400	8	1825		3660	375	8	1825		3040	330	7	1750
9 1/2	45S-1.8	3060	185	6	1475	450S-1.8	2810	175	6	1475	4500S-1.8	2360	155	5	1475
11 7/8		3965	315	7	1625		3620	295	7	1625		3025	260	6	1625
14		4725	460	8	1825		4310	430	8	1825		3585	380	8	1825
16		5410	630	9	1975		4930	585	9	1975		4090	515	9	1975
9 1/2	50S-1.8	3520	210	6	1475	500S-1.8	3230	195	6	1475	5000S-1.8	2725	175	5	1475
11 7/8		4555	355	7	1625		4165	335	7	1625		3485	295	6	1625
14		5430	520	8	1825		4955	490	8	1825		4130	430	8	1825
16		6220	710	9	1975		5670	665	9	1975		4715	580	9	1975
9 1/2	60S-1.8	4090	240	6	1575	600S-1.8	3755	225	6	1575	6000S-1.8	3165	200	5	1575
11 7/8		5295	405	7	1675		4845	380	7	1675		4060	335	6	1675
14		6315	595	8	1925		5765	560	8	1925		4815	490	8	1925
16		7235	810	9	2175		6595	760	9	2175		5495	660	9	2175
18		8140	1065	10	2375		7415	990	10	2375		6165	865	10	2375
20		9040	1350	11	2450		8225	1260	11	2450		6825	1095	11	2450
9 1/2	65S-1.8	4520	265	6	1575	650S-1.8	4155	250	6	1575	6500S-1.8	3505	220	5	1575
11 7/8		5855	445	7	1675		5360	420	7	1675		4495	365	7	1675
14		6985	655	8	1925		6380	610	8	1925		5330	535	8	1925
16		8000	890	9	2175		7300	830	9	2175		6085	720	9	2175
18		9005	1165	10	2375		8205	1085	10	2375		6825	940	10	2375
20		10000	1480	11	2450		9105	1375	11	2450		7565	1195	11	2450
9 1/2	90S-1.8	6255	360	6	1675	900S-1.8	5755	340	6	1675	9000S-1.8	4870	300	5	1675
11 7/8		8105	605	7	2150		7430	570	7	2150		6245	495	7	2150
14		9670	885	8	2350		8840	825	8	2350		7405	720	8	2350
16		11080	1200	9	2550		10115	1115	9	2550		8450	970	9	2550
18		12470	1565	10	2750		11370	1455	10	2750		9485	1260	10	2750
20		13845	1985	11	2850		12615	1840	11	2850		10505	1590	11	2850

For **SI**: 1 inch = 25.4 mm; 1 ft-lb = 1.36 N-m; 1 in^2-lb = 179 mm^2-N; 1 in-lb/in = 4.4 N-mm/mm; 1 lb = 4.45 N; 1 lb/ft = 14.6 N/m.

[1] For joist descriptions see TABLE 1.

[2] Calculate bending and shear deflection as described in Section 4.11 "Deflection".

[3] Repetitive member use factors are limited to 1.0

[4] For reference design reaction values, see Table 3.

TABLE 2 (CONT.)—REFERENCE DESIGN VALUES FOR BCI JOISTS[1], [4]

DEPTH (in)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)
9 1/2	40S-1.9	2785	165	6	1450	400S-1.9	2550	160	6	1450	4000S-1.9	2140	140	5	1450
11 7/8		3600	285	7	1625		3290	270	7	1625		2740	235	6	1600
14		4295	420	8	1825		3910	395	8	1825		3250	345	7	1750
9 1/2	45S-1.9	3270	195	6	1475	450S-1.9	3000	185	6	1475	4500S-1.9	2520	160	5	1475
11 7/8		4235	330	7	1625		3870	310	7	1625		3235	270	6	1625
14		5050	485	8	1825		4605	455	8	1825		3830	400	8	1825
16		5785	660	9	1975		5265	615	9	1975		4370	540	9	1975
9 1/2	50S-1.9	3760	220	6	1475	500S-1.9	3450	210	6	1475	5000S-1.9	2905	185	5	1475
11 7/8		4865	375	7	1625		4450	350	7	1625		3725	310	6	1625
14		5805	550	8	1825		5295	515	8	1825		4415	450	8	1825
16		6650	745	9	1975		6055	695	9	1975		5035	610	9	1975
9 1/2	60S-1.9	4370	255	6	1575	600S-1.9	4015	240	6	1575	6000S-1.9	3385	210	5	1575
11 7/8		5655	430	7	1675		5175	400	7	1675		4340	355	6	1675
14		6745	630	8	1925		6160	585	8	1925		5145	515	8	1925
16		7730	855	9	2175		7045	795	9	2175		5870	695	9	2175
18		8700	1115	10	2375		7920	1040	10	2375		6585	905	10	2375
20		9660	1420	11	2450		8785	1320	11	2450		7295	1150	11	2450
9 1/2	65S-1.9	4830	280	6	1575	650S-1.9	4440	260	6	1575	6500S-1.9	3745	230	5	1575
11 7/8		6260	470	7	1675		5730	440	7	1675		4805	385	7	1675
14		7465	690	8	1925		6815	645	8	1925		5695	560	8	1925
16		8550	935	9	2175		7800	870	9	2175		6500	760	9	2175
18		9625	1225	10	2375		8765	1140	10	2375		7295	990	10	2375
20		10685	1555	11	2450		9725	1445	11	2450		8080	1255	11	2450
9 1/2	90S-1.9	6685	380	6	1675	900S-1.9	6150	355	6	1675	9000S-1.9	5200	315	5	1675
11 7/8		8660	640	7	2150		7935	600	7	2150		6670	520	7	2150
14		10330	935	8	2350		9445	870	8	2350		7910	755	8	2350
16		11835	1265	9	2550		10805	1175	9	2550		9030	1020	9	2550
18		13325	1650	10	2750		12150	1530	10	2750		10135	1320	10	2750
20		14795	2085	11	2850		13480	1935	11	2850		11225	1670	11	2850
9 1/2	40S-2.0	3070	175	6	1450	400S-2.0	2815	165	6	1450	4000S-2.0	2360	150	5	1450
11 7/8		3970	300	7	1625		3625	280	7	1625		3020	250	6	1600
14		4735	440	8	1825		4315	410	8	1825		3580	365	7	1750
9 1/2	45S-2.0	3605	205	6	1475	450S-2.0	3310	190	6	1475	4500S-2.0	2780	170	5	1475
11 7/8		4670	345	7	1625		4265	325	7	1625		3565	285	6	1625
14		5565	505	8	1825		5075	475	8	1825		4225	415	8	1825
16		6375	690	9	1975		5805	645	9	1975		4820	565	9	1975
9 1/2	50S-2.0	4145	230	6	1475	500S-2.0	3805	220	6	1475	5000S-2.0	3205	195	5	1475
11 7/8		5365	390	7	1625		4905	370	7	1625		4105	325	6	1625
14		6400	575	8	1825		5840	540	8	1825		4865	470	8	1825
16		7330	780	9	1975		6680	730	9	1975		5555	640	9	1975
9 1/2	60S-2.0	4815	265	6	1575	600S-2.0	4425	250	6	1575	6000S-2.0	3730	220	5	1575
11 7/8		6235	450	7	1675		5710	420	7	1675		4785	370	6	1675
14		7440	660	8	1925		6790	615	8	1925		5670	540	8	1925
16		8520	895	9	2175		7770	835	9	2175		6470	725	9	2175
18		9590	1170	10	2375		8735	1090	10	2375		7260	950	10	2375
20		10650	1490	11	2450		9690	1385	11	2450		8040	1205	11	2450
9 1/2	65S-2.0	5325	295	6	1575	650S-2.0	4895	275	6	1575	6500S-2.0	4130	245	5	1575
11 7/8		6900	495	7	1675		6315	465	7	1675		5295	405	7	1675
14		8230	725	8	1925		7515	675	8	1925		6280	590	8	1925
16		9425	985	9	2175		8600	915	9	2175		7165	795	9	2175
18		10610	1285	10	2375		9665	1195	10	2375		8045	1035	10	2375
20		11780	1630	11	2450		10725	1515	11	2450		8910	1315	11	2450
9 1/2	90S-2.0	7370	400	6	1675	900S-2.0	6780	375	6	1675	9000S-2.0	5735	330	5	1675
11 7/8		9550	675	7	2150		8750	630	7	2150		7355	550	7	2150
14		11390	980	8	2350		10415	915	8	2350		8725	795	8	2350
16		13050	1330	9	2550		11915	1235	9	2550		9955	1070	9	2550
18		14690	1730	10	2750		13395	1605	10	2750		11170	1385	10	2750
20		16310	2190	11	2850		14860	2030	11	2850		12375	1750	11	2850

For **SI**: 1 inch = 25.4 mm; 1 ft-lb = 1.36 N-m; 1 in^2-lb = 179 mm^2-N; 1 in-lb/in = 4.4 N-mm/mm; 1 lb = 4.45 N; 1 lb/ft = 14.6 N/m.

[1] For joist descriptions see TABLE 1.

[2] Calculate bending and shear deflection as described in Section 4.11 "Deflection".

[3] Repetitive member use factors are limited to 1.0

[4] For reference design reaction values, see Table 3.

TABLE 2 (CONT.)—REFERENCE DESIGN VALUES FOR BCI JOISTS[1], [4]

DEPTH (in)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)	SERIES	MOMENT[3] (ft-lbs)	EI[2] x 10^6 (in^2-lbs)	K[2] x 10^6 (in-lb/in)	VERT. SHEAR (lbs)
9 1/2	40S-2.1	3210	185	6	1450	400S-2.1	2940	175	6	1450	4000S-2.1	2470	155	5	1450
11 7/8		4155	315	7	1625		3795	295	7	1625		3165	260	6	1600
14		4955	460	8	1825		4515	430	8	1825		3750	380	7	1750
9 1/2	45S-2.1	3775	215	6	1475	450S-2.1	3460	200	6	1475	4500S-2.1	2910	180	5	1475
11 7/8		4885	360	7	1625		4465	340	7	1625		3730	300	6	1625
14		5825	530	8	1825		5310	495	8	1825		4420	435	8	1825
16		6670	725	9	1975		6075	675	9	1975		5045	590	9	1975
9 1/2	50S-2.1	4335	245	6	1475	500S-2.1	3980	230	6	1475	5000S-2.1	3350	200	5	1475
11 7/8		5615	410	7	1625		5135	385	7	1625		4295	340	6	1625
14		6695	600	8	1825		6110	565	8	1825		5095	490	8	1825
16		7670	820	9	1975		6990	765	9	1975		5810	665	9	1975
9 1/2	60S-2.1	5040	280	6	1575	600S-2.1	4630	265	6	1575	6000S-2.1	3905	230	5	1575
11 7/8		6525	470	7	1675		5975	440	7	1675		5005	385	6	1675
14		7785	690	8	1925		7110	645	8	1925		5935	565	8	1925
16		8915	940	9	2175		8130	875	9	2175		6770	760	9	2175
18		10035	1225	10	2375		9140	1140	10	2375		7600	990	10	2375
20		11145	1555	11	2450		10140	1445	11	2450		8415	1255	11	2450
9 1/2	65S-2.1	5575	305	6	1575	650S-2.1	5125	290	6	1575	6500S-2.1	4325	255	5	1575
11 7/8		7220	520	7	1675		6610	485	7	1675		5545	425	7	1675
14		8610	760	8	1925		7865	710	8	1925		6575	615	8	1925
16		9865	1030	9	2175		9000	960	9	2175		7500	830	9	2175
18		11105	1345	10	2375		10115	1250	10	2375		8415	1085	10	2375
20		12330	1705	11	2450		11220	1585	11	2450		9325	1370	11	2450
9 1/2	90S-2.1	7710	420	6	1675	900S-2.1	7095	395	6	1675	9000S-2.1	6000	345	5	1675
11 7/8		9990	705	7	2150		9155	660	7	2150		7700	575	7	2150
14		11920	1030	8	2350		10900	960	8	2350		9130	830	8	2350
16		13655	1390	9	2550		12470	1295	9	2550		10420	1120	9	2550
18		15375	1815	10	2750		14020	1680	10	2750		11690	1450	10	2750
20		17070	2295	11	2850		15555	2125	11	2850		12950	1830	11	2850
9 1/2	40S-2.2	3460	190	6	1450	400S-2.2	3170	180	6	1450	4000S-2.2	2660	160	5	1450
11 7/8		4480	325	7	1625		4090	305	7	1625		3410	270	6	1600
14		5340	480	8	1825		4865	450	8	1825		4040	395	7	1750
9 1/2	45S-2.2	4065	225	6	1475	450S-2.2	3730	210	6	1475	4500S-2.2	3135	185	5	1475
11 7/8		5265	380	7	1625		4810	355	7	1625		4020	310	6	1625
14		6280	555	8	1825		5725	520	8	1825		4765	455	8	1825
16		7190	755	9	1975		6545	705	9	1975		5435	615	9	1975
9 1/2	50S-2.2	4675	255	6	1475	500S-2.2	4290	240	6	1475	5000S-2.2	3610	210	5	1475
11 7/8		6050	430	7	1625		5535	405	7	1625		4630	355	6	1625
14		7215	630	8	1825		6585	590	8	1825		5490	515	8	1825
16		8265	855	9	1975		7530	795	9	1975		6265	695	9	1975
9 1/2	60S-2.2	5430	290	6	1575	600S-2.2	4990	275	6	1575	6000S-2.2	4205	245	5	1575
11 7/8		7035	495	7	1675		6440	460	7	1675		5395	405	6	1675
14		8390	720	8	1925		7660	675	8	1925		6395	585	8	1925
16		9610	980	9	2175		8760	915	9	2175		7300	795	9	2175
18		10815	1280	10	2375		9850	1190	10	2375		8190	1035	10	2375
20		12010	1625	11	2450		10930	1510	11	2450		9070	1310	11	2450
9 1/2	65S-2.2	6005	320	6	1575	650S-2.2	5520	300	6	1575	6500S-2.2	4660	265	5	1575
11 7/8		7780	545	7	1675		7125	510	7	1675		5975	445	7	1675
14		9280	795	8	1925		8480	740	8	1925		7090	645	8	1925
16		10630	1075	9	2175		9700	1000	9	2175		8090	870	9	2175
18		11965	1405	10	2375		10905	1305	10	2375		9070	1130	10	2375
20		13290	1780	11	2450		12095	1655	11	2450		10050	1430	11	2450
9 1/2	90S-2.2	8310	440	6	1675	900S-2.2	7645	410	6	1675	9000S-2.2	6470	360	5	1675
11 7/8		10770	740	7	2150		9870	690	7	2150		8295	600	7	2150
14		12845	1075	8	2350		11745	1000	8	2350		9840	870	8	2350
16		14720	1455	9	2550		13440	1350	9	2550		11230	1170	9	2550
18		16570	1895	10	2750		15110	1760	10	2750		12600	1515	10	2750
20		18400	2400	11	2850		16765	2220	11	2850		13960	1915	11	2850
9 1/2	90E-2.0	7280	368	6.5	1675										
11 7/8		9435	624	8.0	2175										
14		11360	913	9.4	2350										
16		13170	1240	10.7	2550										
18		14985	1620	12.0	2750										
20		16795	2056	13.3	2850										
22		18610	2548	14.6	3235										
24		20420	3099	15.9	3440										

For **SI**: 1 inch = 25.4 mm; 1 ft-lb = 1.36 N-m; 1 in^2-lb = 179 mm^2-N; 1 in-lb/in = 4.4 N-mm/mm; 1 lb = 4.45 N; 1 lb/ft = 14.6 N/m.

[1] For joist descriptions see Table 1.

[2] Calculate bending and shear deflection as described in Section 4.11 "Deflection".

[3] Repetitive member use factors are limited to 1.0

[4] For reference design reaction values, see Table 3.

TABLE 3—REFERENCE DESIGN REACTION VALUES FOR BCI JOISTS[1]

SERIES	DEPTH (in)	END REACTION (lbs)						INTERMEDIATE REACTION (lbs)					
		1 1/2" [2]		3 1/2"		5 1/4"		3 1/2" [2]		5 1/4"		7"	
		NO [3]	YES [4]	NO [3]	YES [4]	NO [3]	YES [4]	NO [3]	YES [4]	NO [3]	YES [4]	NO [3]	YES [4]
40, 400 40S, 400S	9 1/2	950	1125	1125	1275			2050	2350	2525	2750		
	11 7/8	950	1425	1400	1475			2200	2850	2650	3250		
	14	1025	1525	1425	1725			2200	3450	2700	3650		
45, 450 45S 450S	9 1/2	1025	1125	1125	1275			2200	2350	2575	2750		
	11 7/8	1025	1425	1425	1475			2325	2850	2650	3250		
	14	1025	1525	1450	1725			2350	3450	2700	3650		
	16	1025	1625	1475	1975			2400	3650	2750	3750		
50, 500 50S, 500S	9 1/2	1025	1125	1125	1275			2200	2350	2575	2750		
	11 7/8	1025	1425	1425	1475			2325	2850	2650	3250		
	14	1025	1525	1475	1725			2350	3450	2700	3650		
	16	1025	1625	1500	1975			2400	3650	2750	3750		
60, 600 60S, 600S	9 1/2	1175	1375	1375	1425			2400	2650	2700	2750		
	11 7/8	1175	1425	1425	1475			2750	2850	3200	3250		
	14	1175	1525	1525	1725			2750	3450	3200	3650		
	16	1175	1625	1550	1975			2750	3650	3200	3750		
	18	N/A	1750	N/A	2175			N/A	3950	N/A	4550		
	20	N/A	1900	N/A	2250			N/A	4200	N/A	4750		
65, 650 65S, 650S	9 1/2	1175	1375	1375	1425			2400	2650	2700	2750		
	11 7/8	1175	1425	1425	1475			2750	2850	3200	3250		
	14	1175	1525	1525	1725			2750	3450	3200	3650		
	16	1175	1625	1550	1975			2750	3650	3200	3750		
	18	N/A	1750	N/A	2175			N/A	3950	N/A	4550		
	20	N/A	1900	N/A	2250			N/A	4200	N/A	4750		
90, 900 90S, 900S	9 1/2	1175	1425	1375	1450			3000	3150	3000	3150		
	11 7/8	1425	1850	1800	1950			3375	3700	4000	4300		
	14	1450	1950	1850	2150			3400	3850	4100	4450		
	16	1475	2150	1900	2350			3425	4000	4200	4650		
	18	N/A	2300	N/A	2550			N/A	4150	N/A	4750		
	20	N/A	2500	N/A	2650			N/A	4300	N/A	4850		
4000 4000S	9 1/2	950	1125	1125	1275	1275	1325	2050	2350	2525	2750	2525	2900
	11 7/8	950	1250	1250	1475	1475	1525	2200	2850	2525	3000	2525	3225
	14	950	1350	1350	1725	1725	1725	2200	3050	2525	3200	2525	3500
4500 4500S	9 1/2	950	1125	1125	1275	1275	1325	2100	2350	2525	2750	2525	2950
	11 7/8	950	1425	1425	1475	1475	1525	2250	2850	2525	3000	2525	3250
	14	950	1525	1450	1725	1675	1775	2350	3050	2525	3200	2525	3650
	16	950	1625	1475	1975	1750	1975	2400	3200	2525	3350	2525	3750
5000 5000S	9 1/2	950	1125	1125	1275	1275	1325	2100	2350	2525	2750	2525	2950
	11 7/8	950	1425	1425	1475	1475	1525	2250	2850	2525	3000	2525	3250
	14	950	1525	1475	1725	1675	1775	2350	3050	2525	3200	2525	3650
	16	950	1625	1500	1975	1750	1975	2400	3200	2525	3350	2525	3750
6000 6000S	9 1/2	1175	1375	1375	1425	1425	1475	2400	2650	2700	2750	3000	3150
	11 7/8	1175	1425	1425	1475	1475	1675	2500	2850	2900	3000	3200	3250
	14	1175	1525	1525	1725	1725	1925	2600	3150	2925	3200	3400	3650
	16	1175	1625	1550	1975	1900	2175	2650	3350	2950	3350	3575	3750
	18	N/A	1750	N/A	2175	N/A	2375	N/A	3500	N/A	3550	N/A	4550
	20	N/A	1900	N/A	2250	N/A	2450	N/A	3650	N/A	3700	N/A	4750
6500 6500S	9 1/2	1175	1375	1375	1425	1425	1475	2400	2650	2700	2750	3000	3150
	11 7/8	1175	1425	1425	1475	1475	1675	2500	2850	2900	3000	3200	3250
	14	1175	1525	1525	1725	1725	1925	2600	3150	2925	3200	3400	3650
	16	1175	1625	1550	1975	1900	2175	2650	3350	2950	3350	3575	3750
	18	N/A	1750	N/A	2175	N/A	2375	N/A	3500	N/A	3550	N/A	4550
	20	N/A	1900	N/A	2250	N/A	2450	N/A	3650	N/A	3700	N/A	4750
9000 9000S	9 1/2	1175	1425	1375	1450	1450	1650	3000	3150	3000	3150	3100	3350
	11 7/8	1250	1850	1425	1950	1850	2150	3025	3700	3150	3800	3400	3800
	14	1250	1950	1625	2150	2050	2350	3050	3850	3250	4200	3700	4200
	16	1300	2150	1625	2350	2225	2550	3100	4000	3400	4600	3900	4600
	18	N/A	2300	N/A	2550	N/A	2750	N/A	4150	N/A	4750	N/A	4850
	20	N/A	2500	N/A	2650	N/A	2850	N/A	4300	N/A	4850	N/A	4950
90E	9 1/2	1215	1425	1375	1550			2775	3150	3045	3270		
	11 7/8	1215	1875	1660	1950			2855	3745	3150	3880		
	14	1215	1950	1680	2150			2930	3850	3245	4425		
	16	1215	2150	1700	2350			2995	4000	3335	4650		
	18	N/A	2240	N/A	2550			N/A	4150	N/A	4720		
	20	N/A	2500	N/A	2650			N/A	4300	N/A	4850		
	22	N/A	2935	N/A	3150			N/A	5230	N/A	5505		
	24	N/A	3110	N/A	3320			N/A	5345	N/A	5900		

For **SI:** 1 inch = 25.4 mm; 1 lb = 4.45 N

[1] For joist descriptions see Table 1.
[2] Minimum bearing length required.
[3] No web stiffener required.
[4] Web stiffener required see Figure 1.

TABLE 4-BLOCKING PANELS AND RIM BOARDS[1][5]

FLANGE DEPTH (in)	JOIST DEPTH (in)	VERT. CAP. (lbs/ft) STIFFENER NO	VERT. CAP. (lbs/ft) STIFFENER YES[2][3]	FLANGE DEPTH (in)	JOIST DEPTH (in)	VERT. CAP. (lbs/ft) STIFFENER NO	VERT. CAP. (lbs/ft) STIFFENER YES[2][3]	FLANGE DEPTH (in)	JOIST DEPTH (in)	VERT. CAP. (lbs/ft) STIFFENER NO	VERT. CAP. (lbs/ft) STIFFENER YES[2][3]
1.5	9 1/2	2650 (1,875)[4]	N/A	1.31	9 1/2	2400	N/A	1.125	9 1/2	2300	N/A
	11 7/8	2500 (1,680)[4]	N/A		11 7/8	2250	N/A		11 7/8	2150	N/A
	14	2400 (1,500)[4]	N/A		14	2100	N/A		14	2000	N/A
	16	2300 (1,340)[4]	2700		16	2000	2600		16	1900	2500
	18	N/A	2700		18	N/A	2600		18	N/A	2500
	20 - 24	N/A	2700		20	N/A	2600		20	N/A	2500

For **SI**: 1 inch = 25.4 mm; 1 lb/ft = 14.6 N/m

[1] Blocking panels and rim boards shall be continuously supported

[2] Web stiffener required at each end and at 24" on center max, see FIGURE 1.

[3] 3 - 8d nails required in web stiffeners for blocking panels.

[4] Values in parentheses apply to BCI90e only

[5] Maximum horizontal load transfer capacity for all BCI joists is 690 plf (see Table 7).

TABLE 5—EQUIVALENT SPECIFIC GRAVITIES FOR CONNECTORS [1]

FLANGE GRADING	LATERAL INSTALLED INTO WIDE FACE		LATERAL INSTALLED INTO NARROW FACE		WITHDRAWAL	
	Loaded parallel to length	Loaded perp. to length	Loaded parallel to length	Loaded perp. to length	Loaded parallel to length	Loaded perp. to length
1.3-2.2	0.50	0.50	0.50	0.46	0.50	0.50

[1]A specific gravity of 0.46 is equivalent to Douglas Fir-South
A specific gravity of 0.50 is equivalent to Douglas Fir-Larch

TABLE 6—ALLOWABLE MINIMUM CONNECTOR SPACINGS FOR BCI JOISTS

CONNECTOR SIZE	NAILS PERPENDICULAR TO THE GLUE LINE		NAILS PARALLEL TO THE GLUE LINE	
	O.C. SPACING (inches)	END OF JOIST (inches)	O.C. SPACING (inches)	END OF JOIST (inches)
8d BOX	2	1.5	4	1.5
8d COMMON	2	1.5	4	3
10d & 12d BOX	2	1.5	4	3
16d BOX	2	1.5	4	3
10d & 12d COMMON	3	2	6	4
16d SINKER	3	2	6	4
16d COMMON	3	2	6	4

For **SI**: 1 inch = 25.4 mm

TABLE 7—ALLOWABLE SHEAR (PLF) FOR HORIZONTAL WOOD STRUCTURAL PANEL DIAPHRAGMS FRAMED WITH BCI JOISTS FOR SEISMIC LOADING[1,10]

SHEATHING GRADE	COMMON NAIL SIZE	MINIMUM NOMINAL PANEL THICKNESS (IN)	MINIMUM NOMINAL WIDTH OF FRAMING MEMBERS AT ADJOINING EDGES AND BOUNDARIES (IN)[2,4,5]	BLOCKED DIAPHRAGMS			UNBLOCKED DIAPHRAGMS	
				NAIL SPACING (IN) AT DIAPHRAGHM BOUNDARIES (ALL CASES), AT CONTINUOUS PANEL EDGES PARALLEL TO LOAD (CASES 3 & 4), AND AT ALL PANEL EDGES (CASES 5 & 6)[6]			NAILS SPACED 6 IN MAX AT SUPPORTED EDGES	
				6	4[7]	2-1/2[7,8]	CASE 1 (NO UNBLOCKED EDGES OR CONTINUOUS JOINTS PARALLEL TO LOAD	ALL OTHER CONFIGURATIONS (CASES 2, 3, 4, 5 & 6)
				NAIL SPACING (IN) AT OTHER PANEL EDGES (CASES 1, 2, 3 & 4)				
				6	6	4[7]		
Structural 1	6d[9]	5/16	2	185	250	—	165	125
			3	210	280	400	185	140
	8d	3/8	2	270	360	—	240	180
			3	300	400	575	265	200
	10d	15/32	2	320	425	—	285	215
			3	360	480	690	320	240
Sheathing and Single Floor	6d[9]	5/16	2	170	225	—	150	110
			3	190	250	360	170	125
		3/8	2	185	250	—	165	125
			3	210	280	400	185	140
	8d	3/8	2	240	320	—	215	160
			3	270	360	515	240	180
		7/16	2	255	340	—	230	170
			3	285	380	545	255	190
		15/32	2	270	360	—	240	180
			3	300	400	575	265	200
	10d	15/32	2	290	385	—	255	190
			3	325	430	620	290	215
		19/32	2	320	425	—	285	215
			3	360	480	690	320	240

For **SI**: 1 inch = 25.4 mm; 1 plf = 14.59 N/m.

[1]For wind load applications, the values in the table above shall be permitted to be multiplied by 1.4.

[2]Minimum flange grade = 1.7E MOE.

[3]The tabulated allowable shear capacities are for I-joist series with flanges having a specific gravity (G) of 0.50 or higher (see Table 5). For G<0.50 the allowable shear capacities shall be reduced by multiplying the allowable shear shear capacities by the Specific Gravity Adjustment Factor = [1-(0.5-G)]. The Specific Gravity Adjustment Factor shall not be greater than 1.

[4]Nominal widths of framing members are as follows: 1-1/2 in, 1-3/4 in, and 2 in = 2 in (4000(s)-5000(s)); 2-5/16 in, 2-9/16 in, and 3-1/2 in = 3 in (6000(s)-9000(s), BCI '10' series).

[5]The minimum nominal width of framing members not located at boundaries or adjoining panel edges shall be 2 inches.

[6]Space nails maximum 12 inches o.c. along intermediate framing members (6 inches o.c. when supports are spaced 48 inches o.c. or greater). Fasteners shall be located 3/8 inch minimum from panel edges.

[7]When nail spacing is closer than 6 inches on center at diaphragm boundaries or any panel edge, adjacent nails within a row must be offset (staggered) 1/2 inch.

[8]Nail spacing closer than 4 inches on center requires BCI '10' series framing (2 5/16" min. flange width, 1 1/2" min. flange depth.)

[9]8d common nails minimum are recommended for roof panel attachments.

[10]See Table 4.2A of SDPWS for diaphragm Configurations.

Table 8 - Boise BCI Web Hole Charts: 40 psf Live Load, 15 psf Dead Load, up to 16" oc

Joist Depth	Clear Span	Circular Holes												Rectangular Holes															
		Distance from End Support						Distance from Interior Support						Distance from End Support									Distance from Interior Support							
		Hole Diameter						Hole Diameter						Maximum Hole Dimension: Depth or Width									Maximum Hole Dimension: Depth or Width							
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"	2x2	4x4	6x6	6x8	6x10	6x12	6x14	6x16	6x18	2x2	4x4	6x6	6x8	6x10	6x12	6x14	6x16	6x18
9-1/2"	5'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-3"
	6'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-5"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-11"
	7'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-10"	2'-3"	3'-1"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-3"	2'-10"	3'-7"
	8'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-1"	2'-10"	3'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-8"	2'-3"	2'-10"	3'-6"	4'-4"
	9'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-11"	2'-8"	3'-5"	4'-4"	1'-3"	1'-4"	1'-5"	1'-8"	2'-3"	2'-11"	3'-6"	4'-2"	5'-0"
	10'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-9"				1'-3"	1'-4"	1'-5"	1'-6"	1'-9"	2'-6"	3'-3"	4'-1"	x	1'-3"	1'-4"	1'-8"	2'-4"	2'-11"	3'-6"	4'-1"	4'-10"	5'-9"
	11'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	2'-4"				1'-3"	1'-4"	1'-6"	1'-8"	2'-4"	3'-1"	3'-10"	4'-8"	x	1'-3"	1'-4"	2'-4"	2'-11"	3'-6"	4'-2"	4'-9"	5'-7"	6'-6"
	12'	1'-3"	1'-4"	1'-7"				1'-3"	1'-4"	3'-0"				1'-3"	1'-4"	1'-6"	2'-2"	2'-11"	3'-8"	4'-6"	5'-4"	x	1'-3"	1'-4"	2'-11"	3'-7"	4'-2"	4'-10"	5'-5"	6'-3"	7'-2"
	13'	1'-3"	1'-4"	2'-1"				1'-3"	1'-4"	3'-7"				1'-3"	1'-4"	2'-1"	2'-9"	3'-6"	4'-3"	5'-1"	5'-11"	x	1'-3"	1'-4"	3'-7"	4'-2"	4'-9"	5'-5"	6'-2"	7'-0"	7'-11"
	14'	1'-3"	1'-4"	2'-8"				1'-3"	1'-4"	4'-3"				1'-3"	1'-4"	2'-8"	3'-4"	4'-1"	4'-10"	5'-8"	6'-7"	x	1'-3"	2'-0"	4'-2"	4'-10"	5'-5"	6'-0"	6'-10"	7'-9"	8'-8"
	15'	1'-3"	1'-4"	3'-3"				1'-3"	1'-4"	4'-10"				1'-3"	1'-4"	3'-2"	3'-11"	4'-8"	5'-6"	6'-4"	7'-3"	x	1'-3"	2'-7"	4'-10"	5'-5"	6'-0"	6'-8"	7'-6"	8'-5"	x
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"	2x2	4x4	6x6	8x8	8x10	8x12	8x14	8x16	8x18	2x2	4x4	6x6	8x8	8x10	8x12	8x14	8x16	8x18
11-7/8"	5'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"
	6'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-0"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-6"
	7'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-7"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-5"	3'-2"
	8'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-3"	3'-3"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-4"	3'-1"	3'-11"
	9'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-0"	2'-11"	3'-10"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-3"	3'-0"	3'-8"	4'-7"
	10'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-9"	2'-7"	3'-6"	4'-6"	1'-3"	1'-4"	1'-5"	1'-6"	2'-2"	2'-10"	3'-7"	4'-4"	5'-3"
	11'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-4"	3'-2"	4'-1"	5'-1"	1'-3"	1'-4"	1'-5"	2'-1"	2'-9"	3'-6"	4'-3"	5'-0"	6'-0"
	12'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-10"			1'-3"	1'-4"	1'-5"	1'-6"	2'-1"	2'-10"	3'-9"	4'-9"	5'-9"	1'-3"	1'-4"	1'-5"	2'-8"	3'-5"	4'-1"	4'-10"	5'-8"	6'-9"
	13'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	2'-5"			1'-3"	1'-4"	1'-5"	1'-9"	2'-7"	3'-5"	4'-4"	5'-4"	6'-5"	1'-3"	1'-4"	1'-5"	3'-4"	4'-0"	4'-9"	5'-6"	6'-5"	7'-5"
	14'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	3'-1"			1'-3"	1'-4"	1'-5"	2'-4"	3'-2"	4'-1"	5'-0"	6'-0"	7'-0"	1'-3"	1'-4"	1'-10"	3'-11"	4'-8"	5'-4"	6'-1"	7'-1"	8'-2"
	15'	1'-3"	1'-4"	1'-5"	1'-11"			1'-3"	1'-4"	1'-5"	3'-8"			1'-3"	1'-4"	1'-5"	2'-11"	3'-9"	4'-8"	5'-7"	6'-7"	x	1'-3"	1'-4"	2'-5"	4'-7"	5'-3"	6'-0"	6'-10"	7'-10"	8'-11"
	16'	1'-3"	1'-4"	1'-5"	2'-6"			1'-3"	1'-4"	1'-5"	4'-4"			1'-3"	1'-4"	1'-5"	3'-6"	4'-4"	5'-3"	6'-2"	7'-3"	x	1'-3"	1'-4"	3'-1"	5'-2"	5'-11"	6'-7"	7'-6"	8'-6"	9'-7"
	17'	1'-3"	1'-4"	1'-5"	3'-0"			1'-3"	1'-4"	1'-6"	4'-11"			1'-3"	1'-4"	1'-8"	4'-0"	4'-11"	5'-10"	6'-10"	7'-10"	x	1'-3"	1'-7"	3'-8"	5'-10"	6'-6"	7'-3"	8'-2"	9'-4"	10'-4"
	18'	1'-3"	1'-4"	1'-5"	3'-7"			1'-3"	1'-4"	2'-2"	5'-7"			1'-3"	1'-4"	2'-2"	4'-8"	5'-6"	6'-5"	7'-5"	8'-6"	x	1'-3"	2'-3"	4'-4"	6'-5"	7'-2"	7'-11"	8'-11"	9'-11"	11'-1"
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"	2x2	4x4	6x6	8x8	10x10	10x12	10x14	10x16	10x18	2x2	4x4	6x6	8x8	10x10	10x12	10x14	10x16	10x18
14"	5'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"
	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-5"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-6"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-3"	3'-0"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-1"	3'-1"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-1"	2'-10"	3'-9"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-8"	3'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-11"	2'-8"	3'-6"	4'-5"
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-3"	3'-3"	4'-4"	1'-3"	1'-4"	1'-5"	1'-6"	1'-8"	2'-6"	3'-4"	4'-1"	5'-2"
	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-10"	2'-10"	3'-10"	5'-0"	1'-3"	1'-4"	1'-5"	1'-6"	2'-4"	3'-2"	3'-11"	4'-9"	5'-10"
	12'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-5"	3'-5"	4'-5"	5'-7"	1'-3"	1'-4"	1'-5"	1'-6"	2'-11"	3'-9"	4'-7"	5'-5"	6'-7"
	13'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	2'-1"	3'-0"	4'-0"	5'-1"	6'-3"	1'-3"	1'-4"	1'-5"	1'-6"	3'-7"	4'-5"	5'-2"	6'-2"	7'-3"
	14'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-11"		1'-3"	1'-4"	1'-5"	1'-6"	2'-1"	3'-2"	4'-3"	5'-6"	6'-10"	1'-3"	1'-4"	1'-5"	2'-2"	4'-2"	5'-0"	5'-10"	6'-10"	8'-0"
	15'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	2'-6"		1'-3"	1'-4"	1'-5"	1'-6"	2'-8"	3'-9"	4'-11"	6'-2"	7'-6"	1'-3"	1'-4"	1'-5"	2'-9"	4'-10"	5'-8"	6'-5"	7'-6"	8'-9"
	16'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	3'-2"		1'-3"	1'-4"	1'-5"	1'-6"	3'-3"	4'-4"	5'-6"	6'-9"	x	1'-3"	1'-4"	1'-5"	3'-5"	5'-5"	6'-3"	7'-2"	8'-3"	9'-5"
	17'	1'-3"	1'-4"	1'-5"	1'-6"	1'-10"		1'-3"	1'-4"	1'-5"	1'-6"	3'-9"		1'-3"	1'-4"	1'-5"	1'-6"	3'-10"	4'-11"	6'-2"	7'-5"	x	1'-3"	1'-4"	1'-11"	4'-0"	6'-1"	6'-11"	7'-10"	8'-11"	10'-2"
	18'	1'-3"	1'-4"	1'-5"	1'-6"	2'-4"		1'-3"	1'-4"	1'-5"	1'-6"	4'-5"		1'-3"	1'-4"	1'-5"	1'-9"	4'-5"	5'-7"	6'-9"	8'-1"	x	1'-3"	1'-4"	2'-7"	4'-8"	6'-8"	7'-6"	8'-6"	9'-8"	10'-11"
	19'	1'-3"	1'-4"	1'-5"	1'-6"	2'-11"		1'-3"	1'-4"	1'-5"	1'-6"	5'-0"		1'-3"	1'-4"	1'-5"	2'-4"	5'-0"	6'-2"	7'-5"	8'-9"	x	1'-3"	1'-4"	3'-2"	5'-3"	7'-4"	8'-2"	9'-3"	10'-4"	11'-7"
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"	2x2	4x4	6x6	8x8	10x10	12x12	12x14	12x16	12x18	2x2	4x4	6x6	8x8	10x10	12x12	12x14	12x16	12x18
16"	5'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"
	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-5"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-5"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-2"	3'-0"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-11"	3'-1"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-11"	2'-9"	3'-9"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-6"	3'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-7"	3'-5"	4'-5"
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-1"	3'-2"	4'-4"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-4"	3'-2"	4'-0"	5'-2"
	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-8"	3'-9"	4'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-11"	3'-11"	4'-8"	5'-10"
	12'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-2"	3'-3"	4'-4"	5'-7"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-7"	4'-5"	5'-4"	6'-7"
	13'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-9"	3'-10"	5'-0"	6'-3"	1'-3"	1'-4"	1'-5"	1'-6"	2'-2"	4'-2"	5'-1"	6'-0"	7'-3"
	14'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-3"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-4"	4'-5"	5'-7"	6'-10"	1'-3"	1'-4"	1'-5"	1'-6"	2'-9"	4'-10"	5'-8"	6'-9"	8'-0"
	15'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-10"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-11"	5'-0"	6'-3"	x	1'-3"	1'-4"	1'-5"	1'-6"	3'-5"	5'-5"	6'-4"	7'-5"	8'-8"
	16'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-6"	1'-3"	1'-4"	1'-5"	1'-6"	2'-1"	4'-6"	5'-8"	6'-10"	x	1'-3"	1'-4"	1'-5"	2'-0"	4'-0"	6'-1"	6'-11"	8'-2"	9'-5"
	17'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-1"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	4'-1"	1'-3"	1'-4"	1'-5"	1'-6"	2'-8"	5'-1"	6'-3"	7'-6"	x	1'-3"	1'-4"	1'-5"	2'-7"	4'-8"	6'-8"	7'-8"	8'-10"	10'-2"
	18'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-11"	4'-9"	1'-3"	1'-4"	1'-5"	1'-6"	3'-3"	5'-8"	6'-10"	8'-1"	x	1'-3"	1'-4"	1'-5"	3'-3"	5'-3"	7'-4"	8'-4"	9'-7"	10'-11"
	19'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-2"	1'-3"	1'-4"	1'-5"	1'-6"	2'-6"	5'-4"	1'-3"	1'-4"	1'-5"	1'-6"	3'-9"	6'-4"	7'-6"	8'-9"	x	1'-3"	1'-4"	1'-10"	3'-10"	5'-11"	7'-11"	9'-0"	10'-3"	11'-7"
	20'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-9"	1'-3"	1'-4"	1'-5"	1'-6"	3'-2"	6'-0"	1'-3"	1'-4"	1'-5"	1'-6"	4'-4"	6'-11"	8'-1"	9'-4"	x	1'-3"	1'-4"	2'-6"	4'-6"	6'-6"	8'-7"	9'-9"	11'-0"	12'-4"
	21'	1'-3"	1'-4"	1'-5"	1'-6"	1'-8"	4'-4"	1'-3"	1'-4"	1'-5"	1'-6"	3'-9"	6'-7"	1'-3"	1'-4"	1'-5"	1'-6"	4'-11"	7'-6"	8'-9"	10'-0"	x	1'-3"	1'-4"	3'-1"	5'-1"	7'-2"	9'-3"	10'-5"	11'-8"	x
	22'	1'-3"	1'-4"	1'-5"	1'-6"	1'-8"	4'-11"	1'-3"	1'-4"	1'-5"	1'-6"	4'-5"	7'-3"	1'-3"	1'-4"	1'-5"	1'-6"	5'-6"	8'-2"	9'-4"	10'-8"	x	1'-3"	1'-8"	3'-9"	5'-9"	7'-9"	9'-11"	11'-2"	12'-5"	x
	23'	1'-3"	1'-4"	1'-5"	1'-6"	2'-3"	5'-6"	1'-3"	1'-4"	1'-5"	2'-2"	5'-0"	7'-10"	1'-3"	1'-4"	1'-5"	1'-6"	6'-1"	8'-9"	10'-0"	11'-3"	x	1'-3"	2'-4"	4'-4"	6'-4"	8'-5"	10'-8"	11'-10"	13'-2"	x
	24'	1'-3"	1'-4"	1'-5"	1'-6"	2'-9"	6'-1"	1'-3"	1'-4"	1'-5"	2'-9"	5'-8"	8'-6"	1'-3"	1'-4"	1'-5"	1'-6"	6'-8"	9'-4"	10'-7"	11'-11"	x	1'-3"	2'-11"	5'-0"	7'-0"	9'-0"	11'-4"	12'-7"	13'-10"	x

NOTES:

1. **CUT HOLES CAREFULLY! DO NOT OVERCUT CORNERS OF RECTANGULAR HOLES! DO NOT CUT JOIST FLANGES!**
2. The hole locations listed above are valid for joists supporting only uniform loads, (40 psf Live Load and a 15 psf Dead Load, spaced up to 16" on center).
3. Hole location is measured from the center of bearing to the center of a circular or rectangular hole from the closest support.
4. Circular and rectangular holes may be placed anywhere within the depth of the joist web.
5. For a hole size that differs from those covered, use the next larger hole dimension.

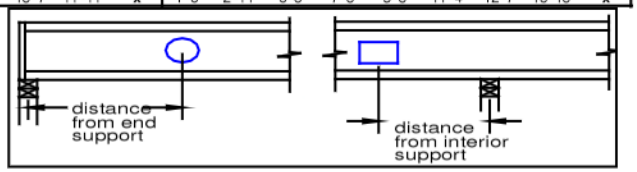


Table 9 - Boise BCI Web Hole Charts: 40 psf Live Load, 20 psf Dead Load, up to 16" oc

Joist Depth	Clear Span	Circular Holes												Rectangular Holes															
		Distance from End Support						Distance from Interior Support						Distance from End Support								Distance from Interior Support							
		Hole Diameter						Hole Diameter						Maximum Hole Dimension: Depth or Width								Maximum Hole Dimension: Depth or Width							
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"	2x2	4x4	6x6	6x8	6x10	6x12	6x14	6x16	6x18	2x2	4x4	6x6	6x8	6x10	6x12	6x14	6x16	6x18
9-1/2"	5'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-3"
	6'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-6"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-10"	2'-4"	2'-11"
	7'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-4"	3'-1"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-10"	2'-5"	3'-0"	3'-8"
	8'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-3"	2'-11"	3'-9"	1'-3"	1'-4"	1'-5"	1'-6"	1'-11"	2'-6"	3'-1"	3'-8"	4'-5"
	9'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-2"	2'-10"	3'-7"	4'-4"	1'-3"	1'-4"	1'-5"	2'-0"	2'-7"	3'-1"	3'-8"	4'-4"	5'-1"
	10'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	2'-1"				1'-3"	1'-4"	1'-5"	1'-6"	2'-1"	2'-9"	3'-5"	4'-2"	x	1'-3"	1'-4"	2'-1"	2'-8"	3'-2"	3'-9"	4'-4"	5'-0"	5'-10"
	11'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	2'-9"				1'-3"	1'-4"	1'-6"	2'-0"	2'-8"	3'-4"	4'-0"	4'-9"	x	1'-3"	1'-4"	2'-8"	3'-3"	3'-10"	4'-4"	5'-0"	5'-9"	6'-6"
	12'	1'-3"	1'-4"	2'-0"				1'-3"	1'-4"	3'-4"				1'-3"	1'-4"	1'-11"	2'-7"	3'-3"	3'-11"	4'-8"	5'-5"	x	1'-3"	1'-4"	3'-4"	3'-11"	4'-5"	5'-0"	5'-8"	6'-5"	7'-3"
	13'	1'-3"	1'-4"	2'-6"				1'-3"	1'-4"	4'-0"				1'-3"	1'-4"	3'-3"	3'-2"	3'-10"	4'-6"	5'-3"	6'-0"	x	1'-3"	1'-11"	3'-11"	4'-6"	5'-1"	5'-8"	6'-4"	7'-2"	7'-11"
	14'	1'-3"	1'-4"	3'-1"				1'-3"	1'-4"	4'-7"				1'-3"	1'-4"	3'-10"	3'-9"	4'-5"	5'-1"	5'-10"	6'-8"	x	1'-3"	2'-7"	4'-8"	5'-2"	5'-8"	6'-4"	7'-1"	7'-10"	8'-8"
	15'	1'-3"	1'-4"	3'-8"				1'-3"	1'-7"	5'-3"				1'-3"	1'-4"	4'-5"	4'-7"	5'-0"	5'-9"	6'-6"	7'-3"	x	1'-3"	3'-2"	5'-2"	5'-9"	6'-4"	7'-0"	7'-9"	8'-7"	x
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"	2x2	4x4	6x6	8x8	8x10	8x12	8x14	8x16	8x18	2x2	4x4	6x6	8x8	8x10	8x12	8x14	8x16	8x18
11-7/8"	5'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-0"
	6'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-1"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-0"	2'-8"
	7'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-11"	2'-9"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-11"	2'-7"	3'-4"
	8'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-6"	3'-4"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-11"	2'-7"	3'-3"	4'-0"
	9'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-3"	3'-1"	3'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-11"	2'-6"	3'-2"	3'-10"	4'-8"
	10'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-1"	2'-10"	3'-8"	4'-7"	1'-3"	1'-4"	1'-5"	1'-10"	2'-6"	3'-2"	3'-10"	4'-6"	5'-5"
	11'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-8"			1'-3"	1'-4"	1'-5"	1'-6"	1'-10"	2'-7"	3'-5"	4'-3"	5'-2"	1'-3"	1'-4"	1'-5"	2'-6"	3'-2"	3'-9"	4'-5"	5'-2"	6'-1"
	12'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	2'-4"			1'-3"	1'-4"	1'-5"	1'-8"	2'-5"	3'-2"	4'-0"	4'-10"	5'-9"	1'-3"	1'-4"	1'-5"	3'-1"	3'-9"	4'-5"	5'-1"	5'-11"	6'-10"
	13'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	2'-11"			1'-3"	1'-4"	1'-5"	2'-3"	3'-0"	3'-9"	4'-7"	5'-6"	6'-5"	1'-3"	1'-4"	1'-9"	3'-9"	4'-5"	5'-0"	5'-10"	6'-7"	7'-6"
	14'	1'-3"	1'-4"	1'-5"	1'-11"			1'-3"	1'-4"	1'-5"	3'-7"			1'-3"	1'-4"	1'-5"	2'-9"	3'-7"	4'-4"	5'-2"	6'-1"	x	1'-3"	1'-4"	2'-5"	4'-4"	5'-0"	5'-8"	6'-5"	7'-3"	8'-3"
	15'	1'-3"	1'-4"	1'-5"	2'-5"			1'-3"	1'-4"	1'-5"	4'-2"			1'-3"	1'-4"	1'-5"	3'-4"	4'-2"	4'-11"	5'-10"	6'-8"	x	1'-3"	1'-4"	3'-0"	5'-0"	5'-8"	6'-3"	7'-1"	8'-0"	8'-11"
	16'	1'-3"	1'-4"	1'-5"	3'-0"			1'-3"	1'-4"	1'-8"	4'-10"			1'-3"	1'-4"	1'-9"	3'-11"	4'-9"	5'-6"	6'-5"	7'-4"	x	1'-3"	1'-9"	3'-8"	5'-7"	6'-3"	6'-11"	7'-9"	8'-8"	9'-8"
	17'	1'-3"	1'-4"	1'-5"	3'-7"			1'-3"	1'-4"	2'-3"	5'-5"			1'-3"	1'-4"	2'-3"	4'-6"	5'-4"	6'-2"	7'-0"	7'-11"	x	1'-3"	2'-6"	4'-3"	6'-3"	6'-11"	7'-7"	8'-6"	9'-5"	10'-4"
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"	2x2	4x4	6x6	8x8	10x10	10x12	10x14	10x16	10x18	2x2	4x4	6x6	8x8	10x10	10x12	10x14	10x16	10x18
14"	5'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"
	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-0"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-6"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-7"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-5"	3'-2"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-3"	3'-2"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-4"	3'-0"	3'-11"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-11"	2'-10"	3'-10"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-2"	2'-11"	3'-8"	4'-7"
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-6"	3'-5"	4'-5"	1'-3"	1'-4"	1'-5"	1'-6"	2'-1"	2'-10"	3'-8"	4'-3"	5'-3"
	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-3"	3'-1"	4'-0"	5'-0"	1'-3"	1'-4"	1'-5"	1'-6"	2'-9"	3'-5"	4'-2"	5'-0"	6'-0"
	12'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-9"		1'-3"	1'-4"	1'-5"	1'-6"	1'-11"	2'-9"	3'-8"	4'-8"	5'-8"	1'-3"	1'-4"	1'-5"	1'-6"	3'-4"	4'-1"	4'-10"	5'-8"	6'-8"
	13'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	2'-5"		1'-3"	1'-4"	1'-5"	1'-6"	2'-6"	3'-4"	4'-3"	5'-3"	6'-3"	1'-3"	1'-4"	1'-5"	2'-3"	4'-0"	4'-8"	5'-5"	6'-4"	7'-5"
	14'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	3'-0"		1'-3"	1'-4"	1'-5"	1'-6"	3'-1"	3'-11"	4'-10"	5'-10"	6'-11"	1'-3"	1'-4"	1'-5"	2'-8"	4'-7"	5'-4"	6'-1"	7'-1"	8'-1"
	15'	1'-3"	1'-4"	1'-5"	1'-6"	1'-10"		1'-3"	1'-4"	1'-5"	1'-6"	3'-8"		1'-3"	1'-4"	1'-5"	1'-6"	3'-8"	4'-6"	5'-6"	6'-5"	7'-6"	1'-3"	1'-4"	1'-5"	3'-4"	5'-3"	5'-11"	6'-9"	7'-9"	8'-10"
	16'	1'-3"	1'-4"	1'-5"	1'-6"	2'-5"		1'-3"	1'-4"	1'-5"	1'-6"	4'-3"		1'-3"	1'-4"	1'-5"	2'-0"	4'-2"	5'-1"	6'-1"	7'-1"	x	1'-3"	1'-4"	2'-1"	3'-11"	5'-10"	6'-7"	7'-5"	8'-5"	9'-6"
	17'	1'-3"	1'-4"	1'-5"	1'-6"	2'-11"		1'-3"	1'-4"	1'-5"	1'-6"	4'-11"		1'-3"	1'-4"	1'-5"	2'-7"	4'-9"	5'-8"	6'-8"	7'-8"	x	1'-3"	1'-4"	2'-8"	4'-7"	6'-6"	7'-2"	8'-2"	9'-2"	10'-3"
	18'	1'-3"	1'-4"	1'-5"	1'-6"	3'-6"		1'-3"	1'-4"	1'-5"	2'-8"	5'-6"		1'-3"	1'-4"	1'-5"	3'-1"	5'-4"	6'-4"	7'-3"	8'-4"	x	1'-3"	1'-5"	3'-4"	5'-2"	7'-1"	7'-10"	8'-10"	9'-10"	10'-11"
	19'	1'-3"	1'-4"	1'-5"	1'-6"	4'-1"		1'-3"	1'-4"	1'-5"	3'-3"	6'-2"		1'-3"	1'-4"	1'-7"	3'-8"	5'-11"	6'-11"	7'-11"	8'-11"	x	1'-3"	2'-0"	3'-11"	5'-10"	7'-9"	8'-6"	9'-6"	10'-7"	11'-8"
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"	2x2	4x4	6x6	8x8	10x10	12x12	12x14	12x16	12x18	2x2	4x4	6x6	8x8	10x10	12x12	12x14	12x16	12x18
16"	5'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"
	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-0"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-6"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-7"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-4"	3'-2"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-11"	3'-2"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-2"	3'-0"	3'-10"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-10"	2'-2"	3'-9"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-0"	2'-10"	3'-7"	4'-7"
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-4"	2'-9"	4'-5"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-8"	3'-5"	4'-3"	5'-3"
	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-0"	2'-11"	3'-4"	5'-0"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-3"	4'-1"	4'-11"	6'-0"
	12'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-7"	3'-6"	3'-11"	5'-8"	1'-3"	1'-4"	1'-5"	1'-6"	2'-0"	3'-11"	4'-8"	5'-7"	6'-8"
	13'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-2"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-2"	4'-1"	4'-6"	6'-3"	1'-3"	1'-4"	1'-5"	1'-6"	2'-8"	4'-6"	5'-4"	6'-3"	7'-5"
	14'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-9"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-8"	4'-8"	5'-2"	6'-11"	1'-3"	1'-4"	1'-5"	1'-6"	3'-3"	5'-2"	5'-11"	6'-11"	8'-1"
	15'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-5"	1'-3"	1'-4"	1'-5"	1'-6"	2'-1"	4'-3"	5'-4"	5'-9"	x	1'-3"	1'-4"	1'-5"	2'-0"	3'-11"	5'-9"	6'-7"	7'-8"	8'-10"
	16'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-2"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	4'-0"	1'-3"	1'-4"	1'-5"	1'-6"	2'-8"	4'-10"	5'-11"	6'-4"	x	1'-3"	1'-4"	1'-5"	2'-8"	4'-6"	6'-5"	7'-3"	8'-4"	9'-6"
	17'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-8"	1'-3"	1'-4"	1'-5"	1'-6"	2'-1"	4'-8"	1'-3"	1'-4"	1'-5"	1'-6"	3'-3"	5'-6"	6'-6"	7'-7"	x	1'-3"	1'-4"	1'-5"	3'-3"	5'-2"	7'-0"	8'-0"	9'-1"	10'-3"
	18'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-3"	1'-3"	1'-4"	1'-5"	1'-6"	2'-8"	5'-3"	1'-3"	1'-4"	1'-5"	1'-9"	3'-9"	6'-1"	7'-1"	8'-3"	x	1'-3"	1'-4"	2'-1"	3'-11"	5'-9"	7'-8"	8'-8"	9'-9"	10'-11"
	19'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-10"	1'-3"	1'-4"	1'-5"	1'-6"	3'-4"	5'-11"	1'-3"	1'-4"	1'-5"	2'-4"	4'-4"	6'-8"	7'-9"	8'-10"	x	1'-3"	1'-4"	2'-8"	4'-6"	6'-5"	8'-4"	9'-4"	10'-6"	11'-8"
	20'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	4'-4"	1'-3"	1'-4"	1'-5"	1'-6"	3'-11"	6'-6"	1'-3"	1'-4"	1'-5"	2'-10"	4'-11"	7'-3"	8'-4"	9'-5"	x	1'-3"	1'-4"	3'-4"	5'-2"	7'-0"	9'-0"	10'-1"	11'-2"	12'-4"
	21'	1'-3"	1'-4"	1'-5"	1'-6"	2'-0"	5'-0"	1'-3"	1'-4"	1'-5"	1'-6"	4'-7"	7'-2"	1'-3"	1'-4"	1'-5"	3'-5"	5'-6"	7'-10"	8'-11"	10'-1"	x	1'-3"	2'-1"	3'-11"	5'-9"	7'-8"	9'-8"	10'-9"	11'-10"	13'-2"
	22'	1'-3"	1'-4"	1'-5"	1'-6"	2'-6"	5'-6"	1'-3"	1'-4"	1'-5"	2'-7"	5'-2"	7'-9"	1'-3"	1'-4"	1'-10"	3'-11"	6'-1"	8'-5"	9'-7"	10'-8"	x	1'-3"	2'-8"	4'-7"	6'-5"	8'-3"	10'-4"	11'-5"	12'-7"	x
	23'	1'-3"	1'-4"	1'-5"	1'-6"	3'-1"	6'-1"	1'-3"	1'-4"	1'-5"	3'-2"	5'-10"	8'-5"	1'-3"	1'-4"	2'-5"	4'-5"	6'-8"	9'-1"	10'-2"	11'-4"	x	1'-6"	3'-4"	5'-2"	7'-0"	8'-11"	11'-1"	12'-2"	13'-3"	x

NOTES:

1. **CUT HOLES CAREFULLY! DO NOT OVERCUT CORNERS OF RECTANGULAR HOLES! DO NOT CUT JOIST FLANGES!**
2. The hole locations listed above are valid for joists supporting only uniform loads, (40 psf Live Load and a 20 psf Dead Load, spaced up to 16" on center).
3. Hole location is measured from the center of bearing to the center of a circular or rectangular hole from the closest support.
4. Circular and rectangular holes may be placed anywhere within the depth of the joist web.
5. For a hole size that differs from those covered, use the next larger hole dimension.

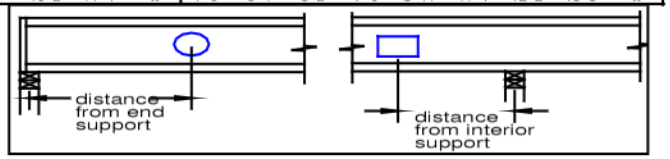


Table 10 - Boise BCI Web Hole Charts: 40 psf Live Load, 25 psf Dead Load, up to 16" oc

Circular Holes

Joist Depth	Clear Span	Distance from End Support – Hole Diameter						Distance from Interior Support – Hole Diameter					
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
9-1/2"	5'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"			
	6'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"			
	7'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"			
	8'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"			
	9'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-10"			
	10'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	2'-5"			
	11'	1'-3"	1'-4"	1'-9"				1'-3"	1'-4"	3'-1"			
	12'	1'-3"	1'-4"	2'-4"				1'-3"	1'-4"	3'-8"			
	13'	1'-3"	1'-4"	2'-11"				1'-3"	1'-4"	4'-4"			
	14'	1'-3"	1'-4"	3'-5"				1'-3"	1'-7"	4'-11"			
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
11-7/8"	5'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"		
	6'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"		
	7'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"		
	8'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"		
	9'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"		
	10'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"		
	11'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	2'-1"		
	12'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	2'-8"		
	13'	1'-3"	1'-4"	1'-5"	1'-9"			1'-3"	1'-4"	1'-5"	3'-4"		
	14'	1'-3"	1'-4"	1'-5"	2'-4"			1'-3"	1'-4"	1'-5"	3'-11"		
	15'	1'-3"	1'-4"	1'-5"	2'-10"			1'-3"	1'-4"	1'-8"	4'-7"		
	16'	1'-3"	1'-4"	1'-5"	3'-5"			1'-3"	1'-4"	2'-3"	5'-2"		
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
14"	5'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	12'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	2'-3"	
	13'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	2'-10"	
	14'	1'-3"	1'-4"	1'-5"	1'-6"	1'-9"		1'-3"	1'-4"	1'-5"	1'-6"	3'-6"	
	15'	1'-3"	1'-4"	1'-5"	1'-6"	2'-4"		1'-3"	1'-4"	1'-5"	1'-6"	4'-1"	
	16'	1'-3"	1'-4"	1'-5"	1'-6"	2'-11"		1'-3"	1'-4"	1'-5"	2'-1"	4'-9"	
	17'	1'-3"	1'-4"	1'-5"	1'-6"	3'-5"		1'-3"	1'-4"	1'-5"	2'-8"	5'-4"	
	18'	1'-3"	1'-4"	1'-5"	1'-6"	4'-0"		1'-3"	1'-4"	1'-5"	3'-4"	6'-0"	
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
16"	5'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	12'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-0"
	13'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-8"
	14'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-3"
	15'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-1"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-11"
	16'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-8"	1'-3"	1'-4"	1'-5"	1'-6"	2'-1"	4'-6"
	17'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-2"	1'-3"	1'-4"	1'-5"	1'-6"	2'-8"	5'-2"
	18'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-9"	1'-3"	1'-4"	1'-5"	1'-6"	3'-4"	5'-9"
	19'	1'-3"	1'-4"	1'-5"	1'-6"	1'-8"	4'-4"	1'-3"	1'-4"	1'-5"	1'-6"	3'-11"	6'-5"
	20'	1'-3"	1'-4"	1'-5"	1'-6"	2'-2"	4'-10"	1'-3"	1'-4"	1'-5"	2'-2"	4'-7"	7'-0"
	21'	1'-3"	1'-4"	1'-5"	1'-6"	2'-8"	5'-5"	1'-3"	1'-4"	1'-5"	2'-9"	5'-2"	7'-8"
	22'	1'-3"	1'-4"	1'-5"	1'-6"	3'-3"	6'-0"	1'-3"	1'-4"	1'-5"	3'-5"	5'-10"	8'-3"
	23'	1'-3"	1'-4"	1'-5"	1'-6"	3'-9"	6'-7"						

Rectangular Holes

Joist Depth	Clear Span	Distance from End Support – Maximum Hole Dimension: Depth or Width									Distance from Interior Support – Maximum Hole Dimension: Depth or Width								
		2x2	4x4	6x6	6x8	6x10	6x12	6x14	6x16	6x18	2x2	4x4	6x6	6x8	6x10	6x12	6x14	6x16	6x18
9-1/2"	5'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-5"
	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-11"	2'-7"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-11"	2'-6"	3'-1"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-10"	2'-6"	3'-2"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-1"	2'-7"	3'-1"	3'-9"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-10"	2'-5"	3'-1"	3'-9"	1'-3"	1'-4"	1'-5"	1'-6"	1'-8"	2'-2"	2'-8"	3'-2"	3'-9"	4'-6"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-9"	2'-5"	3'-0"	3'-8"	4'-4"	1'-3"	1'-4"	1'-5"	1'-6"	1'-9"	2'-4"	2'-10"	3'-4"	3'-10"	4'-6"	5'-2"
	10'	1'-3"	1'-4"	1'-5"	1'-9"	2'-4"	2'-11"	3'-7"	4'-3"	x	1'-3"	1'-4"	2'-5"	2'-11"	3'-5"	3'-11"	4'-6"	5'-2"	5'-10"	
	11'	1'-3"	1'-4"	1'-9"	2'-4"	2'-11"	3'-6"	4'-2"	4'-10"	x	1'-3"	1'-4"	3'-0"	3'-7"	4'-1"	4'-7"	5'-2"	5'-10"	6'-7"	
	12'	1'-3"	1'-4"	2'-3"	2'-11"	3'-6"	4'-1"	4'-9"	5'-6"	x	1'-3"	1'-9"	3'-8"	4'-2"	4'-8"	5'-2"	5'-10"	6'-7"	7'-3"	
	13'	1'-3"	1'-4"	2'-10"	3'-5"	4'-1"	4'-8"	5'-5"	6'-1"	x	1'-3"	2'-5"	4'-4"	4'-10"	5'-4"	5'-11"	6'-7"	7'-3"	8'-0"	
	14'	1'-3"	1'-4"	3'-5"	4'-0"	4'-8"	5'-4"	6'-0"	6'-8"	x	1'-3"	3'-0"	4'-11"	5'-5"	5'-11"	6'-7"	7'-3"	7'-11"	8'-8"	
		2x2	4x4	6x6	8x8	8x10	8x12	8x14	8x16	8x18	2x2	4x4	6x6	8x8	8x10	8x12	8x14	8x16	8x18
11-7/8"	5'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-1"
	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-2"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-1"	2'-9"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-0"	2'-10"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-2"	2'-9"	3'-5"	
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-11"	2'-7"	3'-5"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-2"	2'-9"	3'-4"	4'-1"	
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-9"	2'-5"	3'-2"	4'-0"	1'-3"	1'-4"	1'-5"	1'-7"	2'-2"	2'-9"	3'-5"	4'-0"	4'-8"	4'-10"
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-4"	3'-0"	3'-9"	4'-7"	1'-3"	1'-4"	1'-5"	2'-2"	2'-10"	3'-5"	4'-0"	4'-8"	5'-6"	
	11'	1'-3"	1'-4"	1'-5"	1'-6"	2'-2"	2'-11"	3'-7"	4'-5"	5'-3"	1'-3"	1'-4"	1'-5"	2'-10"	3'-5"	4'-0"	4'-8"	5'-5"	6'-2"	
	12'	1'-3"	1'-4"	1'-5"	2'-1"	2'-9"	3'-5"	4'-2"	5'-0"	5'-10"	1'-3"	1'-4"	1'-8"	3'-5"	4'-1"	4'-8"	5'-3"	6'-1"	6'-11"	
	13'	1'-3"	1'-4"	1'-5"	2'-7"	3'-4"	4'-0"	4'-9"	5'-7"	6'-5"	1'-3"	1'-4"	2'-3"	4'-2"	4'-8"	5'-3"	6'-0"	6'-9"	7'-7"	
	14'	1'-3"	1'-4"	1'-5"	3'-2"	3'-10"	4'-7"	5'-5"	6'-2"	7'-0"	1'-3"	1'-4"	2'-11"	4'-8"	5'-4"	5'-11"	6'-8"	7'-5"	8'-4"	
	15'	1'-3"	1'-4"	1'-9"	3'-9"	4'-5"	5'-2"	6'-0"	6'-10"	x	1'-3"	1'-9"	3'-6"	5'-4"	5'-11"	6'-7"	7'-4"	8'-2"	9'-0"	
	16'	1'-3"	1'-4"	2'-3"	4'-3"	5'-0"	5'-9"	6'-7"	7'-5"	x	1'-3"	2'-4"	4'-2"	5'-11"	6'-7"	7'-3"	8'-0"	8'-11"	9'-8"	
		2x2	4x4	6x6	8x8	10x10	10x12	10x14	10x16	10x18	2x2	4x4	6x6	8x8	10x10	10x12	10x14	10x16	10x18
14"	5'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-0"
	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-1"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-11"	2'-8"	
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-11"	2'-7"	3'-4"	
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-8"	3'-3"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-10"	2'-6"	3'-2"	4'-0"	
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-2"	3'-0"	3'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-9"	2'-6"	3'-2"	3'-10"	4'-8"	
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-11"	2'-9"	3'-7"	4'-6"	1'-3"	1'-4"	1'-5"	1'-6"	2'-5"	3'-1"	3'-10"	4'-6"	5'-5"	
	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-9"	2'-6"	3'-4"	4'-2"	5'-1"	1'-3"	1'-4"	1'-5"	1'-6"	3'-0"	3'-9"	4'-5"	5'-2"	6'-2"	
	12'	1'-3"	1'-4"	1'-5"	1'-6"	2'-3"	3'-1"	3'-11"	4'-9"	5'-8"	1'-3"	1'-4"	1'-5"	1'-11"	3'-8"	4'-4"	5'-0"	5'-10"	6'-9"	
	13'	1'-3"	1'-4"	1'-5"	1'-6"	2'-10"	3'-8"	4'-6"	5'-4"	6'-4"	1'-3"	1'-4"	1'-5"	2'-6"	4'-3"	5'-0"	5'-8"	6'-6"	7'-6"	
	14'	1'-3"	1'-4"	1'-5"	1'-6"	3'-6"	4'-3"	5'-1"	6'-0"	6'-11"	1'-3"	1'-4"	1'-5"	3'-2"	4'-11"	5'-7"	6'-4"	7'-3"	8'-2"	
	15'	1'-3"	1'-4"	1'-5"	1'-6"	4'-1"	4'-10"	5'-8"	6'-7"	7'-6"	1'-3"	1'-4"	2'-0"	3'-9"	5'-6"	6'-3"	7'-0"	7'-11"	8'-10"	
	16'	1'-3"	1'-4"	1'-5"	2'-1"	4'-9"	5'-5"	6'-3"	7'-2"	x	1'-3"	1'-4"	2'-8"	4'-5"	6'-2"	6'-10"	7'-8"	8'-7"	9'-7"	
	17'	1'-3"	1'-4"	1'-5"	2'-8"	5'-4"	6'-0"	6'-10"	7'-9"	x	1'-3"	1'-6"	3'-3"	5'-5"	6'-9"	7'-6"	8'-5"	9'-4"	10'-3"	
	18'	1'-3"	1'-4"	1'-5"	3'-4"	6'-0"	6'-7"	7'-6"	8'-5"	x	1'-3"	2'-2"	3'-11"	5'-8"	7'-5"	8'-2"	9'-1"	10'-0"	11'-0"	
		2x2	4x4	6x6	8x8	10x10	12x12	12x14	12x16	12x18	2x2	4x4	6x6	8x8	10x10	12x12	12x14	12x16	12x18
16"	5'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-0"
	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-1"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-11"	2'-7"	
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-6"	3'-4"	
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-4"	3'-3"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-5"	3'-2"	4'-1"	
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-0"	2'-11"	3'-10"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-3"	3'-0"	3'-9"	4'-8"	
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-9"	2'-7"	3'-6"	4'-6"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-11"	3'-8"	4'-5"	5'-4"	
	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-4"	3'-2"	4'-1"	5'-1"	1'-3"	1'-4"	1'-5"	1'-6"	1'-10"	3'-6"	4'-3"	5'-2"	6'-1"	
	12'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-10"	3'-9"	4'-8"	5'-8"	1'-3"	1'-4"	1'-5"	1'-6"	2'-5"	4'-2"	4'-11"	5'-9"	6'-9"	
	13'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-5"	4'-4"	5'-3"	6'-4"	1'-3"	1'-4"	1'-5"	1'-6"	3'-1"	4'-9"	5'-6"	6'-5"	7'-6"	
	14'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	4'-0"	4'-11"	5'-11"	6'-11"	1'-3"	1'-4"	1'-5"	2'-0"	3'-8"	5'-5"	6'-2"	7'-2"	8'-2"	
	15'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	4'-7"	5'-6"	6'-6"	**7'-6"**	1'-3"	1'-4"	1'-5"	2'-7"	4'-4"	6'-0"	6'-10"	7'-10"	8'-10"	
	16'	1'-3"	1'-4"	1'-5"	1'-6"	3'-2"	5'-2"	6'-1"	7'-1"	x	1'-3"	1'-4"	1'-6"	3'-3"	4'-11"	6'-8"	7'-7"	8'-6"	9'-7"	
	17'	1'-3"	1'-4"	1'-5"	1'-9"	3'-8"	5'-9"	6'-8"	7'-8"	x	1'-3"	1'-4"	2'-2"	3'-10"	5'-7"	7'-4"	8'-3"	9'-3"	10'-3"	
	18'	1'-3"	1'-4"	1'-5"	2'-4"	4'-3"	6'-4"	7'-4"	8'-4"	x	1'-3"	1'-4"	2'-9"	4'-6"	6'-2"	8'-0"	8'-11"	9'-11"	11'-0"	
	19'	1'-3"	1'-4"	1'-5"	2'-10"	4'-10"	6'-11"	7'-11"	8'-11"	x	1'-3"	1'-8"	3'-5"	5'-2"	6'-10"	8'-8"	9'-7"	10'-7"	11'-8"	
	20'	1'-3"	1'-4"	1'-5"	3'-5"	5'-5"	7'-6"	8'-6"	9'-6"	x	1'-3"	2'-4"	4'-0"	5'-9"	7'-5"	9'-4"	10'-4"	11'-4"	12'-5"	
	21'	1'-3"	1'-4"	2'-1"	4'-0"	6'-0"	8'-1"	9'-1"	10'-1"	x	1'-3"	2'-11"	4'-8"	6'-4"	8'-2"	10'-0"	11'-0"	12'-0"	x	
	22'	1'-3"	1'-4"	2'-7"	4'-6"	6'-7"	8'-9"	9'-8"	10'-9"	x	1'-10"	3'-7"	5'-4"	7'-0"	8'-8"	10'-8"	11'-8"	12'-9"	x	
	23'	1'-3"	1'-4"	3'-2"	5'-1"	7'-1"	9'-4"	10'-4"	11'-4"	x									

NOTES:

1. **CUT HOLES CAREFULLY! DO NOT OVERCUT CORNERS OF RECTANGULAR HOLES! DO NOT CUT JOIST FLANGES!**
2. The hole locations listed above are valid for joists supporting only uniform loads, (40 psf Live Load and a 25 psf Dead Load, spaced up to 16" on center).
3. Hole location is measured from the center of bearing to the center of a circular or rectangular hole from the closest support.
4. Circular and rectangular holes may be placed anywhere within the depth of the joist web.
5. For a hole size that differs from those covered, use the next larger hole dimension.

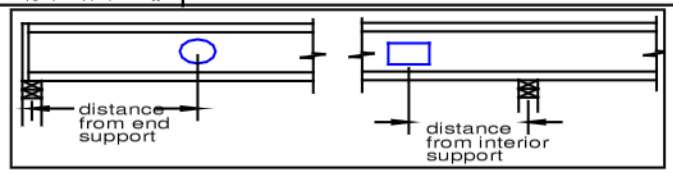


Table 11 - Boise BCI Web Hole Charts: 40 psf Live Load, 15 psf Dead Load, up to 24" oc

Circular Holes

Joist Depth	Clear Span	Distance from End Support – Hole Diameter						Distance from Interior Support – Hole Diameter					
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
9-1/2"	6'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"			
	7'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"			
	8'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"			
	9'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	2'-8"			
	10'	1'-3"	1'-4"	2'-2"				1'-3"	1'-4"	3'-3"			
	11'	1'-3"	1'-4"	2'-9"				1'-3"	1'-4"	3'-11"			
	12'	1'-3"	1'-4"	3'-4"				1'-3"	1'-10"	4'-6"			
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
11-7/8"	6'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"		
	7'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"		
	8'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"		
	9'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-10"		
	10'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	2'-6"		
	11'	1'-3"	1'-4"	1'-5"	1'-10"			1'-3"	1'-4"	1'-5"	3'-2"		
	12'	1'-3"	1'-4"	1'-5"	2'-5"			1'-3"	1'-4"	1'-5"	3'-9"		
	13'	1'-3"	1'-4"	1'-5"	3'-0"			1'-3"	1'-4"	2'-1"	4'-4"		
	14'	1'-3"	1'-4"	1'-5"	3'-7"			1'-3"	1'-4"	2'-8"	5'-0"		
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
14"	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	2'-1"	
	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	2'-9"	
	12'	1'-3"	1'-4"	1'-5"	1'-6"	2'-0"		1'-3"	1'-4"	1'-5"	1'-6"	3'-4"	
	13'	1'-3"	1'-4"	1'-5"	1'-6"	2'-6"		1'-3"	1'-4"	1'-5"	1'-11"	4'-0"	
	14'	1'-3"	1'-4"	1'-5"	1'-6"	3'-1"		1'-3"	1'-4"	1'-5"	2'-6"	4'-7"	
	15'	1'-3"	1'-4"	1'-5"	1'-6"	3'-8"		1'-3"	1'-4"	1'-5"	3'-2"	5'-3"	
	16'	1'-3"	1'-4"	1'-5"	1'-10"	4'-3"							
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
16"	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-11"
	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-7"
	12'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-9"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-2"
	13'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-4"	1'-3"	1'-4"	1'-5"	1'-6"	1'-11"	3'-10"
	14'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-11"	1'-3"	1'-4"	1'-5"	1'-6"	2'-6"	4'-5"
	15'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-6"	1'-3"	1'-4"	1'-5"	1'-6"	3'-2"	5'-1"
	16'	1'-3"	1'-4"	1'-5"	1'-6"	1'-10"	4'-1"	1'-3"	1'-4"	1'-5"	1'-10"	3'-9"	5'-8"
	17'	1'-3"	1'-4"	1'-5"	1'-6"	2'-5"	4'-8"	1'-3"	1'-4"	1'-5"	2'-6"	4'-5"	6'-4"
	18'	1'-3"	1'-4"	1'-5"	1'-6"	2'-11"	5'-3"						

Rectangular Holes

Joist Depth	Clear Span	Distance from End Support – Maximum Hole Dimension: Depth or Width									Distance from Interior Support – Maximum Hole Dimension: Depth or Width								
		2x2	4x4	6x6	6x8	6x10	6x12	6x14	6x16	6x18	2x2	4x4	6x6	6x8	6x10	6x12	6x14	6x16	6x18
9-1/2"	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-4"	2'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-11"	2'-4"	2'-10"	3'-4"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-10"	2'-5"	2'-11"	x	1'-3"	1'-4"	1'-5"	1'-9"	2'-2"	2'-7"	3'-0"	3'-6"	4'-1"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-11"	2'-5"	3'-0"	3'-7"	x	1'-3"	1'-4"	2'-0"	2'-5"	2'-9"	3'-2"	3'-8"	4'-2"	x
	9'	1'-3"	1'-4"	1'-7"	2'-1"	2'-6"	3'-1"	3'-7"	4'-2"	x	1'-3"	1'-4"	2'-7"	3'-0"	3'-5"	3'-10"	4'-4"	4'-11"	x
	10'	1'-3"	1'-4"	2'-2"	2'-8"	3'-2"	3'-8"	4'-3"	4'-10"	x	1'-3"	1'-9"	3'-3"	3'-8"	4'-0"	4'-6"	5'-0"	5'-8"	x
	11'	1'-3"	1'-4"	2'-9"	3'-3"	3'-9"	4'-3"	4'-10"	x	x	1'-3"	2'-5"	3'-11"	4'-3"	4'-8"	5'-2"	5'-9"	6'-4"	x
	12'	1'-3"	1'-7"	3'-4"	3'-10"	4'-4"	4'-11"	5'-6"	x	x	1'-6"	3'-0"	4'-6"	4'-11"	5'-4"	5'-11"	6'-6"	x	x
		2x2	4x4	6x6	8x8	8x10	8x12	8x14	8x16	8x18	2x2	4x4	6x6	8x8	8x10	8x12	8x14	8x16	8x18
11-7/8"	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-11"	2'-7"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-0"	2'-6"	3'-1"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-11"	2'-6"	3'-3"	1'-3"	1'-4"	1'-5"	1'-6"	1'-8"	2'-2"	2'-7"	3'-1"	3'-9"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-11"	2'-6"	3'-2"	3'-10"	1'-3"	1'-4"	1'-5"	1'-10"	2'-3"	2'-9"	3'-3"	3'-10"	4'-6"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-11"	2'-6"	3'-1"	3'-9"	4'-6"	1'-3"	1'-4"	1'-5"	2'-5"	2'-11"	3'-5"	3'-10"	4'-6"	5'-3"
	10'	1'-3"	1'-4"	1'-5"	1'-11"	2'-6"	3'-2"	3'-9"	4'-5"	x	1'-3"	1'-4"	1'-8"	3'-1"	3'-6"	4'-0"	4'-7"	5'-3"	5'-11"
	11'	1'-3"	1'-4"	1'-5"	2'-6"	3'-1"	3'-8"	4'-4"	5'-1"	x	1'-3"	1'-4"	2'-3"	3'-8"	4'-2"	4'-8"	5'-3"	5'-11"	6'-8"
	12'	1'-3"	1'-4"	1'-6"	3'-1"	3'-8"	4'-4"	5'-0"	5'-8"	x	1'-3"	1'-6"	2'-11"	4'-4"	4'-9"	5'-4"	5'-11"	6'-8"	7'-5"
	13'	1'-3"	1'-4"	2'-0"	3'-8"	4'-4"	4'-11"	5'-7"	6'-4"	x	1'-3"	2'-1"	3'-6"	4'-11"	5'-5"	6'-0"	6'-8"	7'-4"	8'-2"
	14'	1'-3"	1'-4"	2'-7"	4'-3"	4'-11"	5'-7"	6'-3"	6'-11"	x	1'-3"	2'-9"	4'-3"	5'-7"	6'-1"	6'-8"	7'-4"	8'-1"	x
		2x2	4x4	6x6	8x8	10x10	10x12	10x14	10x16	10x18	2x2	4x4	6x6	8x8	10x10	10x12	10x14	10x16	10x18
14"	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-6"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-10"	2'-4"	3'-0"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-4"	3'-1"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-11"	2'-5"	3'-0"	3'-8"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-3"	3'-0"	3'-9"	1'-3"	1'-4"	1'-5"	1'-6"	2'-0"	2'-6"	3'-1"	3'-8"	4'-5"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-3"	2'-11"	3'-7"	4'-5"	1'-3"	1'-4"	1'-5"	1'-6"	2'-7"	3'-2"	3'-8"	4'-4"	5'-1"
	10'	1'-3"	1'-4"	1'-5"	1'-6"	2'-2"	2'-10"	3'-6"	4'-3"	5'-0"	1'-3"	1'-4"	1'-5"	1'-10"	3'-3"	3'-9"	4'-4"	5'-0"	5'-10"
	11'	1'-3"	1'-4"	1'-5"	1'-6"	2'-9"	3'-5"	4'-1"	4'-10"	x	1'-3"	1'-4"	1'-5"	2'-6"	3'-10"	4'-5"	5'-0"	5'-9"	6'-7"
	12'	1'-3"	1'-4"	1'-5"	1'-8"	3'-4"	4'-0"	4'-9"	5'-6"	x	1'-3"	1'-4"	1'-9"	3'-1"	4'-6"	5'-0"	5'-8"	6'-5"	7'-3"
	13'	1'-3"	1'-4"	1'-5"	2'-3"	3'-11"	4'-7"	5'-4"	6'-1"	x	1'-3"	1'-4"	2'-4"	3'-9"	5'-1"	5'-8"	6'-5"	7'-2"	8'-0"
	14'	1'-3"	1'-4"	1'-5"	2'-10"	4'-6"	5'-3"	6'-0"	6'-9"	x	1'-3"	1'-7"	3'-0"	4'-4"	5'-9"	6'-4"	7'-1"	7'-11"	x
	15'	1'-3"	1'-4"	1-10"	3'-5"	5'-1"	5-10"	6'-7"	7'-5"	x									
	16'	1'-3"	1'-4"	2'-4"	4'-0"	5'-9"	6'-5"	7'-3"	x	x									
		2x2	4x4	6x6	8x8	10x10	12x12	12x14	12x16	12x18	2x2	4x4	6x6	8x8	10x10	12x12	12x14	12x16	12x18
16"	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-10"	2'-6"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-3"	3'-0"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-4"	3'-1"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-9"	2'-4"	2'-11"	3'-8"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-3"	2'-11"	3'-9"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-5"	3'-0"	3'-7"	4'-5"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-1"	2'-9"	3'-6"	4'-5"	1'-3"	1'-4"	1'-5"	1'-6"	1'-8"	3'-0"	3'-7"	4'-3"	5'-1"
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-8"	3'-4"	4'-2"	5'-0"	1'-3"	1'-4"	1'-5"	1'-6"	2'-3"	3'-8"	4'-3"	5'-0"	5'-10"
	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-8"	3'-3"	4'-0"	4'-9"	x	1'-3"	1'-4"	1'-5"	1'-7"	2'-11"	4'-3"	4'-10"	5'-8"	6'-6"
	12'	1'-3"	1'-4"	1'-5"	1'-6"	2'-2"	3'-10"	4'-7"	5'-5"	x	1'-3"	1'-4"	1'-5"	2'-2"	3'-6"	4'-11"	5'-7"	6'-5"	7'-3"
	13'	1'-3"	1'-4"	1'-5"	1'-6"	2'-9"	4'-5"	5'-2"	6'-1"	x	1'-3"	1'-4"	1'-5"	2'-10"	4'-2"	5'-6"	6'-3"	7'-1"	8'-0"
	14'	1'-3"	1'-4"	1'-5"	1'-9"	3'-4"	5'-0"	5'-10"	6'-8"	x	1'-3"	1'-4"	2'-1"	3'-5"	4'-9"	6'-2"	7'-0"	7'-10"	x
	15'	1'-3"	1'-4"	1'-5"	2'-4"	3'-11"	5'-8"	6'-6"	7'-4"	x	1'-3"	1'-4"	2'-8"	4'-1"	5'-5"	6'-10"	7'-8"	8'-6"	x
	16'	1'-3"	1'-4"	1'-5"	2'-10"	4'-6"	6'-3"	7'-1"	8'-0"	x	1'-3"	2'-0"	3'-4"	4'-8"	6'-0"	7'-7"	8'-5"	9'-3"	x
	17'	1'-3"	1'-4"	1'-11"	3'-5"	5'-1"	6'-11"	7'-9"	x	x	1'-3"	2'-7"	3'-11"	5'-4"	6'-8"	8'-3"	9'-1"	x	x
	18'	1'-3"	1'-4"	2'-5"	4'-0"	5'-8"	7'-6"	8'-4"	x	x									

NOTES:

1. **CUT HOLES CAREFULLY! DO NOT OVERCUT CORNERS OF RECTANGULAR HOLES! DO NOT CUT JOIST FLANGES!**
2. The hole locations listed above are valid for joists supporting only uniform loads, (40 psf Live Load and a 15 psf Dead Load, spaced up to 24" on center).
3. Hole location is measured from the center of bearing to the center of a circular or rectangular hole from the closest support.
4. Circular and rectangular holes may be placed anywhere within the depth of the joist web.
5. For a hole size that differs from those covered, use the next larger hole dimension.

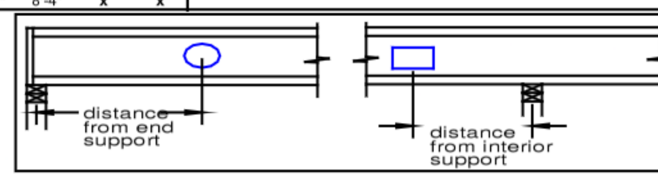


Table 12 - Boise BCI Web Hole Charts: 40 psf Live Load, 20 psf Dead Load, up to 24" oc

Joist Depth	Clear Span	Circular Holes												Rectangular Holes											
		Distance from End Support						Distance from Interior Support						Distance from End Support								Distance from Interior Support							
		Hole Diameter						Hole Diameter						Maximum Hole Dimension: Depth or Width								Maximum Hole Dimension: Depth or Width							
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"	2x2	4x4	6x6	6x8	6x10	6x12	6x14	6x16	6x18	2x2	4x4	6x6	6x8	6x10	6x12	6x14	6x16	6x18
	6'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-11"	2'-5"	2'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-9"	2'-1"	2'-6"	3'-0"	3'-5"
	7'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-8"				1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-0"	2'-6"	3'-0"	3'-6"	1'-3"	1'-4"	1'-7"	2'-0"	2'-4"	2'-9"	3'-1"	3'-7"	4'-2"
	8'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	2'-3"				1'-3"	1'-4"	1'-5"	1'-9"	2'-2"	2'-7"	3'-1"	3'-7"	x	1'-3"	1'-4"	2'-3"	2'-7"	3'-0"	3'-4"	3'-10"	4'-4"	4'-10"
9-1/2"	9'	1'-3"	1'-4"	1'-11"				1'-3"	1'-4"	2'-11"				1'-3"	1'-4"	1'-10"	2'-4"	2'-9"	3'-3"	3'-9"	4'-3"	x	1'-3"	1'-6"	2'-10"	3'-3"	3'-7"	4'-0"	4'-6"	5'-0"	x
	10'	1'-3"	1'-4"	2'-5"				1'-3"	1'-4"	3'-6"				1'-3"	1'-4"	2'-5"	2'-10"	3'-4"	3'-10"	4'-4"	4'-10"	x	1'-3"	2'-2"	3'-6"	3'-10"	4'-3"	4'-8"	5'-2"	5'-9"	x
	11'	1'-3"	1'-4"	3'-0"				1'-3"	1'-4"	4'-2"				1'-3"	1'-5"	3'-0"	3'-6"	3'-11"	4'-5"	4'-11"	x	x	1'-5"	2'-9"	4'-1"	4'-6"	4'-11"	5'-4"	5'-11"	6'-5"	x
	12'	1'-3"	1'-4"	3'-7"				1'-3"	2'-4"	4'-9"				1'-3"	2'-0"	3'-7"	4'-1"	4'-6"	5'-0"	5'-7"	x	x	2'-0"	3'-5"	4'-9"	5'-1"	5'-7"	6'-1"	6'-7"	7'-2"	x
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"	2x2	4x4	6x6	8x8	8x10	8x12	8x14	8x16	8x18	2x2	4x4	6x6	8x8	8x10	8x12	8x14	8x16	8x18
	6'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-1"	2'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-2"	2'-7"	3'-2"
	7'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-1"	2'-8"	3'-3"	1'-3"	1'-4"	1'-5"	1'-6"	1'-11"	2'-4"	2'-9"	3'-3"	3'-10"
	8'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-7"			1'-3"	1'-4"	1'-5"	1'-6"	1'-8"	2'-2"	2'-8"	3'-3"	3'-10"	1'-3"	1'-4"	1'-5"	2'-1"	2'-6"	2'-11"	3'-5"	3'-11"	4'-7"
	9'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	2'-2"			1'-3"	1'-4"	1'-5"	1'-8"	2'-2"	2'-9"	3'-3"	3'-10"	4'-6"	1'-3"	1'-4"	1'-5"	2'-8"	3'-2"	3'-7"	4'-1"	4'-8"	5'-3"
11-7/8"	10'	1'-3"	1'-4"	1'-5"	1'-8"			1'-3"	1'-4"	1'-5"	2'-10"			1'-3"	1'-4"	1'-5"	2'-3"	2'-9"	3'-4"	3'-11"	4'-6"	x	1'-3"	1'-4"	2'-0"	3'-4"	3'-9"	4'-2"	4'-9"	5'-4"	6'-0"
	11'	1'-3"	1'-4"	1'-5"	2'-2"			1'-3"	1'-4"	1'-5"	3'-5"			1'-3"	1'-4"	1'-5"	2'-10"	3'-4"	3'-11"	4'-6"	5'-1"	x	1'-3"	1'-4"	2'-8"	3'-11"	4'-5"	4'-10"	5'-5"	6'-1"	6'-8"
	12'	1'-3"	1'-4"	1'-5"	2'-9"			1'-3"	1'-4"	1'-11"	4'-1"			1'-3"	1'-4"	1'-11"	3'-5"	3'-11"	4'-6"	5'-1"	5'-9"	x	1'-3"	2'-0"	3'-3"	4'-7"	5'-0"	5'-7"	6'-2"	6'-9"	x
	13'	1'-3"	1'-4"	1'-5"	3'-4"			1'-3"	1'-4"	2'-7"	4'-8"			1'-3"	1'-4"	2'-5"	4'-0"	4'-6"	5'-2"	5'-9"	6'-4"	x	1'-4"	2'-7"	3'-11"	5'-2"	5'-8"	6'-3"	6'-10"	7'-6"	x
	14'	1'-3"	1'-4"	1'-6"	3'-11"			1'-3"	1'-4"	3'-2"	5'-4"			1'-3"	1'-7"	3'-0"	4'-7"	5'-2"	5'-9"	6'-4"	7'-0"	x	1'-11"	3'-3"	4'-6"	5'-10"	6'-4"	6'-11"	7'-6"	8'-2"	x
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"	2x2	4x4	6x6	8x8	10x10	10x12	10x14	10x16	10x18	2x2	4x4	6x6	8x8	10x10	10x12	10x14	10x16	10x18
	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-11"	2'-7"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-0"	2'-5"	3'-1"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-11"	2'-6"	3'-2"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-1"	2'-7"	3'-1"	3'-10"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-10"	2'-6"	3'-2"	3'-9"	1'-3"	1'-4"	1'-5"	1'-6"	2'-3"	2'-9"	3'-3"	3'-9"	4'-6"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-10"		1'-3"	1'-4"	1'-5"	1'-6"	1'-10"	2'-5"	3'-1"	3'-8"	4'-5"	1'-3"	1'-4"	1'-5"	1'-7"	2'-10"	3'-4"	3'-10"	4'-6"	5'-2"
14"	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	2'-5"		1'-3"	1'-4"	1'-5"	1'-6"	2'-5"	3'-0"	3'-8"	4'-4"	5'-0"	1'-3"	1'-4"	1'-5"	2'-3"	3'-6"	4'-0"	4'-6"	5'-2"	5'-11"
	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-10"		1'-3"	1'-4"	1'-5"	1'-6"	3'-1"		1'-3"	1'-4"	1'-5"	1'-7"	3'-0"	3'-7"	4'-3"	4'-11"	x	1'-3"	1'-4"	1'-7"	2'-10"	4'-1"	4'-7"	5'-2"	5'-11"	6'-7"
	12'	1'-3"	1'-4"	1'-5"	1'-6"	2'-4"		1'-3"	1'-4"	1'-5"	1'-6"	3'-7"		1'-3"	1'-4"	1'-5"	2'-1"	3'-7"	4'-3"	4'-10"	5'-7"	x	1'-3"	1'-4"	2'-3"	3'-6"	4'-9"	5'-3"	5'-11"	6'-7"	7'-4"
	13'	1'-3"	1'-4"	1'-5"	1'-6"	2'-11"		1'-3"	1'-4"	1'-5"	2'-5"	4'-4"		1'-3"	1'-4"	1'-5"	2'-8"	4'-2"	4'-10"	5'-6"	6'-2"	x	1'-3"	1'-7"	2'-4"	4'-1"	5'-4"	5'-11"	6'-7"	7'-3"	8'-0"
	14'	1'-3"	1'-4"	1'-5"	1'-6"	3'-6"		1'-3"	1'-4"	1'-5"	3'-0"	4'-11"		1'-3"	1'-4"	1'-9"	3'-3"	4'-9"	5'-5"	6'-1"	6'-10"	x	1'-3"	2'-2"	3'-6"	4'-9"	6'-0"	6'-7"	7'-4"	8'-0"	x
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"	2x2	4x4	6x6	8x8	10x10	12x12	12x14	12x16	12x18	2x2	4x4	6x6	8x8	10x10	12x12	12x14	12x16	12x18
	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-11"	2'-6"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-11"	2'-5"	3'-1"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-5"	3'-2"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-0"	2'-6"	3'-1"	3'-9"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-9"	2'-4"	3'-0"	3'-9"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-7"	3'-2"	3'-9"	4'-6"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-3"	2'-11"	3'-8"	4'-5"	1'-3"	1'-4"	1'-5"	1'-6"	2'-0"	3'-3"	3'-9"	4'-5"	5'-2"
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-3"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-10"	3'-7"	4'-3"	5'-0"	1'-3"	1'-4"	1'-5"	1'-6"	2'-7"	3'-10"	4'-5"	5'-1"	5'-11"
16"	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-11"	1'-3"	1'-4"	1'-5"	1'-6"	2'-0"	3'-5"	4'-2"	4'-10"	x	1'-3"	1'-4"	1'-5"	2'-0"	3'-3"	4'-6"	5'-1"	5'-10"	6'-8"
	12'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-2"	1'-3"	1'-4"	1'-5"	1'-6"	1'-10"	3'-6"	1'-3"	1'-4"	1'-5"	1'-6"	2'-6"	4'-1"	4'-9"	5'-6"	x	1'-3"	1'-4"	1'-5"	2'-7"	3'-10"	5'-1"	5'-9"	6'-6"	7'-4"
	13'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-9"	1'-3"	1'-4"	1'-5"	1'-6"	2'-5"	4'-2"	1'-3"	1'-4"	1'-5"	1'-8"	3'-1"	4'-8"	5'-4"	6'-1"	x	1'-3"	1'-4"	2'-0"	3'-3"	4'-6"	5'-9"	6'-6"	7'-3"	8'-0"
	14'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-4"	1'-3"	1'-4"	1'-5"	1'-6"	3'-1"	4'-9"	1'-3"	1'-4"	1'-5"	2'-3"	3'-8"	5'-3"	6'-0"	6'-9"	x	1'-3"	1'-5"	2'-8"	3'-10"	5'-1"	6'-5"	7'-1"	7'-11"	x
	15'	1'-3"	1'-4"	1'-5"	1'-6"	1'-10"	3'-10"	1'-3"	1'-4"	1'-5"	1'-11"	3'-8"	5'-5"	1'-3"	1'-4"	1'-5"	2'-10"	4'-3"	5'-10"	6'-7"	7'-4"	x	1'-3"	2'-0"	3'-3"	4'-6"	5'-9"	7'-2"	7'-10"	8'-8"	x
	16'	1'-3"	1'-4"	1'-5"	1'-6"	2'-5"	4'-5"							1'-3"	1'-4"	2'-0"	3'-4"	4'-11"	6'-6"	7'-2"	8'-0"	x									

NOTES:

1. **CUT HOLES CAREFULLY! DO NOT OVERCUT CORNERS OF RECTANGULAR HOLES! DO NOT CUT JOIST FLANGES!**
2. The hole locations listed above are valid for joists supporting only uniform loads, (40 psf Live Load and a 20 psf Dead Load, spaced up to 24" on center).
3. Hole location is measured from the center of bearing to the center of a circular or rectangular hole from the closest support.
4. Circular and rectangular holes may be placed anywhere within the depth of the joist web.
5. For a hole size that differs from those covered, use the next larger hole dimension.

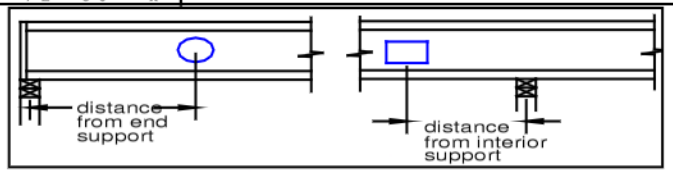


Table 13 - Boise BCI Web Hole Charts: 40 psf Live Load, 25 psf Dead Load, up to 24" oc

Circular Holes

Joist Depth	Clear Span	Distance from End Support – Hole Diameter						Distance from Interior Support – Hole Diameter					
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
9-1/2"	6'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-5"			
	7'	1'-3"	1'-4"	1'-5"				1'-3"	1'-4"	1'-10"			
	8'	1'-3"	1'-4"	1'-7"				1'-3"	1'-4"	2'-6"			
	9'	1'-3"	1'-4"	2'-1"				1'-3"	1'-4"	3'-1"			
	10'	1'-3"	1'-4"	2'-8"				1'-3"	1'-6"	3'-9"			
	11'	1'-3"	1'-4"	3'-5"				1'-3"	2'-1"	4'-4"			
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
11-7/8"	6'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"		
	7'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	1'-6"		
	8'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	2'-0"		
	9'	1'-3"	1'-4"	1'-5"	1'-6"			1'-3"	1'-4"	1'-5"	2'-5"		
	10'	1'-3"	1'-4"	1'-5"	1'-11"			1'-3"	1'-4"	1'-5"	3'-1"		
	11'	1'-3"	1'-4"	1'-5"	2'-6"			1'-3"	1'-4"	1'-9"	3'-8"		
	12'	1'-3"	1'-4"	1'-5"	3'-1"			1'-3"	1'-4"	2'-4"	4'-4"		
	13'	1'-3"	1'-4"	1'-5"	3'-7"			1'-3"	1'-4"	3'-0"	4'-11"		
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
14"	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	2'-1"	
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"		1'-3"	1'-4"	1'-5"	1'-6"	2'-9"	
	11'	1'-3"	1'-4"	1'-5"	1'-6"	2'-1"		1'-3"	1'-4"	1'-5"	1'-7"	3'-4"	
	12'	1'-3"	1'-4"	1'-5"	1'-6"	2'-8"		1'-3"	1'-4"	1'-5"	2'-3"	4'-0"	
	13'	1'-3"	1'-4"	1'-5"	1'-6"	3'-3"		1'-3"	1'-4"	1'-5"	2'-10"	4'-7"	
	14'	1'-3"	1'-4"	1'-5"	1'-10"	3'-10"							
		2"	4"	6"	8"	10"	12"	2"	4"	6"	8"	10"	12"
16"	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-9"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-0"
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-10"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-7"
	11'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-11"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-3"
	12'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-6"	1'-3"	1'-4"	1'-5"	1'-6"	2'-3"	3'-10"
	13'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-1"	1'-3"	1'-4"	1'-5"	1'-6"	2'-10"	4'-6"
	14'	1'-3"	1'-4"	1'-5"	1'-6"	1'-10"	3'-8"	1'-3"	1'-4"	1'-5"	1'-10"	3'-6"	5'-1"

Rectangular Holes

Joist Depth	Clear Span	Distance from End Support – Maximum Hole Dimension: Depth or Width									Distance from Interior Support – Maximum Hole Dimension: Depth or Width								
		2x2	4x4	6x6	6x8	6x10	6x12	6x14	6x16	6x18	2x2	4x4	6x6	6x8	6x10	6x12	6x14	6x16	6x18
9-1/2"	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-0"	2'-5"	2'-11"	1'-3"	1'-4"	1'-5"	1'-7"	1'-8"	2'-3"	2'-7"	3'-0"	3'-6"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-9"	2'-2"	2'-7"	3'-1"	x	1'-3"	1'-4"	1'-10"	2'-2"	2'-6"	2'-10"	3'-3"	3'-8"	4'-2"
	8'	1'-3"	1'-4"	1'-6"	1'-11"	2'-4"	2'-9"	3'-2"	3'-8"	x	1'-3"	1'-4"	2'-5"	2'-10"	3'-2"	3'-6"	3'-11"	4'-5"	4'-10"
	9'	1'-3"	1'-4"	2'-1"	2'-6"	2'-11"	3'-4"	3'10"	4'-3"	x	1'-3"	1'-10"	3'-1"	3'-5"	3'-9"	4'-2"	4'-7"	5'-1"	x
	10'	1'-3"	1'-4"	2'-8"	3'-1"	3'-6"	3'-11"	4'-5"	4'-10"	x	1'-3"	2'-5"	3'-8"	4'-1"	4'-5"	4'-10"	5'-4"	5'-9"	x
	11'	1'-3"	1'-9"	3'-3"	3'-8"	4'-1"	4'-6"	5'-0"	5'-6"	x	1'-10"	3'-1"	4'-4"	4'-8"	5'-1"	5'-6"	6'-0"	6'-6"	x
		2x2	4x4	6x6	8x8	8x10	8x12	8x14	8x16	8x18	2x2	4x4	6x6	8x8	8x10	8x12	8x14	8x16	8x18
11-7/8"	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-2"	2'-8"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-10"	2'-3"	2'-8"	3'-3"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-9"	2'-3"	2'-9"	3'-3"	1'-3"	1'-4"	1'-5"	1'-8"	2'-1"	2'-6"	2'-11"	3'-4"	3'-11"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-10"	2'-4"	2'-10"	3'-4"	3'-11"	1'-3"	1'-4"	1'-5"	2'-4"	2'-9"	3'-1"	3'-6"	4'-1"	4'-7"
	9'	1'-3"	1'-4"	1'-5"	1'-11"	2'-5"	2'-11"	3'-5"	3'-11"	4'-6"	1'-3"	1'-4"	1'-9"	2'-11"	3'-4"	3'-9"	4'-3"	4'-9"	5'-4"
	10'	1'-3"	1'-4"	1'-5"	2'-6"	3'-0"	3'-6"	4'-0"	4'-7"	x	1'-3"	1'-4"	2'-4"	3'-7"	4'-0"	4'-5"	4'-11"	5'-5"	6'-0"
	11'	1'-3"	1'-4"	1'-8"	3'-1"	3'-7"	4'-2"	4'-7"	5'-2"	x	1'-3"	1'-10"	2'-11"	4'-2"	4'-7"	5'-1"	5'-7"	6'-2"	6'-9"
	12'	1'-3"	1'-4"	2'-3"	3'-8"	4'-2"	4'-8"	5'-2"	5'-9"	x	1'-3"	2'-5"	3'-7"	4'-10"	5'-3"	5'-9"	6'-3"	6'-10"	x
	13'	1'-3"	1'-6"	2'-10"	4'-3"	4'-9"	5'-3"	5'-10"	6'-4"	x	1'-10"	3'-1"	4'-3"	5'-5"	5'-11"	6'-5"	7'-0"	7'-6"	x
		2x2	4x4	6x6	8x8	10x10	10x12	10x14	10x16	10x18	2x2	4x4	6x6	8x8	10x10	10x12	10x14	10x16	10x18
14"	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	2'-0"	2'-7"	1'-3"	1'-4"	1'-5"	1'-6"	1'-8"	2'-3"	2'-7"	3'-0"	3'-6"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-0"	2'-7"	3'-2"	1'-3"	1'-4"	1'-5"	1'-6"	1'-10"	2'-3"	2'-9"	3'-3"	3'-10"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-1"	2'-7"	3'-2"	3'-10"	1'-3"	1'-4"	1'-5"	1'-6"	2'-5"	2'-11"	3'-4"	3'-11"	4'-6"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	2'-1"	2'-8"	3'-2"	3'-10"	4'-6"	1'-3"	1'-4"	1'-5"	1'-11"	3'-1"	3'-6"	4'-0"	4'-7"	5'-3"
	10'	1'-3"	1'-4"	1'-5"	1'-6"	2'-8"	3'-3"	3'-10"	4'-5"	5'-0"	1'-3"	1'-4"	1'-5"	2'-6"	3'-8"	4'-2"	4'-8"	5'-4"	5-11"
	11'	1'-3"	1'-4"	1'-5"	1'-11"	2'-11"	3'-10"	4'-5"	5'-0"	x	1'-3"	1'-4"	2'-0"	3'-2"	4'-4"	4'-10"	5'-5"	6'-0"	6'-8"
	12'	1'-3"	1'-4"	1'-5"	2'-5"	3'-10"	4'-5"	5'-0"	5'-7"	x	1'-3"	1'-5"	2'-7"	3'-9"	4'-11"	5'-6"	6'-2"	6'-8"	7'-4"
	13'	1'-3"	1'-4"	1'-8"	3'-0"	4'-5"	5'-0"	5'-7"	6'-3"	x	1'-3"	2'-1"	3'-3"	4'-5"	5'-7"	6'-2"	6'-9"	7'-5"	x
	14'	1'-3"	1'-4"	2'-3"	3'-7"	5'-0"	5'-7"	6'-2"	6'-10"	x									
		2x2	4x4	6x6	8x8	10x10	12x12	12x14	12x16	12x18	2x2	4x4	6x6	8x8	10x10	12x12	12x14	12x16	12x18
16"	6'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-9"	1'-11"	2'-7"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	2'-0"	2'-6"	3'-2"
	7'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-8"	1'-11"	2'-7"	3'-2"	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-2"	2'-8"	3'-2"	3'-10"
	8'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	1'-11"	2'-6"	3'-2"	3'-10"	1'-3"	1'-4"	1'-5"	1'-6"	1'-8"	2'-9"	3'-3"	3'-10"	4'-6"
	9'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	2'-6"	3'-1"	3'-9"	4'-5"	1'-3"	1'-4"	1'-5"	1'-6"	2'-3"	3'-5"	3'-11"	4'-7"	5'-3"
	10'	1'-3"	1'-4"	1'-5"	1'-6"	1'-7"	3'-1"	3'-8"	4'-4"	5'-0"	1'-3"	1'-4"	1'-5"	1'-9"	2'-11"	4'-0"	4'-7"	5'-3"	5'-11"
	11'	1'-3"	1'-4"	1'-5"	1'-6"	2'-3"	3'-8"	4'-3"	4'-11"	x	1'-3"	1'-4"	1'-5"	2'-5"	3'-6"	4'-8"	5'-3"	5'-11"	6'-8"
	12'	1'-3"	1'-4"	1'-5"	1'-7"	2'-10"	4'-3"	4'-11"	5'-7"	x	1'-3"	1'-4"	1'-10"	3'-0"	4'-2"	5'-4"	6'-0"	6'-8"	7'-4"
	13'	1'-3"	1'-4"	1'-5"	2'-1"	3'-5"	4'-10"	5'-6"	6'-2"	x	1'-3"	1'-4"	2'-6"	3'-8"	4'-9"	6'-0"	6'-8"	7'-4"	8'-0"
	14'	1'-3"	1'-4"	1'-5"	2'-8"	4'-0"	5'-5"	6'-1"	6'-9"	x	1'-3"	2'-0"	3'-1"	4'-3"	5'-7"	6'-8"	7'-4"	8'-0"	x

NOTES:

1. **CUT HOLES CAREFULLY! DO NOT OVERCUT CORNERS OF RECTANGULAR HOLES! DO NOT CUT JOIST FLANGES!**
2. The hole locations listed above are valid for joists supporting only uniform loads, (40 psf Live Load and a 25 psf Dead Load, spaced up to 24" on center).
3. Hole location is measured from the center of bearing to the center of a circular or rectangular hole from the closest support.
4. Circular and rectangular holes may be placed anywhere within the depth of the joist web.
5. For a hole size that differs from those covered, use the next larger hole dimension.

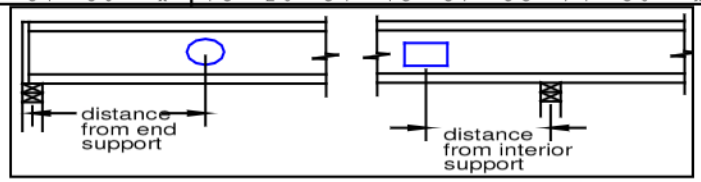


TABLE 14—BCI ALLOWABLE FLOOR SPANS[1, 2, 3, 4]
(Residential Living Areas, live load = 40 psf, L/360 for live loads, L/240 for total loads)

JOIST SPACING (inches)	SERIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			Joist Depth (inches)							
			9 1/2	11 7/8	14	16	9 1/2	11 7/8	14	16
			Maximum Floor Joist Spans							
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
12	BCI 4500	1.7E	18 - 3	20 - 11	22 - 9	24 - 3	16 - 10	19 - 1	20 - 9	22 - 2
		1.8E	18 - 8	22 - 0	23 - 11	25 - 6	17 - 8	20 - 0	21 - 10	23 - 4
		1.9E	18 - 10	22 - 3	24 - 9	26 - 5	18 - 3	20 - 9	22 - 7	24 - 1
		2.0E	19 - 2	22 - 7	25 - 8	27 - 9	19 - 2	21 - 9	23 - 8	25 - 4
	BCI 5000	1.7E	19 - 0	22 - 5	24 - 5	26 - 1	18 - 1	20 - 5	22 - 3	23 - 9
		1.8E	19 - 4	22 - 9	25 - 8	27 - 5	19 - 0	21 - 6	23 - 5	25 - 0
		1.9E	19 - 6	23 - 1	26 - 2	28 - 4	19 - 6	22 - 3	24 - 3	25 - 10
		2.0E	19 - 9	23 - 5	26 - 6	29 - 4	19 - 9	23 - 4	25 - 5	27 - 2
	BCI 6000	1.7E	19 - 8	23 - 4	26 - 4	28 - 2	19 - 6	22 - 1	24 - 0	25 - 8
		1.8E	19 - 11	23 - 7	26 - 10	29 - 7	19 - 11	23 - 3	25 - 4	27 - 0
		1.9E	20 - 4	24 - 0	27 - 2	30 - 1	20 - 4	24 - 0	26 - 2	27 - 11
		2.0E	20 - 8	24 - 4	27 - 7	30 - 6	20 - 8	24 - 4	27 - 5	29 - 4
	BCI 6500	1.7E	20 - 3	24 - 0	27 - 1	29 - 7	20 - 3	23 - 3	25 - 4	27 - 0
		1.8E	20 - 6	24 - 4	27 - 7	30 - 5	20 - 6	24 - 4	26 - 7	28 - 5
		1.9E	20 - 10	24 - 9	28 - 0	30 - 11	20 - 10	24 - 9	27 - 6	29 - 5
		2.0E	21 - 2	25 - 1	28 - 4	31 - 4	21 - 2	25 - 1	28 - 4	30 - 10
16	BCI 4500	1.7E	16 - 0	18 - 1	19 - 8	21 - 0	14 - 7	16 - 6	18 - 0	19 - 2
		1.8E	16 - 9	19 - 0	20 - 8	22 - 1	15 - 4	17 - 4	18 - 11	20 - 2
		1.9E	17 - 3	19 - 8	21 - 5	22 - 10	15 - 10	17 - 11	19 - 6	20 - 10
		2.0E	17 - 7	20 - 8	22 - 6	24 - 0	16 - 8	18 - 10	20 - 6	21 - 11
	BCI 5000	1.7E	17 - 2	19 - 5	21 - 2	22 - 7	15 - 8	17 - 8	19 - 3	20 - 7
		1.8E	17 - 8	20 - 5	22 - 3	23 - 9	16 - 6	18 - 8	20 - 3	21 - 8
		1.9E	17 - 10	21 - 1	23 - 0	24 - 6	17 - 0	19 - 3	21 - 0	22 - 5
		2.0E	18 - 1	21 - 5	24 - 1	25 - 9	17 - 10	20 - 3	22 - 0	23 - 6
	BCI 6000	1.7E	18 - 0	20 - 11	22 - 10	24 - 4	16 - 11	19 - 1	20 - 10	22 - 3
		1.8E	18 - 3	21 - 7	24 - 0	25 - 8	17 - 9	20 - 1	21 - 11	23 - 5
		1.9E	18 - 8	22 - 0	24 - 10	26 - 6	18 - 4	20 - 9	22 - 8	24 - 2
		2.0E	18 - 11	22 - 3	25 - 3	27 - 10	18 - 11	21 - 10	23 - 9	25 - 5
	BCI 6500	1.7E	18 - 6	22 - 0	24 - 0	25 - 8	17 - 9	20 - 1	21 - 11	23 - 5
		1.8E	18 - 9	22 - 3	25 - 3	27 - 0	18 - 8	21 - 2	23 - 1	24 - 8
		1.9E	19 - 0	22 - 7	25 - 7	27 - 11	19 - 0	21 - 11	23 - 10	25 - 5
		2.0E	19 - 5	22 - 11	25 - 11	28 - 7	19 - 5	22 - 11	25 - 0	26 - 9
19.2	BCI 4500	1.7E	14 - 7	16 - 6	18 - 0	19 - 2	13 - 4	15 - 1	16 - 5	17 - 6
		1.8E	15 - 4	17 - 4	18 - 11	20 - 2	14 - 0	15 - 10	17 - 3	18 - 5
		1.9E	15 - 10	17 - 11	19 - 6	20 - 10	14 - 5	16 - 5	17 - 10	19 - 0
		2.0E	16 - 7	18 - 10	20 - 6	21 - 11	15 - 2	17 - 2	18 - 9	19 - 9
	BCI 5000	1.7E	15 - 8	17 - 8	19 - 3	20 - 7	14 - 3	16 - 2	17 - 7	18 - 10
		1.8E	16 - 6	18 - 8	20 - 3	21 - 8	15 - 0	17 - 0	18 - 6	19 - 9
		1.9E	16 - 10	19 - 3	21 - 0	22 - 5	15 - 6	17 - 7	19 - 2	19 - 9
		2.0E	17 - 2	20 - 3	22 - 0	23 - 6	16 - 4	18 - 5	19 - 9	19 - 9
	BCI 6000	1.7E	16 - 11	19 - 1	20 - 10	22 - 3	15 - 5	17 - 5	19 - 0	20 - 4
		1.8E	17 - 3	20 - 1	21 - 11	23 - 5	16 - 2	18 - 4	20 - 0	21 - 4
		1.9E	17 - 7	20 - 9	22 - 8	24 - 2	16 - 9	19 - 0	20 - 8	22 - 1
		2.0E	17 - 10	21 - 0	23 - 9	25 - 5	17 - 7	19 - 11	21 - 8	23 - 2
	BCI 6500	1.7E	17 - 6	20 - 1	21 - 11	23 - 5	16 - 3	18 - 4	20 - 0	21 - 4
		1.8E	17 - 9	21 - 0	23 - 1	24 - 8	17 - 1	19 - 4	21 - 0	22 - 6
		1.9E	18 - 0	21 - 4	23 - 10	25 - 5	17 - 7	20 - 0	21 - 9	23 - 3
		2.0E	18 - 4	21 - 8	24 - 6	26 - 9	18 - 4	21 - 0	22 - 10	24 - 5
24	BCI 4500	1.7E	13 - 0	14 - 9	16 - 1	17 - 2	11 - 11	13 - 6	14 - 8	15 - 8
		1.8E	13 - 8	15 - 6	16 - 11	18 - 1	12 - 6	14 - 2	15 - 5	15 - 10
		1.9E	14 - 2	16 - 1	17 - 6	18 - 8	12 - 11	14 - 8	15 - 10	15 - 10
		2.0E	14 - 10	16 - 10	18 - 4	19 - 0	13 - 7	15 - 4	15 - 10	15 - 10
	BCI 5000	1.7E	14 - 0	15 - 10	17 - 3	18 - 5	12 - 9	14 - 5	15 - 9	15 - 10
		1.8E	14 - 9	16 - 8	18 - 2	19 - 0	13 - 5	15 - 2	15 - 10	15 - 10
		1.9E	15 - 2	17 - 3	18 - 9	19 - 0	13 - 10	15 - 9	15 - 10	15 - 10
		2.0E	16 - 0	18 - 1	19 - 0	19 - 0	14 - 7	15 - 10	15 - 10	15 - 10
	BCI 6000	1.7E	15 - 1	17 - 1	18 - 7	19 - 11	13 - 9	15 - 7	17 - 0	18 - 2
		1.8E	15 - 10	18 - 0	19 - 7	20 - 11	14 - 6	16 - 5	17 - 10	19 - 1
		1.9E	16 - 5	18 - 7	20 - 3	21 - 8	15 - 0	17 - 0	18 - 6	19 - 6
		2.0E	16 - 8	19 - 6	21 - 3	22 - 9	15 - 9	17 - 10	19 - 5	19 - 6
	BCI 6500	1.7E	15 - 11	18 - 0	19 - 7	20 - 11	14 - 6	16 - 5	17 - 11	19 - 1
		1.8E	16 - 7	18 - 11	20 - 7	22 - 0	15 - 3	17 - 3	18 - 10	19 - 6
		1.9E	16 - 9	19 - 7	21 - 4	22 - 9	15 - 9	17 - 10	19 - 5	19 - 6
		2.0E	17 - 1	20 - 3	22 - 4	23 - 6	16 - 7	18 - 9	19 - 6	19 - 6

For **SI:** 1 ft = 0.3048 m; 1 inch = 25.4 mm; 1 psf = 47.88 N/m^2.

[1]Values represent simple spans.
[2]Spans are measured from middle of bearing length to middle of bearing length (1 1/2-inch minimum bearing).
[3]Span table is based on 23/32", 24-inch oc-rated Sturd-I-Floor, glued and nailed to BCI Joists. The adhesive must comply with Specification AFG-01 of the APA—The Engineered Wood Association. The type and spacing of the fasteners must comply with the code.
[4]Span table based on 1 1/2-inch end reaction values with no web stiffeners.

TABLE 14—BCI ALLOWABLE FLOOR SPANS[1, 2, 3, 4] (Continued)
(Residential Living Areas, live load = 40 psf, L/360 for live loads, L/240 for total loads)

JOIST SPACING (inches)	SERIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			Joist Depth (inches)							
			9 1/2	11 7/8	14	16	9 1/2	11 7/8	14	16
			Maximum Floor Joist Spans							
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
12	BCI 4500s	1.7E	18 - 5	20 - 11	22 - 9	24 - 3	16 - 10	19 - 1	20 - 9	22 - 2
		1.8E	18 - 10	22 - 0	23 - 11	25 - 6	17 - 8	20 - 0	21 - 10	23 - 4
		1.9E	19 - 0	22 - 6	24 - 9	26 - 5	18 - 3	20 - 9	22 - 7	24 - 1
		2.0E	19 - 4	22 - 10	25 - 11	27 - 9	19 - 3	21 - 9	23 - 8	25 - 4
	BCI 5000s	1.7E	19 - 2	22 - 5	24 - 5	26 - 1	18 - 1	20 - 5	22 - 3	23 - 9
		1.8E	19 - 6	23 - 1	25 - 8	27 - 5	19 - 0	21 - 6	23 - 5	25 - 0
		1.9E	19 - 9	23 - 5	26 - 6	28 - 4	19 - 8	22 - 3	24 - 3	25 - 10
		2.0E	20 - 1	23 - 9	26 - 10	29 - 9	20 - 1	23 - 4	25 - 5	27 - 2
	BCI 6000s	1.7E	19 - 11	23 - 7	26 - 4	28 - 2	19 - 6	22 - 1	24 - 0	25 - 8
		1.8E	20 - 3	23 - 11	27 - 2	29 - 7	20 - 3	23 - 3	25 - 4	27 - 0
		1.9E	20 - 6	24 - 4	27 - 7	30 - 5	20 - 6	24 - 0	26 - 2	27 - 11
		2.0E	20 - 10	24 - 8	28 - 0	30 - 10	20 - 10	24 - 8	27 - 5	29 - 4
	BCI 6500s	1.7E	20 - 6	24 - 4	27 - 5	29 - 7	20 - 6	23 - 3	25 - 4	27 - 0
		1.8E	20 - 10	24 - 7	27 - 11	30 - 9	20 - 10	24 - 5	26 - 7	28 - 5
		1.9E	21 - 1	25 - 0	28 - 3	31 - 3	21 - 1	25 - 0	27 - 6	29 - 5
		2.0E	21 - 5	25 - 4	28 - 8	31 - 8	21 - 5	25 - 4	28 - 8	30 - 10
16	BCI 4500s	1.7E	16 - 0	18 - 1	19 - 8	21 - 0	14 - 7	16 - 6	18 - 0	19 - 2
		1.8E	16 - 9	19 - 0	20 - 8	22 - 1	15 - 4	17 - 4	18 - 11	20 - 2
		1.9E	17 - 4	19 - 8	21 - 5	22 - 10	15 - 10	17 - 11	19 - 6	20 - 10
		2.0E	17 - 8	20 - 8	22 - 6	24 - 0	16 - 8	18 - 10	20 - 6	21 - 11
	BCI 5000s	1.7E	17 - 2	19 - 5	21 - 2	22 - 7	15 - 8	17 - 8	19 - 3	20 - 7
		1.8E	17 - 10	20 - 5	22 - 3	23 - 9	16 - 6	18 - 8	20 - 3	21 - 8
		1.9E	18 - 1	21 - 1	23 - 0	24 - 6	17 - 0	19 - 3	21 - 0	22 - 5
		2.0E	18 - 5	21 - 8	24 - 1	25 - 9	17 - 10	20 - 3	22 - 0	23 - 6
	BCI 6000s	1.7E	18 - 3	20 - 11	22 - 10	24 - 4	16 - 11	19 - 1	20 - 10	22 - 3
		1.8E	18 - 6	21 - 11	24 - 0	25 - 8	17 - 9	20 - 1	21 - 11	23 - 5
		1.9E	18 - 9	22 - 3	24 - 10	26 - 6	18 - 4	20 - 9	22 - 8	24 - 2
		2.0E	19 - 0	22 - 6	25 - 7	27 - 10	19 - 0	21 - 10	23 - 9	25 - 5
	BCI 6500s	1.7E	18 - 9	22 - 1	24 - 0	25 - 8	17 - 9	20 - 1	21 - 11	23 - 5
		1.8E	19 - 0	22 - 6	25 - 3	27 - 0	18 - 8	21 - 2	23 - 1	24 - 8
		1.9E	19 - 3	22 - 10	25 - 10	27 - 11	19 - 3	21 - 11	23 - 10	25 - 5
		2.0E	19 - 7	23 - 2	26 - 3	28 - 11	19 - 7	23 - 0	25 - 0	26 - 9
19.2	BCI 4500s	1.7E	14 - 7	16 - 6	18 - 0	19 - 2	13 - 4	15 - 1	16 - 5	17 - 6
		1.8E	15 - 4	17 - 4	18 - 11	20 - 2	14 - 0	15 - 10	17 - 3	18 - 5
		1.9E	15 - 10	17 - 11	19 - 6	20 - 10	14 - 5	16 - 5	17 - 10	19 - 0
		2.0E	16 - 8	18 - 10	20 - 6	21 - 11	15 - 2	17 - 2	18 - 9	19 - 9
	BCI 5000s	1.7E	15 - 8	17 - 8	19 - 3	20 - 7	14 - 3	16 - 2	17 - 7	18 - 10
		1.8E	16 - 6	18 - 8	20 - 3	21 - 8	15 - 0	17 - 0	18 - 6	19 - 9
		1.9E	17 - 0	19 - 3	21 - 0	22 - 5	15 - 6	17 - 7	19 - 2	19 - 9
		2.0E	17 - 5	20 - 3	22 - 0	23 - 6	16 - 4	18 - 5	19 - 9	19 - 9
	BCI 6000	1.7E	16 - 11	19 - 1	20 - 10	22 - 3	15 - 5	17 - 5	19 - 0	20 - 4
		1.8E	17 - 6	20 - 1	21 - 11	23 - 5	16 - 2	18 - 4	20 - 0	21 - 4
		1.9E	17 - 9	20 - 9	22 - 8	24 - 2	16 - 9	19 - 0	20 - 8	22 - 1
		2.0E	18 - 0	21 - 3	23 - 9	25 - 5	17 - 7	19 - 11	21 - 8	23 - 2
	BCI 6500s	1.7E	17 - 9	20 - 1	21 - 11	23 - 5	16 - 3	18 - 4	20 - 0	21 - 4
		1.8E	18 - 0	21 - 2	23 - 1	24 - 8	17 - 1	19 - 4	21 - 0	22 - 6
		1.9E	18 - 2	21 - 7	23 - 10	25 - 5	17 - 7	20 - 0	21 - 9	23 - 3
		2.0E	18 - 6	21 - 11	24 - 9	26 - 9	18 - 6	21 - 0	22 - 10	24 - 5
24	BCI 4500s	1.7E	13 - 0	14 - 9	16 - 1	17 - 2	11 - 11	13 - 6	14 - 8	15 - 8
		1.8E	13 - 8	15 - 6	16 - 11	18 - 1	12 - 6	14 - 2	15 - 5	15 - 10
		1.9E	14 - 2	16 - 1	17 - 6	18 - 8	12 - 11	14 - 8	15 - 10	15 - 10
		2.0E	14 - 10	16 - 10	18 - 4	19 - 0	13 - 7	15 - 4	15 - 10	15 - 10
	BCI 5000s	1.7E	14 - 0	15 - 10	17 - 3	18 - 5	12 - 9	14 - 5	15 - 9	15 - 10
		1.8E	14 - 9	16 - 8	18 - 2	19 - 0	13 - 5	15 - 2	15 - 10	15 - 10
		1.9E	15 - 2	17 - 3	18 - 9	19 - 0	13 - 10	15 - 9	15 - 10	15 - 10
		2.0E	16 - 0	18 - 1	19 - 0	19 - 0	14 - 7	15 - 10	15 - 10	15 - 10
	BCI 6000	1.7E	15 - 1	17 - 1	18 - 7	19 - 11	13 - 9	15 - 7	17 - 0	18 - 2
		1.8E	15 - 10	18 - 0	19 - 7	20 - 11	14 - 6	16 - 5	17 - 10	19 - 1
		1.9E	16 - 5	18 - 7	20 - 3	21 - 8	15 - 0	17 - 0	18 - 6	19 - 6
		2.0E	16 - 9	19 - 6	21 - 3	22 - 9	15 - 9	17 - 10	19 - 5	19 - 6
	BCI 6500s	1.7E	15 - 11	18 - 0	19 - 7	20 - 11	14 - 6	16 - 5	17 - 11	19 - 1
		1.8E	16 - 8	18 - 11	20 - 7	22 - 0	15 - 3	17 - 3	18 - 10	19 - 6
		1.9E	17 - 0	19 - 7	21 - 4	22 - 9	15 - 9	17 - 10	19 - 5	19 - 6
		2.0E	17 - 3	20 - 5	22 - 4	23 - 6	16 - 7	18 - 9	19 - 6	19 - 6

For **SI:** 1 ft = 0.3048 m; 1 inch = 25.4 mm; 1 psf = 47.88 N/m^2.

[1]Values represent simple spans.
[2]Spans are measured from middle of bearing length to middle of bearing length (1 1/2-inch minimum bearing).
[3]Span table is based on 23/32", 24-inch oc rated Sturd-I-Floor, glued and nailed to BCI Joists. The adhesive must comply with Specification AFG-01 of the APA—The Engineered Wood Association. The type and spacing of the fasteners must comply with the code.
[4]Span table based on 1 1/2-inch end reaction values with no web stiffeners.

TABLE 14—BCI ALLOWABLE FLOOR SPANS[1, 2, 3, 4] (Continued)
(Residential Living Areas, live load = 40 psf, L/360 for live loads, L/240 for total loads)

JOIST SPACING (inches)	SERIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			Joist Depth (inches)							
			9 1/2	11 7/8	14	16	9 1/2	11 7/8	14	16
			Maximum Floor Joist Spans							
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
12	BCI 50	1.7E	20 - 0	23 - 9	26 - 11	29 - 10	20 - 0	23 - 5	25 - 7	27 - 4
		1.8E	20 - 4	24 - 1	27 - 4	30 - 3	20 - 4	24 - 1	26 - 10	28 - 9
		1.9E	20 - 7	24 - 6	27 - 9	30 - 8	20 - 7	24 - 6	27 - 9	29 - 9
		2.0E	20 - 11	24 - 10	28 - 2	31 - 2	20 - 11	24 - 10	28 - 2	31 - 2
	BCI 60	1.7E	20 - 11	24 - 9	28 - 1	31 - 0	20 - 11	24 - 9	27 - 7	29 - 6
		1.8E	21 - 2	25 - 1	28 - 6	31 - 6	21 - 2	25 - 1	28 - 6	31 - 0
		1.9E	21 - 7	25 - 6	28 - 11	32 - 0	21 - 7	25 - 6	28 - 11	32 - 0
		2.0E	21 - 10	25 - 10	29 - 4	32 - 5	21 - 10	25 - 10	29 - 4	32 - 5
	BCI 65	1.7E	21 - 5	25 - 5	28 - 9	31 - 10	21 - 5	25 - 5	28 - 9	31 - 0
		1.8E	21 - 10	25 - 10	29 - 3	32 - 4	21 - 10	25 - 10	29 - 3	32 - 4
		1.9E	22 - 1	26 - 2	29 - 8	32 - 10	22 - 1	26 - 2	29 - 8	32 - 10
		2.0E	22 - 5	26 - 7	30 - 2	33 - 3	22 - 5	26 - 7	30 - 2	33 - 3
	BCI 90	1.7E	23 - 5	27 - 9	31 - 6	34 - 9	23 - 5	27 - 9	31 - 6	34 - 9
		1.8E	23 - 10	28 - 3	32 - 0	35 - 4	23 - 10	28 - 3	32 - 0	35 - 4
		1.9E	24 - 3	28 - 9	32 - 6	35 - 11	24 - 3	28 - 9	32 - 6	35 - 11
		2.0E	24 - 6	29 - 2	33 - 0	36 - 6	24 - 6	29 - 2	33 - 0	36 - 6
16	BCI 50	1.7E	18 - 4	21 - 9	24 - 3	25 - 11	17 - 9	20 - 3	22 - 1	23 - 8
		1.8E	18 - 7	22 - 1	25 - 0	27 - 3	18 - 7	21 - 4	23 - 3	24 - 11
		1.9E	18 - 11	22 - 5	25 - 5	28 - 1	18 - 11	22 - 0	24 - 1	25 - 7
		2.0E	19 - 2	22 - 9	25 - 9	28 - 6	19 - 2	22 - 9	25 - 3	25 - 7
	BCI 60	1.7E	19 - 1	22 - 7	25 - 8	28 - 0	19 - 1	21 - 10	23 - 10	25 - 6
		1.8E	19 - 4	23 - 0	26 - 1	28 - 10	19 - 4	23 - 0	25 - 1	26 - 10
		1.9E	19 - 9	23 - 4	26 - 5	29 - 3	19 - 9	23 - 4	25 - 11	27 - 9
		2.0E	19 - 11	23 - 7	26 - 10	29 - 7	19 - 11	23 - 7	26 - 10	29 - 2
	BCI 65	1.7E	19 - 7	23 - 3	26 - 4	29 - 1	19 - 7	23 - 0	25 - 1	26 - 10
		1.8E	19 - 11	23 - 7	26 - 9	29 - 7	19 - 11	23 - 7	26 - 5	28 - 3
		1.9E	20 - 2	23 - 11	27 - 1	30 - 0	20 - 2	23 - 11	27 - 1	29 - 2
		2.0E	20 - 6	24 - 4	27 - 6	30 - 5	20 - 6	24 - 4	27 - 6	29 - 4
	BCI 90	1.7E	21 - 5	25 - 4	28 - 9	31 - 9	21 - 5	25 - 4	28 - 9	31 - 7
		1.8E	21 - 9	25 - 9	29 - 2	32 - 3	21 - 9	25 - 9	29 - 2	32 - 3
		1.9E	22 - 1	26 - 2	29 - 8	32 - 9	22 - 1	26 - 2	29 - 8	32 - 9
		2.0E	22 - 4	26 - 7	30 - 1	33 - 3	22 - 4	26 - 7	30 - 1	33 - 3
19.2	BCI 50	1.7E	17 - 4	20 - 3	22 - 1	23 - 8	16 - 3	18 - 6	20 - 2	21 - 4
		1.8E	17 - 7	20 - 11	23 - 3	24 - 11	17 - 1	19 - 5	21 - 3	21 - 4
		1.9E	17 - 10	21 - 3	24 - 0	25 - 7	17 - 8	20 - 1	21 - 4	21 - 4
		2.0E	18 - 1	21 - 6	24 - 4	25 - 7	18 - 1	21 - 1	21 - 4	21 - 4
	BCI 60	1.7E	18 - 1	21 - 5	23 - 10	25 - 6	17 - 6	19 - 11	21 - 9	23 - 4
		1.8E	18 - 4	21 - 8	24 - 7	26 - 10	18 - 4	21 - 0	22 - 11	24 - 5
		1.9E	18 - 8	22 - 0	25 - 0	27 - 7	18 - 8	21 - 8	23 - 8	24 - 5
		2.0E	18 - 10	22 - 4	25 - 4	28 - 0	18 - 10	22 - 4	24 - 5	24 - 5
	BCI 65	1.7E	18 - 6	21 - 11	24 - 10	26 - 10	18 - 5	21 - 0	22 - 11	24 - 5
		1.8E	18 - 10	22 - 4	25 - 3	27 - 11	18 - 10	22 - 1	24 - 1	24 - 5
		1.9E	19 - 1	22 - 7	25 - 7	28 - 4	19 - 1	22 - 7	24 - 5	24 - 5
		2.0E	19 - 4	22 - 11	26 - 0	28 - 8	19 - 4	22 - 11	24 - 5	24 - 5
	BCI 90	1.7E	20 - 2	23 - 11	27 - 1	29 - 11	20 - 2	23 - 11	26 - 11	28 - 10
		1.8E	20 - 7	24 - 4	27 - 6	30 - 5	20 - 7	24 - 4	27 - 6	30 - 4
		1.9E	20 - 11	24 - 9	27 - 11	30 - 11	20 - 11	24 - 9	27 - 11	30 - 8
		2.0E	21 - 1	25 - 1	28 - 4	31 - 4	21 - 1	25 - 1	28 - 4	30 - 8
24	BCI 50	1.7E	15 - 11	18 - 1	19 - 9	20 - 6	14 - 6	16 - 6	17 - 0	17 - 0
		1.8E	16 - 6	19 - 1	20 - 6	20 - 6	15 - 3	17 - 0	17 - 0	17 - 0
		1.9E	16 - 8	19 - 8	20 - 6	20 - 6	15 - 9	17 - 0	17 - 0	17 - 0
		2.0E	16 - 11	20 - 0	20 - 6	20 - 6	16 - 7	17 - 0	17 - 0	17 - 0
	BCI 60	1.7E	16 - 11	19 - 6	21 - 4	22 - 10	15 - 8	17 - 10	19 - 6	19 - 6
		1.8E	17 - 1	20 - 3	22 - 5	23 - 6	16 - 6	18 - 9	19 - 6	19 - 6
		1.9E	17 - 5	20 - 7	23 - 2	23 - 6	17 - 0	19 - 4	19 - 6	19 - 6
		2.0E	17 - 7	20 - 10	23 - 6	23 - 6	17 - 7	19 - 6	19 - 6	19 - 6
	BCI 65	1.7E	17 - 4	20 - 6	22 - 5	23 - 6	16 - 6	18 - 9	19 - 6	19 - 6
		1.8E	17 - 7	20 - 10	23 - 6	23 - 6	17 - 4	19 - 6	19 - 6	19 - 6
		1.9E	17 - 10	21 - 1	23 - 6	23 - 6	17 - 10	19 - 6	19 - 6	19 - 6
		2.0E	18 - 1	21 - 5	23 - 6	23 - 6	18 - 1	19 - 6	19 - 6	19 - 6
	BCI 90	1.7E	18 - 10	22 - 4	25 - 3	27 - 11	18 - 10	22 - 1	24 - 1	24 - 6
		1.8E	19 - 2	22 - 8	25 - 8	28 - 4	19 - 2	22 - 8	24 - 2	24 - 6
		1.9E	19 - 5	23 - 0	26 - 0	28 - 9	19 - 5	23 - 0	24 - 2	24 - 6
		2.0E	19 - 8	23 - 4	26 - 5	29 - 2	19 - 6	23 - 4	24 - 2	24 - 6

For **SI:** 1 ft = 0.3048 m; 1 inch = 25.4 mm; 1 psf = 47.88 N/m^2.

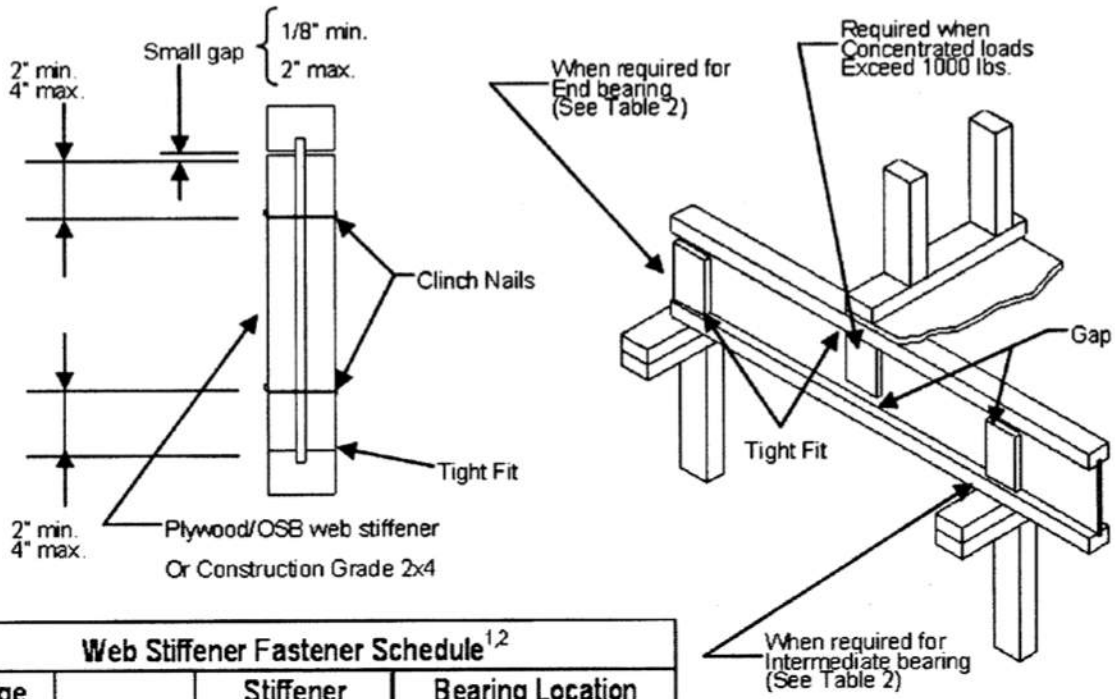
[1]Values represent simple spans.
[2]Spans are measured from middle of bearing length to middle of bearing length (1 1/2-inch minimum bearing).
[3]Span table is based on 23/32", 24-inch oc rated Sturd-I-Floor, glued and nailed to BCI Joists. The adhesive must comply with Specification AFG-01 of the APA—The Engineered Wood Association. The type and spacing of the fasteners must comply with the code.
[4]Span table based on 1 1/2-inch end reaction values with no web stiffeners.

TABLE 14—BCI ALLOWABLE FLOOR SPANS[1, 2, 3, 4] (Continued)
(Residential Living Areas, live load = 40 psf, L/360 for live loads, L/240 for total loads)

JOIST SPACING (inches)	SERIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			Joist Depth (inches)							
			9 1/2	11 7/8	14	16	9 1/2	11 7/8	14	16
			Maximum Floor Joist Spans							
			(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)	(ft. - in.)
12	BCI 50s	1.7E	20 - 4	24 - 0	27 - 3	30 - 0	20 - 4	23 - 5	25 - 7	27 - 4
		1.8E	20 - 7	24 - 5	27 - 8	30 - 8	20 - 7	24 - 5	26 - 10	28 - 9
		1.9E	20 - 11	24 - 10	28 - 2	31 - 1	20 - 11	24 - 10	27 - 9	29 - 9
		2.0E	21 - 2	25 - 1	28 - 6	31 - 6	21 - 2	25 - 1	28 - 6	31 - 3
	BCI 60s	1.7E	21 - 2	25 - 0	28 - 4	31 - 5	21 - 2	25 - 0	27 - 7	29 - 6
		1.8E	21 - 5	25 - 5	28 - 9	31 - 10	21 - 5	25 - 5	28 - 9	31 - 0
		1.9E	21 - 10	25 - 10	29 - 3	32 - 4	21 - 10	25 - 10	29 - 3	32 - 1
		2.0E	22 - 1	26 - 2	29 - 8	32 - 10	22 - 1	26 - 2	29 - 8	32 - 10
	BCI 65s	1.7E	21 - 8	25 - 9	29 - 2	32 - 3	21 - 8	25 - 9	29 - 0	31 - 0
		1.8E	22 - 1	26 - 1	29 - 7	32 - 9	22 - 1	26 - 1	29 - 7	32 - 7
		1.9E	22 - 5	26 - 6	30 - 1	33 - 3	22 - 5	26 - 6	30 - 1	33 - 3
		2.0E	22 - 9	26 - 11	30 - 6	33 - 9	22 - 9	26 - 11	30 - 6	33 - 9
	BCI 90s	1.7E	23 - 9	28 - 2	31 - 11	35 - 3	23 - 9	28 - 2	31 - 11	35 - 3
		1.8E	24 - 1	28 - 7	32 - 5	35 - 10	24 - 1	28 - 7	32 - 5	35 - 10
		1.9E	24 - 6	29 - 1	32 - 11	36 - 5	24 - 6	29 - 1	32 - 11	36 - 5
		2.0E	24 - 11	29 - 6	33 - 5	36 - 11	24 - 11	29 - 6	33 - 5	36 - 11
16	BCI 50s	1.7E	18 - 7	22 - 0	24 - 3	25 - 11	17 - 9	20 - 3	22 - 1	23 - 8
		1.8E	18 - 11	22 - 4	25 - 4	27 - 3	18 - 9	21 - 4	23 - 3	24 - 11
		1.9E	19 - 2	22 - 9	25 - 9	28 - 2	19 - 2	22 - 0	24 - 1	25 - 7
		2.0E	19 - 4	23 - 0	26 - 1	28 - 10	19 - 4	23 - 0	25 - 3	25 - 7
	BCI 60s	1.7E	19 - 4	22 - 11	25 - 11	28 - 0	19 - 2	21 - 10	23 - 10	25 - 6
		1.8E	19 - 7	23 - 3	26 - 4	29 - 1	19 - 7	23 - 0	25 - 1	26 - 10
		1.9E	19 - 11	23 - 7	26 - 9	29 - 7	19 - 11	23 - 7	25 - 11	27 - 9
		2.0E	20 - 2	23 - 11	27 - 1	30 - 0	20 - 2	23 - 11	27 - 1	29 - 2
	BCI 65s	1.7E	19 - 10	23 - 6	26 - 8	29 - 5	19 - 10	23 - 0	25 - 1	26 - 10
		1.8E	20 - 2	23 - 10	27 - 1	29 - 11	20 - 2	23 - 10	26 - 5	28 - 3
		1.9E	20 - 6	24 - 3	27 - 6	30 - 4	20 - 6	24 - 3	27 - 3	29 - 2
		2.0E	20 - 10	24 - 7	27 - 10	30 - 10	20 - 10	24 - 7	27 - 10	29 - 4
	BCI 90s	1.7E	21 - 8	25 - 8	29 - 1	32 - 1	21 - 8	25 - 8	29 - 1	31 - 7
		1.8E	22 - 0	26 - 1	29 - 6	32 - 8	22 - 0	26 - 1	29 - 6	32 - 8
		1.9E	22 - 4	26 - 6	30 - 0	33 - 2	22 - 4	26 - 6	30 - 0	33 - 2
		2.0E	22 - 9	26 - 11	30 - 5	33 - 8	22 - 9	26 - 11	30 - 5	33 - 8
19.2	BCI 50s	1.7E	17 - 7	20 - 3	22 - 1	23 - 8	16 - 3	18 - 6	20 - 2	21 - 4
		1.8E	17 - 10	21 - 2	23 - 3	24 - 11	17 - 1	19 - 5	21 - 3	21 - 4
		1.9E	18 - 1	21 - 6	24 - 1	25 - 7	17 - 8	20 - 1	21 - 4	21 - 4
		2.0E	18 - 4	21 - 9	24 - 7	25 - 7	18 - 4	21 - 1	21 - 4	21 - 4
	BCI 60s	1.7E	18 - 4	21 - 8	23 - 10	25 - 6	17 - 6	19 - 11	21 - 9	23 - 4
		1.8E	18 - 6	21 - 11	24 - 10	26 - 10	18 - 5	21 - 0	22 - 11	24 - 5
		1.9E	18 - 10	22 - 4	25 - 3	27 - 9	18 - 10	21 - 8	23 - 8	24 - 5
		2.0E	19 - 1	22 - 7	25 - 7	28 - 4	19 - 1	22 - 7	24 - 5	24 - 5
	BCI 65s	1.7E	18 - 9	22 - 3	25 - 1	26 - 10	18 - 5	21 - 0	22 - 11	24 - 5
		1.8E	19 - 1	22 - 6	25 - 7	28 - 3	19 - 1	22 - 1	24 - 1	24 - 5
		1.9E	19 - 4	22 - 11	25 - 11	28 - 8	19 - 4	22 - 10	24 - 5	24 - 5
		2.0E	19 - 8	23 - 3	26 - 4	29 - 1	19 - 8	23 - 3	24 - 5	24 - 5
	BCI 90s	1.7E	20 - 5	24 - 3	27 - 5	30 - 4	20 - 5	24 - 3	26 - 11	28 - 10
		1.8E	20 - 10	24 - 7	27 - 10	30 - 10	20 - 10	24 - 7	27 - 10	30 - 4
		1.9E	21 - 1	25 - 0	28 - 4	31 - 3	21 - 1	25 - 0	28 - 4	30 - 8
		2.0E	21 - 5	25 - 5	28 - 8	31 - 9	21 - 5	25 - 5	28 - 8	30 - 8
24	BCI 50s	1.7E	15 - 11	18 - 1	19 - 9	20 - 6	14 - 6	16 - 6	17 - 0	17 - 0
		1.8E	16 - 8	19 - 1	20 - 6	20 - 6	15 - 3	17 - 0	17 - 0	17 - 0
		1.9E	16 - 11	19 - 8	20 - 6	20 - 6	15 - 9	17 - 0	17 - 0	17 - 0
		2.0E	17 - 1	20 - 3	20 - 6	20 - 6	16 - 7	17 - 0	17 - 0	17 - 0
	BCI 60s	1.7E	17 - 1	19 - 6	21 - 4	22 - 10	15 - 8	17 - 10	19 - 6	19 - 6
		1.8E	17 - 4	20 - 6	22 - 5	23 - 6	16 - 6	18 - 9	19 - 6	19 - 6
		1.9E	17 - 7	20 - 10	23 - 2	23 - 6	17 - 0	19 - 4	19 - 6	19 - 6
		2.0E	17 - 10	21 - 1	23 - 6	23 - 6	17 - 10	19 - 6	19 - 6	19 - 6
	BCI 65s	1.7E	17 - 6	20 - 6	22 - 5	23 - 6	16 - 6	18 - 9	19 - 6	19 - 6
		1.8E	17 - 9	21 - 0	23 - 6	23 - 6	17 - 4	19 - 6	19 - 6	19 - 6
		1.9E	18 - 1	21 - 4	23 - 6	23 - 6	17 - 11	19 - 6	19 - 6	19 - 6
		2.0E	18 - 4	21 - 8	23 - 6	23 - 6	18 - 4	19 - 6	19 - 6	19 - 6
	BCI 90s	1.7E	19 - 1	22 - 7	25 - 7	28 - 3	19 - 1	22 - 1	24 - 1	24 - 6
		1.8E	19 - 5	22 - 11	25 - 11	28 - 8	19 - 5	22 - 11	24 - 2	24 - 6
		1.9E	19 - 8	23 - 3	26 - 4	29 - 1	19 - 6	23 - 3	24 - 2	24 - 6
		2.0E	20 - 0	23 - 8	26 - 9	29 - 6	19 - 6	23 - 8	24 - 2	24 - 6

For **SI:** 1 ft = 0.3048 m; 1 inch = 25.4 mm; 1 psf = 47.88 N/m^2.

[1]Values represent simple spans.
[2]Spans are measured from middle of bearing length to middle of bearing length (1 1/2-inch minimum bearing).
[3]Span table is based on 23/32", 2-inch oc rated Sturd-I-Floor, glued and nailed to BCI Joists. The adhesive must comply with Specification AFG-01 of the APA—The Engineered Wood Association. The type and spacing of the fasteners must comply with the code.
[4]Span table based on 1 1/2-inch end reaction values with no web stiffeners.

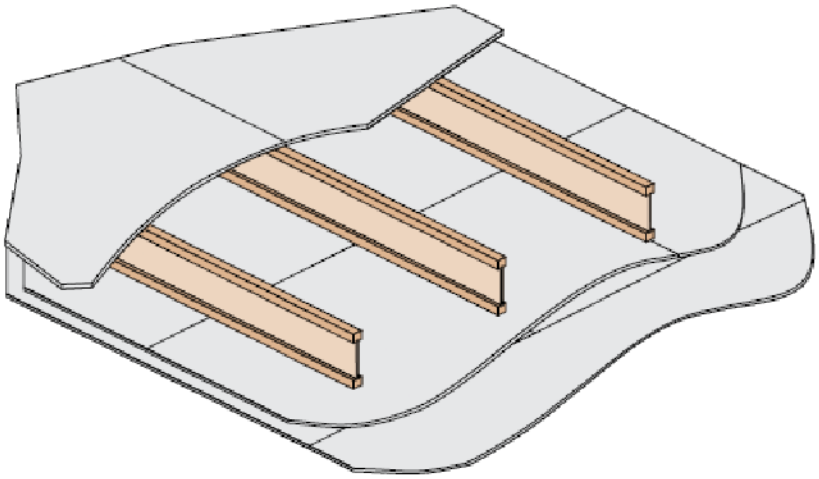


Web Stiffener Fastener Schedule[1,2]				
Flange Width	Depth	Stiffener Dimensions	Bearing Location	
			End	Interm.
1 1/2"	9 1/2"	1/2" x 2 5/16"	2-8d	2-8d
	11 7/8"		2-8d	3-8d
	14"		2-8d	5-8d
1 3/4" & 2"	9 1/2"	5/8" x 2 5/16"	2-8d	2-8d
	11 7/8"		2-8d	3-8d
	14"		2-8d	5-8d
	16"		2-8d	6-8d
2 5/16" & 2 9/16"	9 1/2"	3/4" x 2 5/16"	2-8d	2-8d
	11 7/8"		2-8d	3-8d
	14"		2-8d	5-8d
	16"		2-8d	6-8d
	18"		3-8d	7-8d
	20"		3-8d	8-8d
3 1/2"	9 1/2"	1 1/2" x 3 1/2"	2-16d	2-16d
	11 7/8"		3-16d	3-16d
	14"		5-16d	5-16d
	16"		6-16d	6-16d
	18"		7-16d	7-16d
	20"		8-16d	8-16d
	22"		8-16d	8-16d
	24"		8-16d	8-16d

[1]Nails shall be equally spaced vertically.

[2]Stiffeners are required on all joists supported by U-type hangers when the sides of the hanger do not extend up far enough to support the top flanges laterally.

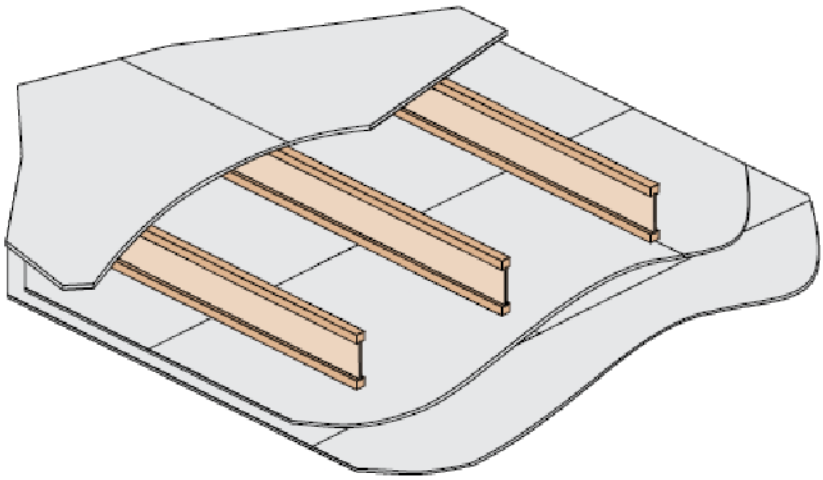
FIGURE 1—WEB STIFFENER DETAIL



BASE ASSEMBLY	
Component	**Material Specification**
Floor Topping (Optional)	**Varies**
Reference sound ratings if applicable	
Floor Sheathing	**Min. $^{23}/_{32}$-inch (18 mm) T&G Wood Structural Panel**
A modified contact construction adhesive must be applied to the top surface of the I-joist top flanges prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joists centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.	
Insulation (Optional)	**Max 9$^{1}/_{2}$-inch (241 mm) Glass Fiber Insulation**
Reference sound ratings if applicable	
Structural Members	**Min. 9$^{1}/_{2}$-inch (241 mm) Deep Joists**
Maximum 24 inch (610 mm) on center spacing. Minimum flange dimensions of 1$^{1}/_{8}$-inch (29 mm) thick by 1$^{1}/_{2}$-inch (38 mm) wide.	
Resilient Channels (Optional)	**Min. 0.019-inch (0.5 mm) Galvanized Resilient Channels**
Attached perpendicular to the bottom flange of the joist with 1$^{1}/_{4}$-inch (32 mm) Type S drywall screws. Channels are spaced a maximum of 16 inches (406 mm), 24 inches (610 mm) on center when I-joists are spaced a maximum of 16 inches on center.	
Ceiling	**(2) Layers of $^{5}/_{8}$-inch (16 mm) Type X Gypsum Wallboard**
Base Layer: Install with long dimension perpendicular to joist length. Attach to the bottom flange of the joists using 1$^{1}/_{4}$-inch (32 mm) Type W drywall screws at 24 inches (610 mm) on center. The end joints of the wallboard must be centered on the bottom flange of the joist and must be staggered the equivalent of two joist spacings with those of adjacent sheets. Face Layer: Install with long dimension perpendicular to joist length. Attach to the bottom flange of the joists through the first layer using 1$^{7}/_{8}$-inch (48 mm) Type W drywall screws spaced at 12 inches (305 mm) on center. The longitudinal joints of this layer must be offset 24 inches (610 mm) from those of the base layer. The end joints must be centered on the bottom flange of the joists and offset a minimum of one joist spacing from those of the base layer. Additionally, face layer end joints are attached to the base layer with 1$^{1}/_{2}$-inch (38 mm) Type G drywall screws at 12 inches (305 mm) on center placed 2 inches (51 mm) either side of the joint. With Resilient Channels: attached as described above except use 1$^{1}/_{8}$-inch (29 mm) and 1$^{5}/_{8}$-inch (41 mm) Type S screws for the base and face layer, respectively. The end joints of the wallboard must be centered on a resilient channel and must be staggered the equivalent of two joist spacings with those of adjacent sheets. Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.	

SOUND RATING (w/ Resilient Channels)		
Components	**STC**	**IIC**
Base Assembly with Carpet and Padding	54	68
Base Assembly with 3$^{1}/_{2}$" (89 mm) Insulation	55	46
Base Assembly with additional layer of $^{5}/_{8}$" Sheathing and 9$^{1}/_{2}$" Insulation	61	50
Base Assembly with Tarkett "Acoustiflor" vinyl and 3$^{1}/_{2}$" Insulation	59	50
Base Assembly with cushioned vinyl, $^{3}/_{4}$" Gypsum Concrete and 3$^{1}/_{2}$" Insulation	67	51

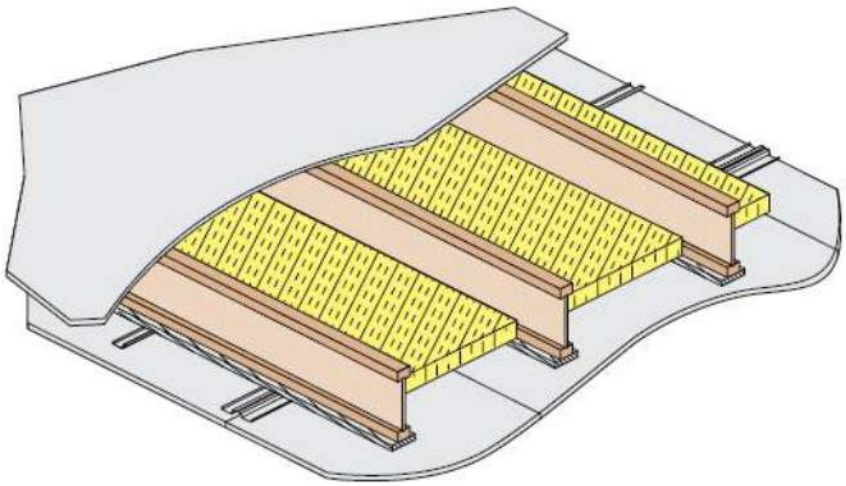
FIGURE 2—ONE-HOUR FIRE-RESISTANCE-RATED FLOOR AND ROOF ASSEMBLY
(Two Layers $^{5}/_{8}$" Type X Gypsum Wallboard)



BASE ASSEMBLY	
Component	**Material Specification**
Floor Topping (Optional)	**Varies**
Reference sound ratings if applicable.	
Floor Sheathing	**Min. $^{23}/_{32}$-inch (18 mm) T&G Wood Structural Panel**
A modified contact construction adhesive must be applied to the top surface of the I-joist top flanges prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joists centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.	
Insulation (Optional)	**Max 9$^1/_2$-inch (241 mm) Glass Fiber Insulation**
Reference sound ratings if applicable.	
Structural Members	**Min. 9$^1/_2$-inch (241 mm) Deep Joists**
Maximum 24 inch (610 mm) on center spacing. Minimum flange dimensions of 1$^1/_8$-inch (29 mm) thick by 1$^1/_2$-inch (38 mm) wide.	
Resilient Channels (Optional)	**Min. 0.019-inch (0.5 mm) Galvanized Resilient Channels**
Attached perpendicular to the bottom flange of the joist with 1$^1/_4$-inch (32 mm) Type S drywall screws. Channels are spaced a maximum of 16 inches (406 mm), 24 inches (610 mm) on center when I-joists are spaced a maximum of 16 inches on center.	
Ceiling	**(2) Layers of ½-inch (13 mm) Gold Bond Brand Fire-Shield C Gypsum Wallboard**
Base Layer: Install with long dimension perpendicular to joist length. Attach to the bottom flange of the joists using 1$^3/_4$-inch (44 mm) Type W or S drywall screws at 12 inches (305 mm) on center. The end joints of the wallboard must be centered on the bottom flange of the joist and must be staggered the equivalent of two joist spacings with those of adjacent sheets. Face Layer: Install with long dimension perpendicular to joist length. Attach to the bottom flange of the joists through the first layer using 2-inch (51 mm) Type W or S drywall screws spaced at 12 inches (305 mm) on center on intermediate joists and 6 inches (152 mm) on center at end joints. The longitudinal joints of this layer must be offset 24 inches (610 mm) from those of the base layer. The end joints must be centered on the bottom flange of the joists and offset a minimum of one joist spacing from those of the base layer. Additionally, face layer end joints are attached to the base layer with 1$^1/_2$-inch (38 mm) Type G drywall screws at 12 inches (305 mm) on center placed 1 ¾ inches (44 mm) either side of the joint. With Resilient Channels: attached as described above except use 1-inch (25 mm) and 1$^5/_8$-inch (41 mm) Type S screws for the base and face layer, respectively. The end joints of the wallboard must be centered on a resilient channel and must be staggered the equivalent of two joist spacings with those of adjacent sheets. Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.	

SOUND RATING (w/ Resilient Channels)		
Components	**STC**	**IIC**
Base Assembly with Carpet and Padding	54	68
Base Assembly with 3$^1/_2$" (89 mm) Insulation	55	46
Base Assembly with additional layer of $^5/_8$" Sheathing and 9$^1/_2$" Insulation	61	50
Base Assembly with Tarkett "Acoustiflor" vinyl and 3$^1/_2$" Insulation	59	50
Base Assembly with cushioned vinyl, $^3/_4$" Gypsum Concrete and 3$^1/_2$" Insulation	67	51

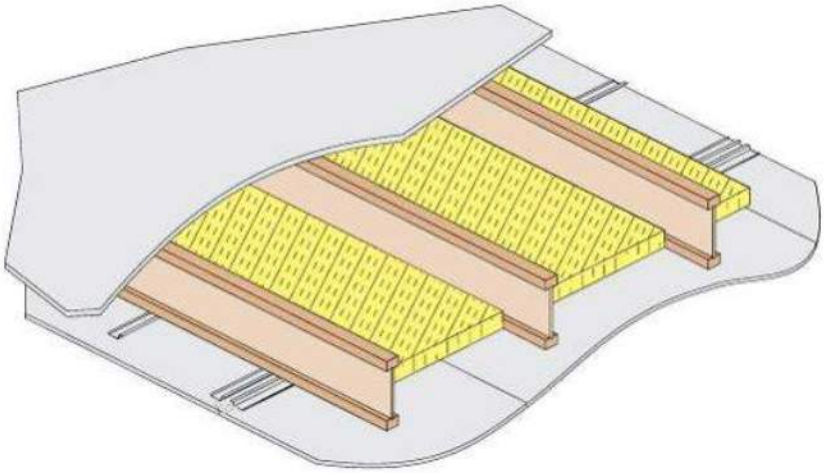
FIGURE 3—ONE-HOUR FIRE-RESISTANCE-RATED FLOOR AND ROOF ASSEMBLY (Two Layers $^1/_2$" 'Type C' Gypsum Wallboard)



BASE ASSEMBLY	
Component	**Material Specification**
Floor Topping (Optional)	**Varies**
Reference sound ratings if applicable	
Floor Sheathing	**Min. $^{23}/_{32}$-inch (18 mm) T&G Wood Structural Panel**
A modified contact construction adhesive must be applied to the top surface of the I-joist top flanges prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joists centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.	
Insulation	**Min. 2-inch (51 mm) Mineral Fiber Insulation, Min. 3.5 pcf**
Installed adjacent to the bottom flange of the I-Joist and supported by the 1x4 furring strips. The ends of the batts must be centered over resilient channels.	
Structural Members	**Min. 9$^{1}/_{2}$-inch (241 mm) Deep Joists**
Maximum 24 inch (610 mm) on center spacing. Minimum flange dimensions of 1$^{5}/_{16}$-inch (33 mm) thick by 1$^{3}/_{4}$-inch (44 mm) wide.	
Furring Strips	**1x4 (Nominal) Wood Furring Strips**
Centered on the bottom flange of the I-Joist and attached with 1$^{1}/_{2}$-inch (38 mm) Type W screws at 24 inches (610 mm) on center	
Resilient Channels	**Min. 0.019-inch (0.5 mm) Galvanized Resilient Channels**
Attached perpendicular to the bottom flange of the I-Joist with 1$^{7}/_{8}$-inch (48 mm) Type S drywall screws. Channels are spaced a maximum of 16 inches (406 mm) on center and doubled at each wallboard end joint extending to the next joist beyond each joint.	
Ceiling	**(1) Layer of $^{5}/_{8}$-inch (16 mm) Gold Bond Brand Fire-Shield C Gypsum Wallboard**
Installed with long dimension perpendicular to resilient channels and fastened with minimum 1$^{1}/_{8}$-inch (29 mm) Type S drywall screws at 7 inches (178 mm) on center. The end joints of the wallboard must be staggered the equivalent of two joist spacings with those of adjacent sheets. Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.	

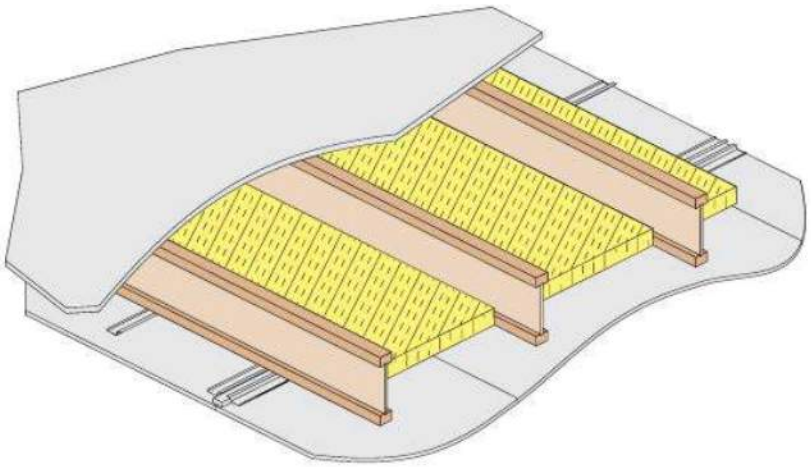
SOUND RATING		
Components	**STC**	**IIC**
Base Assembly with Carpet and Padding	52	66
Base Assembly with cushioned vinyl, $^{3}/_{4}$" Gypsum Concrete	55	49
Base Assembly With cushioned vinyl, 1" Gypsum Concrete, $^{1}/_{4}$" Acousti-Mat II	58	57

FIGURE 4—ONE-HOUR FIRE-RESISTANCE-RATED FLOOR AND ROOF ASSEMBLY (One Layer $^{5}/_{8}$" 'Type C' Gypsum Wallboard and 1x4 Furring Strips)



BASE ASSEMBLY	
Component	**Material Specification**
Floor Topping (Optional)	**Varies**
Reference sound ratings if applicable	
Floor Sheathing	**Min. $^{23}/_{32}$-inch (18 mm) T&G Wood Structural Panel**
A modified contact construction adhesive must be applied to the top surface of the I-joist top flanges prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joists centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.	
Insulation	**Min. $1^{1}/_{2}$-inch (38 mm) Mineral Fiber Insulation, Min. 2.8 pcf**
Installed adjacent to the bottom flange of the I-Joist and supported by the furring channels. The ends of the batts shall be centered over resilient channels.	
Structural Members	**Min. $9^{1}/_{2}$-inch (241 mm) Deep Joists**
Maximum 24 inch (610 mm) on center spacing. Minimum flange dimensions of $1^{1}/_{2}$-inch (38 mm) thick by $3^{1}/_{2}$-inch (89 mm) wide.	
Resilient Channels	**Min. 0.019-inch (0.5 mm) Resilient Channels**
Attached perpendicular to the bottom flange of the I-Joist with $1^{5}/_{8}$-inch (41 mm) Type S drywall screws. Channels are spaced a maximum of 16 inches (406 mm) on center and doubled at each wallboard end joint extending to the next joist beyond each joint.	
Ceiling	**(1) Layer of $^{5}/_{8}$-inch (16 mm) Gold Bond Brand Fire-Shield C Gypsum Wallboard**
Installed with long dimension perpendicular to resilient channels and fastened with minimum $1^{1}/_{8}$-inch (29 mm) Type S drywall screws spaced at 8 inches (203 mm) on center. The end joints of the wallboard must be staggered the equivalent of two joist spacings with those of adjacent sheets. Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.	

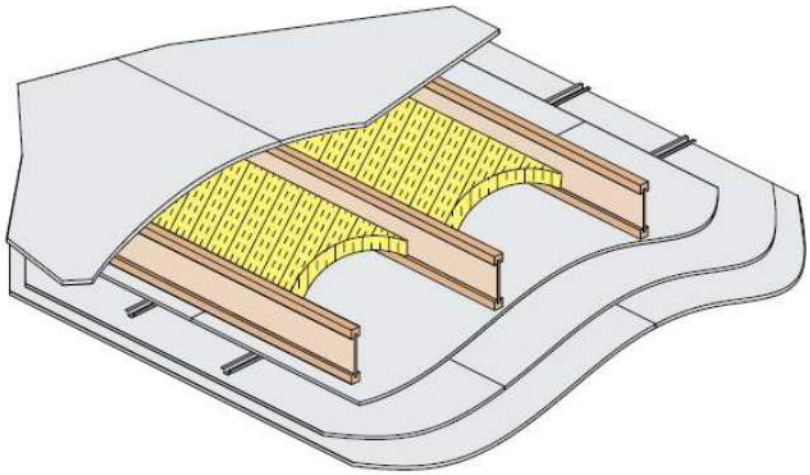
FIGURE 5—ONE-HOUR FIRE-RESISTANCE-RATED FLOOR AND ROOF ASSEMBLY
(One Layer $^{5}/_{8}$" 'Type C' Gypsum Wallboard)



BASE ASSEMBLY	
Component	**Material Specification**
Floor Topping (Optional)	**Varies**
Reference sound ratings if applicable	
Floor Sheathing	**Min. $^{23}/_{32}$-inch (18 mm) T&G Wood Structural Panel**
A modified contact construction adhesive must be applied to the top surface of the I-joist top flanges prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joists centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.	
Insulation	**Min. 2-inch (51 mm) Mineral Fiber Insulation, Min. 3.5 pcf**
Installed adjacent to the bottom flange of the I-Joist and supported by the furring channels. The ends of the batts shall be centered over resilient channels.	
Structural Members	**Min. 9$^{1}/_{2}$-inch (241 mm) Deep Joists**
Maximum 24 inch (610 mm) on center spacing. Minimum flange dimensions of 1$^{5}/_{16}$-inch (33 mm) thick by 3$^{1}/_{2}$-inch (89 mm) wide.	
Resilient Channels	**Min. 0.019-inch (0.5 mm) Resilient Channels**
Attached perpendicular to the bottom flange of the I-Joist with 1$^{1}/_{4}$-inch (32 mm) Type W drywall screws. Channels are spaced a maximum of 16 inches (406 mm) on center and doubled at each wallboard end joint extending to the next joist beyond each joint.	
Gypsum Strips	**2-inch (51 mm) wide by ½-inch (13 mm) Gold Bond Brand Fire-Shield C Gypsum Wallboard**
Installed perpendicular to the joists above each end joint of the $^{5}/_{8}$-inch (16 mm) gypsum wallboard. The strips are attached with one 1$^{1}/_{4}$-inch (32 mm) Type W drywall screw at each joist.	
Ceiling	**(1) Layer of $^{5}/_{8}$-inch (16 mm) Gold Bond Brand Fire-Shield C Gypsum Wallboard**
Installed with long dimension perpendicular to resilient channels and fastened with minimum 1$^{1}/_{8}$-inch (29 mm) Type S drywall screws spaced at 8 inches (203 mm) on center. The end joints of the wallboard must be staggered the equivalent of two joist spacings with those of adjacent sheets. Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.	

SOUND RATING		
Components	**STC**	**IIC**
Base Assembly with Carpet and Padding	55	62
Base Assembly with cushioned vinyl, $^{3}/_{4}$" Gypsum Concrete	58	45
Base Assembly with cushioned vinyl, 1" Gypsum Concrete, $^{1}/_{4}$" Acousti-Mat II	61	53

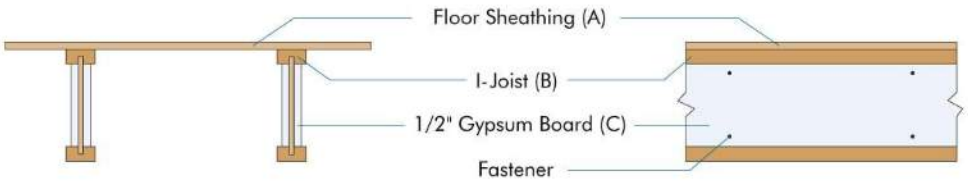
FIGURE 6—ONE-HOUR FIRE-RESISTANCE-RATED FLOOR AND ROOF ASSEMBLY (One Layer $^{5}/_{8}$" 'Type C' Gypsum Wallboard and 2" Gypsum Strips)



BASE ASSEMBLY	
Component	**Material Specification**
Floor Topping (Optional)	**Varies**
Reference sound ratings if applicable	
Floor Sheathing	**Min. $^{23}/_{32}$-inch (18 mm) T&G Wood Structural Panel**
A modified contact construction adhesive must be applied to the top surface of the I-joist top flanges prior to placing sheathing. The sheets shall be installed with their long edge perpendicular to the joists with end joists centered over the top flange of joists and staggered one joist spacing with adjacent sheets. Floor sheathing must be installed per code requirements.	
Insulation	**Max 3$^{1}/_{2}$-inch (89 mm) Unfaced Glass Fiber Insulation**
Friction fitted between I-Joists and supported by stay wires spaced 12 inches (305 mm) on center along the top of the joist bottom flange.	
Structural Members	**Min. 9$^{1}/_{2}$-inch (241 mm) Deep Joists**
Maximum 24 inch (610 mm) on center spacing. Minimum flange dimensions of 1$^{1}/_{8}$-inch (29 mm) thick by 2-inch (51 mm) wide.	
Furring Channels	**Min. 0.019 inch (0.5 mm) Hat Shaped Galv. Steel Channels**
Attached perpendicular to the bottom flange of the I-Joist with two (2) 1$^{5}/_{8}$-inch (41 mm) Type S drywall screws penetrating through the wallboard base layer into each joist flange. Channels are spaced a maximum of 16 inches (406 mm) on center and doubled at each wallboard end joint extending to the next joist beyond each joint.	
Ceiling	**(3) Layers of $^{5}/_{8}$-inch (16 mm) Sheetrock Brand Firecode C Gypsum Wallboard**
Base Layer: Install with long dimension perpendicular to joist length. Attach to the bottom flange of the joists using 1$^{5}/_{8}$-inch (41 mm) Type S drywall screws at 12 inches (305 mm) on center. The end joints of the wallboard must be centered on the bottom flange of the joist and must be staggered the equivalent of two joist spacings with those of adjacent sheets. Middle Layer: attached to furring channels using 1-inch (25 mm) Type S drywall screws at 12 inches (305 mm) on center with the long dimension perpendicular to furring channels. End joints must be staggered from end joints of adjacent sheets and end joints on the face layer. Face Layer: attached to furring channels through the middle layer using 1$^{5}/_{8}$-inch (41 mm) Type S drywall screws spaced at 8 inches (203 mm) on center with long dimension perpendicular to furring channel. End joints must be staggered from end joints of adjacent sheets and staggered 32 inches (813 mm) end joints on the middle layer. Edge joints (long dimension) must be offset 24 inches (610 mm) from those of the middle layer. Finish: The face layer joints must be covered with tape and coated with joint compound. Screw heads must also be covered with joint compound.	

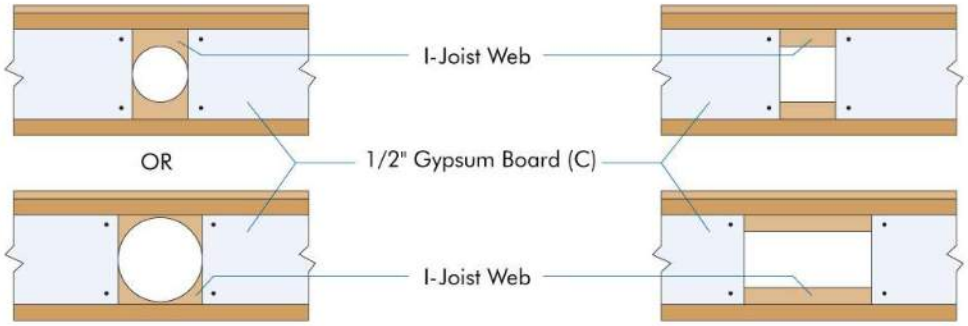
FIGURE 7—TWO-HOUR FIRE-RESISTANCE-RATED FLOOR AND ROOF ASSEMBLY
(Three Layers $^{5}/_{8}$" 'Type C' Gypsum Wallboard)

1/2-inch-thick Gypsum Board Attached to Web



(A) Floor Sheathing: Materials and installation must be per 2018, 2015 or 2012 IRC Section R503
(B) I-Joist: Installation per Section 4.1 of this evaluation report. Minimum flange size of 1.5 inches x 2.0 inches. Minimum web thickness of 3/8 inch.
(C) 1/2-inch-thick Gypsum Board: Materials (entire length of I-joist) per 2018, 2015 or 2012 IRC Section R702.3.1 (not required to be finished with tape and joint compound). Fasteners: Min. 1inch-long screws (Type W or Type S) or nails installed 1 inch from edges and 16 inches on center, top and bottom. Fasteners may be staggered from top to bottom.

Installation Requirements at Web Holes



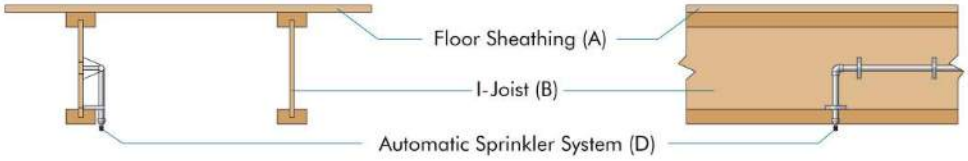
Note: At hole location, fasteners must be installed 1 inch from the edge of the gypsum board and horizontally spaced a distance equivalent to the hole width/diameter plus 2 inches.

Crawl Space Exception

Per Exception 2 of 2018 or 2015 IRC Section R302.13 or 2012 IRC Section R501.3, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require additional fire protection.

Automatic Sprinkler System Exception

Per Exception 1 of 2018 or 2015 IRC Section R302.13 or 2012 IRC Section R501.3, floor assemblies located directly over a space protected by an automatic sprinkler system do not require additional fire protection.

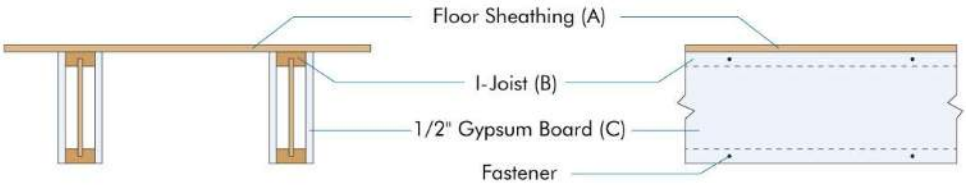


(D) Automatic Sprinkler System: System in accordance with Section P2904 of the 2018, 2015 IRC or 2012 IRC, NFPA 13D, or other equivalent sprinkler system. Note: Per 2018, 2015 or 2012 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only in buildings not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.

For **SI**: 1 inch = 25.4 mm

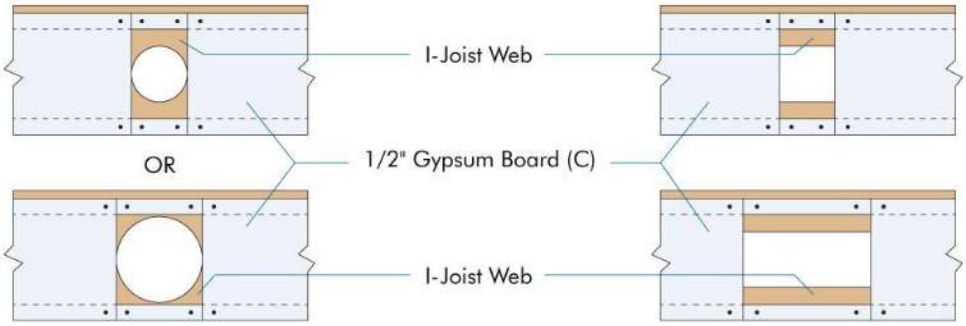
FIGURE 8—FIRE PROTECTION: 2018 AND 2015 IRC SECTION R302.13 OR 2012 IRC SECTION R501.3, EXCEPTIONS 1 AND 2, AND EXCEPTION 4; 1/2-INCH-THICK GYPSUM BOARD ATTACHED DIRECTLY TO WEB

1/2-inch-thick Gypsum Board Attached to Sides of Flange



(A) Floor Sheathing: Materials and installation must be per 2018, 2015 or 2012 IRC Section R503.
(B) I-Joist: Installation per Section 4.1 of this evaluation report. Minimum flange size of 1.125 inches x 1.75 inches. Minimum web thickness of 3/8 inch.
(C) 1/2-inch-thick Gypsum Board: Materials (entire length of I-joist) per 2018, 2015 or 2012 IRC Section R702.3.1 (not required to be finished with tape and joint compound). Fasteners: Min. 1-inch-long screws (Type W or Type S) or nails installed 1/2 inch from edges and 16 inches on center, top and bottom. Fasteners may be staggered from top to bottom.

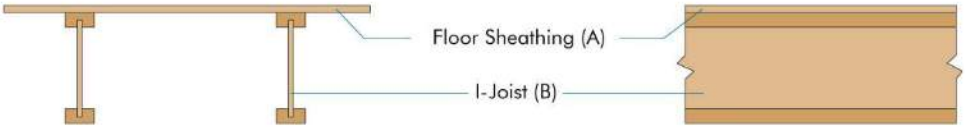
Installation Requirements at Web Holes



Note: At hole location, fasteners must be installed 1 inch from the edge of the gypsum board and horizontally spaced a distance equivalent to the hole width/diameter plus 2 inches. Maximum fastener spacing shall be no more than 8" on gypsum board above and below the hole.

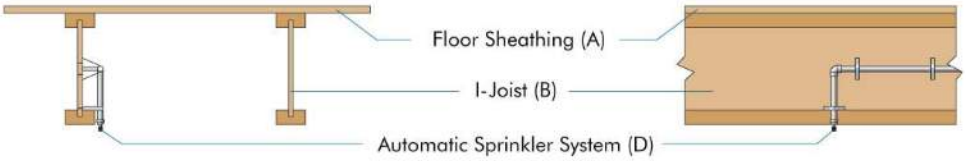
Crawl Space Exception

Per Exception 2 of 2018 or 2015 IRC Section R302.13 or 2012 IRC Section R501.3, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require additional fire protection.



Automatic Sprinkler System Exception

Per Exception 1 of 2018 or 2015 IRC Section R302.13 or 2012 IRC Section R501.3, floor assemblies located directly over a space protected by an automatic sprinkler system do not require additional fire protection.

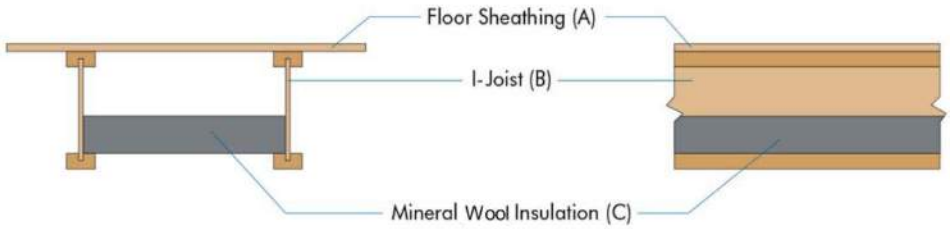


(D) Automatic Sprinkler System: System in accordance with Section P2904 of the 2018, 2015 or 2012 IRC, NFPA 13D, or other equivalent sprinkler system. Note: Per 2018 or 2015 IRC or 2012 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only in buildings is not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.

For **SI**: 1 inch = 25.4 mm

FIGURE 9—FIRE PROTECTION: 2018 AND 2015 IRC SECTION R302.13 OR 2012 IRC SECTION R501.3, EXCEPTIONS 1 AND 2, AND EXCEPTION 4; 1/2-INCH-THICK GYPSUM BOARD ATTACHED DIRECTLY TO SIDES OF FLANGE

Mineral Wool Insulation



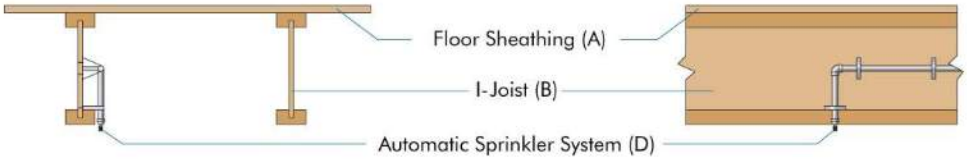
(A) Floor Sheathing: Materials and installation must be per 2018, 2015 or 2012 IRC Section R503.
(B) I-Joist: Installation per Section 4.0 of this evaluation report. Minimum flange size of 1.125 inches x 2.0 inches. Minimum web thickness of $^3/_8$ inch. Maximum 24 inches on center I-joint spacing.
(C) Mineral Wool Batt Insulation: 3-inch-thick, minimum 2.5 lb per ft^3 mineral wool batt insulation made of rock or furnace slag (ASTM C665 Type 1 compliant) installed as shown with insulation stay wire supports spaced no more than 24 inches apart and no more than 6 inches from ends of batts. The insulation width must be a minimum of 15-$^1/_4$ inches when installed between joists that are 16 inches on center or 23 inches when installed between joists that are 24 inches on center. The insulation batts must be properly located on top of the I-joist bottom flange and installed without gaps between individual batts.

Crawl Space Exception

Per Exception 2 of 2018 or 2015 IRC Section R302.13 or 2012 IRC Section R501.3, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require additional fire protection. Note: insulation may be required for energy code compliance purposes; check with the local building official for specific jurisdictional requirements.

Automatic Sprinkler System Exception

Per Exception 1 of 2018 or 2015 IRC Section R302.13 or 2012 IRC Section R501.3, floor assemblies located directly over a space protected by an automatic sprinkler system do not require additional fire protection. Note: insulation may be required for energy code compliance purposes; check with the local building official for specific jurisdictional requirements.

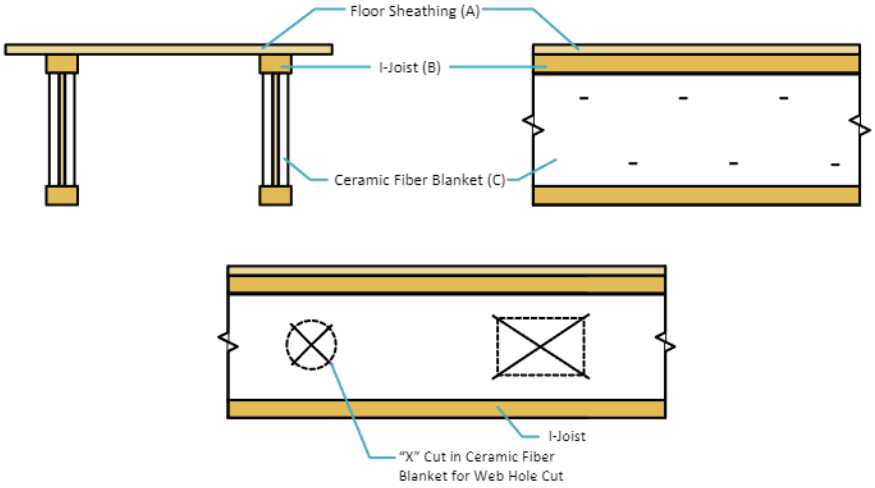


(D) Automatic Sprinkler System: System in accordance with Section P2904 of the 2018, 2015 or 2012 IRC, NFPA 13D, or other equivalent sprinkler system. Note: Per 2018, 2015 or 2012 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only in buildings not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.

For **SI**: 1 inch = 25.4 mm, 1 lb/ft^3 = 16 kg/m^3

FIGURE 10—FIRE PROTECTION: 2018 AND 2015 IRC SECTION R302.13 OR 2012 IRC SECTION R501.3, EXCEPTIONS 1 AND 2, AND EXCEPTION 4; MINERAL WOOL BATT INSULATION

Ceramic Fiber Blanket Attahced on Web



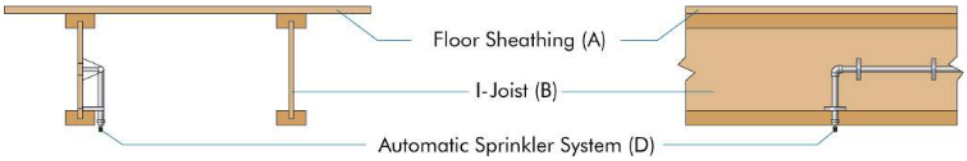
(A) Floor Sheathing: Materials and installation must be per 2018, 2015 IRC or 2012 IRC Section R503.
(B) I-Joist: Installation per Section 4.0 of this ESR report. Minimum flange size of 1.5-inch-thick by 2.31-inch-wide. Minimum web thickness of $^{3}/_{8}$ inch.
(C) Ceramic Fiber Blanket: ¾-inch-thick, minimum 4 lb per ft^3, Mei Guo International, LLC (USA) FireBreak® proprietary ceramic fiber blanket made of aluminum oxide and silicon dioxide (ASTM C892 Type III compliant) is attached directly on web as shown with two rows of $^{7}/_{8}$-inch-long crown staples installed staggered at 8 inches on center horizontal spacing. The maximum vertical staple-to-staple distance between two row of staples must be 3 inches with additonal rows of staples added as necessary for i-joist depth greater then $9^{1}/_{2}$ inches. The ceramic blanket must fill the web space with no gaps, and contact both inside flange faces to protect the web. Joist spacing up to 24 inches on center is allowed. Holes should be 1 inch larger than service dimension, and an "X" cut in the ceramic fiber blanket on both sides to allow wire/pipe/duct to pass through.

Crawl Space Exception

Per Exception 2 of 2018 or 2015 IRC Section R302.13 or 2012 IRC Section R501.3, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require additional fire protection. Note: insulation may be required for energy code compliance purposes; check with the local building official for specific jurisdictional requirements.

Automatic Sprinkler System Exception

Per Exception 1 of 2018 or 2015 IRC Section R302.13 or 2012 IRC Section R501.3, floor assemblies located directly over a space protected by an automatic sprinkler system do not require for additional fire protection. Note: insulation may be required for energy code compliance purposes; check with the local building official for specific jurisdictional requirements.

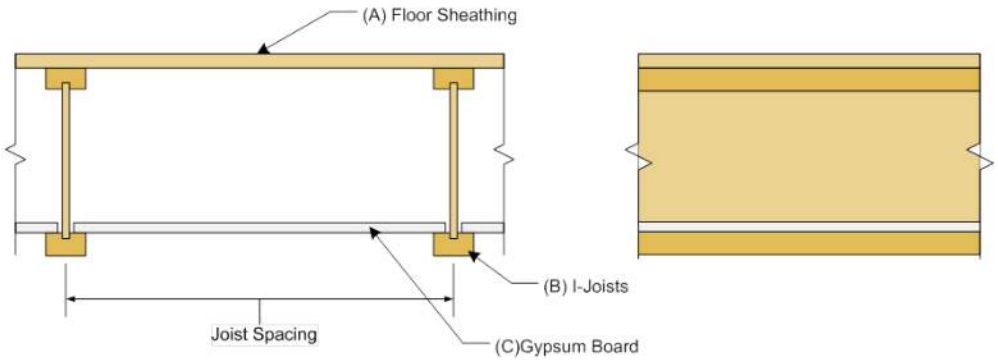


(D) Automatic Sprinkler System: System in accordance with Section P2904 of the 2018, 2015 or 2012 IRC, NFPA 13D, or other equivalent sprinkler system. Note: Per 2018, 2015 or 2012 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only when the entire dwelling unit is not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.

For **SI**: 1 inch = 25.4 mm, 1 lb/ft^3 = 16 kg/m^3

FIGURE 11—FIRE PROTECTION: 2018 AND 2015 IRC SECTION R302.13 OR 2012 IRC SECTION R501.3, EXCEPTIOS 1 AND 2, AND EXCEPTION 4; CERAMIC FIBER BLANKET ATTACHED DIRECTLY ON WEB

Drop-in Gypsum Board



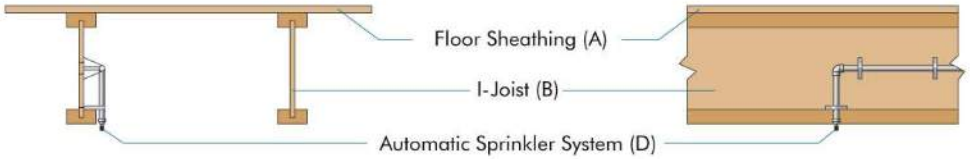
(A) Floor Sheathing: Materials and installation must be per 2018, 2015 or 2012 IRC Section R503.
(B) I-Joist: Installation per Section 4.0 of this evaluation report. Minimum flange size of 1.125 inches x 2.0 inches. Minimum web thickness of $^{3}/_{8}$ inch. The maximum I-joist center-to-center spacing is either 19.2 inches or 24 inches.
(C) Gypsum Board Drop-In Panel: For 19.2-inch maximum I-joist spacing, one layer of minimum $^{1}/_{2}$-inch-thick gypsum wallboard must be used. For 24-inch maximum I-joist spacing, one layer of minimum $^{5}/_{8}$-inch-thick gypsum wall board must be used. Gypsum wallboard shall comply to ASTM C1396 for gypsum wallboards. The drop-in panel is installed on the top surface of the bottom flange. Mechanical fastener or adhesive attachment to the top surface of the bottom flange is not required. A maximum gap of $^{5}/_{16}$ inch between the edge of the gypsum and the I-joist web shall be permitted. Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations on I-joist web shall be permitted.

Crawl Space Exception

Per Exception 2 of 2018 or 2015 IRC Section R302.13 or 2012 IRC Section R501.3, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require additional fire protection. Note: insulation may be required for energy code compliance purposes; check with the local building official for specific jurisdictional requirements.

Automatic Sprinkler System Exception

Per Exception 1 of 2018 or 2015 R302.13 or 2012 IRC Section R501.3.13, floor assemblies located directly over a space protected by an automatic sprinkler system do not require additional fire protection. Note: insulation may be required for energy code compliance purposes; check with the local building official for specific jurisdictional requirements.

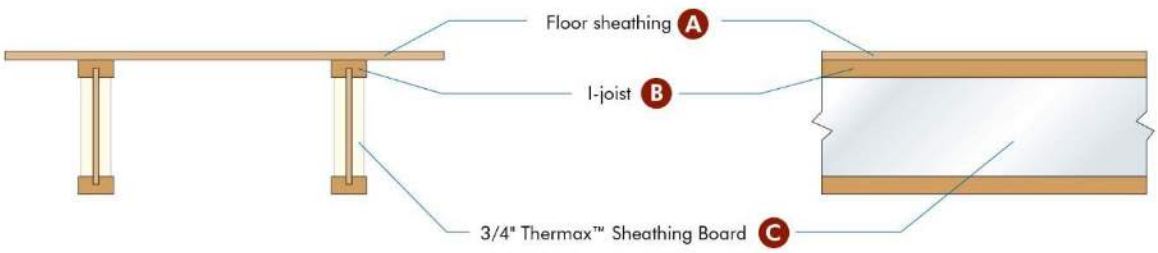


(D) Automatic Sprinkler System: System in accordance with Section P2904 of the 2018 or 2015 or 2012 IRC, NFPA 13D, or other equivalent sprinkler system. Note: Per 2018 or 2015 or 2012 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only in buildings not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.

For **SI**: 1 inch = 25.4 mm

FIGURE 12—FIRE PROTECTION: 2018 AND 2015 IRC SECTION R302.13 OR 2012 IRC SECTION R501.3, EXCEPTIONS 1 AND 2, AND EXCEPTION 4; DROP-IN GYPSUM

Fire Membrane Joist (FMJ™) Factory-Applied Thermax™ Sheathing Board



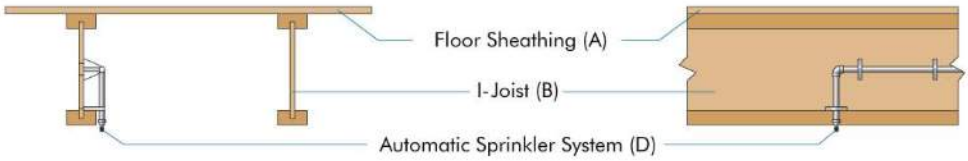
(A) Floor sheathing: Materials and installation must be per Section R503 of the 2018, 2015 or 2012 IRC.
(B) I-joist: Installation per Section 4.0 of this evaluation report. Maximum 24 inches on center spacing. Minimum flange size of 1.50 inches thick x 2.50 inches wide. Minimum web thickness of $^3/_8$ inch.
(C) Factory-applied proprietary Thermax™ Sheathing Board: One layer of $^3/_4$-inch thick Thermax™ Sheathing board conforming to ICC-ES ESR-1659 is adhered to each side of the I-joist web in accordance with the in-plant manufacturing standard.

Crawl Space Exception

Per Exception 2 of 2018 or 2015 IRC Section R302.13 or 2012 IRC Section R501.3, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require additional fire protection. Note: insulation may be required for energy code compliance purposes; check with the local building official for specific jurisdictional requirements.

Automatic Sprinkler System Exception

Per Exception 1 of 2018 or 2015 IRC Section R302.13 or 2012 IRC Section R501.3, floor assemblies located directly over a space protected by an automatic sprinkler system do not require additional fire protection. Note: insulation may be required for energy code compliance purposes; check with the local building official for specific jurisdictional requirements.

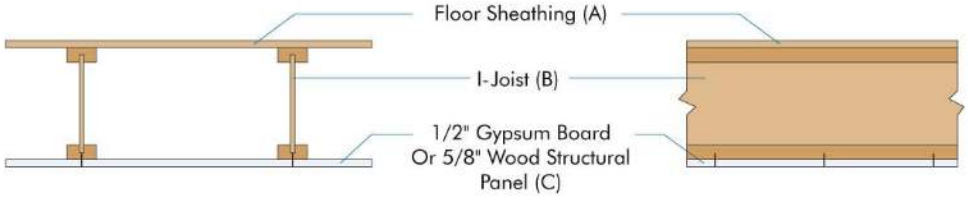


(D) Automatic sprinkler system: System in accordance with Section P2904 of the 2018, 2015 and 2012 IRC, NFPA 13D, or other equivalent sprinkler systems. Note: Per 2018, 2015 or 2012 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only in buildings not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.

For SI: 1 inch = 25.4 mm, 1 lb/ft^3 = 16 kg/m^3

FIGURE 13—FIRE PROTECTION: 2018 AND 2015 IRC SECTION R302.13 OR 2012 IRC SECON R501.3, EXCEPTIONS 1 AND 2, AND EXCEPTION 4; THERMAX™ SHEATHING BOARD

Gypsum Board or Wood Structural Panels Attached to Bottom of Flange



(A) Floor Sheathing: Materials and installation must be per 2018, 2015 or 2012 IRC Section R503.
(B) I-Joist: Installation per Section 4.1 of this evaluation report. Applicable to all flange sizes. Minimum web thickness of $^3/_8$ inch.
(C) $^1/_2$-inch-thick Gypsum Board: Materials and installation per Section R702.3.1 of the 2018, 2015 or 2012 IRC or equivalent. Gypsum Board not required to be finished with tape and joint compound; or $^5/_8$-inch-thick Wood Structural Panel: Materials and installation per Section R503.2 of the 2015 IRC or 2012 IRC, or equivalent. Wood Structural Panel not required to be finished with wood filler or sanded.
Note: Per Exception 3 of 2018, 2015 Section R302.13 or 2012 IRC Section R501.3, portions of floor assembly can be unprotected when complying with the following:

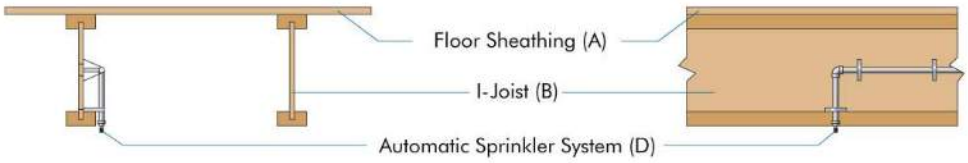
1) The aggregate area of the unprotected portions shall not exceed 80 square feet per story.
2) Fire blocking in accordance with Section R302.11.1 of the 2018, 2015 or 2012 IRC must be installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.

Crawl Space Exception

Per Exception 2 of 2018 or 2015 IRC Section R302.13 or 2012 IRC Section R501.3, floor assemblies located directly over a crawl space not intended for storage or fuel-fired appliances do not require additional fire protection.

Automatic Sprinkler System Exception

Per Exception 1 of 2018 or 2015 IRC Section R302.13 or 2012 IRC Section R501.3, floor assemblies located directly over a space protected by an automatic sprinkler system do not require additional fire protection of floors using gypsum board or wood structural panels attached to the bottom of the flange.



(D) Automatic Sprinkler System: System in accordance with Section P2904 of the 2018, 2015 or 2012 IRC, NFPA 13D, or other equivalent sprinkler system. Note: Per 2018, 2015 or 2012 IRC Section P2904, partial residential sprinkler systems are permitted to be installed only in buildings not required to be equipped with a residential sprinkler system. Check with the local building official for specific jurisdictional requirements.

For **SI**: 1 inch = 25.4 mm

FIGURE 14—2018 AND 2015 IRC SECTION R302.13 OR 2012 IRC, SECTION R501.3, FLOOR ASSEMBLY DETAIL

DISCLAIMER

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DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES
Section: 06 17 33—Wood I-joists

REPORT HOLDER:

BOISE CASCADE WOOD PRODUCTS, LLC

EVALUATION SUBJECT:

BCI PREFABRICATED WOOD I-JOISTS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that BCI prefabricated wood I-joists, described in ICC-ES evaluation report ESR-1336 have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The BCI prefabricated wood I-joists, described in Sections 2.0 through 7.0 of the evaluation report ESR-1336, comply with the LABC Chapter 23 and the LARC, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The BCI prefabricated wood I-joists, described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report ESR-1336.
- The design, installation, conditions of use and identification are in accordance with the 2018 *International Building Code®* (IBC) and 2018 *International Residential Code®* (IRC) provisions noted in the evaluation report ESR-1336, as applicable.
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Flanges must not be subjected to dynamic or static outward forces which may tend to separate the flanges from the web. Bottom flanges must not support load exceeding 250 pounds on each side of flange at 5 feet on center or 100 pounds per linear foot.

This supplement expires concurrently with the evaluation report, reissued September 2021.

DIVISION: 06 00 00—WOOD, PLASTICS, AND COMPOSITES
Section: 06 17 33—Wood I-Joists

REPORT HOLDER:

BOISE CASCADE WOOD PRODUCTS, LLC

EVALUATION SUBJECT:

BCI PREFABRICATED WOOD I-JOISTS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the BCI prefabricated wood I-joists described in ICC-ES evaluation report ESR-1336, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2020 *and* 2017 *Florida Building Code—Building*
- 2020 and 2017 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The BCI prefabricated wood I-joists, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-1336, comply with the *Florida Building Code—Building* and the *Florida Building Code—Residential*, provided the design requirements are in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable. The installation requirements noted in ICC-ES evaluation report ESR-1336 for the for the 2018 and 2015 *International Building Code®* (IBC) meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable.

Use of the BCI prefabricated wood I-joists for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential* has not been evaluated and is outside the scope of this evaluation report.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality-assurance program is audited by a quality-assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued September 2021.