City of Republic—Community Development

Ceiling Joist Span Chart—Attics with Limited Storage

Revision Date: January 2017

2012 IRC Table R802.4(2) - Ceiling Joist Spans for Common Lumber Species

(Uninhabitable Attics With Limited Storage, Live Load = 10 psf, L/Δ = 240)

Ceiling Joist Spacing (inches)	Species and Grade		Dead Load = 10 psf			
			2 x 4	2 x 6	2 x 8	2 x 10
			Maximum Ceiling Joist Spans			
			Feet-inches	Feet-inches	Feet-inches	Feet-inches
12	Douglas Fir-Larch	SS	10-5	16-4	21-7	Note a
		#1	10-0	15-9	20-1	24-6
		#2	9-10	14-10	18-9	22-11
		#3	7-8	11-2	14-2	17-4
	Hem-Fir	SS	9-10	15-6	20-5	Note a
		#1	9-8	15-2	19-7	23-11
		#2	9-2	14-5	18-6	22-7
		#3	7-8	11-2	14-2	17-4
	Southern Pine	SS	10-3	16-1	21-2	Note a
		#1	10-0	15-9	20-10	Note a
		#2	9-10	15-6	20-1	23-11
		#3	8-2	12-0	15-4	18-1
	Spruce-Pine-Fir	SS	9-8	15-2	19-11	25-5
		#1	9-5	14-9	18-9	22-11
		#2	9-5	14-9	18-9	22-11
		#3	7-8	11-2	14-2	17-4
16	Douglas Fir-Larch	SS	9-6	14-11	19-7	25-0
		#1	9-1	13-9	17-5	21-3
		#2	8-9	12-10	16-3	19-10
		#3	6-8	9-8	12-4	15-0
	Hem-Fir	SS	8-11	14-1	18-6	23-8
		#1	8-9	13-5	16-10	20-8
		#2	8-4	12-8	16-0	19-7
		#3	6-8	9-8	12-4	15-0
	Southern Pine	SS	9-4	14-7	19-3	24-7
		#1	9-1	14-4	18-11	23-1
		#2	8-11	13-6	17-5	20-9
		#3	7-1	10-5	13-3	15-8
	Spruce-Pine-Fir	SS	8-9	13-9	18-1	23-1
		#1	8-7	12-10	16-3	19-10
		#2	8-7	12-10	16-3	19-10
		#3	6-8	9-8	12-4	15-0

2012 IRC TABLE R802.4(2) - CEILING JOIST SPANS FOR COMMON LUMBER SPECIES

(UNINHABITABLE ATTICS WITH LIMITED STORAGE, LIVE LOAD = 10 PSF, L/Δ = 240)

CEILING JOIST SPACING (INCHES)	SPECIES AND GRADE		Dead Load = 10 psf			
			2 x 4	2 x 6	2 x 8	2 x 10
			Maximum Ceiling Joist Spans			
			Feet-inches	Feet-inches	Feet-inches	Feet-inches
19.2	Douglas Fir-Larch	SS	8-11	14-0	18-5	23-4
		#1	8-7	12-6	15-10	19-5
		#2	8-0	11-9	14-10	18-2
		#3	6-1	8-10	11-3	13-8
	Hem-Fir	SS	8-5	13-3	17-5	22-3
		#1	8-3	12-3	15-6	18-11
		#2	7-10	11-7	14-8	17-10
		#3	6-1	8-10	11-3	13-8
	Southern Pine	SS	8-9	13-9	18-1	23-1
		#1	8-7	13-6	17-9	21-1
		#2	8-5	12-3	15-10	18-11
		#3	6-5	9-6	12-1	14-4
	Spruce-Pine-Fir	SS	8-3	12-11	17-1	21-8
		#1	8-0	11-9	14-10	18-2
		#2	8-0	11-9	14-10	18-2
		#3	6-1	8-10	11-3	13-8
24	Douglas Fir-Larch	SS	8-3	13-0	17-1	20-11
		#1	7-8	11-2	14-2	17-4
		#2	7-2	10-6	13-3	16-3
		#3	5-5	7-11	10-0	12-3
	Hem-Fir	SS	7-10	12-3	16-2	20-6
		#1	7-6	10-11	13-10	16-11
		#2	7-1	10-4	13-1	16-0
		#3	5-5	7-11	10-0	12-3
	Southern Pine	SS	8-1	12-9	16-10	21-6
		#1	8-0	12-6	15-10	18-10
		#2	7-8	11-0	14-2	16-11
		#3	5-9	8-6	10-10	12-10
	Spruce-Pine-Fir	SS	7-8	12-0	15-10	19-5
		#1	7-2	10-6	13-3	16-3
		#2	7-2	10-6	13-3	16-3
		#3	5-5	7-11	10-0	12-3

Check sources for availability of lumber in lengths greater than 20 feet.

a. Span exceeds 26 feet in length.

TABLE R301.5 - MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS (IN POUNDS PER SF)	
USE	LIVE LOADS
Uninhabitable attics without storage [b]	10
Uninhabitable attics with limited storage [b,g]	20
Habitable attics and attics served with fixed stairs	30
Balconies (exterior) and decks [e]	40
Fire escapes	40
Guardrails and handrails [d]	200 [h]
Guardrail in-fill components [f]	50 [h]
Passenger vehicle garages [a]	50 [a]
Rooms other than sleeping rooms	40
Sleeping rooms	30
Stairs	40 [c]

a. Elevated garage floors shall be capable of supporting a 2,000-pound load applied over a 20-square-inch area.

b. Uninhabitable attics without storage are those where the maximum clear height between joist and rafter is less than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches high by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.

c. Individual stair treads shall be designed for the uniformly distributed live load or a 300-pound concentrated load acting over an area of 4 square inches, whichever produces the greater stresses.

d. A single concentrated load applied in any direction at any point along the top.

e. See Section R502.2.2 for decks attached to exterior walls.

f. Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot. This load need not be assumed to act concurrently with any other live load requirement.

g. uninhabitable attics with limited storage are those where the maximum clear height between joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with the web configuration capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. The live load need only be applied to those portions of the joists or truss bottom chords where all of the following conditions are met:

    1. The attic area is accessible from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is a minimum of 30 inches.

    2. The slopes of the joists or truss bottom chords are no greater than 2 inches vertical to 12 inches horizontal.

    3. Required insulation depth is less than the joist or truss bottom chord member depth. The remaining portions of the joists or truss bottom chords shall be designed for a uniformly distributed concurrent live load of not less than 10 pounds per square foot.

h. Glazing used in handrail assemblies and guards shall be designed with a safety factor of 4. The safety factor shall be applied to each of the concentrated loads applied to the top of the rail, and to the load on the in-fill components. These loads shall be determined independent of one another, and loads are assumed not to occur with any other live load.

Allowable ceiling joist spans (R802.4): Spans for ceiling joists shall be in accordance with Tables R802.4(1) and R802.4(2). For other grades and species and for other loading conditions, refer to the AF&PA *Span Tables for Joists and Rafters*.

Allowable Rafter Spans (R802.5): Spans for rafters shall be in accordance with Tables R802.5.1(1) through R802.5.1 (8). For other grades and species and for other loading conditions, refer to the AF&PA *Span Tables for Joists and Rafters*. The span of each rafter shall be measured along the horizontal projection of the rafter.

Purlins (R802.5.1): Installation of purlins to reduce the span of rafters is permitted as shown in Figure R802.5.1. Purlins shall be sized no less than the required size of the rafters they support. Purlins shall be continuous and shall be supported by 2 inch by 4 inch braces installed to the bearing walls at a slope not less than 45 degrees from the horizontal. The braces shall be spaced not more than 4 feet on center and the unbraced length of braces shall not exceed 8 feet.

Commentary: Tables R802.4(1) and R802.4(2) list allowable ceiling joist spans for common lumber sizes, species and grades based on spacing and design loads. These tables are similar to the rafter tables explained in the commentary for section R802.5. The tables provide ceiling joist spans for live loads of 10 and 20 pounds per square foot (psf) and dead loads of 5 and 10 psf. The weight of the ceiling joist is included in the 5 or 10 psf dead load.

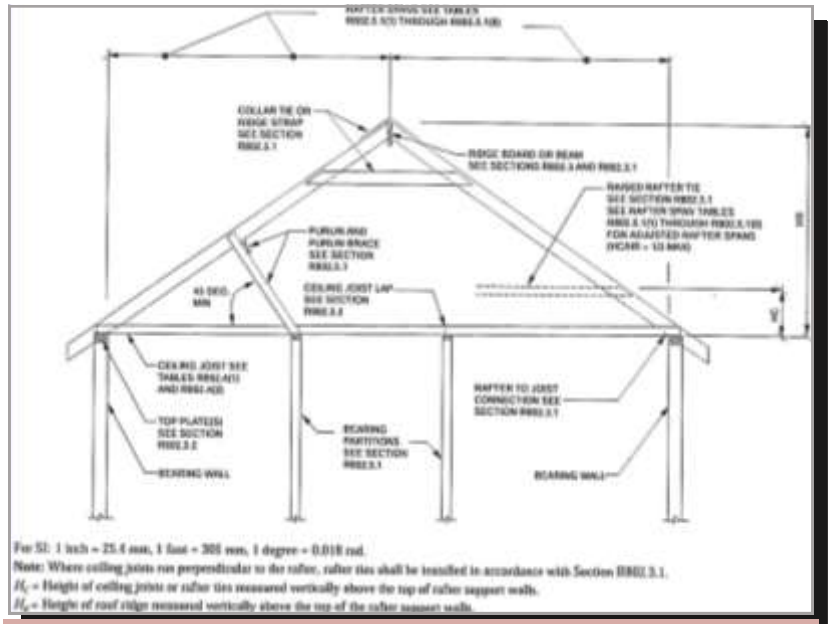
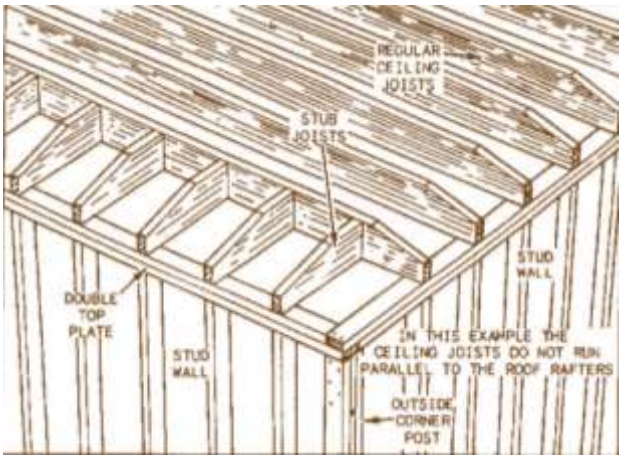


Figure R802.5.1—Braced Rafter Construction



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The Community Development Department is made up of five full-time employees including a Department Director, Administrative Assistant, Principal Planner, Building Inspector, and Code Compliance Official. Our office is located at 204 North Main Street. The goal of the department is to serve the citizens of Republic through pursuance, guidance, and assistance in the development of the City. This is accomplished through marketing and strategic planning accompanied by oversight and enforcement of the City's Building Codes, Zoning Codes and Subdivision Regulations.

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Community Development Department

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