

TJI® L65, L90, H90 Joists



Lightweight for Fast Installation

Compatible with Standard Framing

Available in Long Lengths

Resists Bowing, Twisting, and Shrinking

Works with Multiple Spans



Introduction



ABOUT THIS GUIDE

The Trus Joist Commercial Design Guide for TJI® L65, L90, and H90 joists is one of several design guides that offer technical information and design recommendations for Trus Joist commercial products. The information in this guide is meant to provide architects, designers, and engineers with all of the information necessary to specify TJI® joists in commercial applications.

Trus Joist: The Industry Leader in Engineered Wood Products

For four decades, Trus Joist has been the world's leader in the invention, fabrication, and application of structural engineered lumber, offering building solutions for a broad range of residential, commercial, and industrial applications.

Trus Joist is a global enterprise, pioneering unique, patented manufacturing technologies and providing world-class service and technical support for architects, specifiers, builders, and homeowners. With products like TJI® joists, TimberStrand® LSL headers and studs, TJ-Beam® design software, and structural packages like the FrameWorks® Floor System, Trus Joist continues to deliver the industry's most innovative and leading-edge engineered lumber products and systems.

As a Weyerhaeuser Business, Trus Joist can utilize the vast resources of one of the world's largest forest products companies to provide products and services that extend from the forest floor to the Silent Floor®.



Our Mission: Innovation and Environmental Responsibility

By making the most of every tree—including those that are smaller diameter—Trus Joist can produce cost-effective, readily available engineered lumber that minimizes environmental impact. Using patented technologies, we can take a tree apart and put its fibers back together to take advantage of the wood's natural strength. The result is a quality wood product that offers superior strength and reliable performance.

Trus Joist engineered lumber also provides builders with many other benefits of wood construction:

- Unlike steel, concrete, or plastic, wood is a renewable resource, making it the most sustainable of the major building materials.

- Compared to steel and concrete, wood has significantly less impact on air pollution, water pollution, and solid waste.
- Wood requires less processing energy than alternative materials, and can be reused and recycled into new products.

As part of Weyerhaeuser, Trus Joist is committed to providing quality products through environmentally responsible practices that include sustainable forestry and environmental management systems in our manufacturing facilities. And that's good for structural performance, good for the environment, and good for your customers.

Products for Every Application

In addition to TJI® joists, Trus Joist offers a variety of other engineered lumber products that are ideal for use in commercial projects. For more information, contact your Trus Joist representative or visit www.trusjoist.com to download the following Trus Joist commercial product literature:



**Open-Web Truss
Commercial Design Guide
#1043**



**Parallam® PSL Beam
Commercial Design Guide
#1048**



**1.5E TimberStrand® LSL Stud
Commercial Design Guide
#1047**

For Eastern U.S. only

TJI® Joist Features and Benefits

TJI® joists are lightweight joists suitable for use in roofs and floors in residential, multifamily, institutional, commercial, and light industrial applications. This product is available in multiple series so you can design the most cost-effective system. Other TJI® joist benefits include:

- **Dependable Delivery**—Trus Joist’s large network of plants in key market areas enables us to deliver materials quickly. And each Trus Joist plant is staffed with experienced personnel who understand your special requirements and can help solve problems.
- **Minimum Waste**—TJI® joists won’t twist or shrink, and they can be cut to size at the factory so there’s no time or material waste prior to installation.
- **Compatibility**—All TJI® joists fit equally well into wood frame, masonry, or steel construction, and they can accommodate a wide variety of decking and ceiling materials—including wood, plywood, steel, and gypsum.
- **Easy Mechanical Access**—Knockout holes for ventilation and flexible conduit are provided in the web of the TJI® joists. The web can also be cut or drilled to accommodate larger ductwork (see page 11), so costly suspended ceilings can often be eliminated.

Product Selection

This guide provides specifiers with technical information on Trus Joist’s Commercial TJI® joist product line. However, when you consider the relationship between span, load-carrying capacity, and design constraints, you will often find that a variety of products can work in any given application.

Your local Trus Joist representative, with support from our network of regional engineering offices, can assist you in choosing the best system for your specific application. Feel free to contact us for help with any of the following:

- Product selection
- Building department calculations
- Complete cost analysis
- System selection (system packages can include horizontal framing, main carrying beams, headers, wall framing, mansard framing, and accessories)

Unsurpassed Technical Support



Trus Joist maintains a sales force of more than 175 technical representatives, many of whom have design and engineering backgrounds. Their services include consultation, computer-assisted design and layout, delivery coordination, and installation review. They can suggest cost-cutting techniques and check any special application requirements. In addition, they’re backed by a staff of engineers who provide comprehensive technical support when needed.

Special requests are accommodated wherever practical, and Trus Joist offers comprehensive cost analysis, engineering analysis, assistance with building code approvals—even the creation of special product applications for bold and innovative designs.

The goal of Trus Joist technical support is to help the architect or specifier achieve quality design applications with the most cost-efficient product selection possible.

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For Western U.S. only

1.6E TimberStrand® LSL Stud Commercial Design Guide #1071

Tapered TJI® Joist Commercial Design Guide #1065

Sprinkler System Installation Guidelines #1046

Fire Facts Guide #5003

Preservative Treatment Guide #5020

Engineering Services

Upon request, Trus Joist will provide the following services for the products described in this TJI® Joist Commercial Design Guide:

- A complete design package including shop drawings and detailed design calculations.
- Review and analysis of the application.
- Drawings or calculations sealed by a professional engineer.

Installation Review

Although responsibility for proper installation lies with the contractor-builder, Trus Joist provides detailed suggestions and guidelines for installation. If requested, a Trus Joist representative will visit the site to verify the contractor's understanding of proper installation. Trus Joist engineers also are available to help solve job-site application problems.

Engineering Responsibility Position Statement

Trus Joist is a manufacturer of proprietary structural components.

It employs a staff of engineers to aid in the development, manufacture, and marketing of its products. Trus Joist does not accept the responsibility of the design professional of record for any structure.

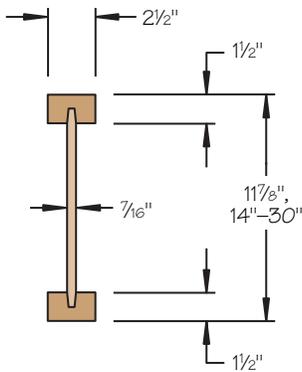
Trus Joist accepts the delegation of engineering responsibility only for the products it manufactures, provided that the application conditions are specified by the design professional of record, or other responsible party when a design professional is not engaged. Trus Joist provides engineering in the design of its products and does not displace the need on any project for a design professional of record.



TJI® Joist Descriptions

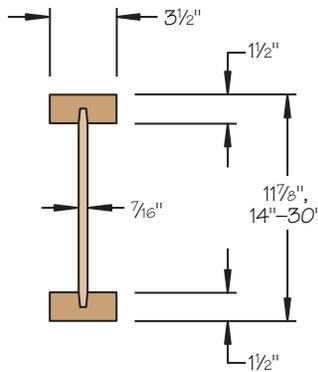
This guide covers three series of joists: TJI® L65, TJI® L90, and TJI® H90. These joists are primarily intended for commercial applications such as retail stores, office buildings, schools, restaurants, hotels, warehouses, and nursing homes. They are typically designed, manufactured, and sold by Trus Joist for each specific job. Contact your Trus Joist representative for more information.

TJI® joists are normally produced without camber. However, camber is available at 2,250' radius as a special order. Camber is not recommended for floors, or for multiple-span or cantilever applications.



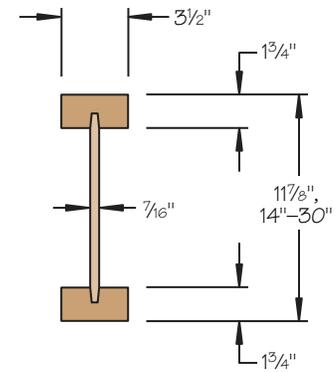
TJI® L65

Top and bottom flanges of 1 1/2" x 2 1/2" Microllam® LVL with 7/16" Performance Plus® web.



TJI® L90

Top and bottom flanges of 1 1/2" x 3 1/2" Microllam® LVL with 7/16" Performance Plus® web.



TJI® H90

Top and bottom flanges of 1 3/4" x 3 1/2" Microllam® LVL with 7/16" Performance Plus® web.

Joist depths from 14" to 30" are available in 2" increments.

Load Tables

TJI® L65 • Allowable Uniform Load (PLF)

Depth	11 7/8"		14"		16"		18"		20"		22"		24"		26"		28"		30"			
	100% TL	115% TL																				
Span	100% LL	125% TL																				
	100% LL	125% TL																				
12'	320	368	354	407	388	446	412	474	416	479	416	479	416	479	416	479	416	479	416	479	416	479
	252	401	350	442	*	485	*	515	*	520	*	520	*	520	*	520	*	520	*	520	*	520
14'	275	316	303	349	332	382	353	406	357	410	357	410	357	410	357	410	357	410	357	410	357	410
	169	343	238	379	311	416	*	441	*	446	*	446	*	446	*	446	*	446	*	446	*	446
16'	210	242	250	288	287	330	309	355	312	359	312	359	312	359	312	359	312	359	312	359	312	359
	118	263	168	313	221	359	281	386	*	390	*	390	*	390	*	390	*	390	*	390	*	390
18'	153	191	198	228	227	261	256	294	277	319	277	319	277	319	277	319	277	319	277	319	277	319
	76	204	109	247	144	284	184	320	229	347	*	347	*	347	*	347	*	347	*	347	*	347
20'	114	152	160	184	184	211	207	238	230	265	250	287	250	287	250	287	250	287	250	287	250	287
	51	152	73	200	98	230	125	259	157	288	191	312	228	312	*	312	*	312	*	312	*	312
22'	86	115	126	152	152	175	171	197	190	219	209	241	227	261	227	261	227	261	227	261	227	261
	39	115	56	165	75	190	97	214	121	238	148	262	178	284	210	284	*	284	*	284	*	284
24'	67	90	98	128	127	147	144	165	160	184	176	202	192	220	207	238	208	239	208	239	208	239
	30	90	44	131	59	159	76	180	96	200	117	220	141	240	167	259	195	260	*	260	*	260
26'		71	78	104	106	125	122	141	136	157	150	172	163	188	177	203	190	218	192	221	192	221
		71	35	104	47	136	61	153	77	170	94	187	114	204	135	221	158	237	183	240	183	240
28'		57		84	86	108	105	121	117	135	129	148	141	162	152	175	164	188	175	201	175	201
		57		84	38	114	49	132	62	147	77	161	93	176	110	190	130	205	150	219	150	219
30'		47		69	70	94	92	106	102	117	112	129	122	141	132	152	142	164	152	175	152	175
		47		69	31	94	40	115	51	128	63	141	77	153	91	166	107	178	125	191	125	191
32'		39		57		78	76	93	90	103	99	114	108	124	116	134	125	144	134	154	134	154
		39		57		78	34	101	43	112	53	123	64	135	76	146	90	157	104	168	104	168
34'		32		48		65		82	79	91	87	100	95	110	103	119	111	128	119	136	119	136
		32		48		65		85	36	99	44	109	54	119	64	129	76	139	88	148	88	148
36'				40		55		72	69	81	78	90	85	98	92	106	99	114	106	122	106	122
				40		55		72	30	89	38	97	46	106	55	115	65	124	75	132	75	132
38'				34		47		62		73	70	80	76	88	82	95	89	102	95	109	95	109
				34		47		62		79	32	87	39	95	47	103	55	111	65	119	65	119
40'						40		53		66		72	69	79	74	86	80	92	86	98	86	98
						40		53		68		79	34	86	40	93	48	100	56	107	56	107

*Indicates total load value controls.

Load Table Instructions

To size floor joists:

- Check both total load (100% TL) and live load (100% LL). Total load values limit deflection to L/240. Live load values are based on a nailed floor system and the commercial deflection criteria shown on page 21. Live load (100% LL) values may be increased with a glue-nailed floor system; use TJ-Beam® software or contact your Trus Joist representative for assistance.

To size roof joists:

- Check the appropriate snow load area (115% TL) value or non-snow load area (125% TL) value to determine the maximum allowable total load. Both total load values limit joist deflection to L/180.
- Consult local codes to verify deflection limits required for specific applications.

General Notes

- Values shown are maximum allowable load capacities of the joists in pounds per linear foot (plf) and assume:
 - simple span; horizontal clear distance between supports.
 - uniformly loaded conditions with 2½" bearing length and web stiffeners. Other capacities may be possible with different criteria; use TJ-Beam® software or contact your Trus Joist representative.
 - positive drainage in roof applications (¼" per foot slope minimum).
- Camber (2,250' radius) is available for simple-span applications only. **Contact your Trus Joist representative for availability.**
- For span or loading conditions not covered by these tables (such as multiple spans or concentrated loads), use TJ-Beam® software or contact your Trus Joist representative for assistance.

100% TL (Total Load)

Use this and the 100% LL to select floor member. This is the maximum allowable total load in pounds per linear foot of joist. Values are limited by deflection equal to L/240 at total load.

100% LL (Live Load)

Use this and the 100% TL to select floor member. This number is the maximum allowable live load capacity in pounds per linear foot of joist. Value is based on the **Commercial Floor Deflection Limit** shown on page 21.

Depth	11 7/8"		14"	
	100% TL	115% TL	100% TL	115% TL
Span	100% LL	125% TL	100% LL	125% TL
12'				

115% TL (Total Load)

Use this to select roof member in snow load areas. This is the maximum allowable total load in pounds per linear foot of joist. Values are limited by deflection equal to L/180 at total load.

125% TL (Total Load)

Use this to select roof member in non-snow load areas. This is the maximum allowable total load in pounds per linear foot of joist. Values are limited by deflection equal to L/180 at total load.

Design Properties

Joist Depth	Basic Properties						Reaction Properties ⁽⁴⁾⁽⁵⁾							
	Joist Weight (lbs/ft)	Resistive Moment ⁽¹⁾ (ft-lbs)	Vertical Shear ⁽²⁾ (lbs)	EI x 10 ⁶ (in. ² -lbs)	EI ⁽³⁾ x 10 ⁶ TJI® Joist with Nailed Floor Sheathing (in. ² -lbs)	EI ⁽³⁾ x 10 ⁶ TJI® Joist with Glue-Nailed Floor Sheathing (in. ² -lbs)	End Reaction (lbs)				Intermediate Reaction (lbs)			
							Bearing Length				Bearing Length			
							1 3/4"		3 1/2"		3 1/2"		5 1/4"	
							Web Stiffeners ⁽⁶⁾		Web Stiffeners ⁽⁶⁾		Web Stiffeners ⁽⁶⁾		Web Stiffeners ⁽⁶⁾	
No	Yes	No	Yes	No	Yes	No	Yes	No	Yes					
TJI® L65 Joist														
11 7/8"	3.3	6,750	1,925	450	512	561	1,375	1,745	1,885	1,925	2,745	3,120	3,365	3,735
14"	3.6	8,030	2,125	666	752	821	1,375	1,750	1,885	2,125	2,745	3,365	3,365	3,985
16"	3.9	9,210	2,330	913	1,025	1,116	1,375	1,750	1,885	2,330	2,745	3,490	3,365	4,105
18"	4.2	10,380	2,535	1,205	1,348	1,462	1,375	1,750	1,885	2,535	2,745	3,615	3,365	4,230
20"	4.4	11,540	2,740	1,545	1,722	1,864	N.A.	1,750	N.A.	2,740	N.A.	3,740	N.A.	4,355
22"	4.7	12,690	2,935	1,934	2,149	2,322	N.A.	1,750	N.A.	2,935	N.A.	3,860	N.A.	4,480
24"	5.0	13,830	3,060	2,374	2,632	2,838	N.A.	1,750	N.A.	3,060	N.A.	3,875	N.A.	4,605
26"	5.3	14,960	2,900	2,868	3,172	3,416	N.A.	1,750	N.A.	2,900	N.A.	4,725 ⁽⁷⁾	N.A.	5,345 ⁽⁸⁾
28"	5.5	16,085	2,900	3,417	3,772	4,056	N.A.	1,750	N.A.	2,900	N.A.	4,850 ⁽⁷⁾	N.A.	5,470 ⁽⁸⁾
30"	5.8	17,205	2,900	4,025	4,434	4,762	N.A.	1,750	N.A.	2,900	N.A.	4,975 ⁽⁷⁾	N.A.	5,590 ⁽⁸⁾
TJI® L90 Joist														
11 7/8"	4.2	9,605	1,925	621	687	741	1,400	1,715	1,885	1,925	3,350	3,665	3,965	4,285
14"	4.5	11,430	2,125	913	1,005	1,079	1,400	1,875	1,885	2,125	3,350	3,825	3,965	4,440
16"	4.7	13,115	2,330	1,246	1,366	1,462	1,400	2,030	1,885	2,330	3,350	3,980	3,965	4,600
18"	5.0	14,785	2,535	1,635	1,786	1,908	1,400	2,030	1,885	2,515	3,350	3,980	3,965	4,600
20"	5.3	16,435	2,740	2,085	2,272	2,422	N.A.	2,190	N.A.	2,675	N.A.	4,140	N.A.	4,755
22"	5.6	18,075	2,935	2,597	2,824	3,006	N.A.	2,345	N.A.	2,830	N.A.	5,090	N.A.	5,705
24"	5.8	19,700	3,060	3,172	3,442	3,659	N.A.	2,345	N.A.	2,830	N.A.	5,405	N.A.	6,020
26"	6.1	21,315	2,900	3,814	4,132	4,387	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
28"	6.4	22,915	2,900	4,525	4,895	5,191	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
30"	6.6	24,510	2,900	5,306	5,732	6,073	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
TJI® H90 Joist														
11 7/8"	4.6	10,960	1,925	687	755	810	1,400	1,715	1,885	1,925	3,495	3,810	4,100	4,420
14"	4.9	13,090	2,125	1,015	1,109	1,185	1,400	1,875	1,885	2,125	3,495	3,970	4,100	4,575
16"	5.2	15,065	2,330	1,389	1,512	1,610	1,400	2,030	1,885	2,330	3,495	4,130	4,100	4,735
18"	5.4	17,010	2,535	1,827	1,982	2,106	1,400	2,030	1,885	2,515	3,495	4,130	4,100	4,735
20"	5.7	18,945	2,740	2,331	2,522	2,676	N.A.	2,190	N.A.	2,675	N.A.	4,285	N.A.	4,890
22"	6.0	20,855	2,935	2,904	3,136	3,321	N.A.	2,345	N.A.	2,830	N.A.	5,235	N.A.	5,840
24"	6.3	22,755	3,060	3,549	3,825	4,046	N.A.	2,345	N.A.	2,830	N.A.	5,425	N.A.	6,155
26"	6.5	24,645	2,900	4,266	4,590	4,850	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
28"	6.8	26,520	2,900	5,059	5,436	5,737	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾
30"	7.1	28,380	2,900	5,930	6,363	6,710	N.A.	2,450	N.A.	2,900	N.A.	5,800 ⁽⁷⁾	N.A.	5,800 ⁽⁸⁾

The stated allowable design properties are for loads of normal duration. Adjustments to the allowable design values shall be in accordance with the applicable code.

- (1) **Caution:** Joist resistive moment properties reflect the latest ASTM standards and should not be increased by a repetitive-member use factor.
- (2) For possible increases in shear capacity see below.
- (3) For deflection calculation only. Assumes 12" joist spacing with a 24" span-rated panel.

(4) Interpolation between bearing lengths is permitted for allowable design reactions.

- (5) Allowable bearing lengths have been determined based on Trus Joist products. Allowable bearing on supporting members shall be checked.
- (6) Refer to page 10 for web stiffener details.
- (7) A 5 1/4" bearing length is required at intermediate reactions.
- (8) A 7" bearing length is required at intermediate reactions.

TJI® Joist Shear Design

When joists are used as simple-span members, the design shear is equal to the shear at the face of the support.

When joists **up to 24" in depth** are used as multiple-span members, the design shear is the calculated shear at the interior support reduced by the following:

$$R = \frac{W}{19.25} \leq 18\%$$

Where: R is the percent reduction
W is uniform load in plf

Building Codes and Product Acceptance:

ICC ESR-1153, HUD SEB No. 689 Rev.9, L.A. City RR #25538, DSA PA-048

Load Tables

TJI® L90 • Allowable Uniform Load (PLF)

Depth	11 7/8"		14"		16"		18"		20"		22"		24"		26"		28"		30"	
	100% TL	115% TL																		
Span	100% LL	125% TL																		
14'	275	316	297	341	320	368	320	368	342	393	365	419	365	419	387	445	410	471	410	471
	214	343	296	371	*	400	*	400	*	427	*	456	*	456	*	483	*	512	*	512
16'	240	276	260	299	280	322	280	322	299	344	319	367	319	367	338	389	358	412	358	412
	151	300	212	325	276	350	*	350	*	374	*	399	*	399	*	423	*	448	*	448
18'	203	245	231	265	248	286	248	286	266	306	283	326	283	326	301	346	318	366	318	366
	98	267	138	288	182	311	230	311	*	332	*	354	*	354	*	376	*	398	*	398
20'	152	203	208	239	224	257	224	257	239	275	255	293	255	293	271	311	287	330	287	330
	66	203	94	260	124	280	158	280	195	299	236	319	*	319	*	338	*	358	*	358
22'	116	155	167	217	203	234	203	234	217	250	232	267	232	267	246	283	260	300	260	300
	51	155	72	223	96	254	123	254	153	272	185	290	220	290	*	307	*	326	*	326
24'	91	121	131	175	176	209	186	214	199	229	212	244	212	244	225	259	239	275	239	275
	40	121	57	175	76	227	97	233	121	249	148	266	176	266	207	282	*	298	*	298
26'	72	97	105	140	141	178	172	198	184	211	196	226	196	226	208	239	220	253	220	253
	32	97	45	140	61	188	78	215	98	230	119	245	143	245	168	260	196	275	*	275
28'		78	85	113	114	152	148	173	167	192	182	209	182	209	193	222	205	235	205	235
		78	37	113	49	152	64	188	80	209	98	228	117	228	138	241	161	256	186	256
30'	64	69	93	94	125	122	151	146	168	160	184	170	195	180	207	191	220	191	220	
	64	30	93	41	125	52	162	66	182	81	200	97	212	115	225	134	239	155	239	
32'		53		77	78	104	101	132	128	147	141	162	153	176	166	191	179	205	179	206
		53		77	34	104	44	135	55	160	67	176	81	192	96	208	113	223	130	224
34'		44		65	65	87	85	114	107	130	125	143	136	156	147	169	158	182	168	194
		44		65	28	87	37	114	46	142	57	156	69	170	82	184	95	198	111	211
36'		37		55		74	72	96	91	116	111	128	121	139	131	151	141	162	151	173
		37		55		74	31	96	39	122	48	139	58	152	70	164	82	176	94	189
38'		32		47		63		82	78	104	97	115	109	125	118	135	126	145	135	156
		32		47		63		82	34	104	41	125	50	136	60	147	70	158	81	169
40'				40		54		71	67	90	83	103	98	113	106	122	114	131	122	140
				40		54		71	29	90	36	111	43	123	52	133	61	143	71	153
42'				35		47		62		78	72	94	88	102	96	111	103	119	111	127
				35		47		62		78	31	97	38	111	45	120	53	129	61	138

TJI® H90 • Allowable Uniform Load (PLF)

Depth	11 7/8"		14"		16"		18"		20"		22"		24"		26"		28"		30"	
	100% TL	115% TL																		
Span	100% LL	125% TL																		
14'	275	316	297	341	320	368	320	368	342	393	365	419	365	419	387	445	410	471	410	471
	230	343	*	371	*	400	*	400	*	427	*	456	*	456	*	483	*	512	*	512
16'	240	276	260	299	280	322	280	322	299	344	319	367	319	367	338	389	358	412	358	412
	163	300	229	325	*	350	*	350	*	374	*	399	*	399	*	423	*	448	*	448
18'	213	245	231	265	248	286	248	286	266	306	283	326	283	326	301	346	318	366	318	366
	106	267	150	288	197	311	*	311	*	332	*	354	*	354	*	376	*	398	*	398
20'	166	221	208	239	224	257	224	257	239	275	255	293	255	293	271	311	287	330	287	330
	72	221	102	260	135	280	172	280	212	299	*	319	*	319	*	338	*	358	*	358
22'	127	170	183	217	203	234	203	234	217	250	232	267	232	267	246	283	260	300	260	300
	55	170	79	236	105	254	134	254	166	272	201	290	*	290	*	307	*	326	*	326
24'	100	133	144	192	186	214	186	214	199	229	212	244	212	244	225	259	239	275	239	275
	43	133	62	192	83	233	106	233	132	249	161	266	191	266	*	282	*	298	*	298
26'	79	106	115	154	155	198	172	198	184	211	196	226	196	226	208	239	220	253	220	253
	34	106	50	154	66	207	86	215	107	230	130	245	156	245	183	260	212	275	*	275
28'		86	93	125	126	168	160	184	171	196	182	209	182	209	193	222	205	235	205	235
		86	40	125	54	168	70	200	87	213	107	228	128	228	151	241	175	256	202	256
30'		70	77	102	104	138	134	171	159	183	170	195	170	195	180	207	191	220	191	220
		70	33	102	44	138	58	179	72	199	88	212	106	212	126	225	146	239	169	239
32'		58		85	86	115	112	150	141	170	159	183	159	183	169	194	179	206	179	206
		58		85	37	115	48	150	60	185	74	199	89	199	105	211	123	224	142	224
34'		49		71	72	97	94	126	119	150	144	165	150	172	159	183	168	194	168	194
		49		71	31	97	40	126	51	159	63	180	75	187	89	199	105	211	121	211
36'		41		60		82	80	107	101	134	125	148	140	161	150	173	159	183	159	183
		41		60		82	34	107	43	135	53	160	64	175	76	188	89	199	103	199
38'		35		52		70	69	92	87	116	107	132	126	144	136	157	146	168	151	173
		35		52		70	29	92	37	116	46	143	55	157	66	170	77	183	89	188
40'		30		44		60		79	75	100	93	119	112	130	123	141	132	152	141	163
		30		44		60		79	32	100	39	124	48	142	57	154	67	165	77	177
42'				38		52		69	65	87	80	107	98	118	111	128	120	138	128	148
				38		52		69	28	87	34	107	42	128	49	139				

Floor Performance and the TJ-Pro™ Rating System

It's about choice—

The TJ-Pro™ Rating System is a sophisticated computer model for predicting floor performance and evaluating the relationship between the cost and the “feel” of any given floor system. Its methodology is based on extensive laboratory research, more than one million installations, and the combined expertise of the best engineers in the field. TJ-Pro™ Rating goes beyond deflection criteria to consider job-specific needs and expectations. In many cases, TJ-Pro™ Rating will offer a system that improves performance while actually reducing costs!

TJ-Pro™ Rating System Advantages:

- Works as part of Trus Joist's TJ-Beam® software.
- Provides a new method for accurately predicting floor performance.
- Takes perceptions of the occupant into account.
- Provides cost comparison.

Don't have TJ-Beam® software?
Contact your Trus Joist representative or call 1-866-TJWorks. You can also visit our website at www.trusjoist.com to order software or find the Trus Joist representative nearest you.



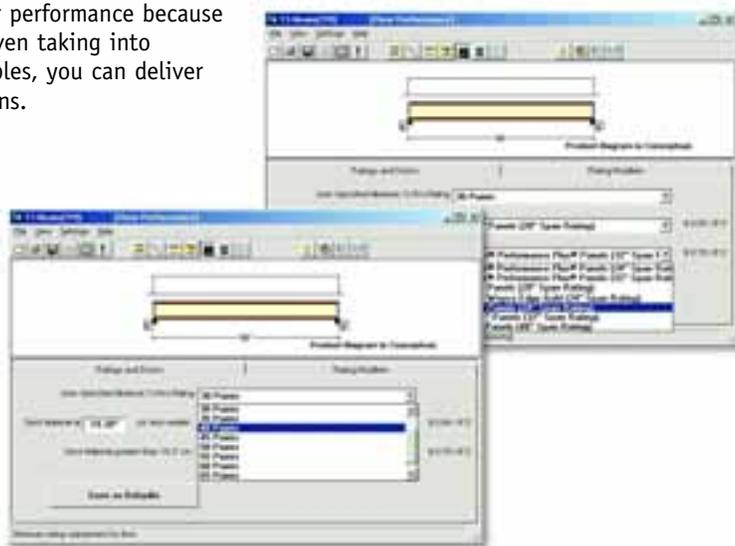
Design smarter—don't over-specify

The traditional way to specify a floor system is to use live load deflection criteria, but deflection only explains part of how a floor performs. Depending on factors unique to the structure and its use, the code minimum of L/360 (or even the more restrictive limits shown on page 21) may disappoint many customers.

The TJ-Pro™ Rating System is a much better predictor of floor performance because it considers the many factors that affect floor performance, even taking into account the perceptions of the occupant. With so many variables, you can deliver an economical solution tailored to your customer's expectations.

Factors that affect floor performance:

- TJI® joist series, depth, and spacing
- Deck thickness and quality
- Directly applied ceilings
- Location of partitions on floor
- Blocking
- Bearing conditions for the TJI® joists



Get the support you need—

We're here to help you make the most of the TJ-Pro™ Rating System, whether it's help with setup, tips and tricks, or selecting the best rating for your project. Call your Trus Joist representative today.

1.0 GENERAL

1.1 Scope

This work includes the complete furnishings and installation of all TJI® joists, as shown on the drawings herein specified and necessary to complete the work.

1.2 Code Approvals

These products shall be designed and manufactured to the standards set forth in ICC ES Report No. ESR-1153.

1.3 Related Work Specified Elsewhere

- A. Carpentry and Millwork
- B. Glu-Laminated Members

1.4 Design

A. Products:

Trus Joist products shall be designed to fit the dimensions and loads indicated on the plans.

B. Design Calculations:

When required, a complete set of design calculations shall be prepared by Trus Joist.

1.5 Submittals

A. Drawings:

When required, drawings showing layout and detail necessary for determining fit and placement in the building shall be provided by Trus Joist.

B. Production:

Fabrication and/or cutting shall not proceed until the architect and/or engineer have approved the submittal package.

2.0 PRODUCTS

2.1 Materials

Flange members, web members, and adhesives shall conform to the provisions of ICC ES Report No. ESR-1153.

2.2 Fabrication

TJI® joists shall be manufactured by Trus Joist in a plant listed in the reports referred to above and under the supervision of an approved third-party inspection agency.

2.3 Tolerances

Depth: $\pm 1/16$ "

Flange Width: $\pm 1/16$ "

2.4 Identification

Each of the joists shall be identified by a stamp indicating the joist series, ICC-ES evaluation report number, manufacturer's name, plant number, date of fabrication, and the independent inspection agency's logo.

2.5 Hardware

Not applicable.

3.0 EXECUTION

3.1 Installation

TJI® joists, if stored prior to installation, shall be protected from the weather. They shall be handled with care so they are not damaged. TJI® joists are to be installed in accordance with the plans and any Trus Joist drawings and installation suggestions. Temporary construction loads that cause stresses beyond design limits are not permitted. Safety bracing is to be provided by the installer to keep the TJI® joists straight and plumb as required and to ensure adequate lateral support for the individual TJI® joist members and the entire system until the sheathing material is applied.

3.2 Installation Review

The Contractor shall give notification to the Trus Joist representative—prior to enclosing the TJI® joists—to provide an opportunity for review of the installation.

3.3 Performance Standards

Products shall be proven by testing and evaluation in accordance with the provisions of ASTM D-5055.

3.4 Fire Rating/Sound Rating

Fire and sound ratings are to be established in accordance with assemblies as detailed in ICC ES Report No. ESR-1153 or the *Directory of Listed Products*, published by Intertek Testing Services.

3.5 Warranty

The products delivered shall be free from manufacturing errors or defects in workmanship and material. The products, when correctly installed and maintained, shall perform as designed for the normal and expected life of the building.

4.0 ALTERNATES AND/OR EQUALS

4.1 Base Bid

Due to the customized detailing and engineering characteristics of the roof and/or floor framing assembly, it is a requirement that TJI® joists be used in the base bid.

4.2 Alternate Manufacturers

Other manufacturers' bids are to be listed in the alternate section of your proposal. All framing plans, detailing, and calculations for the alternate bids will be reviewed by the owner, architect, and engineer for structural performance, possible conflicts with related trades, and compatibility with the overall building requirements and building code.

4.3 Alternate Products

Alternate products will only be permitted if written approval and acceptance is obtained by both architect and owner at least seven days prior to the bid date. Any monetary savings that may be realized by using an alternate product shall be forwarded to the owner.

4.4 Acceptable Alternates

At the discretion of the specifier of record, accepted alternates will be listed on the final addendum prior to the bid date.

Web Stiffeners

The Importance of Web Stiffeners

Web stiffeners are available from Trus Joist in precut sizes and can be installed at the plant on one or both ends upon request. Web stiffeners are an important part of almost all TJI® joist installations because they will:

- Stiffen the TJI® joist web material and prevent buckling.
- Minimize the bearing length required for the TJI® joist.
- Help transfer reaction loads into the TJI® joist web.
- Provide stabilization in hangers.

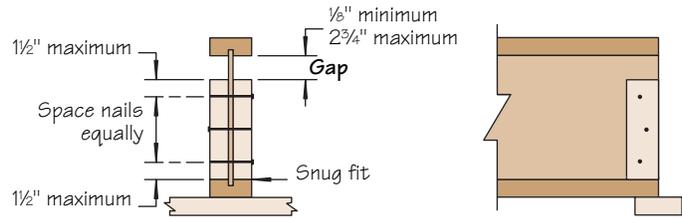
To Ensure System Performance

- Web stiffeners must be installed at bearing points as shown in the details below and at points of concentrated loads exceeding 1,500 lbs.
- Web stiffeners are required on joists 20" and greater in depth.
- Web stiffeners are available from Trus Joist and typically have the maximum gap shown below. Verify that hanger nails adequately engage the web stiffener.
- Gap must be at top for all bearing conditions. For concentrated loads, the gap must be at the bottom (see details below).

Web Stiffener Attachment

Nail Quantities

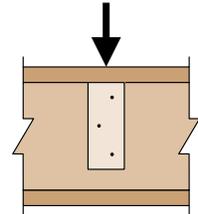
Joist Depth	TJI® L65		TJI® L90 and TJI® H90	
	8d (2½") Nails		16d (3½") Nails	
	End or Intermediate	End	Intermediate	
117/8"	3	3	3	
14"	5	3	3	
16"	6	4	4	
18"	7	4	4	
20"	8	5	5	
22"	9	6	11	
24"	10	6	13	
26"	11	7	14	
28"	12	8	15	
30"	13	8	17	



Web stiffeners are typically supplied with the maximum gap shown above. Verify that all nails fully engage the web stiffener.

Concentrated Load (No Bearing Wall Below)

If concentrated loads from above exceed 1,500 lbs, install web stiffeners tight to TJI® joist top flange. See tables at left for nailing and material requirements.



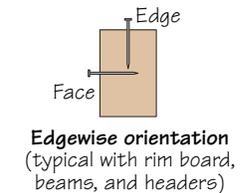
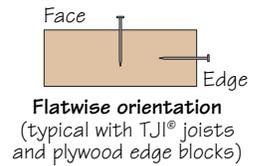
Web Stiffener Size and Material

Flange Width	Web Stiffener Size	Web Stiffener Material
2½"	1" x 2⅝"	Sheathing (with face grain vertical) that meets the requirements of PS1 or PS2, or CSA Standards 0151, 0352, or 0437
3½"	2x4	Construction grade or better

Nailing Information

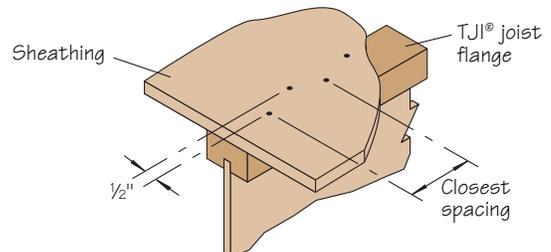
Minimum Nail Spacing

Nail Type	Nail Size	TimberStrand® LSL			Microllam® LVL			Sawn Lumber		
		Face	Edge		Face	Edge		Face	Edge	
			Joist Flange	Rim Board, Header, Beam		Joist Flange	Rim Board, Header, Beam			
8d ⁽¹⁾	Box	0.113" x 2½"	1½"	4"	3"	2"	4"	3"	4"	2"
	Common	0.131" x 2½"	1½"	6"	3"	2"	6"	3"	6"	2"
10d	Box	0.128" x 3"	1½"	6"	3"	2"	6"	3"	6"	2"
	Common	0.148" x 3"	1½"	6"	4"	3"	6"	4"	6"	2½"
12d	Box	0.128" x 3¼"	1½"	6"	3"	2"	6"	3"	6"	2"
	Common	0.148" x 3¼"	1½"	6"	4"	3"	6"	4"	6"	2½"
16d	Box	0.135" x 3½"	1½"	6"	4"	3"	6"	4"	6"	2½"
	Sinker	0.148" x 3¼"	1½"	6"	4"	3"	6"	4"	6"	2½"
	Common	0.162" x 3½"	1¾"	8"	6"	4"	8"	6"	8"	4"

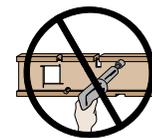
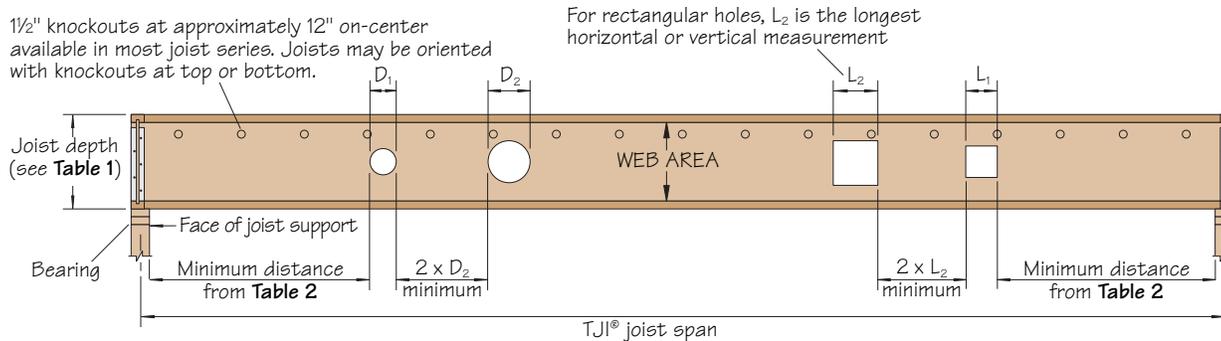


(1) 14 gauge staples may be a direct substitute for 8d nails if a minimum penetration of 1" into the flange is maintained.

- If more than one row of nails is used, offset rows at least ½" and stagger. Use 10d (3") common nails, maximum, and maintain ⅜" minimum edge distance. **Exception: Wind/Seismic Connections** (page 17) and **Shear Diaphragm Nailing** (page 19).
- Nailing pattern to be per plans and specifications, and nail spacing should comply with criteria listed on this page.
- For member stability, nail sheathing to the full length of the member (24" on-center, maximum).



Allowable Holes



DO NOT cut, drill, or notch flanges

Table 1 — Hole Size Factors and Locations

Round Hole Size	Rectangular Hole Size ⁽¹⁾	Joist Depth									
		11 7/8"	14"	16"	18"	20"	22"	24"	26"	28"	30" or 32"
2"	1 1/4"	A	A	A	4"	4"	4"	4"	4"	4"	4"
4"	2 1/4"	B	B	A	A	A	1'-3"	1'-3"	1'-3"	1'-3"	4"
6"	3 1/2"	E	C	C	B	B	A	A	A	A	1'-3"
8"	4 3/4"		E	D	C	C	B	B	A	A	
10"	6"			E	E	D	C	C	B	B	B
12"	7"					E	D	D	C	C	B
14"	8 1/4"						E	E	D	D	C
16"	9 1/2"							E	E	D	D
18"	10 3/4"								E	E	E
20"	12"										E

(1) Rectangular holes based on measurement of longest side; sizes given in the table are hole sizes, not duct sizes.

Table 2 — Hole Locations

Joist Span	Hole Factor				
	A	B	C	D	E
14'	1'-3"	2'-0"	2'-6"	3'-9"	5'-0"
16'	1'-3"	2'-3"	3'-3"	4'-6"	5'-9"
18'	1'-6"	3'-0"	4'-3"	5'-6"	6'-9"
20'	1'-9"	3'-0"	4'-3"	5'-6"	7'-0"
22'	2'-0"	3'-0"	4'-3"	5'-9"	7'-3"
24'	2'-3"	3'-3"	4'-6"	5'-9"	7'-6"
26'	2'-3"	3'-9"	4'-9"	6'-0"	7'-9"
28'	2'-6"	4'-0"	5'-3"	6'-6"	8'-0"
30'	2'-9"	4'-3"	5'-9"	7'-0"	8'-6"
32'	3'-0"	4'-6"	6'-0"	7'-6"	9'-3"
34'	3'-0"	5'-0"	6'-6"	8'-0"	9'-9"
36'	3'-3"	5'-0"	6'-9"	8'-6"	10'-3"

How to determine hole location

- Determine the joist depth and desired hole size and find hole factor (letter) or hole location (distance) in **Table 1**. If the table reports a hole factor, proceed to step 2.
- Refer to **Table 2**. The dimension shown where the joist span and hole factor from **Table 1** intersect is the required minimum distance from nearest edge of hole to inside face of support.

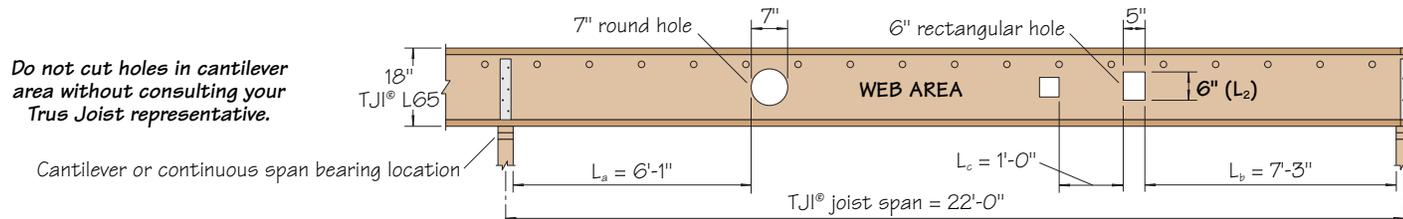
Special considerations

- Tables are based on:
 - Simple spans.
 - More restrictive of either uniform loads or code-required concentrated loads (2,000 lbs over 2 1/2 feet square and over two joists) with 25 psf dead and 20 psf partition load.
- Multiple holes require spacing 2 times the length of the largest hole.
- For joists continuous over a support, add 1" to distance shown in table for each foot of joist span (see **Example** below).

- Holes may be located vertically anywhere in the web. Leave 1/8" of web (minimum) at top and bottom of hole.
- Do not cut holes in cantilever area without consulting your Trus Joist representative.**

For concentrated loads or other conditions or exceptions, contact your Trus Joist representative.

Example: Find minimum distance from inside face of support to nearest edge of hole.



Round holes: For a 7" hole, find L_a :

- From **Table 1**, round up to 8" hole size, where hole factor is C.
- From **Table 2**, distance is 4'-3".
- Joist is continuous over the support nearest the hole, so increase L_a by 1" for each foot of span (22");
 $L_a = 4'-3" + 22" = 6'-1"$.

Rectangular holes: For a 6" hole, find L_b and L_c :

- From **Table 1**, hole factor is E.
- From **Table 2**, distance L_b is 7'-3". Hole is nearest to an end support, so no distance increase is required.
- Minimum distance between holes (L_c) = $2 \times L_2$; $L_c = 2 \times (6") = 1'-0"$.

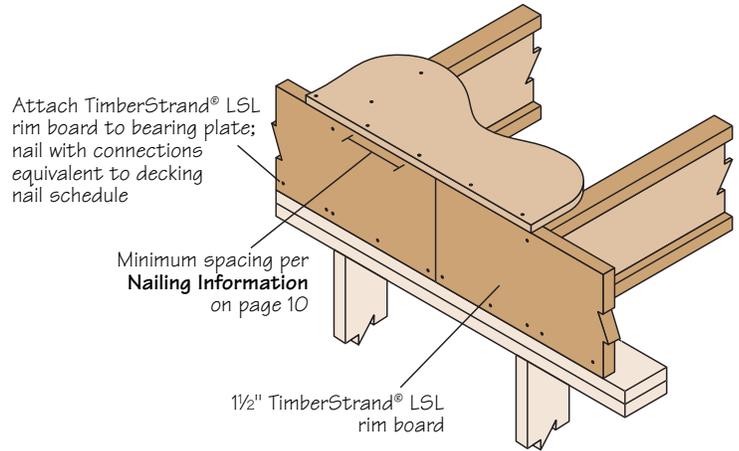
TimberStrand® LSL Rim Board

TimberStrand® LSL rim board (up to 24" in depth) is available from Trus Joist and may be used for:

- Shear transfer (nailing must be established by design).
- Vertical load transfer.
- General closure.
- Helping to prevent rollover during joist installation.

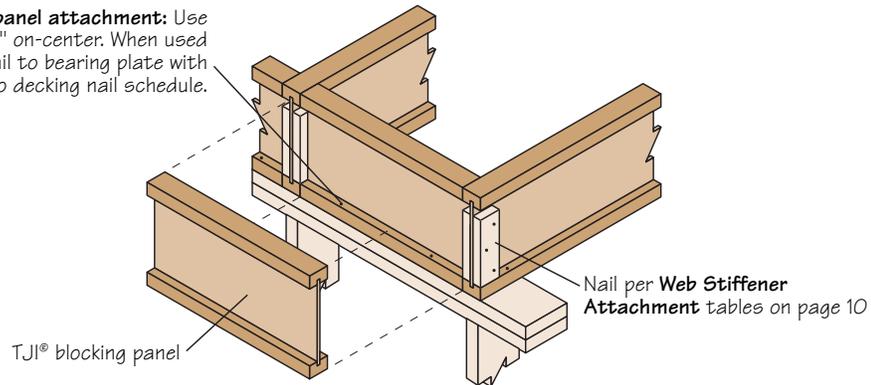
Vertical load transfer

When used for vertical load transfer, the allowable load for 1½" TimberStrand® LSL rim board is 4,140 lbs. Load may not be increased for duration of load.



TJI® Blocking Panels

Minimum TJI® blocking panel attachment: Use 10d (3") box nails at 6" on-center. When used for shear transfer, nail to bearing plate with connections equivalent to decking nail schedule.



TJI® blocking panels are available from Trus Joist and may be used for:

- Shear transfer. Shear transfer capacity is 1,925 lbs per linear foot; nailing must be established by design.
- Vertical load transfer.
- General closure.
- Helping to prevent rollover during joist installation.

When TJI® blocking panels are used for vertical load transfer the following values may be used:

Allowable Uniform Vertical Load Transfer (PLF)

TJI® Joist Series	TJI® Blocking Panel Depth						
	11 7/8"–14"	16"–20"	22"	24"	26"	28"	30"
TJI® L65 and TJI® L90	2,700	2,700	2,400	2,100	1,750	1,450	1,150
TJI® H90	3,150	2,700	2,400	2,100	1,750	1,450	1,150

- Loads are for TJI® blocking panels or TJI® joists as rim board.
- Loads shown may not be increased for duration of load.

Concentrated vertical loads

The allowable concentrated vertical loads on TJI® blocking panels or rim board can be determined by using the equation provided below. Loads exceeding the calculated value should be supported by squash blocks.

$$P_{\text{allow}} = W_{\text{allow}} \left[\frac{L_c + 2t_s + 2t_f}{12} \right]$$

Where:

- P_{allow} = Allowable concentrated vertical load (lbs)
- W_{allow} = Allowable uniform vertical load for blocking panel (plf)
- L_c = Bearing length of column on blocking panel (in.)
- t_s = Sheathing thickness (in.)
- t_f = Effective flange thickness: 7/8" for TJI® L65 and TJI® L90, 1 1/8" for TJI® H90

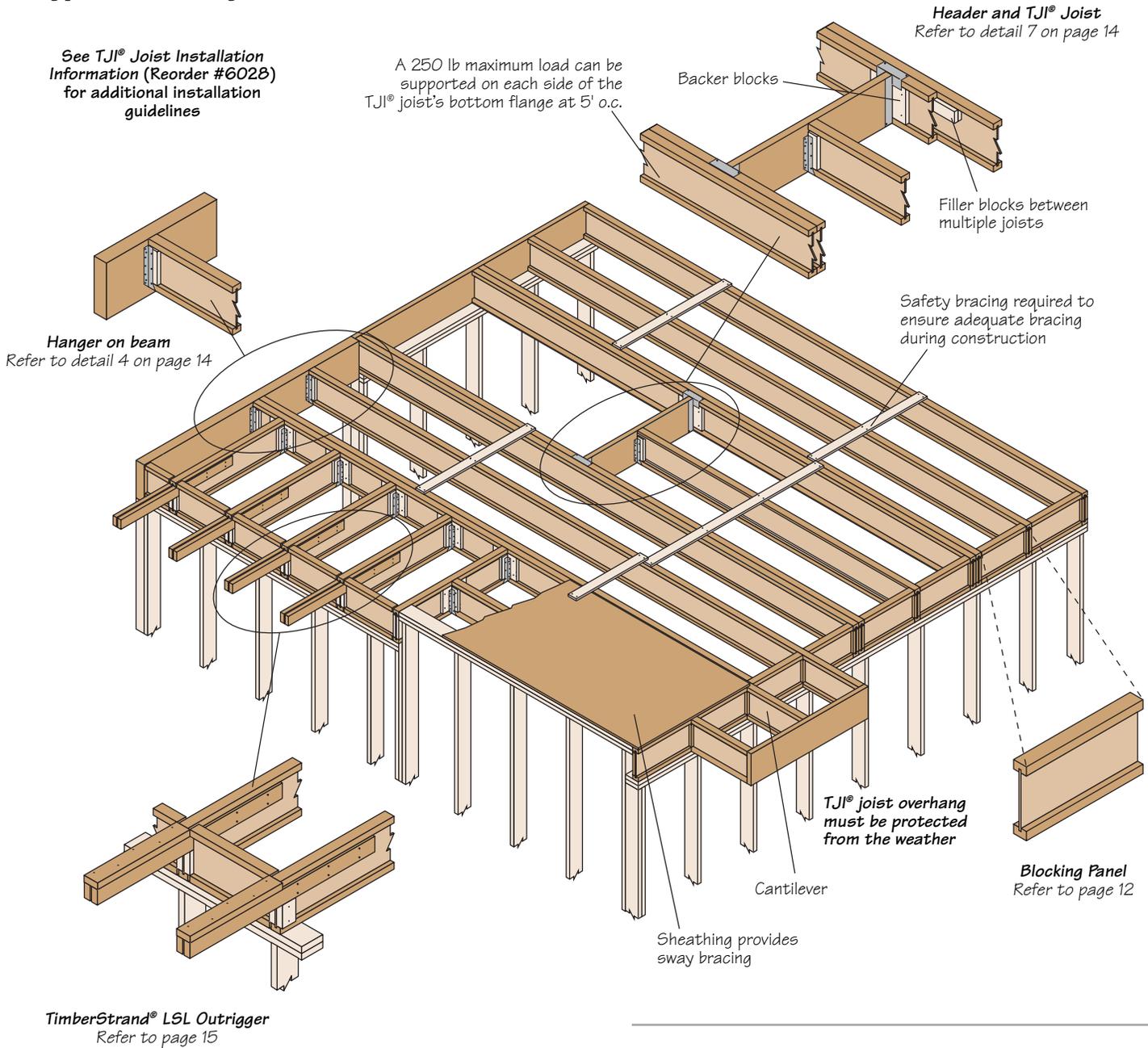
Example:

4x4 post applied to 20" TJI® L65 joist through 23/32" sheathing.

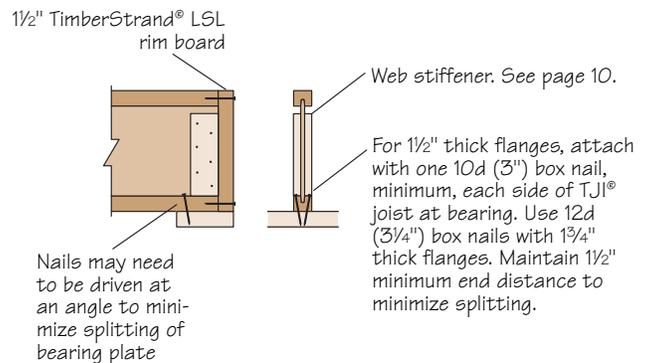
$$P_{\text{allow}} = 2,700 \left[\frac{3.5 + 2(23/32) + 2(7/8)}{12} \right] = 1,505 \text{ lbs}$$

Floor Details

Typical Floor System



1 Nailing TJI® Joist to Bearing Plate

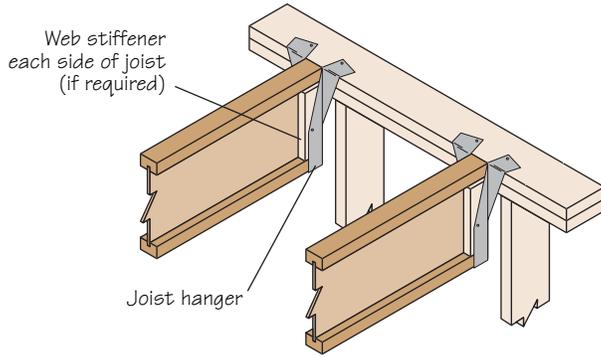


General Notes:

- Details shown on pages 13 through 18 are conceptual. Attachments and connections shall be made to the supporting structure in accordance with the specific design requirements.
- TimberStrand® LSL rim board or TJI® blocking panels (or an equivalent alternate) must always be used to prevent rollover and to provide structural attachment of the deck sheathing to the supporting structure in accordance with the specific design requirements.

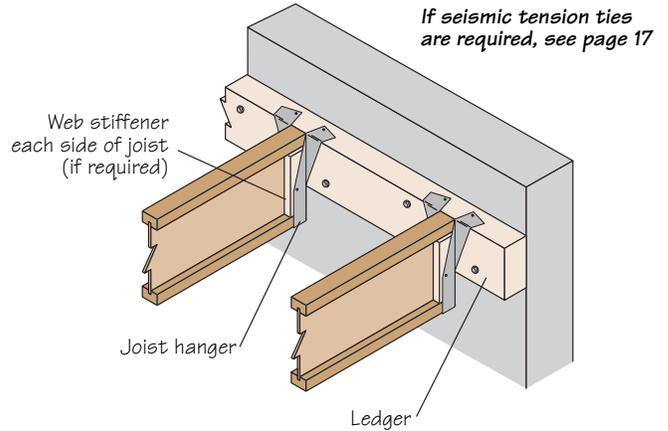
Floor Details

2 Hanger on Stud Wall

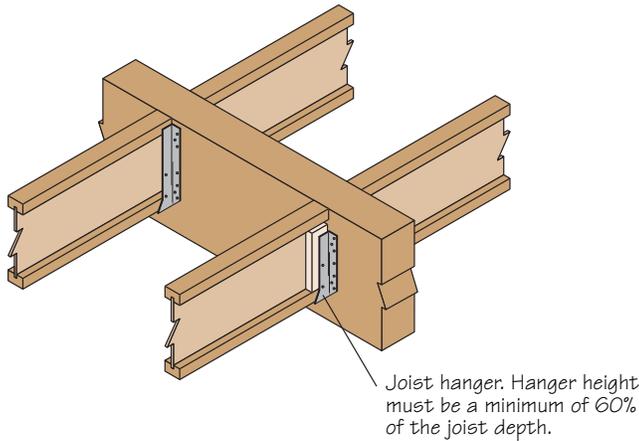


The potential for top plate rotation may reduce hanger capacities. Contact Trus Joist Commercial Engineering for assistance.

3 Hanger on Ledger

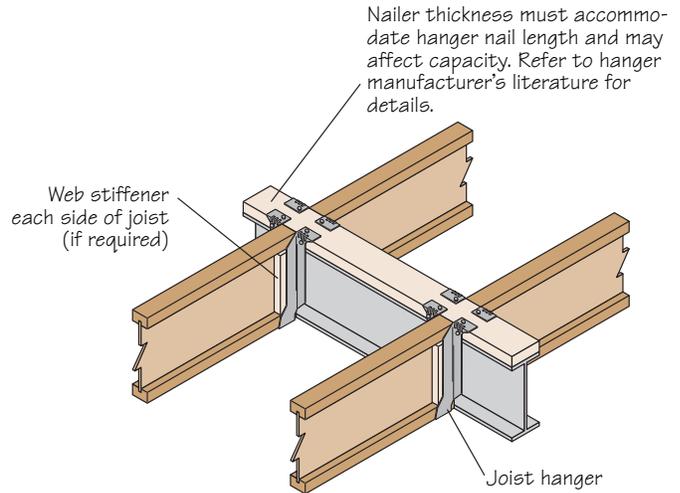


4 Hanger on Beam



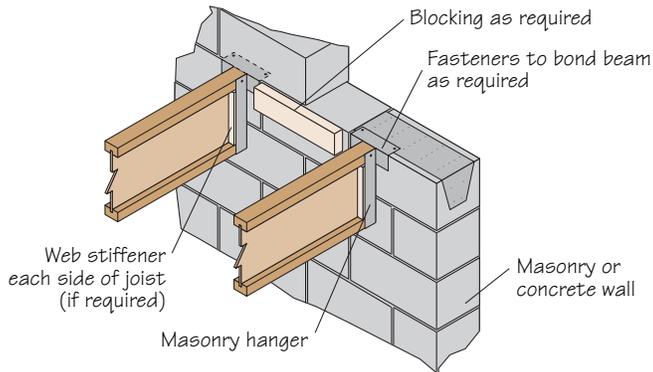
Web stiffeners are required if the sides of the hanger do not laterally support at least 3/8" of the TJI® joist top flange

5 Hanger on Steel Beam



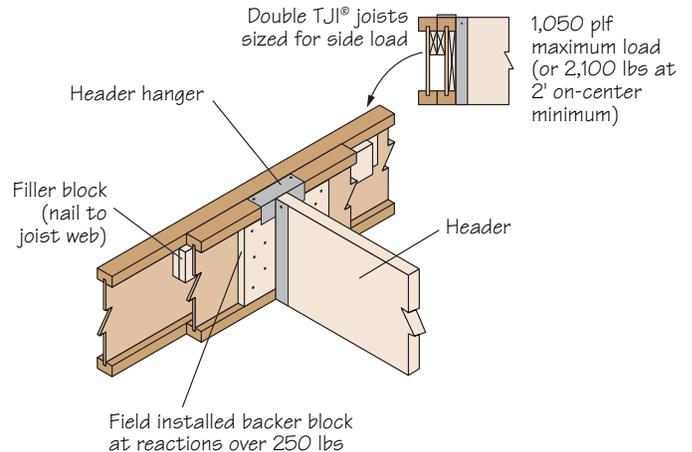
6 Hanger on Masonry Wall

If seismic tension ties are required, see page 17



Traditional masonry hangers will not support construction loads without a minimum amount of cured masonry construction above hanger level. Refer to hanger manufacturer's literature for information on the correct installation and use of masonry hangers.

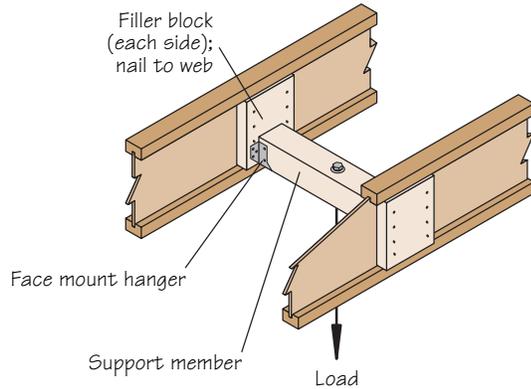
7 Side-Loaded Double Joist



When supported by a TJI® joist, maximum hanger capacity is approximately 2,000 lbs. Refer to hanger manufacturer's literature for details.

Floor Details

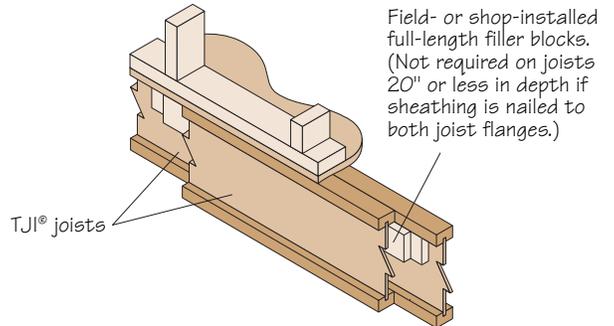
8 Support Detail



A 250 lb maximum load can be supported on each side of the TJI® joist bottom flange at 5'-0" o.c. provided the load is included in normal design loads. Use this detail for loads exceeding these limits.

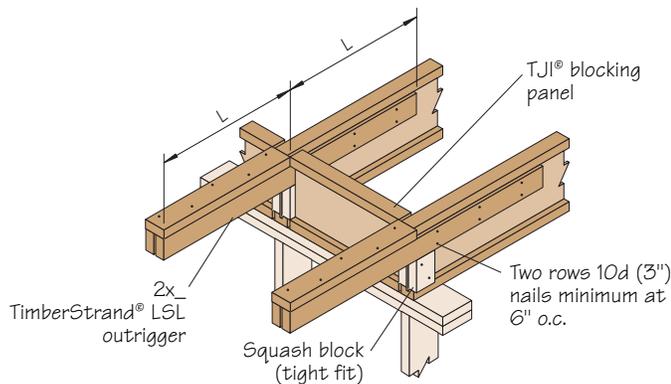
For additional information on supporting sprinkler systems, see the Sprinkler System Installation Guide (Reorder #1046).

9 Top-Loaded Double Joist



Outriggers

10 TimberStrand® LSL Outrigger



Single or double outrigger can be used, depending upon load. See table and notes for capacity.

The following specified strengths were used to develop the values:

1.3E Grade	1.5E Grade
$F_v = 400$ psi	$F_v = 400$ psi
$F_b = 1,700$ psi ⁽¹⁾	$F_b = 2,250$ psi ⁽¹⁾
$E = 1.3 \times 10^6$ psi	$E = 1.5 \times 10^6$ psi

(1) For 12" depth. For other depths, multiply by $\left[\frac{12}{d}\right]^{0.092}$

Cantilever Deflection:

- 2L/480 at floor live load (live load = 0.80 x total load)
- 2L/240 at roof total load
- Cantilever deflection = $\frac{WL^4}{8EI}$

TimberStrand® LSL outriggers and TJI® joists are intended for dry-use, untreated applications

TimberStrand® LSL Double 2x_ Outrigger Capacities

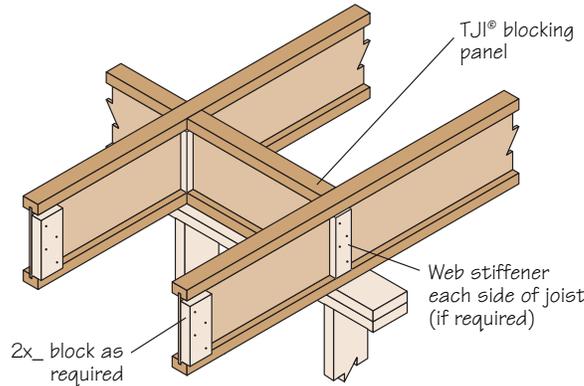
Outrigger Length L	Allowable Uniform Loads (plf)								
	1.3E Grade						1.5E Grade		
	Two 2x4			Two 2x6			Two 2x8		
	Floor	Snow Roof	Non-Snow Roof	Floor	Snow Roof	Non-Snow Roof	Floor	Snow Roof	Non-Snow Roof
24"	393	452	491	393	452	491	393	452	491
30"	258	358	389	384	442	463 ⁽¹⁾	384	442	463 ⁽¹⁾
36"	149	239	239	378	386 ⁽¹⁾	386 ⁽¹⁾	378	386 ⁽¹⁾	386 ⁽¹⁾
42"	94	150	150	330 ⁽¹⁾					
48"	63	101	101	244	289 ⁽¹⁾				
54"	44	71	71	172	257 ⁽¹⁾				
60"	32	52	52	125	200	200	231 ⁽¹⁾	231 ⁽¹⁾	231 ⁽¹⁾
66"				94	150	150	210 ⁽¹⁾	210 ⁽¹⁾	210 ⁽¹⁾
72"				72	116	116	191	193 ⁽¹⁾	193 ⁽¹⁾
78"				57	91	91	151	178 ⁽¹⁾	178 ⁽¹⁾
84"				46	73	73	121	165 ⁽¹⁾	165 ⁽¹⁾
90"				37	59	59	98	154 ⁽¹⁾	154 ⁽¹⁾
96"							81	129	129

(1) Values are limited by plate bearing stress, assuming a 3½" wide SPF plate ($F_{c2} = 425$ psi). Other conditions may apply. Plate bearing stress shall not be increased for duration of load.

- **Bold italic** values may be increased 4% for repetitive-member use if three or more adjacent members are joined by load distributing elements and are spaced no more than 24" on-center.
- Single 2x_ outriggers are permitted with TJI® joists; use half of the allowable load shown for double outriggers.

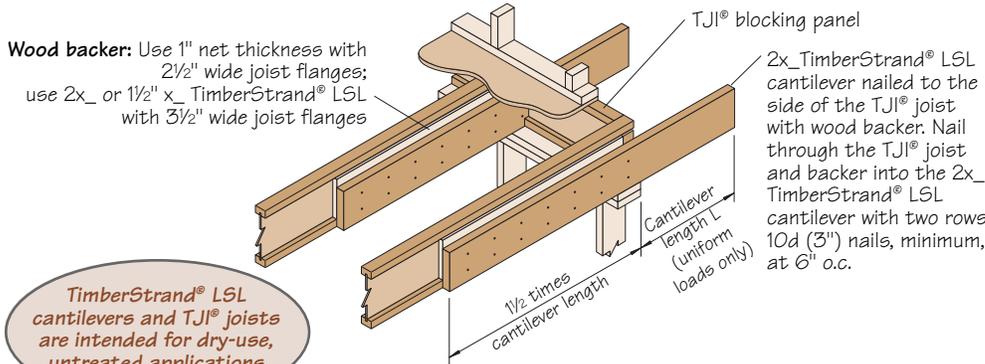
Cantilever Details

11 TJI® Joist Cantilever



TJI® joists are intended for dry-use applications

12 TimberStrand® LSL Cantilever



TimberStrand® LSL cantilevers and TJI® joists are intended for dry-use, untreated applications

The following specified strengths were used to develop the values:

1.3E Grade	1.5E Grade
$F_v = 400$ psi	$F_v = 400$ psi
$F_b = 1,700$ psi ⁽¹⁾	$F_b = 2,250$ psi ⁽¹⁾
$E = 1.3 \times 10^6$ psi	$E = 1.5 \times 10^6$ psi

(1) For 12" depth. For other depths, multiply by $\left[\frac{12}{d}\right]^{0.092}$

Cantilever Deflection:

- 2L/480 at floor live load (live load = 0.80 x total load)
- 2L/240 at roof total load
- Cantilever deflection = $\frac{WL^4}{8EI}$

TimberStrand® LSL Single 2x_ Cantilever Capacities

Cantilever Length L	Allowable Uniform Loads (plf)														
	1.3E Grade						1.5E Grade								
	2x4			2x6			2x8			2x10			2x12		
Floor	Snow Roof	Non-Snow Roof	Floor	Snow Roof	Non-Snow Roof	Floor	Snow Roof	Non-Snow Roof	Floor	Snow Roof	Non-Snow Roof	Floor	Snow Roof	Non-Snow Roof	
24"	243	279	304	393	452	491	393	452	491	393	452	491	393	452	491
30"	129	179	194	368	424	460	384	442	463 ⁽¹⁾	384	442	463 ⁽¹⁾	384	442	463 ⁽¹⁾
36"	75	119	119	256	294	320	378	386 ⁽¹⁾	386 ⁽¹⁾	378	386 ⁽¹⁾	386 ⁽¹⁾	378	386 ⁽¹⁾	386 ⁽¹⁾
42"	47	75	75	182	216	235	330 ⁽¹⁾								
48"	31	50	50	122	165	180	289 ⁽¹⁾								
54"	22	35	35	86	131	137	227	257 ⁽¹⁾							
60"	16	26	26	63	100	100	165	231 ⁽¹⁾							
66"				47	75	75	124	196	199	210 ⁽¹⁾					
72"				36	58	58	96	153	153	193 ⁽¹⁾					
78"				28	46	46	75	120	120	156	178 ⁽¹⁾				
84"				23	36	36	60	96	96	125	165 ⁽¹⁾				
90"				19	30	30	49	78	78	102	154 ⁽¹⁾				
96"							40	65	65	84	134	134	145 ⁽¹⁾	145 ⁽¹⁾	145 ⁽¹⁾

(1) Values are limited by plate bearing stress assuming a 3/2" wide SPF plate ($F_{CL} = 425$ psi). Other conditions may apply. Plate bearing stress shall not be increased for duration of load.

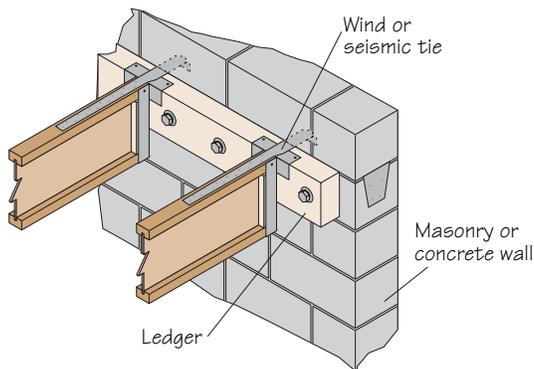
• **Bold italic** values may be increased 4% for repetitive-member use if three or more adjacent members are joined by load distributing elements and are spaced no more than 24" on-center.

• Double 2x_ cantilevers are permitted with TJI® joists; contact your Trus Joist representative for sizing and nailing information.

Wind/Seismic Connections

Trus Joist structural composite lumber flanges may be used for out-of-plane wall anchorage to flexible diaphragms in lieu of the minimum 2½" wood element thickness specified in Item 5 of Section 1633.2.8.1 of the UBC. Trus Joist has obtained code approval for these types of connections; refer to ICC ES Report No. ESR-1153 for information.

13 Wall Tension Tie—With Straps



Strap Tension Tie Nailing and Capacities

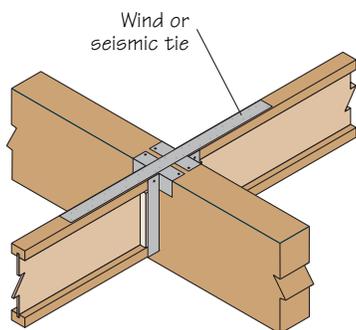
Simpson Strap Model	Strap Length	10d (1½") Common Nails ⁽¹⁾		Allowable Loads (lbs)			
		Masonry	Concrete	Masonry		Concrete	
				133%	160%	133%	160%
1¾" Microllam LVL or 3x Ledger							
PAI18	18"	8 nails	10 nails	1,000	1,205	1,255	1,505
PAI23	23"	13 nails	15 nails	1,630	1,955	1,880	2,255
PAI28	29"	19 nails	21 nails	2,380	2,815	2,630	3,160
PAI35	35"	24 nails	27 nails	2,815	2,815	3,385	3,685
MPAI32 ⁽²⁾	32"	16 nails	16 nails	1,960	2,355	1,960	2,355
MPAI44 ⁽²⁾	44"	24 nails	24 nails	2,865	2,865	2,865	2,865
4x Ledger							
PAI18	18"	7 nails	9 nails	875	1,055	1,130	1,355
PAI23	23"	12 nails	14 nails	1,505	1,805	1,755	2,105
PAI28	29"	18 nails	20 nails	2,255	2,705	2,505	3,010
PAI35	35"	23 nails	26 nails	2,815	2,815	3,260	3,685
MPAI32 ⁽²⁾	32"	16 nails	16 nails	1,960	2,355	1,960	2,355
MPAI44 ⁽²⁾	44"	24 nails	24 nails	2,865	2,865	2,865	2,865

(1) 10d (3") nails are permitted with same design values.

(2) Requires 3½" wide flanges.

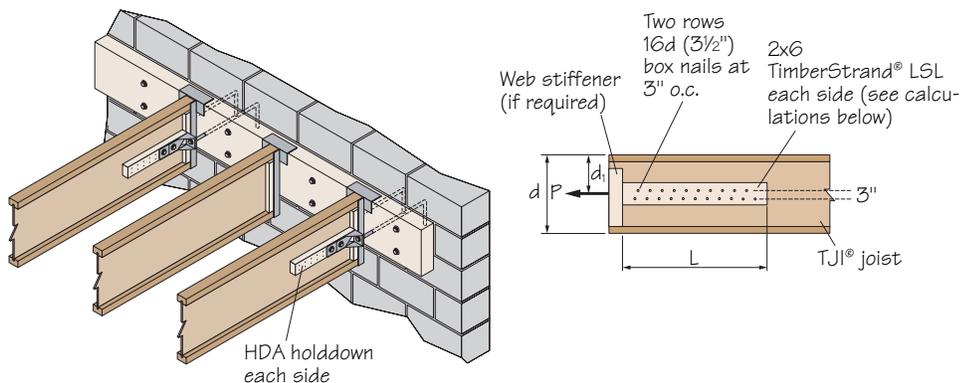
14 Wind or Seismic Tie at Butting Joists

Tension straps must have a minimum nail spacing of 3" on-center per row, with a minimum of ⅜" between rows and maximum nail diameter of 0.148" (10d common).



See strap manufacturer's literature for allowable loads.

15 Wall Tension Tie—HDA Connections



To calculate the length of the TimberStrand® LSL block (to transfer shear to joist flange):

$$1. \text{ Find } L_1 = \frac{0.75(P/K)d_1}{C_D V_A - [V_{DL} + (0.75V_{LL})]}$$

$$2. \text{ Find } L_2 = \frac{3}{2}(n) + 3, \text{ where } n = \frac{P}{V_n C_D}$$

3. Compare L_1 and L_2 . Use maximum of the two values for the length of the TimberStrand® LSL block.

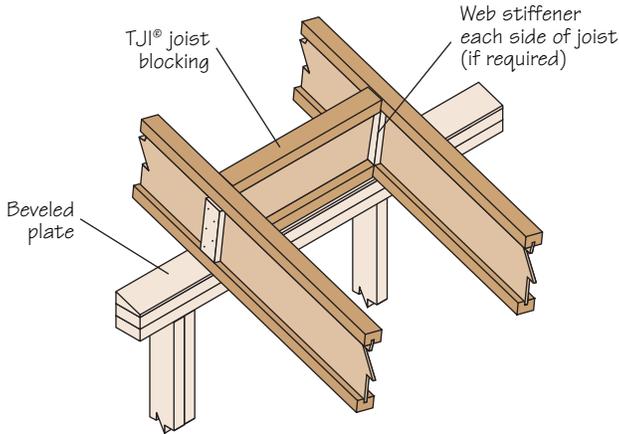
- C_D = Load duration factor
- d_1 = Distance to axial load (in.) from top of joist
- L_1, L_2 = Length of block (ft)
- K = 1.0 for wind; 1.4 for seismic (accounts for strength-based seismic load)
- n = Number of nails
- P = Axial load (lbs)
- V_A = Allowable shear load (lbs) for TJI® joist (see page 5)
- V_{DL} = Shear load due to gravity dead load (lbs)
- V_{LL} = Shear load due to gravity live load (lbs)
- V_n = See table below

16d Nail Shear Capacity

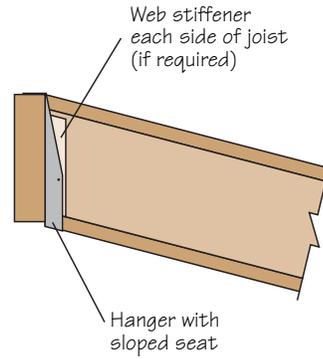
TJI® Web Thickness	V_n (100%) in lbs
3/8"	164
7/16"	169
1/2"	175

Roof Details

16 Slope Detail

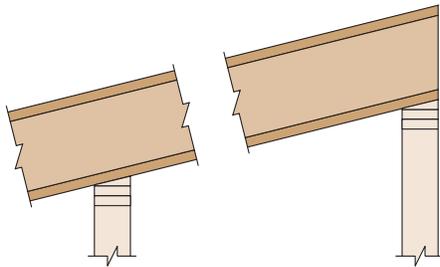


17 Slope Detail at High End



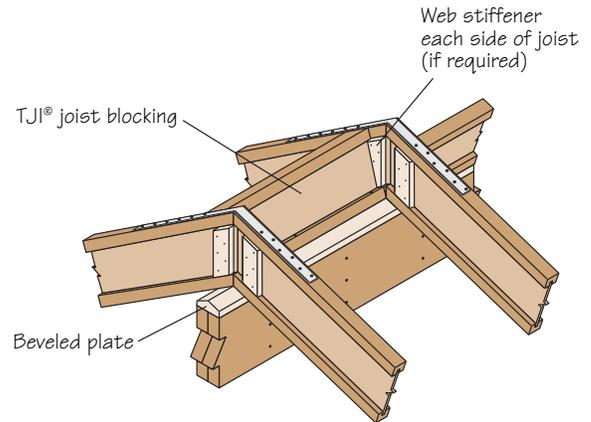
Sloped seat hangers required when slope exceeds 1/2" in 12". Hanger manufacturers may require sloped seat hangers at lesser slopes.

18 Beveled Plate Requirements



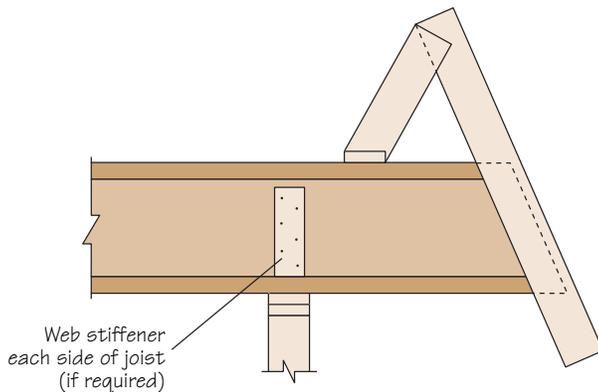
Required Bearing Length	Maximum Slope Without Beveled Plate
1 3/4"	1/2" in 12"
3 1/2"	1/4" in 12"
5 1/2"	1/8" in 12"

19 Ridge Detail

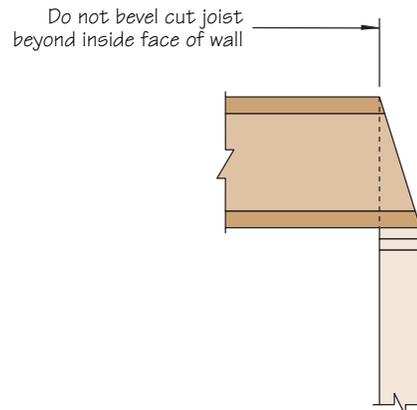


A strap and alternating blocking panels, or two rows of blocking panels, are required for lateral stability.

20 Cantilever with Mansard Framing



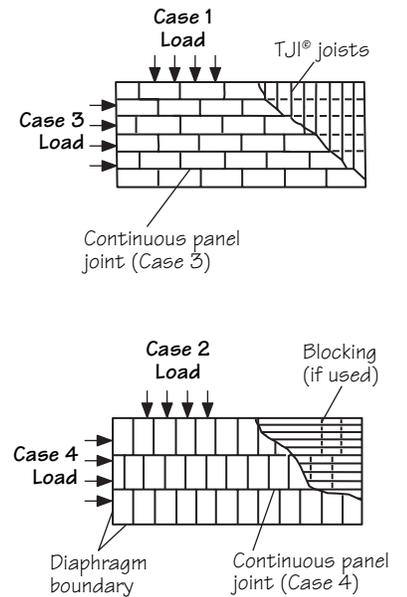
21 Bevel Cut or Fire Cut



Shear Diaphragm Nailing

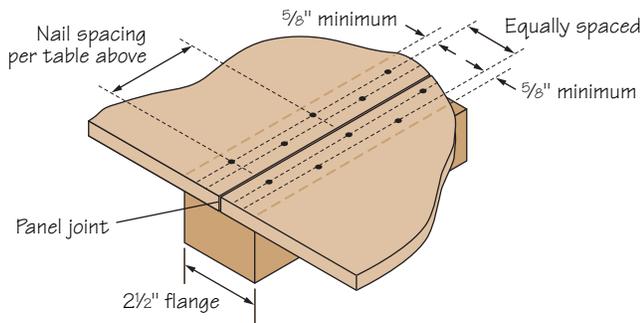
Allowable Shear (in PLF) for Horizontal Blocked Diaphragms and 2½" or Wider TJI® Joists

Panel Grade	Minimum Panel Thickness	Flange Width	Rows of 10d Common Nails	Nail spacing per row at diaphragm boundaries and at continuous panel joints for Cases 3 and 4			
				4"	3"	3"	2½" ⁽¹⁾
				Nail spacing per row at other panel edges			
				6"	5"	4"	3"
Structural I Plywood	15/32"	2½", 3½"	1	440	500	590	740
		2½"	2	640	750	920	1,190
		3½"	2	750	870	1,060	1,370
		3½"	3	920	1,080	1,330	1,740
	19/32"	2½", 3½"	1	490	560	660	800
		2½"	2	700	820	1,000	1,280
		3½"	2	830	960	1,160	1,490
		3½"	3	1,000	1,180	1,450	1,890
	23/32"	2½", 3½"	1	510	580	690	870
		2½"	2	750	870	1,070	1,390
		3½"	2	870	1,020	1,230	1,600
		3½"	3	1,070	1,260	1,550	2,040
Other Plywood or Sheathing Grades	15/32"	2½", 3½"	1	360	420	510	670
		2½"	2	580	690	860	1,140
		3½"	2	670	790	980	1,290
		3½"	3	860	1,030	1,270	1,690
	19/32"	2½", 3½"	1	380	450	550	720
		2½"	2	630	750	920	1,220
		3½"	2	720	850	1,050	1,380
		3½"	3	920	1,100	1,370	1,810
	23/32"	2½", 3½"	1	420	490	600	780
		2½"	2	690	820	1,010	1,330
		3½"	2	780	930	1,150	1,510
		3½"	3	1,010	1,200	1,490	1,980

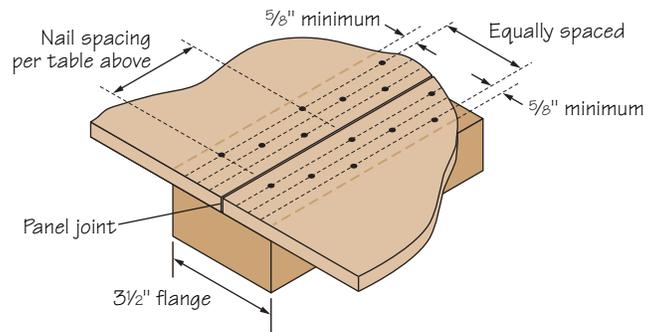


(1) 10d common nails closer than 3" on-center must be nailed into TimberStrand® LSL edge blocking.

2½" Wide Flanges



3½" Wide Flanges



General Notes

References APA Research Report 138.

Assumptions:

- Panels conform to PS1 or PS2.
- Values are for short-term loads due to wind or earthquake.
- Blocking at panel and diaphragm boundaries must meet or exceed the flange width.
- Shear values are based on 24" joist spacing for 15/32" panels, 32" for 19/32" panels, and 48" for 23/32" panels.
- Shear values have been derived from code-recognized methodologies.

Nailing:

- Values require 1½" penetration of 10d common nails into the member.
- Multiple rows of nails require special inspection. Maintain 5/8" minimum edge distance and approximately 3/8" minimum spacing between rows.
- Number of nail rows applies to both boundary nailing and to nailing at other panel edges.

Intermediate framing members:

- Space nails 12" on-center, except when joist spacing is greater than 32", in which case nail spacing should be 6" on-center.

Fire and Sound

Fire Assembly Details

For Fire Assemblies and other construction-related fire information, please refer to our *Fire Facts Guide* (Reorder #5003), or visit the Fire and Sound section of our website at www.trusjoist.com, under Products/Technical Design Information.

Sound Assemblies and Noise Measurement

The ability of a wall or floor/ceiling system to reduce airborne sound transmission is measured using ASTM E 90, and reported using the ASTM E 413 Sound Transmission Class (STC) rating system. The table on the right, from the Acoustical and Insulation Materials Association, provides practical references for a range of STC numbers. In general, the higher the number, the better the acoustical performance. It is important to note that this table is valid only for a given level of background noise and should be used only for generalized comparisons.

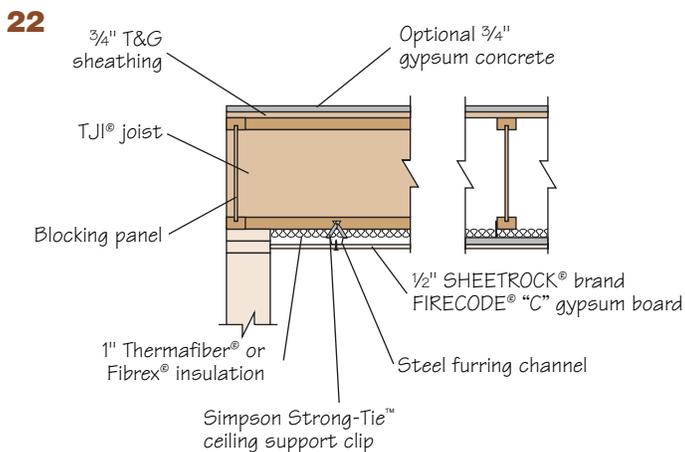
Floor/ceiling systems can also be rated for impact noise transmitted through an assembly. Ratings are determined using the ASTM E 492 Impact Insulation Class (IIC) system, and like STC ratings, a high IIC rating indicates significantly reduced impact noise.

STC Ratings

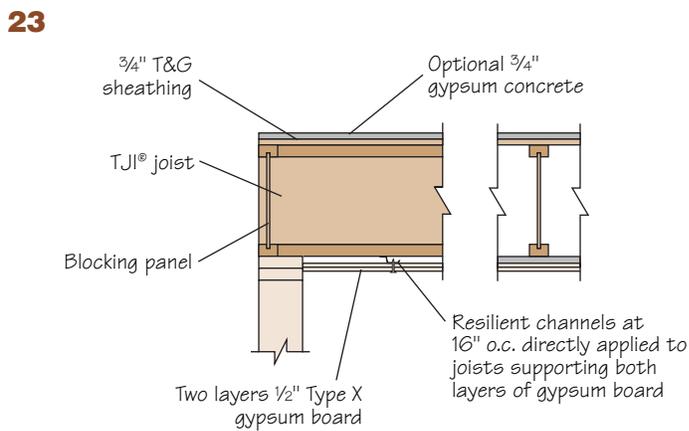
- 25 Normal speech can be understood quite clearly
- 30 Loud speech can be understood fairly well
- 35 Loud speech audible but not intelligible
- 42 Loud speech audible as a murmur
- 45 Must strain to hear loud speech
- 48 Some loud speech barely audible
- 50 Loud speech not audible

Testing

The acoustical assemblies provided below have been tested and rated by recognized acoustical laboratories, and the ratings shown are well within the acceptable range for multi-family buildings. However, in order to achieve these ratings, precautions should be taken to prevent flanking noise and sound leaks, and to ensure that actual construction conforms to the assembly shown.

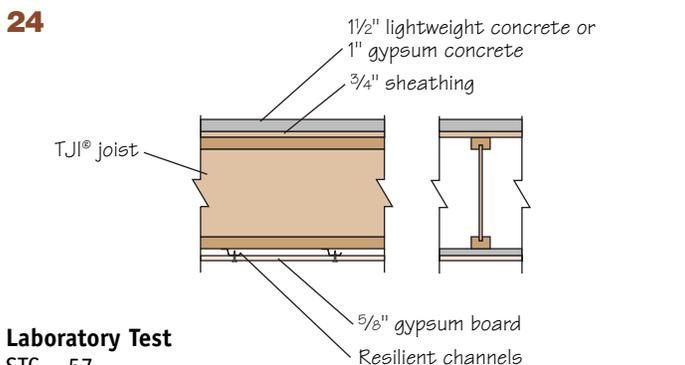


Without Gypsum Concrete	With Gypsum Concrete
STC = 47	STC = 59
Pad and carpet IIC = 54	Pad and carpet IIC = 54
Cushioned vinyl IIC = 43	Cushioned vinyl IIC = 43

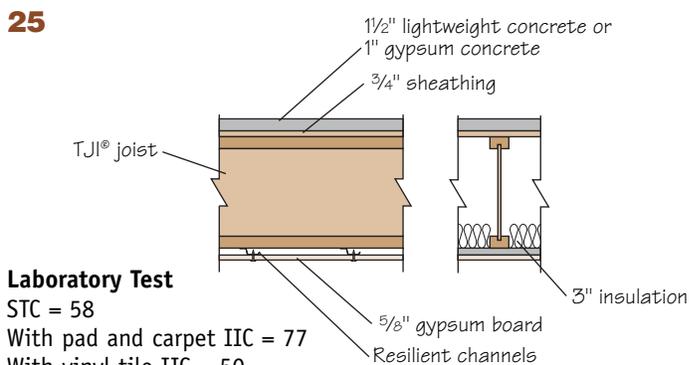


Without Gypsum Concrete	With Gypsum Concrete
STC = 50	STC = 58
Pad and carpet IIC = 60	Pad and carpet IIC = 54
Cushioned vinyl IIC = 45	Cushioned vinyl IIC = 46
Tarkett Acoustiflor® IIC = 51 ⁽¹⁾	Tarkett Acoustiflor® IIC = 54 ⁽¹⁾

(1) Requires two layers of 5/8" Type X gypsum board with one layer of 3 1/2" thick batt insulation.



Laboratory Test
STC = 57
G&H No. USDA-11xST



Laboratory Test
STC = 58
With pad and carpet IIC = 77
With vinyl tile IIC = 50
G&H No. USDA-11xST

Deflection Criteria

Trus Joist Recommended Deflection Criteria

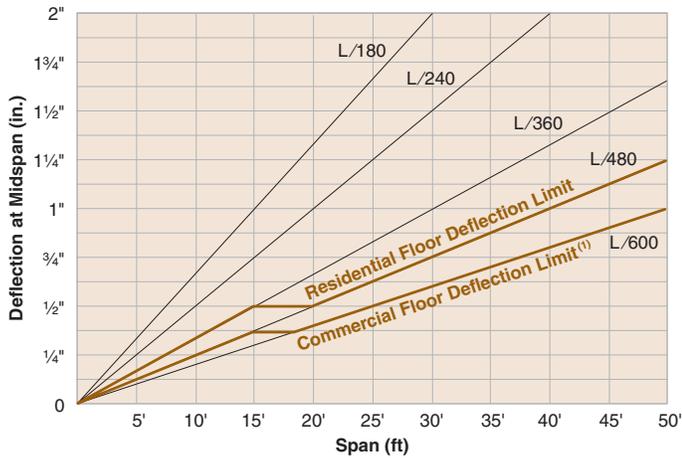
Full-scale tests have shown repeatedly that Trus Joist products have deflection characteristics that are consistently predictable by calculation, with negligible set after load withdrawal.

The graph below shows that Trus Joist's recommended deflection limit for residential and commercial floors is more

restrictive than the minimum of L/360 required by building codes. The floor load portions of the tables shown on pages 6 and 7 were developed based on the **Commercial Floor Deflection Limit** shown in the graph below.

Deflection criteria will vary by application. In a roof system, excessive deflection

would be unsightly and could cause ceiling cracks and/or drainage problems. Floor systems, however, have entirely different—and usually much more restrictive—deflection requirements due to an occupant's perception of floor performance and feel. For more information on floor performance, see page 8.



Floors:

- Maximum deflection at live load is limited as indicated above.

Roofs:

- 1/4" to 12" per foot, maximum deflection L/180 at total load
- Plaster ceilings — also check L/360 at live load

⁽¹⁾ For live load applications greater than 50 psf, check the L/600 deflection limit using a 50 psf live load (movable partitions need not be considered), and check the code prescribed deflection limit using the full live load.

Deflection Calculations

The deflection characteristics of TJI® joists can be closely approximated by analyzing beams using the EI values for flexural deflections shown in the Design Properties table on page 5. The EI values selected from the Design Properties table must be determined by application (i.e., for roof applications use the EI for joists; for floor applications use the EI for nailed panels or glue-nailed panels).

For uniformly loaded simple spans, the mid-span deflection (in inches) can be calculated as shown at right:

TJI® L65, L90, and H90 Joists:

$$\Delta = \frac{22.5wL^4}{EI} + \frac{2.26wL^2}{d \times 10^5}$$

(The second function is shear deflection)

Where:

- w = Uniform load in plf
- L = Span in feet
- d = Depth of TJI® joist in inches
- EI = Value from the proper column in the **Design Properties** table (page 5)

Example:

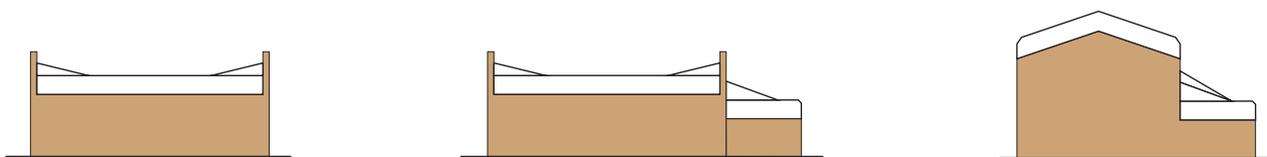
14" TJI® L65 floor joist
Nailed floor sheathing
20' span floor
100 plf uniform load

$$\Delta = \frac{22.5 \times 100 \times 20^4}{752 \times 10^6} + \frac{2.26 \times 100 \times 20^2}{14 \times 10^5} = 0.54"$$

In this same example, if the deck was glue-nailed to the TJI® joists the deflection would reduce to:

$$\Delta = \frac{22.5 \times 100 \times 20^4}{821 \times 10^6} + \frac{2.26 \times 100 \times 20^2}{14 \times 10^5} = 0.50"$$

Snowdrift Loading



Wind direction, site exposure, and roof type and shape are some of the factors that can dramatically influence the accumulation of snow on a roof structure. ASCE 7 (*Minimum Design Loads for Buildings and Other Structures*) and the applicable building code, as well as other local state and regional codes, provide guidelines for calculating snowdrift loadings on all types of building construction.

Drifts usually occur at locations of discontinuity in a roof such as at parapet walls, valleys, or where a high roof meets a low roof. Closer on-center spacing or additional support may be required at these locations. The examples above illustrate potential snowdrift conditions.

The project design professional is ultimately responsible for determining any additional loads due to snow drifting.

Technical Support and Analysis

Technical Support Organization and Functions

Trus Joist has an extensive network of sales offices, and engineering departments staffed by professional engineers and designers. Their role is to provide technical support and service to our field representatives, the professional design community, and the manufacturing plants. Engineering department personnel have access to extensive test data, production standards, building code product acceptance criteria, and the most current computer design software.

The engineering departments work closely with our field representatives and can provide the following services:

- Review and analysis of potential applications submitted by our field representatives

- Drawings showing placement, bearing conditions, dimensions and installation suggestions
- Custom design of the product
- Assistance in resolving field problems should they arise

This design guide contains technical data and design information frequently required by the design professional when using our products. Because of the variety of possible conditions, the design professional is encouraged to request support from Trus Joist engineering through one of our technical representatives.

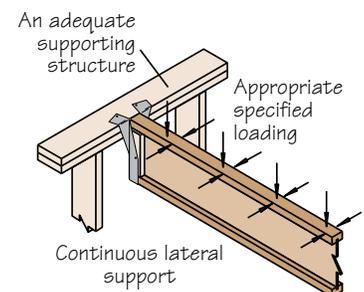
Product Application Assumptions

We must presume that there will be an adequate supporting structure for our products. Trus Joist's role is not to design the entire structure, nor can we assume accountability for the full function of the roof or floor system. We can only be responsible for the internal design integrity of our own products, which are structural components of roof and floor systems necessarily designed by others.

We also presume continuous lateral support to the compression flange of our products unless specific design provisions account for other lateral support conditions. Continuous lateral support is provided by 8d (2½") nails at 24" on-center (minimum) for TJI® joists that are connected to an adequate diaphragm or total lateral strength system.

The magnitude, direction, and location of all design loads are presumed to be as specified by the building designer. The review of this loading by our personnel is only for purposes of designing our product.

Other application assumptions are referenced on the terms and conditions of our purchase agreement contract.

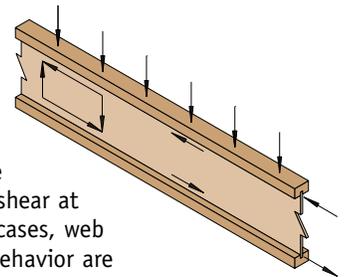


Analysis Procedure—TJI® Joists

Using the allowable stresses found in our code approvals, TJI® joists are analyzed according to the procedures outlined in ASTM D 5055. Bending capacity is determined using the net area of the flanges (rout area deducted) as sole flexural strength, while stiffness considers the contributions of the web material as well. Shear and reaction capacity have been established through product tests, and properties are routinely confirmed through on-going quality control testing. Local web buckling in high shear locations, as well as bearing load transfer to the web, may require reinforcement of the web (usually by use of web stiffeners). Web stiffener requirements and fastening details have been established by test.

The composite nature of the TJI® joist results in multiple control mechanisms—all of which are accounted for in testing but are

generally unrelated to the shear mechanics of solid joists and timbers. For this reason, ignoring loads near supports is not generally appropriate, and the basic design shear is the vertical shear at the face of the support. In some cases, web confinement and inelastic beam behavior are observed to cause increases in shear strength during testing of members that are continuous over a support. Deflection of TJI® joists is closely predicted through flexural and shear deflection analysis, using composite action with the sheathing for nailed or glue-nailed attachments.



Concentrated and Non-Uniform Loads

For the most efficient use of Trus Joist products resisting concentrated loads, non-uniform loads, and/or in conditions other than simple spans, consult TJ-Beam® design software or your Trus Joist representative for precise sizing. As a general rule, extra members should be added to the system to carry concentrated loads such as

bearing partitions, air-conditioners, and other mechanical equipment. Handling concentrated loads in this manner usually provides the most economical system and also helps ensure more uniform deflection.

Treated Products

Preservative-treated Trus Joist products are available and they require special design considerations. Refer to *Preservative*

Treatment Guide (Reorder #5020) or contact your Trus Joist representative for more information.

Material Weights

Refer to local building codes for live load design requirements.

Composition Roofing

2-15 and 1-90 lb	1.7 psf
3-15 and 1-90 lb	2.2 psf
3-ply and gravel	5.6 psf
4-ply and gravel	6.0 psf
5-ply and gravel	6.5 psf
Insulated Roof Membrane Assembly (IRMA)	
2" thick	13.0 psf
Single-ply roofs (insulation not included)	
Ballasted system	13.0 psf
Mechanically fastened	2.0 psf
Fully adhered	2.0 psf

Douglas Fir Sheathing*

(Based on 36 pcf for plywood, 40 pcf for OSB)

1/2" plywood	1.5 psf
5/8" plywood	1.8 psf
3/4" plywood	2.3 psf
1 1/8" plywood	3.4 psf
1/2" OSB	1.7 psf
5/8" OSB	2.0 psf
3/4" OSB	2.5 psf
7/8" OSB	2.9 psf
1 1/8" OSB	3.7 psf

*For southern pine weights, increase Douglas fir weights by 10%.

Miscellaneous Roofing Materials

Corrugated galvanized steel	
16 ga.	2.9 psf
20 ga.	1.8 psf
22 ga.	1.5 psf
24 ga.	1.3 psf
Asphalt shingles	2.5 psf
Wood shingles	2.0 psf
Clay tile	9.0 to 14.0 psf
Slate (3/8" thick).	15.0 psf

Rigid Insulation (1" thick)

Hemlock	1.2 psf
Cork	0.7 psf
Gold bond	1.5 psf
Polystyrene foam	0.2 psf
Foamglass	0.8 psf
Rigid fiberglass	1.5 psf

Roll or Batt Insulation (1" thick)

Rock wool	0.2 psf
Glass wool	0.1 psf

Floors

Hardwood (nominal 1")	4.0 psf
Concrete (1" thick)	
Regular	12.0 psf
Lightweight	8.0 to 10.0 psf
Gypsum concrete (3/4" thick)	6.5 psf
Sheet vinyl	0.5 psf
Carpet and pad	1.0 psf
3/4" ceramic or quarry tile	10.0 psf

Ceilings

Acoustical fiber tile	1.0 psf
1/2" gypsum board	2.2 psf
5/8" gypsum board	2.8 psf
Plaster (1" thick).	8.0 psf
Metal suspension system (including tile)	1.8 psf

To calculate total dead load, use a minimum of 1.5 psf for "miscellaneous" with all dead loads

Weights of Douglas Fir Framing Members*

Nominal Size (in.)	Joist Spacing		
	12"	16"	24"
2x4	1.4 psf	1.1 psf	0.7 psf
2x6	2.2 psf	1.7 psf	1.1 psf
2x8	2.9 psf	2.2 psf	1.5 psf
2x10	3.7 psf	2.8 psf	1.9 psf
2x12	4.4 psf	3.3 psf	2.2 psf
3x6	3.6 plf		
4x6	5.0 plf		
4x8	6.8 plf		
4x10	8.6 plf		
4x12	10.4 plf		

*For southern pine weights, increase Douglas fir weights by 10%.

Weights of Sprinkler Lines

Size of Pipe	Schedule 40, Standard Pipe		Schedule 10, Thin Wall Pipe	
	Dry (plf)	Wet (plf)	Dry (plf)	Wet (plf)
1"	1.7	2.1	1.4	1.8
1 1/4"	2.3	3.0	1.8	2.5
1 1/2"	2.7	3.6	2.1	3.1
2"	3.7	5.2	2.7	4.2
2 1/2"	5.8	7.9	3.6	5.9
3"	7.6	10.8	4.3	8.0
3 1/2"	9.2	13.5	5.0	9.8
4"	10.9	16.4	5.6	11.8
5"	14.8	23.5	7.8	17.3
6"	19.2	31.7	9.3	23.1
8"	28.6	50.8	16.9	40.1
10"	40.5	74.6		

• For additional information on sprinkler systems, refer to Trus Joist's *Sprinkler System Installation Guidelines* (Reorder #1046).

Approximate Weights of Trus Joist Open-Web Products

Series	PLF Weight
TJL™ or TJLX™	3.75–4.25
TJW™	4.50–5.25
TJS™	4.75–5.75
TJM™	8.00–9.00
TJH™	10.00–12.00

• For TJI® L65, TJI® L90, and TJI® H90 joist weights, see **Design Properties** on page 5.

Questions and Answers

Q1: What type of certification and quality assurance do TJI® joists have?

A1: Trus Joist's TJI® joists are manufactured in accordance with rigorous standards, and they are monitored by a third-party quality control agency (PFS Corporation). These standards are documented in current evaluation reports in major model building codes, which are also referenced in this guide.

Q2: What types of adhesives are used in TJI® joists, and are they waterproof?

A2: TJI® joists are manufactured using waterproof, thermoset adhesives such as resorcinol, phenol formaldehyde, and diphenylmethane diisocyanate (MDI). These adhesives all meet the requirements of ASTM standard D 2559-92.

Q3: What is the level of formaldehyde emissions from the adhesives in your TJI® joists?

A3: It is less than 0.10 parts per million (ppm).

Independent third party testing⁽¹⁾⁽²⁾ shows that products manufactured with these adhesives do not emit significant amounts of formaldehyde. When tested in accordance with the ASTM large chamber test⁽³⁾, the formaldehyde emissions of these products were below 0.10 ppm, which is below even the most stringent regulatory requirements. In fact, emissions were so low that they cannot be distinguished from background levels of formaldehyde in the fresh air used during testing.

A more complete question and answer sheet about adhesives and formaldehyde emissions is available in PDF format on our website, www.trusjoist.com. Search for *Product Fact Sheet*, (Reorder #5005), under the Specifier's Guides/Literature link.

Q4: Do TJI® joists meet the requirements set forth in the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) standard?

A4: LEED- NC (new construction) is a commonly used building rating system designed to accelerate the development of green building practice. While products such as TJI® joists are not LEED certified on an individual basis, they may contribute to point totals for a "whole building" certification. For example, the following items may be viewed as contributors toward points in the LEED rating system:

- The *Rapidly Renewable* section (MR 6) defines rapid as a 10-year harvest cycle, although the standard does suggest the use of poplar species as a "potential strategy." Trus Joist uses poplar and other hardwoods in the production of both Performance Plus® OSB web material and TimberStrand® LSL.
- The *Low Emitting Materials* section (EQ 4.4) recognizes composite wood that is free from urea-formaldehyde resins. Trus Joist does not use urea-formaldehyde resins in any of its engineered lumber products.
- The *Certified Wood* section (MR 7) recognizes only FSC certification. Trus Joist has chosen to implement a Sustainable Forestry

Initiative (SFI), plus ISO 14001 standards and practices to assure that strict environmental policies and procedures are in place.

- The Regional Materials section (MR 5.1 & 5.2) recognizes any materials that are manufactured within 500 miles of the constructed project.

The LEED rating system is relatively new and will continue to evolve as building practices change and new products and materials are introduced. While the focus of the current standard is recycled materials, we believe that wood as a renewable building material should be given greater consideration. Life-cycle studies, which may also be included in future versions of this rating system, will demonstrate the benefits of wood as a framing material. In addition, the use of non-traditional species and second- and third-growth timber in the manufacture of TJI® joists supports the overall objective of the LEED rating system.

Q5: Are tapered and cambered TJI® joists available?

A5: Trus Joist offers the TJI® L65 series joist in a single slope, tapered profile to provide minimum roof slopes for drainage. For more details, refer to our *TJI® L65 Tapered Joist Commercial Design Guide* (Reorder #1065). A nominal camber can also be built into some TJI® joist products (see **TJI® Joist Descriptions** on page 4); contact your local Technical Representative for more information.

Q6: How can I contact a Trus Joist Technical Representative?

A6: You can find your local Trus Joist technical representative by calling 1-866-TJWorks (1-866-859-6757) or through the *Contact Us* section of our website at www.trusjoist.com.

Q7: How do I get a copy of your TJ-Beam® sizing software?

A7: You can either contact your local Trus Joist Technical Representative or request a copy on our website at www.trusjoist.com.

Q8: Are repetitive member increases allowed in TJI® joist design?

A8: The newly adopted product qualification model in ASTM D 5055-02 has modified the resistive moment values to more closely model wood I-joist moment capacity. However, this new procedure does not use a repetitive-member increase, so an increase to the TJI® joist moment values shown in this design guide is not applicable.

Q9: Are there special considerations for shear design in TJI® joists?

A9: In wood design, it is common practice to neglect all uniform loads within a distance equal to the joist depth. But that does not apply to TJI® joists at end bearing locations. In addition, it is critical that TJI® joists be designed for both reaction and shear at supports.

Questions and Answers

Q10: What are the deflection criteria most commonly used when selecting TJI® joists?

A10: TJI® joist deflections must meet all applicable building codes and any criteria specified by the building designer. But as the graph on page 21 shows, Trus Joist's recommended deflection limits for residential and commercial floors are more restrictive than the minimums required by typical building codes.

It's important to note that designing a floor around a deflection limit is often not enough to ensure good floor performance. Individual perceptions of floor vibration vary, and they are influenced by a variety of factors associated with floor construction. The best way to predict how a floor will perform is to use the TJ-Pro™ Rating System (available with our TJ-Beam® sizing software).

Q11: Are there special considerations when using double TJI® joists?

A11: With double TJI® joists, if a load is applied to the side of one member, you must connect the two TJI® joists together at the loading point to transfer the load equally into both members. For more specific information, see detail 7 on page 14.

Typically, sheathing is not nailed to both TJI® joists, which leaves one joist with an unbraced compression flange. To ensure lateral stability of both joists when loads are applied from above, the TJI® joists must be connected as shown in detail 9 on page 15. Often, a rectangular member may be the simplest option.

Q12: Is the 1½"-thick flange on commercial TJI® joists sufficient for the nail penetration required by building code diaphragm tables?

A12: Yes, a 1½"-thick (or thicker) flange meets the fastener penetration requirements stated in building code diaphragm tables such as IBC Table 2306.3.1. For other building codes, calculations per the 2001 ANSI/AF&PA National Design Specification for Wood Construction consider fastener penetration into the main member and show that a 1½" penetration does not reduce the lateral nail capacity.

Q13: How do I account for snowdrift loading on TJI® joists?

A13: Snowdrift loading should be considered in any snow load area where roof projections and/or changes in roof elevations could allow snow to accumulate. Specific design criteria falls under the jurisdiction of local building codes.

Q14: Does Trus Joist provide guidelines for the installation of TJI® joists?

A14: Yes. Installation guides are provided with every TJI® joist delivery. Typical construction applications and details can be found in the guide, and particular attention should be given to the handling, storage, safety bracing, and installation instructions. Shop drawings showing job-specific information are also furnished upon request. A copy of our *TJI® Joist Installation Information Guide* (Reorder #6028) can also be downloaded from www.trusjoist.com using the Specifier's Guide/Literature link.

Q15: Are your TJI® joists covered by a warranty?

A15: Yes. Trus Joist warrants that its products will be free from manufacturing errors or defects in workmanship or materials. In addition, provided the product is correctly installed and used, the company warrants the adequacy of its design for the normal and expected life of the building. A copy of this warranty can be found on the back page of this guide or on our website at www.trusjoist.com.

Q16: Does Trus Joist provide any rated fire assembly details?

A16: Yes. Trus Joist provides a number of fire assembly details, which can be downloaded from our website at www.trusjoist.com. Go to the Products/Technical Design Information/Fire & Sound links. These same details are also shown in Trus Joist's *Fire Facts Guide* (Reorder #5003). You can download this guide from our website by searching for Reorder #5003 under the Specifier's Guides/Literature link.

References:

1. *Structural Board Association Technical Bulletin*, 1990 November 15.
2. American Plywood Association, 1986.
3. *Determining Formaldehyde Levels from Wood Products Under Defined Test Conditions Using a Large Chamber*. ASTM E 1333.

Service You Can Count On

TJI® joists are designed to be the foundation of an integrated structural system when combined with other Trus Joist products. In addition, TJI® joists are backed by the industry's largest and most experienced network of engineering support and field service representatives.

- Trus Joist technical representatives are located throughout North America to help with technical information, installation questions, or code compliance.
- An experienced engineering staff is available to provide sizing information, installation advice, and engineered shop drawings.
- User-friendly engineering design software is available to assist you with sizing solutions.
- Trus Joist offers a full line of products that are guaranteed to be manufactured free from errors or defects. This guarantee is effective for the expected life of your structure.



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