

## MEMORANDUM

TO: Daniel Tierney, Deputy State Building Inspector

FROM: Thomas A. DiBlasi, P.E., SECB, State of Connecticut Codes & Standards Committee

SUBJECT: IRC 2012 Rafter Span Tables

DATE: 20 September 2016

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In Appendix R that has been included in the Connecticut Amendments to the *2012 International Residential Code*, a number of municipalities have Ground Snow Loads of 35 psf and 40 psf. The rafter span tables within the body of the IRC are limited to Ground Snow Loads of 30 psf and 50 psf; no guideline for establishing rafter spans in between the values is provided.

To assist Building Officials and others who are attempting to determine rafter spans in these other snow load ranges, the attached tables have been provided. These tables are limited to No. 2 grade lumber which is the prevailing grade used in residential construction in Connecticut. These allowable spans were derived using the *Maximum Span Calculation for Wood Joists and Rafters* which is available at no cost from the American Wood Council website at:

<http://www.awc.org/codes-standards/calculators-software/spancalc>

This utility can be used to establish the allowable spans for other grades and species of lumber.

Allowable spans can also be reasonably estimated using linear interpolation between the 30 psf and 50 psf snow load tables within the IRC.

# MAXIMUM RAFTER SPANS<sup>a</sup> FOR COMMON LUMBER SPECIES

[for use with the 2012 International Residential Code]

GROUND SNOW LOAD = 35 psf  
 CEILING ATTACHED TO RAFTERS:  $L/\Delta = 240$   
 LUMBER GRADE: No. 2

RAFTER SPACING	SPECIES	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
		2"x4"	2"x6"	2"x8"	2"x10"	2"x12"	2"x4"	2"x6"	2"x8"	2"x10"	2"x12"
12"	Douglas Fir-Larch	8'-2"	12'-10"	16'-8"	20'-4"	23'-7"	8'-2"	11'-11"	15'-1"	18'-5"	21'-4"
	Hem-fir	7'-7"	12'-0"	15'-9"	19'-10"	22'-11"	7'-7"	11'-7"	14'-8"	17'-11"	20'-9"
	Southern pine	8'-2"	12'-10"	16'-11"	21'-0"	24'-7"	8'-2"	12'-4"	15'-11"	19'-0"	22'-3"
	Spruce-pine-fir	7'-10"	12'-3"	16'-2"	20'-1"	23'-3"	7'-10"	11'-9"	14'-10"	18'-2"	21'-1"
16"	Douglas Fir-Larch	7'-5"	11'-5"	14'-5"	17'-8"	20'-5"	7'-1"	10'-4"	13'-1"	15'-11"	18'-6"
	Hem-fir	6'-11"	10'-11"	14'-0"	17'-2"	19'-11"	6'-10"	10'-0"	12'-8"	15'-6"	18'-0"
	Southern pine	7'-5"	11'-8"	15'-3"	18'-2"	21'-3"	7'-5"	10'-8"	13'-9"	16'-5"	19'-3"
	Spruce-pine-fir	7'-1"	11'-2"	14'-3"	17'-5"	20'-2"	6'-11"	10'-2"	12'-11"	15'-9"	18'-3"
19.2"	Douglas Fir-Larch	7'-0"	10'-5"	13'-2"	16'-1"	18'-8"	6'-5"	9'-5"	11'-11"	14'-7"	16'-11"
	Hem-fir	6'-6"	10'-1"	12'-10"	15'-8"	18'-2"	6'-3"	9'-2"	11'-7"	14'-2"	16'-5"
	Southern pine	7'-0"	10'-9"	13'-11"	16'-7"	19'-5"	6'-9"	9'-9"	12'-7"	15'-0"	17'-7"
	Spruce-pine-fir	6'-8"	10'-3"	13'-0"	15'-11"	18'-5"	6'-4"	9'-3"	11'-9"	14'-4"	16'-8"
24"	Douglas Fir-Larch	6'-4"	9'-4"	11'-9"	14'-5"	16'-8"	5'-9"	8'-5"	10'-8"	13'-0"	15'-1"
	Hem-fir	6'-1"	9'-1"	11'-6"	14'-0"	16'-3"	5'-7"	8'-2"	10'-4"	12'-8"	14'-8"
	Southern pine	6'-6"	9'-7"	12'-5"	14'-10"	17'-5"	6'-1"	8'-8"	11'-3"	13'-5"	15'-9"
	Spruce-pine-fir	6'-2"	9'-2"	11'-8"	14'-2"	16'-6"	5'-8"	8'-4"	10'-6"	12'-10"	14'-11"

GROUND SNOW LOAD = 35 psf  
 CEILING NOT ATTACHED TO RAFTERS:  $L/\Delta = 180$   
 LUMBER GRADE: No. 2

RAFTER SPACING	SPECIES	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
		2"x4"	2"x6"	2"x8"	2"x10"	2"x12"	2"x4"	2"x6"	2"x8"	2"x10"	2"x12"
12"	Douglas Fir-Larch	9'-0"	13'-2"	16'-8"	20'-4"	23'-7"	8'-2"	11'-11"	15'-1"	18'-5"	21'-4"
	Hem-fir	8'-5"	12'-10"	16'-2"	19'-10"	22'-11"	7'-11"	11'-7"	14'-8"	17'-11"	20'-9"
	Southern pine	9'-0"	13'-7"	17'-7"	21'-0"	24'-7"	8'-7"	12'-4"	15'-11"	19'-0"	22'-3"
	Spruce-pine-fir	8'-7"	13'-0"	16'-5"	20'-1"	23'-3"	8'-0"	11'-9"	14'-10"	18'-2"	21'-1"
16"	Douglas Fir-Larch	7'-10"	11'-5"	14'-5"	17'-8"	20'-5"	7'-1"	10'-4"	13'-1"	15'-11"	18'-6"
	Hem-fir	7'-7"	11'-1"	14'-0"	17'-2"	19'-11"	6'-10"	10'-0"	12'-8"	15'-6"	18'-0"
	Southern pine	8'-2"	11'-9"	15'-3"	18'-2"	21'-3"	7'-5"	10'-8"	13'-9"	16'-5"	19'-3"
	Spruce-pine-fir	7'-8"	11'-3"	14'-3"	17'-5"	20'-2"	6'-11"	10'-2"	12'-11"	15'-9"	18'-3"
19.2"	Douglas Fir-Larch	7'-1"	10'-5"	13'-2"	16'-1"	18'-8"	6'-5"	9'-5"	11'-11"	14'-7"	16'-11"
	Hem-fir	6'-11"	10'-1"	12'-10"	15'-8"	18'-2"	6'-3"	9'-2"	11'-7"	14'-2"	16'-5"
	Southern pine	7'-6"	10'-9"	13'-11"	16'-7"	19'-5"	6'-9"	9'-9"	12'-7"	15'-0"	17'-7"
	Spruce-pine-fir	7'-0"	10'-3"	13'-0"	15'-11"	18'-5"	6'-4"	9'-3"	11'-9"	14'-4"	16'-8"
24"	Douglas Fir-Larch	6'-4"	9'-4"	11'-9"	14'-5"	16'-8"	5'-9"	8'-5"	10'-8"	13'-0"	15'-1"
	Hem-fir	6'-2"	9'-1"	11'-6"	14'-0"	16'-3"	5'-7"	8'-2"	10'-4"	12'-8"	14'-8"
	Southern pine	6'-9"	9'-7"	12'-5"	14'-10"	17'-5"	6'-1"	8'-8"	11'-3"	13'-5"	15'-9"
	Spruce-pine-fir	6'-3"	9'-2"	11'-8"	14'-2"	16'-6"	5'-8"	8'-4"	10'-6"	12'-10"	14'-11"

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors given below:

$H_c/H_R$	Rafter Span Adjustment Factor
1/3	0.67
1/4	0.76
1/5	0.83
1/6	0.90
1/7.5 or less	1.00

where:

$H_c$  = Height of ceiling joists or rafter ties measured vertically above the top of the rafter support walls.

$H_R$  = Height of roof ridge measured vertically above the top of the rafter support walls.

## MAXIMUM RAFTER SPANS<sup>a</sup> FOR COMMON LUMBER SPECIES

[for use with the 2012 International Residential Code]

GROUND SNOW LOAD = 40 psf  
 CEILING ATTACHED TO RAFTERS:  $L/\Delta = 240$   
 LUMBER GRADE: No. 2

RAFTER SPACING	SPECIES	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
		2"x4"	2"x6"	2"x8"	2"x10"	2"x12"	2"x4"	2"x6"	2"x8"	2"x10"	2"x12"
12"	Douglas Fir-Larch	7'-10"	12'-3"	15'-10"	19'-4"	22'-5"	7'-10"	11'-5"	14'-5"	17'-8"	20'-5"
	Hem-fir	7'-3"	11'-5"	15'-1"	18'-9"	21'-9"	7'-3"	11'-1"	14'-0"	17'-2"	19'-11"
	Southern pine	7'-10"	12'-3"	16'-2"	19'-11"	23'-4"	7'-10"	11'-9"	15'-3"	18'-2"	21'-3"
	Spruce-pine-fir	7'-6"	11'-9"	15'-6"	19'-1"	22'-1"	7'-6"	11'-3"	14'-3"	17'-5"	20'-2"
16"	Douglas Fir-Larch	7'-1"	10'-10"	13'-8"	16'-9"	19'-5"	6'-9"	9'-11"	12'-6"	15'-3"	17'-9"
	Hem-fir	6'-7"	10'-5"	13'-4"	16'-3"	18'-10"	6'-7"	9'-7"	12'-2"	14'-10"	17'-3"
	Southern pine	7'-1"	11'-2"	14'-5"	17'-3"	20'-2"	7'-1"	10'-2"	13'-2"	15'-9"	18'-5"
	Spruce-pine-fir	6'-11"	10'-11"	14'-5"	18'-4"	22'-4"	6'-8"	9'-9"	12'-4"	15'-1"	17'-6"
19.2"	Douglas Fir-Larch	6'-8"	9'-11"	12'-6"	15'-3"	17'-9"	6'-2"	9'-0"	11'-5"	13'-11"	16'-2"
	Hem-fir	6'-3"	9'-7"	12'-2"	14'-10"	17'-3"	6'-0"	8'-9"	11'-1"	13'-7"	15'-9"
	Southern pine	6'-8"	10'-2"	13'-2"	15'-9"	18'-5"	6'-6"	9'-4"	12'-0"	14'-4"	16'-10"
	Spruce-pine-fir	6'-5"	9'-9"	12'-4"	15'-1"	17'-6"	6'-1"	8'-11"	11'-3"	13'-9"	15'-11"
24"	Douglas Fir-Larch	6'-0"	8'-10"	11'-2"	13'-8"	15'-10"	5'-6"	8'-1"	10'-3"	12'-6"	14'-6"
	Hem-fir	5'-9"	8'-7"	10'-10"	13'-3"	15'-5"	5'-4"	7'-10"	9'-11"	12'-1"	14'-1"
	Southern pine	6'-2"	9'-2"	11'-9"	14'-1"	16'-6"	5'-10"	8'-4"	10'-9"	12'-10"	15'-1"
	Spruce-pine-fir	5'-11"	8'-9"	11'-0"	13'-6"	15'-7"	5'-5"	7'-11"	10'-1"	12'-4"	14'-3"

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	Hem-fir	7'-2"	10'-6"	13'-4"	16'-3"	18'-10"	6'-7"	9'-7"	12'-2"	14'-10"	17'-3"
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	Spruce-pine-fir	7'-3"	10'-8"	13'-6"	16'-6"	19'-2"	6'-8"	9'-9"	12'-4"	15'-1"	17'-6"
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24"	Douglas Fir-Larch	6'-0"	8'-10"	11'-2"	13'-8"	15'-10"	5'-6"	8'-1"	10'-3"	12'-6"	14'-6"
	Hem-fir	5'-10"	8'-7"	10'-10"	13'-3"	15'-5"	5'-4"	7'-10"	9'-11"	12'-1"	14'-1"
	Southern pine	6'-4"	9'-2"	11'-9"	14'-1"	16'-6"	6'-2"	8'-4"	10'-9"	12'-10"	15'-1"
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$H_R$  = Height of roof ridge measured vertically above the top of the rafter support walls.