Standardized Load Tables Characterizing Residential Solar Thermal and Solar Electric Installations For Residential Structures in Minnesota

BRAUN INTERTEC

MINNESOTA DEPARTMENT OF LABOR & INDUSTRY

MINNESOTA DEPARTMENT OF COMMERCE

Standardized Load Tables Characterizing Residential Solar Thermal and Solar Electric Installations For Residential Structures in Minnesota

Prepared by:

Braun Intertec Corporation

On Behalf of

Minnesota Department of Commerce
Division of Energy Resources

Published June 2013

Disclaimer

This report/project was made possible by a grant from the U.S. Department of Energy and the Minnesota Department of Commerce. Neither the Minnesota Department of Commerce nor any agency thereof, nor any of their employees, makes any warranty, expressed or implied. The services performed were completed with the level of care and skill ordinarily exercised by reputable members of its profession currently practicing in the same locality. The opinions expressed within were found and completed to a reasonable degree of engineering certainty. The authority having jurisdiction for the locale where the work is being performed has the final approval or denial for the pending requests.

Acknowledgements

This report was developed in collaboration with the following individuals and organizations

Stacy A. Miller	Minnesota Department of Commerce
Daniel Kelsey	Minnesota Department of Labor and Industry
Jason S. Hanlon	Braun Intertec Corporation
Michael S. Klotthor	Braun Intertec Corporation

Download a copy of the report:

mn.gov/commerce/energy/topics/clean-energy/Solar

Questions:

Contact the Minnesota Department of Commerce – Energy Division
1-800-657-3710 (MN only)
651-296-5175
energy.info@state.mn.us

Table of Contents

Introduction

The 2013 Minnesota legislative session concluded in May 2013 with multiple new energy policies expected to increase future solar development in the state. Communities with procedures in place to process residents' applications to install solar energy systems will benefit from more transparency and consistency in applying the requirements for installing solar. This will result in more certainty about permitting expectations, review time, and accurate estimation of project costs. To that end, this report is designed to offer guidance to both building officials and solar installers regarding the need for structural review on residential structures where solar is being considered.

The Minnesota Department of Commerce in cooperation with the Department of Labor and Industry has identified value in developing standard tables that outline limitations for the placement of residential rooftop solar electric and solar thermal systems on existing single and multi-family dwelling structures. These tables are intended to encourage safe and structurally reliable systems while reducing costs associated with unnecessary structural review for many residential applications.

When installed on the roof structures, solar energy systems create additional load on the structure that the roof may or may not be capable of supporting. The cost to have a structural review of existing conditions completed when a solar installation is proposed can be a barrier to adoption. By generating these tables to identify common building and roof construction types, structural considerations will be addressed in a prescriptive method without the need for a full structural engineering analysis in many cases. Reducing costs and adding certainty may lead to greater adoption and installation of solar technologies. The following **key design criteria** were identified as part of this analysis:

- An understanding of the types of solar technologies that can be expected to be installed on residential rooftops and corresponding weights and connection details
- Common spans for solid-sawn roof rafters and metal plate connected wood roof trusses
- Common wood species and grade of lumber used for roof framing
- Common roof pitches to be used
- Design loading criteria to be used for roof snow load, wind speed, wind exposure rating
- Typical dead weight to be applied to an existing roof structure.

The layout and information contained in the tables are intended to represent typical conditions for rafter framing and loading conditions in residential construction. It is understood that not all existing conditions will conform to the prescriptive requirements outlined within these tables. These tables are intended to give suppliers, solar installers, building officials and home owners a guide to understand potential limits or opportunities that may be present within given rafter conditions. It is the responsibility of those who are proposing and planning to install a solar energy system to examine existing framing conditions to observe if any defects are present, verify that the framing configuration and existing material characteristics fall within the guidelines presented, and that there are no other conditions that would prohibit installation of the panels. If conditions are found to be beyond what is expressed within these tables, site specific evaluation may be required. The authority having jurisdiction in the location where the work is performed has the final authority.

Approach

Identify Design Criteria

The first step was to identify the key design criteria outlined above. This was a **collaborative process between Braun Intertec, the Minnesota Department of Commerce and Minnesota Department of Labor and Industry** to have all parties agree on the initial design assumptions that resulted in the analysis and corresponding results. The following items were identified:

- The types of roof mounted solar technologies that are common in this area of the country are photovoltaic (PV) solar panels for supplementing electrical services and solar thermal collectors for supplementing heating. The tables presented in this document specify additional allowable load and address both types of systems.
- The spans presented in these tables are developed to closely match spans shown in the International Residential Code (IRC) as well as dependent on the allowable values that were determined. Allowable additional dead load values determined based upon these spans listed in the IRC that were in extreme excess (high values) were not shown to help simplify the amount of data presented in the tables.
- The wood species presented in the tables are based on those listed in the IRC and considered common to Minnesota. Also, a historic “old” Douglas Fir condition is presented. This species was included since a majority of structures constructed in the 1950’s and earlier will likely be framed using this type of wood. The assumed stresses for this species of wood are presented under the “Roof Rafters - Existing Framing” section.
- The common roof pitches were chosen based on those identified in the IRC.

- The design loading criteria was agreed upon based on those values obtained through the formulas or guidelines from the current 2007 Minnesota State Building Code (MSBC), 2006 IRC and International Building Code (IBC), and American Society of Civil Engineers (ASCE) 7-05, "Minimum Design Loads for Buildings and Other Structures." The tables were developed for the two design snow loads in Minnesota as well as including wind load exposure ratings B, C, and D since all three of these ratings can be applied statewide.
- The dead weight assumed for the analysis was developed based on the self-weight of the rafter members, one layer of 1/2-inch plywood or OSB sheathing or 3/4-inch plank board, and one layer of asphalt shingles.

Metal Plate Connected Wood Roof Truss Research

Since the late 1960s and early 1970s, roof construction for residential structures has consisted of pre-manufactured, engineered roof trusses. The Minnesota Department of Commerce requested some initial research be completed to identify opportunities for additional load capacities for these roof components. Initial research including interviewing industry professionals and reviewing previous Building Codes and industry documents was completed. A summary of the findings is presented within this document.

Establish Rafter Tables – Solid Sawn Lumber

The primary deliverables for this project are the Standardized Load Tables Characterizing Residential Solar Installations. These tables have been generated from the analysis completed by Braun Intertec. These tables are to provide information for the building officials, homeowners, and installers/suppliers to review an existing roof framing layout and determine if an existing structure is sufficient to support a proposed solar energy system. These tables are intended for common configurations of both flush mounted and titled PV and Thermal solar energy systems. The **parameters identified** include:

- Roof pitch
- Maximum allowed distributed weight of solar energy system
- Maximum distance between the system and the roof below
- Concentrated load imposed by the panel on the roof sheathing
- Minimum size of roof rafters
- Maximum spacing of roof rafters
- Maximum spans of the rafters
- Wood species and minimum grade of lumber

The tables incorporated the two design snow-load requirements that are present in the State of Minnesota and in accordance with the 2007 Minnesota State Building Code (MSBC).

[End of Section]

Metal Plate Connected Wood Roof Trusses

Since the late 1960s and early 1970s, roof construction for residential structures has primarily consisted of metal plate connected wood roof trusses. Earlier versions of these trusses were constructed in a manner more associated with hand-framing using plywood, steel, glue, nails or a combination of these materials to create connections between the members. In today's modern construction, the analysis of the trusses is completed by truss suppliers and truss plate manufacturers utilizing steel nail plates for the connection of the wood truss members. The use of proprietary software to create added efficiency in design and analysis has been developed over the years by the truss plate manufactures.

In 1960, the Truss Plate Institute (TPI) published the first set of design criteria for wood trusses with the designation TPI-60 "Design Specification for Light Metal Plate Connected Timber Trusses." Since that time TPI has continued to study and evaluate new data and development in metal plate connected wood trusses. Subsequent additions of the TPI design specification have been published with the most recent in 2007.

A review of the historical building codes since 1960 was completed during our research into metal plate connected wood roof trusses. Most of the building codes reference the use of these trusses and refer to the TPI design specification for additional information and requirements for analysis. Typical minimum loading requirements have been provided in all of the editions of the TPI design standard. The minimum design loads have remained consistent over the years and are as follows: Top Chord Dead Load = 7 psf, Bottom Chord Dead Load = 10 psf.

In typical residential construction, the dead load requirements for a roof system are specified by the designer. If dead load requirements are not provided, the minimum loading requirements as specified by TPI are used. Truss manufacturers use these loads to design and optimize truss configurations, member sizes, and connections based upon the site specific conditions. Because of the fine tuned nature of the design it is not typical that additional load can be added beyond these design loads to the truss system without modifications being required.

The Minnesota State Building Code (MSBC) adopted a change in the snow load requirements in 2003. The change decreased the ground snow from 57 psf to 50 psf (40 psf roof snow load to 35 psf roof snow load) in the seven county metro area. However, this change also increased the roof snow load

requirement from 30 psf to 42 psf in a majority of the northern counties in the State. Refer to Figure 1a and Figure 1b showing the changes.

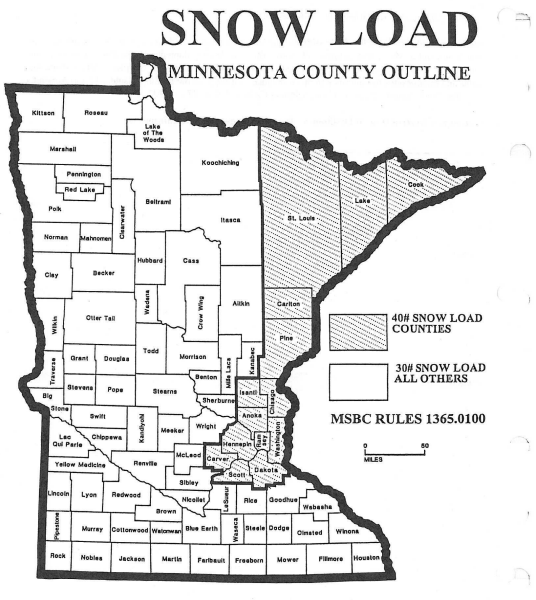


Figure 1a – 1998-Previous MSBC Roof Snow Loads

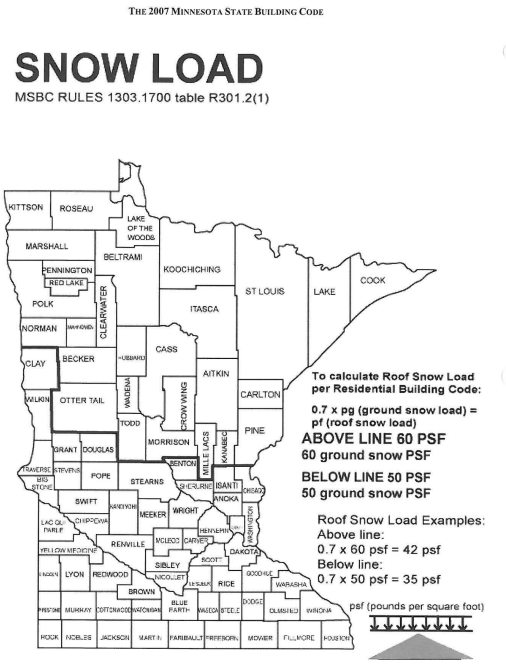


Figure 1b – 2003-Current MSBC Snow Loads

Because of these changes in the snow load requirements in 2003, there are counties in Minnesota where roof structures were designed to support 5 psf more load than what is currently required by 2007 MSBC. This is specifically true within the seven county Twin Cities metro area (Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington) along with Isanti and Chisago counties. Because of the change in these areas, residential structures potentially have an additional 5 psf of additional load capacity that can be considered in the installation of rooftop solar. All other counties in the State experienced an

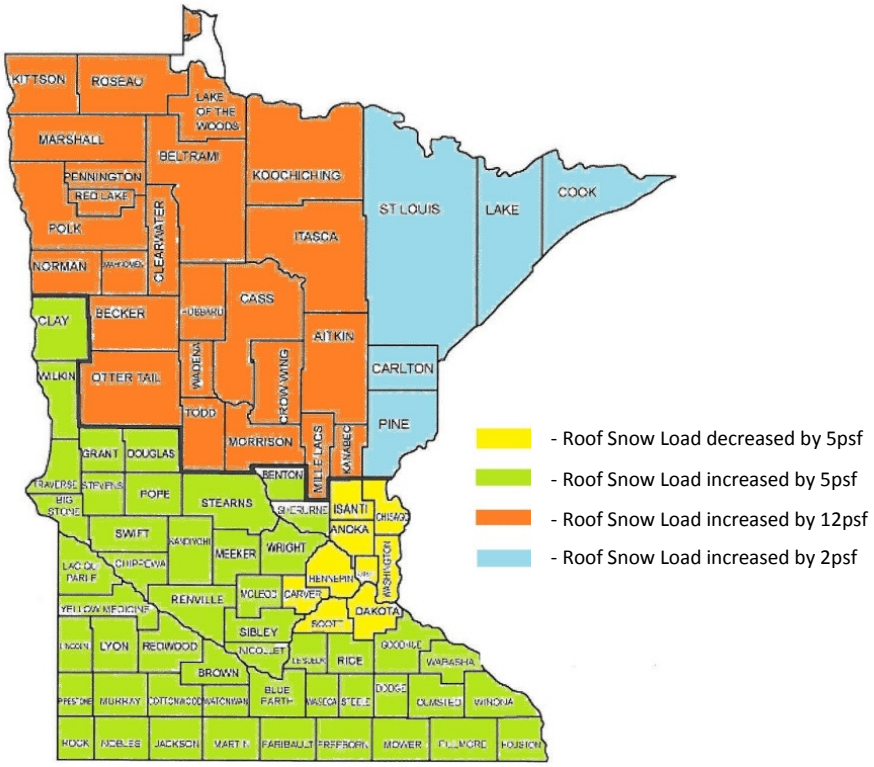


Figure 2 – Summary of Code Required Roof Snow Load Adjustments (2003 MSBC)

increase in the required snow load and therefore these roof structures would not have any additional capacity that can be considered when completing evaluations. Refer to Figure 2 for a summary of the changes and the respective counties affected.

[End of Section]

Roof Rafters (Hand-Framed Construction)

Analysis Approach

The general analysis approach for the determination of additional allowable dead load consisted of an allowable stress design using Code prescribed loading and variety of framing conditions. It was decided to classify the solar panels as a "dead" load since these are fixed pieces of equipment being installed on the structure. In the approach, a spacing of the support legs for the panel railings was assumed to be no more than 4-feet in any direction and the legs always attached over a rafter member.

Existing Framing

Member sizes, spacing, grades, and species were chosen to represent similar conditions found in the International Residential Code (IRC) rafter tables. Like the IRC rafter tables, roof span values are for projected spans with and without the use of additional bracing as shown in Figure 6 under the "Interpreting the Tables" section. Our analysis assumed the use of a ridge nailer plate that only provides a connection between the rafters and does not provide vertical support in a manner such as a ridge beam. The analysis also assumes that the existing framing is capable of supporting the outward thrust force generated by the roof rafters at the exterior walls. An example would be ceiling rafters spanning between the exterior walls. All allowable stress values were taken from the 2005 National Design Specifications (NDS) for Wood Construction with the exception of the "Old" Douglas-Fir values. Historic values were taken from the "Douglas Fir Use Book," published by the West Coast Lumberman's Association, using the allowable stresses listed for Douglas-Fir, Rocky Mountain Region. The allowable stresses for this species are less than the other three types listed, and therefore provided a slightly conservative value in the analysis that would cover the majority of the residential roof construction from the 1950's and prior.

Snow Loading

The snow load values used in our analysis were determined in accordance with the American Society of Civil Engineers (ASCE) 7-05 and the Minnesota State Building Code. The tables provided address both ground snow load conditions required by the Minnesota State Building Code. Our analysis assumed partially exposed roofs for Exposure classifications B, C, and D. Since the IRC does not require snow drifting to be considered in residential roof design, we limited the installation angle of the solar panels such that any drifting that may occur would not exceed the depth of the design snow load. The density of the snow was determined in accordance with ASCE7-05 and is based upon the ground snow load. Below is a set of tables that shows the maximum allowable installation angle for photovoltaic and

thermal solar panels based upon the ground snow load for the area. The installation angles are measured from true horizontal, as shown in Figure 3, and vary depending on the pitch of the roof. For the purposes of standardizing the tables, an assumed standoff of 6-inches for the panels from the roof surface was used. This is measured from the roof surface to the closest section of the top surface of the panels.

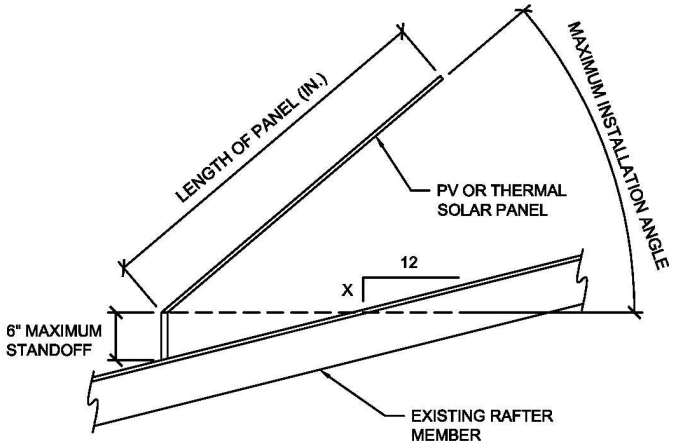


Figure 3 - Maximum Installation Angle Diagram

Table 1 - Maximum Allowable PV Panel Installation Angle
Ground Snow Load = 50 psf, Flat Roof Snow Load = 35 psf

Maximum Allowable PV Panel Installation Angle (deg)						
	Roof Pitch					
PV Panel Length (in)	3:12	4:12	5:12	7:12	9:12	12:12
36	37.0	40.9	44.4	-	-	-
38	35.8	39.7	43.2	-	-	-
40	34.6	38.5	42.2	-	-	-
42	33.6	37.6	41.2	-	-	-
44	32.7	36.7	40.3	-	-	-
46	31.8	35.8	39.5	-	-	-
48	31.1	35.1	38.8	-	-	-
50	30.4	34.4	38.1	44.8	-	-
52	29.7	33.8	37.5	44.2	-	-
54	29.1	33.2	37.0	43.7	-	-
56	28.6	32.7	36.4	43.2	-	-
58	28.1	32.2	36.0	42.7	-	-
60	27.6	31.7	35.5	42.3	-	-

Note: dash indicates that the solar panel may be installed at any angle up to 45 degrees from horizontal

Table 2 - Maximum Allowable Thermal Panel Installation Angle
Ground Snow Load = 50 psf, Flat Roof Snow Load = 35 psf

Maximum Allowable Thermal Panel Installation Angle (deg)						
	Roof Pitch					
PV Panel Length (in)	3:12	4:12	5:12	7:12	9:12	12:12
72	25.3	29.4	33.3	40.3	-	-
74	25.0	29.1	33.0	40.0	-	-
76	24.7	28.9	32.8	39.7	-	-
78	24.4	28.6	32.5	39.5	-	-
80	24.2	28.3	32.3	39.3	-	-
82	23.9	28.1	32.0	39.0	-	-
84	23.7	27.9	31.8	38.8	44.8	-
86	23.5	27.6	31.6	38.6	44.6	-
88	23.2	27.4	31.4	38.4	44.4	-
90	23.0	27.2	31.2	38.3	44.3	-
92	22.8	27.0	31.0	38.1	44.1	-
94	22.6	26.8	30.8	37.9	44.0	-
96	22.5	26.7	30.6	37.8	43.8	-

Note: dash indicates that the solar panel may be installed at any angle up to 45 degrees from horizontal

Table 3 - Maximum Allowable PV Panel Installation Angle
Ground Snow Load = 60 psf, Flat Roof Snow Load = 42 psf

Maximum Allowable PV Panel Installation Angle (deg)						
	Roof Pitch					
PV Panel Length (in)	3:12	4:12	5:12	7:12	9:12	12:12
36	41.5	-	-	-	-	-
38	40.0	43.7	-	-	-	-
40	38.6	42.4	-	-	-	-
42	37.3	41.2	44.7	-	-	-
44	36.2	40.1	43.7	-	-	-
46	35.2	39.1	42.7	-	-	-
48	34.3	38.2	41.8	-	-	-
50	33.4	37.4	41.0	-	-	-
52	32.7	36.6	40.3	-	-	-
54	31.9	35.9	39.6	-	-	-
56	31.3	35.3	39.0	-	-	-
58	30.7	34.7	38.4	-	-	-
60	30.1	34.1	37.9	44.5	-	-

Note: dash indicates that the solar panel may be installed at any angle up to 45 degrees from horizontal

Table 4 - Maximum Allowable Thermal Panel Installation Angle
Ground Snow Load = 60 psf, Flat Roof Snow Load = 42 psf

Maximum Allowable Thermal Panel Installation Angle (deg)						
	Roof Pitch					
PV Panel Length (in)	3:12	4:12	5:12	7:12	9:12	12:12
72	27.4	31.5	35.3	42.1	-	-
74	27.0	31.1	35.0	41.8	-	-
76	26.7	30.8	34.6	41.5	-	-
78	26.3	30.5	34.3	41.2	-	-
80	26.0	30.1	34.0	40.9	-	-
82	25.7	29.9	33.7	40.6	-	-
84	25.4	29.6	33.5	40.4	-	-
86	25.2	29.3	33.2	40.2	-	-
88	24.9	29.1	33.0	39.9	-	-
90	24.7	28.8	32.7	39.7	-	-
92	24.4	28.6	32.5	39.5	-	-
94	24.2	28.4	32.3	39.3	-	-
96	24.0	28.2	32.1	39.1	-	-

Note: dash indicates that the solar panel may be installed at any angle up to 45 degrees from horizontal

Wind Loading

The wind load values used in our analysis were determined in accordance with the ASCE 7-05 and the Minnesota State Building Code. Our analysis used components and cladding loading for structures 30-feet or less in height, not located near isolated hills, ridges, escarpments, or any other abrupt change in general topography. The structure was assumed to be partially enclosed with a gable or hip roof having pitch angles less than 45-degrees. The analysis looked at the downward pressures applied to the roof in Zones 1, 2, and 3 as shown in Figure 4 for Exposure Rating classifications B, C, and D in accordance with ASCE-7.

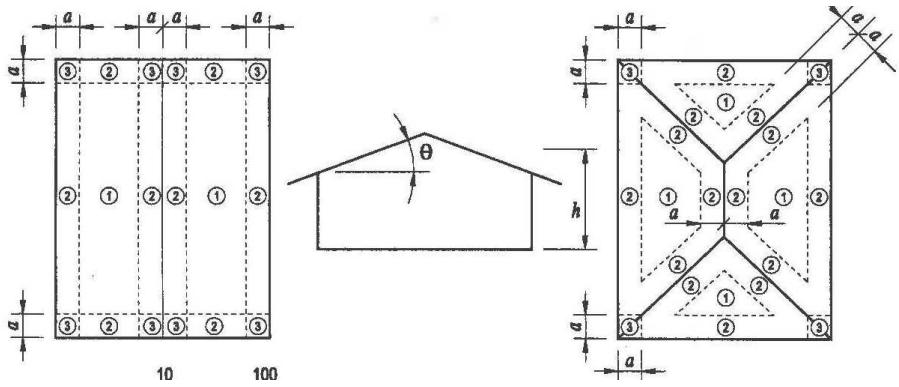


Figure 4 – Roof Zone Reference Diagram, ASCE 7-05 Fig. 6-11C

A comparison between the wind load design requirements for ASCE 7-05 and ASEC 7-10 for the conditions used in our analysis was completed. It was determined, based upon our analysis conditions, that the wind loads calculated in accordance with ASCE 7-10 are slightly less than those calculated in accordance with ASCE 7-05. Therefore these tables will remain applicable when the 2012 IBC/IRC, which references the ASCE 7-10, is adopted in Minnesota. This code adoption is scheduled for January 2014.

It is the responsibility of the panel manufacturer and installer to provide adequate connection strength to resist wind uplift. All panels should be installed on the roof in accordance with the location requirements of the manufacturer and any local Code requirements.

Material Self-Weight (Dead Load)

The material self-weight, or dead load, was determined based upon the actual densities of the materials installed. Our analysis assumed the use of a single layer of asphalt shingles and 1/2-inch plywood/OSB roof sheathing or 3/4-inch plank boards. The rafter member dead load was determined based upon wood species, size, and spacing.

Allowable Stress Design

We used allowable stress design and the load combinations specified in ASCE 7-05 to determine the additional allowable dead load that could be applied to a given roof rafter system. The placement of the panels is being considered under the “dead” load category since these are fixed pieces of equipment. The analysis took into account shear, combined bending and axial loading, and deflection. The deflection was limited to the length of the rafter divided by 180 as required by the IRC for roof rafters with no finished ceiling material attached. The actual length of the rafter member, based upon the given pitch, was used to determine the stresses and deflection. The maximum allowable load, with the addition of the solar panel dead load, was limited based upon shear stress, the interaction of bending stress and axial stress, and the deflection.

Reinforced Rafter Tables

Additional engineering and analysis was completed for the Reinforced Rafter tables that are shown in the tables. A similar analysis and approach to that described for the standard rafters was used to create the Reinforced Rafter tables. The analysis used the combined section modulus and moment of inertia of the original rafter with the addition of a 2x4 member of the same species and grade. The additional member was not accounted for in shear since it is only required that the sistered member be fastened to the existing member to within 12-inches of bearing on each end. The sistered member should be installed as shown in Figure 5 below.

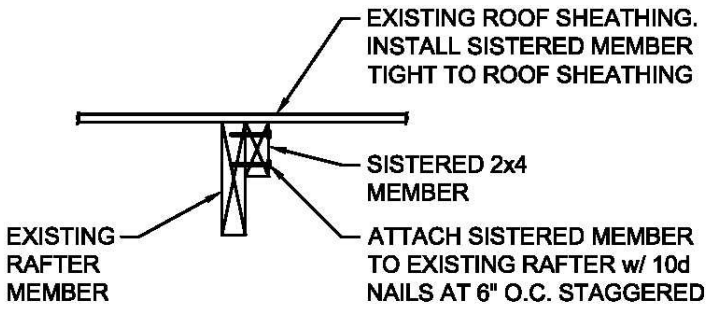


Figure 5 - Sistered Member Installation Requirements

[End of Section]

Interpreting the Tables

Using the Rafter Tables

Each of the presented tables applies to a specific set of criteria and conditions. The following procedure should be used to determine which table is appropriate for use. If during any step of the procedure a certain criteria can not be determined or is not contained within the tables, site specific engineering may be required.

The following assumptions are made in regards to the panel installation. If any of these assumptions are beyond what is listed, the tables cannot be used:

- The legs supporting the railings are spaced no more than 4-feet in any direction and will bear over a rafter location.
- The top of the panel is no more than 6-inches above the top surface of the roof at its closest point to the roof.

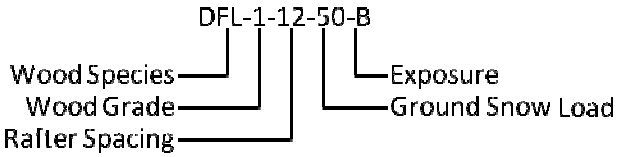
1. Determine the species of the wood for the existing rafter members. The tables apply to Douglas Fir-Larch, old Douglas Fir, Hem-Fir, and Spruce-Pine-Fir.
2. Determine the grade of wood for the given wood species. The tables include:
   - Douglas Fir-Larch grades 1, 2, 3
   - Old Douglas Fir
   - Hem-Fir grades 1, 2, 3
   - Spruce-Pine-Fir grades 1, 2, 3

   If a species, or grade of lumber, is present in the existing framing that is not listed in the tables, the allowable stresses known for the existing framing can be compared against the grades shown in the tables and if it can be matched with an equal or lesser grade lumber, then that respective table can be used.
3. Determine the existing rafter member spacing. Common spacing of 12-inches, 16-inches, 19.2-inches, and 24-inches on center are included in the tables.
4. Determine the ground snow load requirements for the area. Ground snow load requirements are dictated by the Minnesota State Building Code based upon structure's location. Ground snow loads of 50 pounds per square foot (psf) and 60 psf have been included in the tables.
5. Determine the Exposure classification for the area. Exposure classifications B, C, and D have been included in the tables and should be determined in accordance with ASCE 7-05, the Minnesota State Building Code, and local ordinances and requirements.

Once the above noted items have been determined, the following diagram should be used to determine the applicable table to be used.

Wood Species abbreviations:

- DFL – Douglas Fir-Larch
- DF – Old Douglas Fir
- HF – Hem-Fir
- SPF – Spruce-Pine-Fir



Once the applicable table has been determined and found, additional information regarding the existing framing is required.

6. Determine the existing rafter pitch for the gable roof condition. Common pitches of 3:12 (i.e. 3-inch rise and 12-inch run), 4:12, 5:12, 7:12, 9:12, and 12:12 have been included in the tables.
7. Determine the existing rafter member size. Rafter sizes of 2x4, 2x6, 2x8, 2x10, and 2x12 have been included in the tables.
8. Determine the projected existing rafter span as shown in Figure 6 below.

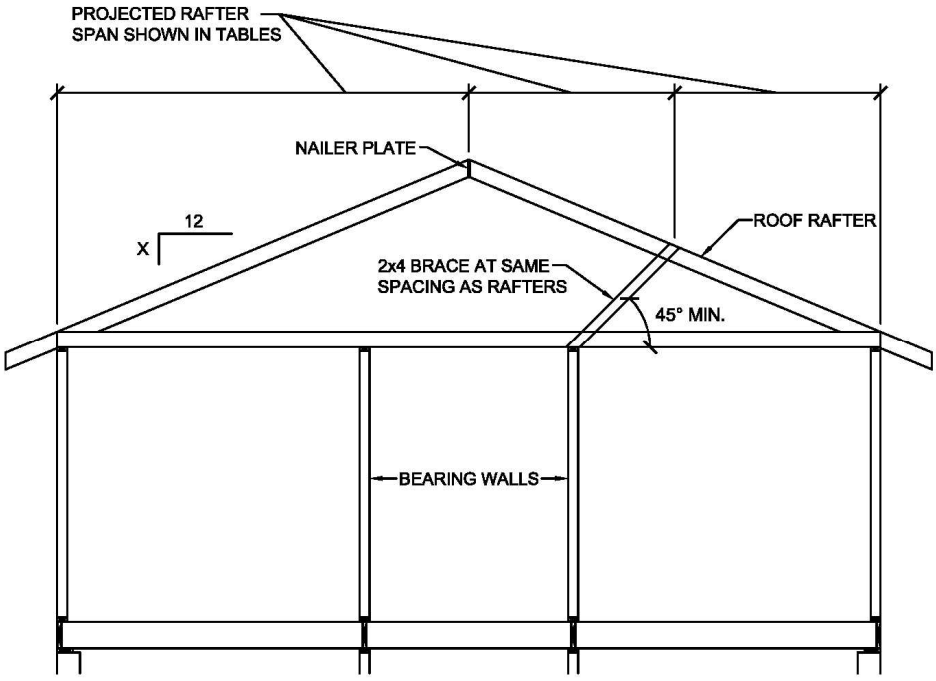


Figure 6 – Existing Framing Layout Diagram

Once the above items have been determined, an additional allowable dead load for installation of the solar panels can be found.

Using the Reinforced Rafter Tables

Additional engineering and analysis was completed to create the reinforced rafter tables found below each of the Rafter Tables. Use of the Reinforced Rafter Tables is similar to the use of the Rafter Tables and the same initial procedure (steps 1-5) should be used to determine the applicable table to be used. In the event that a blank space appears for the additional allowable dead based upon pitch, member size, and span the Reinforced Rafter Table should be used. The same pitch, member size, and span should be used to determine the additional allowable dead load with the addition of a single 2x4 member sistered to each of the existing rafters. The sistered 2x4 member should be the same wood species as the existing rafter member with the same, or better, grade.

Limitations of the Tables

The tables created tried to capture as many of the typical rafter framing and loading conditions that may be experienced in residential construction. There is an understanding that not all existing conditions will conform to the prescriptive requirements outlined within these tables. The tables are intended to give suppliers, installers, building officials and owners a guide to understand potential limits or opportunities that may be present within given conditions. It is the responsibility of those who are proposing and planning to install the solar panels to review the existing framing conditions to observe if any defects are present, the framing configuration and existing material fall within the guidelines presented, and there are no other conditions that would prohibit installation of the panels. If conditions are found to be beyond what is expressed within these tables, site specific evaluation may be required and a qualified and registered engineer should be contacted accordingly.

It should be reiterated that the provided tables apply only to hand-framed roof rafter systems constructed as shown in Figure 6. The tables do not apply to metal plate connected roof trusses even if the truss configuration is similar to the hand framed rafter configuration. Refer to the “Metal Plate Connected Roof Trusses” section for information regarding possible additional load.

[End of Section]

References

Minnesota State Building Code (MSBC) – 2007.
International Building Code (IBC) – 2006.
International Residential Code (IRC) – 2006.
American Society of Civil Engineers (ASCE), Minimum Design Loads for Buildings and Other Structures, (ASCE 7) – 2005.
ASCE 7 – 2010.
National Design Specification (NDS) for Wood Construction – 2005.
Douglas Fir Use Book – 1961.

Definitions

Metal Plate Connected Wood Roof Truss – A pre-engineered and manufactured truss utilizing metal nail plates pressed into the wood for the connection of the truss members. Does not apply to framing configurations of wood members connected using standard nails, plywood gusset plates, or glue.

Roof Rafters – Roof rafters are the wood framing members supporting the sheathing for the roof. Ceiling rafters are the wood framing members that support the ceiling finish on the interior. Ceiling rafters are not considered as roof rafters.

Sistered – Sistered is a term used to describe the attaching of an additional framing member to an existing, or primary, framing member along its length. Another common term for this condition is "scabbing."

Components and Cladding – Elements of a building that do not qualify as part of the main wind force resisting system.

Hills, Ridges, and Escarpments – A hill is a land surface characterized by strong relief in any horizontal direction. A ridge is an elongated crest of a hill characterized by strong relief in two directions. An Escarpment is a cliff or steep slope generally separating two levels or gently sloping areas.

Dead Load – Consists of the weight of all materials of construction incorporated into the building and fixed service equipment.

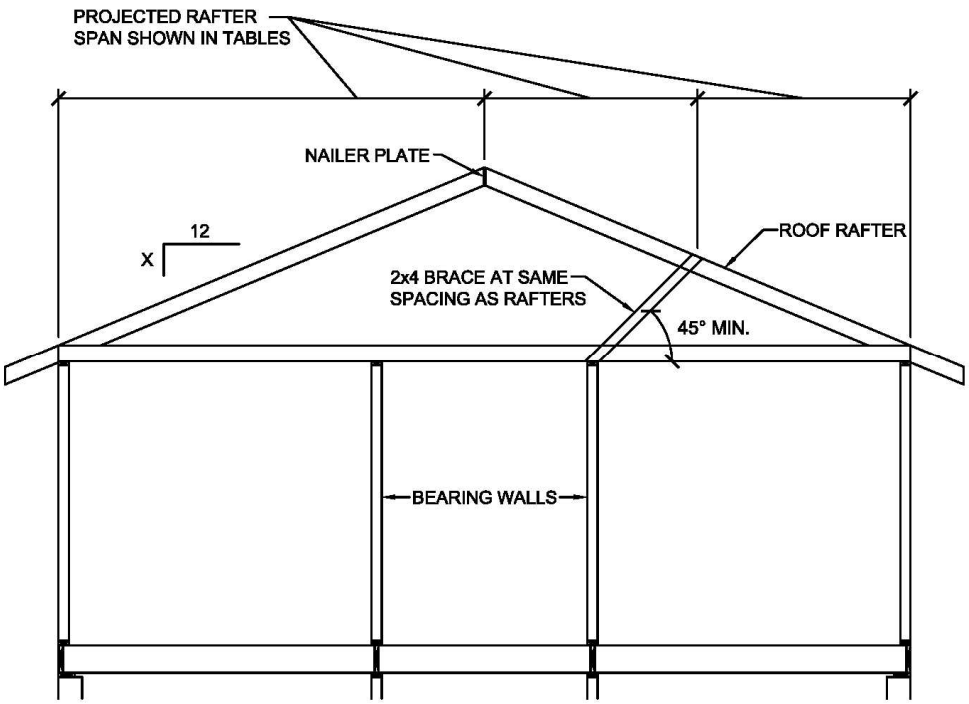
Roof Snow Load – The term roof snow load describes the flat roof snow load as defined in ASCE 7-05 and does not account for any factors due to roof slope.

Exhibit A

Residential Rafter Tables

Allowable Additional Dead Loads

Table Quick Guide Reference Diagrams



Existing Framing Layout Diagram

Wood Species abbreviations:

- DFL – Douglas Fir-Larch
- DF – Old Douglas Fir
- HF – Hem-Fir
- SPF – Spruce-Pine-Fir

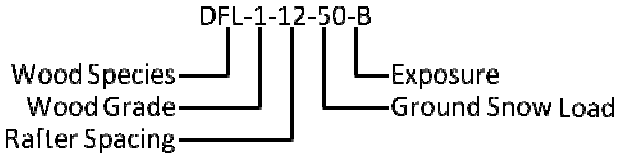
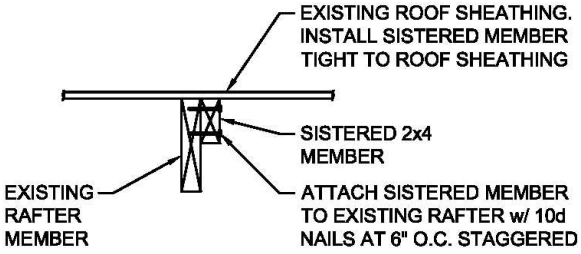


Table Header Key

When the Reinforced Tables are used, sistered members should be installed as shown below:



Sistered Member Installation Requirements

Table DFL-1-12-50-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	7'-0"	20.0	22.5	23.0	15.0	10.5	3.5
		7'-6"	11.5	13.5	14.5	4.0	1.0	
		8'-0"	4.5	6.5	5.5			
		8'-6"						
2x6	1.9	11'-0"	13.5	15.0	15.5	9.0	9.0	2.5
		11'-6"	8.5	10.0	10.5	4.0	3.5	
		12'-0"	4.0	5.5	6.0			
		12'-6"		1.5	2.0			
2x8	2.5	14'-0"	13.5	15.0	15.5	8.5	8.5	6.5
		14'-6"	9.5	11.0	11.5	4.5	5.0	2.0
		15'-0"	6.0	7.5	7.5	1.0	2.0	
		15'-6"	2.5	4.0	4.5			
2x10	3.2	17'-6"	11.5	13.0	13.0	6.0	6.5	4.0
		18'-0"	8.5	9.5	10.0	3.0	3.5	2.0
		18'-6"	5.5	6.5	7.0	0.5	1.0	
		19'-0"	2.5	4.0	4.5			
2x12	3.9	20'-6"	11.0	12.0	12.0	5.0	5.5	3.5
		21'-0"	8.5	9.5	9.5	2.5	3.0	1.0
		21'-6"	6.0	7.0	7.0		1.0	
		22'-0"	3.5	4.5	4.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	7'-0"						41.0
		7'-6"				41.5	39.5	26.0
		8'-0"	26.5			29.0	25.5	15.0
		8'-6"	17.0	22.0	24.5	19.5	14.5	6.0
2x6	3.2	11'-0"						14.0
		11'-6"				12.5	12.0	9.0
		12'-0"	10.0			7.0	7.5	5.0
		12'-6"	5.5	8.0	8.5			
2x8	3.8	14'-0"						
		14'-6"				11.0	11.0	8.0
		15'-0"				7.0	7.0	
		15'-6"	7.0	9.0	9.5			
2x10	4.5	17'-6"						9.0
		18'-0"				9.0	9.0	6.5
		18'-6"				6.0	6.0	
		19'-0"	7.5	9.0	9.5			
2x12	5.2	20'-6"				12.0		8.5
		21'-0"				9.0	9.0	6.0
		21'-6"				6.0	6.0	
		22'-0"	8.5	10.0	10.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-12-50-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	7'-0"	17.0	19.0	19.5	9.0	4.5	
		7'-6"	8.0	10.5	11.0			
		8'-0"	1.0	3.0	2.0			
		8'-6"						
2x6	1.9	11'-0"	10.0	12.0	12.0	3.0	2.5	
		11'-6"	5.0	6.5	7.0			
		12'-0"	0.5	2.0	2.5			
		12'-6"						
2x8	2.5	14'-0"	10.5	12.0	12.0	3.0	2.5	
		14'-6"	6.0	7.5	8.0			
		15'-0"	2.5	4.0	4.5			
		15'-6"		0.5	1.0			
2x10	3.2	17'-6"	8.5	9.5	9.5	0.5		
		18'-0"	5.0	6.5	6.5			
		18'-6"	2.0	3.5	3.5			
		19'-0"		0.5	1.0			
2x12	3.9	20'-6"	8.0	9.0	9.0			
		21'-0"	5.0	6.0	6.0			
		21'-6"	2.5	3.5	3.5			
		22'-0"		1.0	1.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	7'-0"					47.0	34.0
		7'-6"				35.5	33.0	19.0
		8'-0"	23.0	29.0	31.5	23.5	19.5	8.0
		8'-6"	14.0	19.0	21.0	13.5	8.0	
2x6	3.2	11'-0"				12.5	11.5	7.0
		11'-6"	12.5			6.5	6.0	
		12'-0"	7.0	9.5	10.0			
		12'-6"			5.5			
2x8	3.8	14'-0"				9.5	8.5	
		14'-6"				5.0		
		15'-0"	7.5	9.5	10.0			
		15'-6"		6.0	6.0			
2x10	4.5	17'-6"				7.0	6.0	
		18'-0"	10.5					
		18'-6"	7.0	9.0	9.5			
		19'-0"		6.0	6.0			
2x12	5.2	20'-6"				6.0	5.5	
		21'-0"	11.0					
		21'-6"	8.0	9.5	9.5			
		22'-0"	5.5	7.0	7.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-12-50-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	7'-0"	17.5	19.5	20.0	7.5	2.0	
		7'-6"	8.5	11.0	11.0			
		8'-0"	1.5	3.5	2.5			
		8'-6"						
2x6	1.9	11'-0"	10.5	12.5	12.5	1.5	0.5	
		11'-6"	5.5	7.0	7.5			
		12'-0"	1.0	2.5	3.0			
		12'-6"						
2x8	2.5	14'-0"	11.0	12.0	12.0	1.5		
		14'-6"	6.5	8.0	8.0			
		15'-0"	3.0	4.5	4.5			
		15'-6"		1.0	1.0			
2x10	3.2	17'-6"	9.0	10.0	10.0			
		18'-0"	5.5	6.5	6.5			
		18'-6"	2.5	4.0	4.0			
		19'-0"		1.0	1.0			
2x12	3.9	20'-6"	8.5	9.0	9.0			
		21'-0"	5.5	6.5	6.5			
		21'-6"	3.0	4.0	4.0			
		22'-0"	0.5	1.5	1.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	7'-0"					44.5	30.5
		7'-6"				34.0	31.0	15.5
		8'-0"	23.5	29.0	31.5	22.0	17.0	
		8'-6"	14.5	19.5	21.5	12.0	6.0	
2x6	3.2	11'-0"				11.0	9.0	
		11'-6"				5.0		
		12'-0"	7.5	9.5	10.5			
		12'-6"		5.0	5.5			
2x8	3.8	14'-0"				8.0	6.5	
		14'-6"						
		15'-0"	8.0	10.0	10.5			
		15'-6"		6.0	6.5			
2x10	4.5	17'-6"				5.5		
		18'-0"						
		18'-6"	7.5	9.5	9.5			
		19'-0"		6.0	6.5			
2x12	5.2	20'-6"						
		21'-0"						
		21'-6"	8.5	10.0	10.0			
		22'-0"	6.0	7.0	7.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-12-60-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	7'-0"	15.0	17.5	18.5	10.5	7.0	1.0
		7'-6"	6.5	8.5	9.5			
		8'-0"		1.5	0.5			
		8'-6"						
2x6	1.9	11'-0"	8.5	10.0	10.5	4.5	5.5	0.5
		11'-6"	3.0	5.0	5.5			
		12'-0"		0.5	1.0			
		12'-6"						
2x8	2.5	14'-0"	8.5	10.0	10.5	4.0	5.0	4.0
		14'-6"	4.5	6.0	6.5		1.5	
		15'-0"	0.5	2.5	3.0			
		15'-6"						
2x10	3.2	17'-6"	6.5	8.0	8.0	1.5	3.0	2.0
		18'-0"	3.5	4.5	5.0			
		18'-6"	0.5	2.0	2.0			
		19'-0"						
2x12	3.9	20'-6"	6.0	7.0	7.5	0.5	2.0	1.0
		21'-0"	3.0	4.5	4.5			
		21'-6"	0.5	2.0	2.0			
		22'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	7'-0"						38.5
		7'-6"				36.5	36.0	24.0
		8'-0"	21.5	27.0	30.0	24.5	22.0	12.5
		8'-6"	12.0	17.0	20.0	15.0	11.0	
2x6	3.2	11'-0"				13.5		11.5
		11'-6"	10.5	13.0		8.0	8.5	6.5
		12'-0"	5.0	7.5	8.5			
		12'-6"						
2x8	3.8	14'-0"				11.0	11.5	9.0
		14'-6"	10.0			6.5	7.5	5.5
		15'-0"	5.5	8.0	8.5			
		15'-6"			5.0			
2x10	4.5	17'-6"				8.0	9.0	7.0
		18'-0"	9.0	10.5	11.0		5.5	
		18'-6"	5.5	7.5	8.0			
		19'-0"						
2x12	5.2	20'-6"				7.5	8.0	6.0
		21'-0"	9.0	11.0	11.0		5.0	
		21'-6"	6.0	8.0	8.0			
		22'-0"		5.0	5.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-12-60-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	7'-0"	12.0	14.5	15.0	4.5	0.5	
		7'-6"	3.0	5.5	6.0			
		8'-0"						
		8'-6"						
2x6	1.9	11'-0"	5.0	7.0	7.5			
		11'-6"		1.5	2.0			
		12'-0"						
		12'-6"						
2x8	2.5	14'-0"	5.0	7.0	7.0			
		14'-6"	1.0	2.5	3.0			
		15'-0"						
		15'-6"						
2x10	3.2	17'-6"	3.0	4.5	5.0			
		18'-0"		1.5	1.5			
		18'-6"						
		19'-0"						
2x12	3.9	20'-6"	2.5	4.0	4.0			
		21'-0"		1.0	1.0			
		21'-6"						
		22'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	7'-0"				46.0	43.5	31.5
		7'-6"	29.5			31.0	29.5	16.5
		8'-0"	18.0	24.0	26.5	19.0	16.0	5.5
		8'-6"	8.5	14.0	16.5	9.0		
2x6	3.2	11'-0"	13.0			8.0	8.0	
		11'-6"	7.0	10.0	10.5			
		12'-0"			5.0			
		12'-6"						
2x8	3.8	14'-0"	11.5			5.0	5.0	
		14'-6"	6.5	9.0	9.5			
		15'-0"			5.0			
		15'-6"						
2x10	4.5	17'-6"	9.0	11.0	11.5			
		18'-0"	5.5	7.5	8.0			
		18'-6"						
		19'-0"						
2x12	5.2	20'-6"	9.0	10.5	11.0			
		21'-0"	6.0	7.5	7.5			
		21'-6"			5.0			
		22'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-12-60-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	7'-0"	13.0	15.0	15.5	3.5		
		7'-6"	4.0	6.5	7.0			
		8'-0"						
		8'-6"						
2x6	1.9	11'-0"	6.0	8.0	8.0			
		11'-6"	1.0	2.5	3.0			
		12'-0"						
		12'-6"						
2x8	2.5	14'-0"	6.0	7.5	8.0			
		14'-6"	2.0	3.5	4.0			
		15'-0"						
		15'-6"						
2x10	3.2	17'-6"	4.0	5.5	5.5			
		18'-0"	1.0	2.5	2.5			
		18'-6"						
		19'-0"						
2x12	3.9	20'-6"	3.5	4.5	4.5			
		21'-0"	1.0	2.0	2.0			
		21'-6"						
		22'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	7'-0"				45.0	41.5	28.5
		7'-6"	30.5			30.0	27.5	13.5
		8'-0"	19.0	24.5	27.0	18.0	14.0	
		8'-6"	9.5	15.0	17.0	8.0		
2x6	3.2	11'-0"				7.0	6.0	
		11'-6"	8.0	10.5	11.5			
		12'-0"		5.0	6.0			
		12'-6"						
2x8	3.8	14'-0"						
		14'-6"	7.5	9.5	10.0			
		15'-0"		5.5	6.0			
		15'-6"						
2x10	4.5	17'-6"	10.0					
		18'-0"	6.5	8.5	8.5			
		18'-6"		5.0	5.0			
		19'-0"						
2x12	5.2	20'-6"	10.0	11.5	11.5			
		21'-0"	7.0	8.5	8.5			
		21'-6"		5.5	5.5			
		22'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-16-50-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	6'-0"	24.0	26.0	26.5	19.5	19.0	11.0
		6'-6"	13.5	15.5	16.0	9.5	7.5	1.0
		7'-0"	5.5	7.5	8.0	0.5		
		7'-6"		0.5	1.5			
2x6	1.4	9'-0"	23.0	24.5	24.5	17.5	17.0	13.5
		9'-6"	16.0	17.5	17.5	10.5	10.5	8.0
		10'-0"	10.0	11.5	11.5	5.0	5.5	3.0
		10'-6"	4.5	6.0	6.5		1.0	
2x8	1.9	12'-0"	17.0	18.5	18.5	11.5	11.0	8.5
		12'-6"	12.0	13.5	13.5	6.5	7.0	5.0
		13'-0"	7.5	9.0	9.5	2.5	3.0	1.5
		13'-6"	4.0	5.0	5.5			
2x10	2.4	15'-0"	15.0	16.0	16.0	9.0	9.0	6.5
		15'-6"	11.0	12.0	12.0	5.5	5.5	3.5
		16'-0"	7.5	8.5	9.0	2.0	2.5	1.0
		16'-6"	4.5	5.5	5.5			
2x12	3.0	17'-6"	15.0	16.0	15.5	8.5	8.5	6.0
		18'-0"	11.5	12.5	12.5	5.5	5.5	3.5
		18'-6"	8.5	9.5	9.5	2.5	3.0	1.5
		19'-0"	5.5	6.5	6.5		0.5	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	6'-0"						
		6'-6"						36.0
		7'-0"				31.5	30.5	22.0
		7'-6"	19.0	23.5	26.0	20.5	20.0	11.0
2x6	2.4	9'-0"						
		9'-6"						
		10'-0"				14.0		10.5
		10'-6"	11.5			8.0	8.5	6.0
2x8	2.8	12'-0"						
		12'-6"						10.5
		13'-0"				9.0	9.0	6.5
		13'-6"	9.0	11.0			5.0	
2x10	3.3	15'-0"						
		15'-6"						9.0
		16'-0"				8.0	8.5	6.0
		16'-6"	9.5			5.0	5.0	
2x12	3.9	17'-6"						
		18'-0"						9.0
		18'-6"				9.0	9.0	6.5
		19'-0"				6.0	6.0	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-16-50-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	6'-0"	20.5	22.5	23.0	13.5	12.5	4.0
		6'-6"	10.5	12.0	12.5	3.5	1.5	
		7'-0"	2.0	4.0	4.5			
		7'-6"						
2x6	1.4	9'-0"	19.5	21.0	21.0	11.5	10.5	6.5
		9'-6"	12.5	14.0	14.0	5.0	4.5	1.0
		10'-0"	6.5	8.0	8.0			
		10'-6"	1.5	3.0	3.0			
2x8	1.9	12'-0"	13.5	15.0	15.0	5.5	5.0	1.5
		12'-6"	9.0	10.0	10.0	1.0	0.5	
		13'-0"	4.5	5.5	6.0			
		13'-6"	0.5	2.0	2.0			
2x10	2.4	15'-0"	11.5	12.5	12.5	3.0	2.5	
		15'-6"	8.0	9.0	9.0			
		16'-0"	4.5	5.5	5.5			
		16'-6"	1.0	2.0	2.5			
2x12	3.0	17'-6"	11.5	12.5	12.5	2.5	2.0	
		18'-0"	8.5	9.0	9.0			
		18'-6"	5.5	6.0	6.0			
		19'-0"	2.5	3.5	3.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	6'-0"						43.5
		6'-6"				40.0	37.0	28.5
		7'-0"	26.5	31.5	34.0	25.5	24.0	15.0
		7'-6"	15.5	20.5	22.5	14.5	13.5	
2x6	2.4	9'-0"						
		9'-6"				15.0	14.0	9.0
		10'-0"				8.0	7.5	
		10'-6"	8.5	10.5	11.0			
2x8	2.8	12'-0"					12.0	7.5
		12'-6"				8.0	7.0	
		13'-0"	10.0					
		13'-6"	6.0	7.5	8.0			
2x10	3.3	15'-0"				10.5	9.5	5.5
		15'-6"				6.0	5.5	
		16'-0"	10.0					
		16'-6"	6.5	8.0	8.0			
2x12	3.9	17'-6"				10.0	9.0	5.0
		18'-0"				6.5	6.0	
		18'-6"						
		19'-0"	8.5	9.5	9.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-16-50-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	6'-0"	21.0	23.0	23.5	12.0	10.5	1.0
		6'-6"	11.0	12.5	13.0	2.0		
		7'-0"	2.5	4.5	4.5			
		7'-6"						
2x6	1.4	9'-0"	20.0	21.5	21.5	10.0	8.5	3.0
		9'-6"	13.0	14.5	14.5	3.5	2.0	
		10'-0"	7.0	8.5	8.5			
		10'-6"	2.0	3.0	3.5			
2x8	1.9	12'-0"	14.0	15.5	15.0	4.0	2.5	
		12'-6"	9.5	10.5	10.5			
		13'-0"	5.0	6.0	6.0			
		13'-6"	1.0	2.0	2.5			
2x10	2.4	15'-0"	12.0	13.0	13.0	1.5	0.5	
		15'-6"	8.0	9.0	9.0			
		16'-0"	5.0	5.5	5.5			
		16'-6"	1.5	2.5	2.5			
2x12	3.0	17'-6"	12.0	13.0	12.5	1.0		
		18'-0"	9.0	9.5	9.0			
		18'-6"	6.0	6.5	6.0			
		19'-0"	3.0	3.5	3.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	6'-0"						40.0
		6'-6"				38.5	35.0	25.5
		7'-0"	27.0	32.0	34.0	24.5	22.0	11.5
		7'-6"	16.0	20.5	22.5	13.0	11.5	
2x6	2.4	9'-0"						12.5
		9'-6"				13.5	11.5	6.0
		10'-0"				6.5	5.0	
		10'-6"	9.0	11.0	11.5			
2x8	2.8	12'-0"				12.0	10.0	
		12'-6"				6.5	5.0	
		13'-0"	10.5					
		13'-6"	6.0	8.0	8.0			
2x10	3.3	15'-0"				9.0	7.0	
		15'-6"				5.0		
		16'-0"	10.5					
		16'-6"	7.0	8.5	8.5			
2x12	3.9	17'-6"				8.5	7.0	
		18'-0"				5.0		
		18'-6"						
		19'-0"	9.0	10.0	10.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-16-60-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	6'-0"	19.0	21.0	21.5	15.0	15.5	9.0
		6'-6"	8.5	10.5	11.0	5.0	4.0	
		7'-0"	0.5	2.5	3.0			
		7'-6"						
2x6	1.4	9'-0"	17.5	19.5	19.5	12.5	13.5	11.5
		9'-6"	10.5	12.5	12.5	6.0	7.0	6.0
		10'-0"	4.5	6.5	7.0	0.5	2.0	1.0
		10'-6"		1.0	1.5			
2x8	1.9	12'-0"	12.0	13.5	13.5	7.0	7.5	6.5
		12'-6"	7.0	8.5	8.5	2.0	3.5	2.5
		13'-0"	2.5	4.0	4.5			
		13'-6"			0.5			
2x10	2.4	15'-0"	10.0	11.0	11.0	4.5	5.5	4.5
		15'-6"	6.0	7.0	7.5	1.0	2.0	1.5
		16'-0"	2.5	3.5	4.0			
		16'-6"		0.5	1.0			
2x12	3.0	17'-6"	10.0	11.0	11.0	4.0	5.0	4.0
		18'-0"	6.5	7.5	7.5	1.0	2.0	1.5
		18'-6"	3.5	4.5	4.5			
		19'-0"	0.5	1.5	2.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	6'-0"						
		6'-6"				41.0	40.0	33.5
		7'-0"	24.5	30.0	32.5	27.0	26.5	19.5
		7'-6"	13.5	18.5	21.0	16.0	16.5	8.5
2x6	2.4	9'-0"						
		9'-6"						
		10'-0"	12.5			9.5	10.0	8.5
		10'-6"	6.5	9.0	9.5			
2x8	2.8	12'-0"						
		12'-6"				9.0	10.0	8.0
		13'-0"	8.5	10.5	11.0		5.5	
		13'-6"		6.0	6.5			
2x10	3.3	15'-0"				11.5		10.0
		15'-6"				7.5	8.0	6.5
		16'-0"	8.0	10.0	10.5			
		16'-6"		6.5	6.5			
2x12	3.9	17'-6"				11.5	12.0	10.0
		18'-0"				8.0	8.5	7.0
		18'-6"	9.5	11.0	11.5		5.5	
		19'-0"	6.5	8.0	8.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-16-60-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	6'-0"	15.5	18.0	18.0	9.0	9.0	2.0
		6'-6"	5.0	7.5	8.0			
		7'-0"						
		7'-6"						
2x6	1.4	9'-0"	14.5	16.0	16.5	7.0	7.0	4.0
		9'-6"	7.5	9.0	9.5	0.5	1.0	
		10'-0"	1.5	3.0	3.5			
		10'-6"						
2x8	1.9	12'-0"	8.5	10.0	10.0	1.0	1.5	
		12'-6"	3.5	5.0	5.5			
		13'-0"		1.0	1.0			
		13'-6"						
2x10	2.4	15'-0"	6.5	7.5	7.5			
		15'-6"	2.5	4.0	4.0			
		16'-0"		0.5	0.5			
		16'-6"						
2x12	3.0	17'-6"	6.5	7.5	7.5			
		18'-0"	3.0	4.0	4.0			
		18'-6"		1.0	1.0			
		19'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	6'-0"						41.0
		6'-6"	35.0			35.5	33.5	26.5
		7'-0"	21.5	26.5	29.0	21.0	20.5	12.5
		7'-6"	10.5	15.5	17.5	10.0	10.0	
2x6	2.4	9'-0"						13.5
		9'-6"				10.5	10.5	7.0
		10'-0"	9.5	12.0	12.5			
		10'-6"		5.5	6.5			
2x8	2.8	12'-0"				8.5	8.5	5.5
		12'-6"	10.0	12.0				
		13'-0"	5.0	7.0	7.5			
		13'-6"						
2x10	3.3	15'-0"				6.0	6.0	
		15'-6"	9.0	10.5	11.0			
		16'-0"	5.0	6.5	7.0			
		16'-6"						
2x12	3.9	17'-6"				5.5	5.5	
		18'-0"	10.0	11.5	11.5			
		18'-6"	6.5	8.0	8.0			
		19'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-16-60-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	6'-0"	16.5	18.5	19.0	8.0	7.0	
		6'-6"	6.0	8.0	8.5			
		7'-0"			0.5			
		7'-6"						
2x6	1.4	9'-0"	15.5	17.0	17.0	6.0	5.0	1.0
		9'-6"	8.5	10.0	10.0			
		10'-0"	2.5	4.0	4.0			
		10'-6"						
2x8	1.9	12'-0"	9.5	11.0	11.0			
		12'-6"	4.5	6.0	6.0			
		13'-0"	0.5	1.5	1.5			
		13'-6"						
2x10	2.4	15'-0"	7.5	8.5	8.5			
		15'-6"	3.5	4.5	4.5			
		16'-0"		1.5	1.5			
		16'-6"						
2x12	3.0	17'-6"	7.5	8.5	8.0			
		18'-0"	4.0	5.0	5.0			
		18'-6"	1.0	2.0	2.0			
		19'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	6'-0"						38.0
		6'-6"				34.5	31.5	23.5
		7'-0"	22.5	27.5	30.0	20.0	18.5	9.5
		7'-6"	11.5	16.0	18.5	9.0	8.0	
2x6	2.4	9'-0"					16.0	10.5
		9'-6"				9.5	8.5	
		10'-0"	10.5	12.5	13.0			
		10'-6"		6.5	7.0			
2x8	2.8	12'-0"				7.5	6.5	
		12'-6"	11.0					
		13'-0"	6.0	8.0	8.0			
		13'-6"						
2x10	3.3	15'-0"				5.0		
		15'-6"	10.0	11.5	11.5			
		16'-0"	6.0	7.5	7.5			
		16'-6"						
2x12	3.9	17'-6"						
		18'-0"	11.0	12.0	12.0			
		18'-6"	7.5	8.5	8.5			
		19'-0"		5.5	5.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-19.2-50-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	24.5	26.5	27.0	19.5	19.0	15.0
		6'-0"	13.5	15.5	15.5	9.0	9.0	3.5
		6'-6"	5.0	6.5	7.0	1.0		
		7'-0"						
2x6	1.2	8'-6"	19.5	21.0	21.0	14.0	13.5	11.0
		9'-0"	12.5	14.0	14.0	7.5	7.5	5.5
		9'-6"	6.5	8.0	8.5	2.0	2.5	1.0
		10'-0"	1.5	3.0	3.5			
2x8	1.6	11'-0"	17.5	19.0	19.0	11.5	11.5	9.0
		11'-6"	12.5	13.5	13.5	6.5	7.0	5.0
		12'-0"	7.5	9.0	9.0	2.5	3.0	1.5
		12'-6"	3.5	4.5	5.0			
2x10	2.0	13'-6"	17.5	19.0	18.5	11.5	11.5	9.0
		14'-0"	13.5	14.5	14.5	7.5	7.5	5.5
		14'-6"	9.5	10.5	10.5	3.5	4.0	2.5
		15'-0"	6.0	7.0	7.0	0.5	1.0	
2x12	2.5	16'-0"	16.0	16.5	16.5	9.0	9.0	7.0
		16'-6"	12.0	13.0	13.0	6.0	6.0	4.0
		17'-0"	9.0	9.5	9.5	2.5	3.0	1.5
		17'-6"	6.0	6.5	6.5		0.5	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-6"						
		6'-0"						36.0
		6'-6"	29.5			31.0	29.5	24.0
		7'-0"	18.0	23.0	25.0	19.0	19.0	12.5
2x6	2.0	8'-6"						
		9'-0"						
		9'-6"				10.5	10.5	8.0
		10'-0"	8.5	10.5	11.0		5.0	
2x8	2.4	11'-0"						
		11'-6"						10.5
		12'-0"				8.5	9.0	6.5
		12'-6"	9.0	10.5	11.0			
2x10	2.8	13'-6"						
		14'-0"						
		14'-6"				10.0	10.0	7.5
		15'-0"				6.5	6.5	
2x12	3.2	16'-0"						
		16'-6"						10.0
		17'-0"				9.5	9.5	7.0
		17'-6"				6.0	6.5	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-19.2-50-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	21.5	23.5	23.5	14.0	13.0	8.0
		6'-0"	10.0	12.0	12.5	3.0	3.0	
		6'-6"	1.5	3.0	3.5			
		7'-0"						
2x6	1.2	8'-6"	16.0	17.5	17.5	8.0	7.5	4.0
		9'-0"	9.5	10.5	10.5	1.5	1.5	
		9'-6"	3.5	4.5	5.0			
		10'-0"						
2x8	1.6	11'-0"	14.5	15.5	15.5	6.0	5.5	2.0
		11'-6"	9.0	10.0	10.0	1.0	0.5	
		12'-0"	4.5	5.5	5.5			
		12'-6"	0.5	1.5	1.5			
2x10	2.0	13'-6"	14.5	15.5	15.5	5.5	5.0	1.5
		14'-0"	10.0	11.0	11.0	1.5	1.0	
		14'-6"	6.0	7.0	7.0			
		15'-0"	2.5	3.5	3.5			
2x12	2.5	16'-0"	12.5	13.5	13.0	3.5	3.0	
		16'-6"	9.0	9.5	9.5			
		17'-0"	5.5	6.5	6.0			
		17'-6"	2.5	3.5	3.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-6"						
		6'-0"				40.0	37.5	29.0
		6'-6"	26.5	31.5	33.5	25.0	23.5	17.0
		7'-0"	15.0	19.5	21.5	13.5	12.5	5.5
2x6	2.0	8'-6"						12.5
		9'-0"				11.5	10.5	6.0
		9'-6"	11.0	13.0	13.5			
		10'-0"	5.0	7.0	7.5			
2x8	2.4	11'-0"						8.5
		11'-6"				8.0	7.5	
		12'-0"	10.5					
		12'-6"	5.5	7.0	7.5			
2x10	2.8	13'-6"					12.5	8.0
		14'-0"				8.5	8.0	
		14'-6"						
		15'-0"	8.5	9.5	10.0			
2x12	3.2	16'-0"				11.0	10.0	6.0
		16'-6"				7.0	6.5	
		17'-0"						
		17'-6"	8.5	10.0	10.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-19.2-50-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	22.0	23.5	23.5	12.5	10.5	5.0
		6'-0"	10.5	12.5	12.5	2.0	0.5	
		6'-6"	2.0	3.5	4.0			
		7'-0"						
2x6	1.2	8'-6"	16.5	18.0	18.0	6.5	5.0	0.5
		9'-0"	9.5	11.0	11.0			
		9'-6"	4.0	5.0	5.0			
		10'-0"						
2x8	1.6	11'-0"	15.0	16.0	15.5	4.5	3.0	
		11'-6"	9.5	10.5	10.5			
		12'-0"	5.0	6.0	6.0			
		12'-6"	1.0	2.0	2.0			
2x10	2.0	13'-6"	15.0	16.0	15.5	4.0	3.0	
		14'-0"	10.5	11.5	11.0			
		14'-6"	6.5	7.5	7.5			
		15'-0"	3.0	4.0	4.0			
2x12	2.5	16'-0"	13.0	13.5	13.5	2.0	0.5	
		16'-6"	9.5	10.0	9.5			
		17'-0"	6.0	7.0	6.5			
		17'-6"	3.0	4.0	3.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-6"						41.5
		6'-0"				38.5	35.0	26.0
		6'-6"	27.0	32.0	33.5	23.5	21.0	13.5
		7'-0"	15.5	20.0	21.5	12.0	10.5	
2x6	2.0	8'-6"					15.5	9.5
		9'-0"				10.0	8.0	
		9'-6"	11.5	13.5	14.0			
		10'-0"	5.5	7.5	8.0			
2x8	2.4	11'-0"				12.5	10.5	5.0
		11'-6"				6.5	5.0	
		12'-0"	11.0					
		12'-6"	6.0	7.5	7.5			
2x10	2.8	13'-6"				12.0	10.0	
		14'-0"				7.0	5.5	
		14'-6"						
		15'-0"	9.0	10.0	10.0			
2x12	3.2	16'-0"				9.5	8.0	
		16'-6"				6.0		
		17'-0"						
		17'-6"	9.0	10.0	10.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-19.2-60-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	19.5	21.5	22.0	15.0	15.5	13.0
		6'-0"	8.5	10.5	11.0	4.5	5.5	1.0
		6'-6"		1.5	2.0			
		7'-0"						
2x6	1.2	8'-6"	14.5	16.0	16.0	9.5	10.0	8.5
		9'-0"	7.5	9.0	9.5	3.0	4.0	3.0
		9'-6"	1.5	3.0	3.5			
		10'-0"						
2x8	1.6	11'-0"	12.5	14.0	14.0	7.0	8.0	6.5
		11'-6"	7.0	8.5	8.5	2.0	3.5	2.5
		12'-0"	2.5	4.0	4.0			
		12'-6"						
2x10	2.0	13'-6"	12.5	14.0	14.0	7.0	7.5	6.5
		14'-0"	8.0	9.5	9.5	3.0	4.0	3.0
		14'-6"	4.5	5.5	5.5		0.5	
		15'-0"	1.0	2.0	2.0			
2x12	2.5	16'-0"	10.5	11.5	11.5	4.5	5.5	4.5
		16'-6"	7.0	8.0	8.0	1.5	2.5	2.0
		17'-0"	4.0	5.0	5.0			
		17'-6"	1.0	2.0	2.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-6"						
		6'-0"				41.5		34.0
		6'-6"	24.5	29.5	32.0	26.5	26.0	21.5
		7'-0"	13.0	18.0	20.0	14.5	15.5	10.0
2x6	2.0	8'-6"						
		9'-0"				12.5	13.0	11.0
		9'-6"	9.0	11.5	12.0	6.0	7.0	5.5
		10'-0"		5.5	6.0			
2x8	2.4	11'-0"						
		11'-6"				9.5	10.0	8.5
		12'-0"	8.5	10.5	10.5		5.5	
		12'-6"		5.5	6.0			
2x10	2.8	13'-6"						
		14'-0"				10.0	10.5	9.0
		14'-6"	10.5			5.5	6.5	5.5
		15'-0"	6.5	8.0	8.5			
2x12	3.2	16'-0"				12.5		11.0
		16'-6"				8.5	9.0	7.5
		17'-0"	10.5	11.5	12.0	5.0	6.0	
		17'-6"	7.0	8.0	8.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-19.2-60-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	16.5	18.5	18.5	9.5	9.5	6.0
		6'-0"	5.0	7.0	7.5			
		6'-6"						
		7'-0"						
2x6	1.2	8'-6"	11.0	12.5	13.0	3.5	4.0	1.5
		9'-0"	4.0	5.5	6.0			
		9'-6"						
		10'-0"						
2x8	1.6	11'-0"	9.0	10.5	10.5	1.5	2.0	
		11'-6"	4.0	5.0	5.5			
		12'-0"		0.5	0.5			
		12'-6"						
2x10	2.0	13'-6"	9.5	10.5	10.5	1.0	1.5	
		14'-0"	5.0	6.0	6.0			
		14'-6"	1.0	2.0	2.0			
		15'-0"						
2x12	2.5	16'-0"	7.5	8.5	8.0			
		16'-6"	4.0	4.5	4.5			
		17'-0"	0.5	1.5	1.5			
		17'-6"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-6"						
		6'-0"	36.0			35.5	34.0	27.0
		6'-6"	21.0	26.5	28.5	20.5	20.0	14.5
		7'-0"	10.0	14.5	16.5	9.0	9.0	
2x6	2.0	8'-6"				14.5	14.5	10.5
		9'-0"	13.0			6.5	7.0	
		9'-6"	6.0	8.0	8.5			
		10'-0"						
2x8	2.4	11'-0"				9.5	9.0	6.0
		11'-6"	10.5	12.5				
		12'-0"	5.0	7.0	7.5			
		12'-6"						
2x10	2.8	13'-6"				9.0	8.5	5.5
		14'-0"	12.0					
		14'-6"	7.5	9.0	9.0			
		15'-0"			5.0			
2x12	3.2	16'-0"				6.5	6.5	
		16'-6"	11.0	12.0	12.0			
		17'-0"	7.0	8.5	8.5			
		17'-6"		5.0	5.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-19.2-60-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	17.5	19.0	19.5	8.5	7.5	2.5
		6'-0"	6.0	8.0	8.0			
		6'-6"						
		7'-0"						
2x6	1.2	8'-6"	12.0	13.5	13.5	2.5	2.0	
		9'-0"	5.0	6.5	6.5			
		9'-6"		0.5	1.0			
		10'-0"						
2x8	1.6	11'-0"	10.0	11.5	11.5	0.5		
		11'-6"	5.0	6.0	6.0			
		12'-0"	0.5	1.5	1.5			
		12'-6"						
2x10	2.0	13'-6"	10.5	11.5	11.0			
		14'-0"	6.0	7.0	7.0			
		14'-6"	2.0	3.0	3.0			
		15'-0"						
2x12	2.5	16'-0"	8.5	9.0	9.0			
		16'-6"	5.0	5.5	5.5			
		17'-0"	1.5	2.5	2.0			
		17'-6"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-6"						39.5
		6'-0"				34.5	32.0	23.5
		6'-6"	22.0	27.5	29.5	19.5	18.0	11.5
		7'-0"	11.0	15.5	17.0	8.0	7.0	
2x6	2.0	8'-6"				13.5	12.5	7.5
		9'-0"	14.0			5.5	5.0	
		9'-6"	7.0	9.0	9.5			
		10'-0"						
2x8	2.4	11'-0"				8.5	7.5	
		11'-6"	11.5					
		12'-0"	6.0	8.0	8.0			
		12'-6"						
2x10	2.8	13'-6"				8.0	7.0	
		14'-0"						
		14'-6"	8.5	9.5	9.5			
		15'-0"		5.5	5.5			
2x12	3.2	16'-0"				5.5		
		16'-6"	12.0					
		17'-0"	8.0	9.0	9.0			
		17'-6"		5.5	5.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-24-50-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-6"	40.0	42.0	42.0	34.0	32.5	27.5
		5'-0"	24.0	25.5	26.0	18.5	18.0	15.0
		5'-6"	12.0	13.5	14.0	7.5	7.5	5.0
		6'-0"	3.0	4.5	5.0			
2x6	1.0	7'-6"	22.5	24.0	24.0	16.5	16.0	13.0
		8'-0"	14.5	15.5	16.0	9.0	9.0	7.0
		8'-6"	8.0	9.0	9.0	2.5	3.0	2.0
		9'-0"	2.0	3.5	3.5			
2x8	1.3	9'-6"	23.5	24.5	24.5	17.0	16.5	13.5
		10'-0"	17.0	18.0	18.0	10.5	10.5	8.5
		10'-6"	11.0	12.0	12.5	5.5	6.0	4.0
		11'-0"	6.5	7.5	7.5	1.0	1.5	0.5
2x10	1.6	12'-0"	19.5	20.5	20.5	13.0	13.0	10.5
		12'-6"	14.5	15.5	15.5	8.5	8.5	6.5
		13'-0"	10.5	11.0	11.0	4.5	4.5	3.0
		13'-6"	6.5	7.5	7.5	0.5	1.5	
2x12	2.0	14'-0"	19.5	20.5	20.0	12.5	12.5	10.0
		14'-6"	15.5	16.0	16.0	8.5	8.5	6.5
		15'-0"	11.5	12.0	12.0	5.0	5.5	3.5
		15'-6"	8.0	9.0	8.5	2.0	2.5	1.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-6"						
		5'-0"						
		5'-6"						34.5
		6'-0"	27.5	32.5	34.0	28.0	27.0	22.0
2x6	1.6	7'-6"						
		8'-0"						
		8'-6"				11.5	11.5	9.0
		9'-0"	9.5	11.0	11.5	5.0	5.5	
2x8	1.9	9'-6"						
		10'-0"						
		10'-6"						9.5
		11'-0"				7.0	7.5	5.5
2x10	2.2	12'-0"						
		12'-6"						
		13'-0"				11.0	11.0	8.5
		13'-6"				7.0	7.0	5.0
2x12	2.6	14'-0"						
		14'-6"						
		15'-0"				12.0		9.5
		15'-6"				8.5	8.5	6.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-24-50-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-6"	36.5	38.5	38.5	28.0	26.0	20.5
		5'-0"	20.5	22.5	22.5	13.0	12.0	8.0
		5'-6"	8.5	10.5	10.5	1.5	1.5	
		6'-0"		1.0	1.5			
2x6	1.0	7'-6"	19.0	20.5	20.5	10.5	10.0	6.0
		8'-0"	11.0	12.5	12.5	3.0	3.0	
		8'-6"	4.5	5.5	6.0			
		9'-0"			0.5			
2x8	1.3	9'-6"	20.0	21.0	21.0	11.0	10.0	6.5
		10'-0"	13.5	14.5	14.5	5.0	4.5	1.5
		10'-6"	8.0	9.0	9.0			
		11'-0"	3.0	4.0	4.0			
2x10	1.6	12'-0"	16.5	17.5	17.0	7.0	6.5	3.0
		12'-6"	11.5	12.5	12.0	2.5	2.5	
		13'-0"	7.0	8.0	8.0			
		13'-6"	3.0	4.0	4.0			
2x12	2.0	14'-0"	16.5	17.0	16.5	7.0	6.0	3.0
		14'-6"	12.0	13.0	12.5	3.0	2.5	
		15'-0"	8.0	9.0	8.5			
		15'-6"	5.0	5.5	5.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-6"						
		5'-0"						
		5'-6"				38.0	35.5	27.5
		6'-0"	24.5	29.0	31.0	22.5	21.0	15.0
2x6	1.6	7'-6"						
		8'-0"				13.5	12.5	8.0
		8'-6"	12.5			5.5	5.5	
		9'-0"	6.0	8.0	8.0			
2x8	1.9	9'-6"						
		10'-0"				13.0	12.0	7.5
		10'-6"				6.5	6.0	
		11'-0"	9.0	10.5	10.5			
2x10	2.2	12'-0"						10.0
		12'-6"				10.0	9.0	5.5
		13'-0"				5.5	5.0	
		13'-6"	9.0	10.5	10.5			
2x12	2.6	14'-0"						9.5
		14'-6"				10.5	9.5	6.0
		15'-0"				6.5	6.0	
		15'-6"	11.5		12.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-24-50-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-6"	37.0	39.0	38.5	26.5	24.0	17.0
		5'-0"	21.0	22.5	22.5	11.5	9.5	4.5
		5'-6"	9.0	10.5	10.5			
		6'-0"		1.5	2.0			
2x6	1.0	7'-6"	19.5	21.0	20.5	9.0	7.5	2.5
		8'-0"	11.5	13.0	12.5	1.5	0.5	
		8'-6"	5.0	6.0	6.0			
		9'-0"		0.5	0.5			
2x8	1.3	9'-6"	20.5	21.5	21.0	9.5	8.0	3.0
		10'-0"	14.0	15.0	14.5	3.5	2.0	
		10'-6"	8.5	9.5	9.0			
		11'-0"	3.5	4.5	4.0			
2x10	1.6	12'-0"	17.0	17.5	17.0	6.0	4.5	
		12'-6"	12.0	12.5	12.5	1.0		
		13'-0"	7.5	8.5	8.0			
		13'-6"	3.5	4.5	4.0			
2x12	2.0	14'-0"	17.0	17.5	17.0	5.5	4.0	
		14'-6"	12.5	13.0	12.5	1.5		
		15'-0"	8.5	9.5	9.0			
		15'-6"	5.0	6.0	5.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-6"						
		5'-0"						41.0
		5'-6"				36.5	33.0	24.5
		6'-0"	24.5	29.5	31.0	21.0	18.5	11.5
2x6	1.6	7'-6"						12.5
		8'-0"				12.0	10.0	
		8'-6"	13.0					
		9'-0"	6.5	8.0	8.5			
2x8	1.9	9'-6"						10.0
		10'-0"				11.5	9.5	
		10'-6"				5.5		
		11'-0"	9.5	11.0	11.0			
2x10	2.2	12'-0"					12.0	6.5
		12'-6"				8.5	7.0	
		13'-0"						
		13'-6"	9.5	10.5	10.5			
2x12	2.6	14'-0"					12.0	6.5
		14'-6"				9.0	7.5	
		15'-0"				5.0		
		15'-6"	11.5					

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-24-60-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-6"	35.0	37.0	37.0	29.5	29.0	25.0
		5'-0"	18.5	20.5	21.0	14.0	14.5	12.5
		5'-6"	7.0	8.5	9.0	2.5	4.0	3.0
		6'-0"						
2x6	1.0	7'-6"	17.5	19.0	19.0	12.0	12.5	11.0
		8'-0"	9.5	10.5	11.0	4.5	5.5	4.5
		8'-6"	2.5	4.0	4.5			
		9'-0"						
2x8	1.3	9'-6"	18.0	19.5	19.5	12.5	13.0	11.0
		10'-0"	11.5	13.0	13.0	6.0	7.0	6.0
		10'-6"	6.0	7.5	7.5	1.0	2.0	1.5
		11'-0"	1.0	2.5	2.5			
2x10	1.6	12'-0"	14.5	15.5	15.5	8.5	9.5	8.0
		12'-6"	9.5	10.5	10.5	4.0	5.0	4.0
		13'-0"	5.0	6.0	6.5		1.0	1.0
		13'-6"	1.5	2.5	2.5			
2x12	2.0	14'-0"	14.5	15.5	15.0	8.0	9.0	7.5
		14'-6"	10.5	11.0	11.0	4.0	5.0	4.5
		15'-0"	6.5	7.5	7.0	0.5	2.0	1.5
		15'-6"	3.0	4.0	4.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-6"						
		5'-0"						
		5'-6"				39.0	38.0	32.5
		6'-0"	22.5	27.5	29.5	23.5	23.5	19.5
2x6	1.6	7'-6"						
		8'-0"				14.5		13.0
		8'-6"	11.0	13.0	13.5	7.0	8.0	6.5
		9'-0"		6.0	7.0			
2x8	1.9	9'-6"						
		10'-0"						
		10'-6"				8.0	9.0	7.5
		11'-0"	7.0	9.0	9.0			
2x10	2.2	12'-0"						
		12'-6"				11.5	12.0	10.0
		13'-0"	11.5			6.5	7.5	6.0
		13'-6"	7.0	8.5	9.0			
2x12	2.6	14'-0"						
		14'-6"				12.0	12.5	10.5
		15'-0"				7.5	8.5	7.0
		15'-6"	9.5	10.5	10.5		5.0	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-24-60-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-6"	31.5	33.5	33.5	23.5	22.5	18.0
		5'-0"	15.5	17.5	17.5	8.0	8.5	5.5
		5'-6"	3.5	5.5	5.5			
		6'-0"						
2x6	1.0	7'-6"	14.0	15.5	15.5	6.0	6.5	3.5
		8'-0"	6.0	7.5	7.5			
		8'-6"		0.5	1.0			
		9'-0"						
2x8	1.3	9'-6"	15.0	16.0	16.0	6.5	6.5	4.0
		10'-0"	8.5	9.5	9.5	0.5	1.0	
		10'-6"	3.0	4.0	4.0			
		11'-0"						
2x10	1.6	12'-0"	11.5	12.5	12.0	2.5	3.0	1.0
		12'-6"	6.5	7.5	7.5			
		13'-0"	2.0	3.0	3.0			
		13'-6"						
2x12	2.0	14'-0"	11.5	12.0	12.0	2.5	2.5	0.5
		14'-6"	7.0	8.0	7.5			
		15'-0"	3.0	4.0	4.0			
		15'-6"		0.5	0.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-6"						
		5'-0"						
		5'-6"	34.5			33.5	32.0	25.5
		6'-0"	19.0	24.0	26.0	18.0	17.5	12.5
2x6	1.6	7'-6"						13.5
		8'-0"				9.0	9.0	5.5
		8'-6"	7.5	9.5	10.0			
		9'-0"						
2x8	1.9	9'-6"						11.5
		10'-0"				8.5	8.5	5.5
		10'-6"	9.5	11.0	11.5			
		11'-0"		5.5	5.5			
2x10	2.2	12'-0"				11.0	10.5	7.5
		12'-6"				5.5	5.5	
		13'-0"	8.5	10.0	10.0			
		13'-6"		5.5	5.5			
2x12	2.6	14'-0"				11.0	10.5	7.5
		14'-6"				6.0	6.0	
		15'-0"	10.0	11.5	11.5			
		15'-6"	6.0	7.5	7.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-1-24-60-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.1
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-6"	32.5	34.5	34.5	22.5	20.5	15.0
		5'-0"	16.5	18.0	18.0	7.0	6.5	2.5
		5'-6"	4.5	6.0	6.5			
		6'-0"						
2x6	1.0	7'-6"	15.0	16.5	16.5	5.0	4.5	0.5
		8'-0"	7.0	8.5	8.5			
		8'-6"	0.5	1.5	1.5			
		9'-0"						
2x8	1.3	9'-6"	16.0	17.0	17.0	5.5	4.5	1.0
		10'-0"	9.5	10.5	10.5			
		10'-6"	4.0	5.0	4.5			
		11'-0"						
2x10	1.6	12'-0"	12.5	13.0	13.0	1.5	1.0	
		12'-6"	7.5	8.0	8.0			
		13'-0"	3.0	4.0	3.5			
		13'-6"						
2x12	2.0	14'-0"	12.5	13.0	12.5	1.5	0.5	
		14'-6"	8.0	8.5	8.5			
		15'-0"	4.0	5.0	4.5			
		15'-6"	0.5	1.5	1.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-6"						
		5'-0"						39.0
		5'-6"	35.5			32.5	30.0	22.0
		6'-0"	20.0	25.0	26.5	17.0	15.5	9.5
2x6	1.6	7'-6"				17.0	15.5	10.0
		8'-0"				8.0	7.0	
		8'-6"	8.5	10.5	11.0			
		9'-0"						
2x8	1.9	9'-6"					13.0	8.0
		10'-0"				7.5	6.5	
		10'-6"	10.5	12.0	12.0			
		11'-0"	5.0	6.5	6.5			
2x10	2.2	12'-0"				10.0	9.0	
		12'-6"						
		13'-0"	9.5	10.5	10.5			
		13'-6"	5.0	6.0	6.0			
2x12	2.6	14'-0"				10.0	8.5	
		14'-6"				5.0		
		15'-0"	11.0	12.0	12.0			
		15'-6"	7.0	8.0	8.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-12-50-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	6'-6"	24.5	27.0	27.0	20.0	19.5	10.5
		7'-0"	14.5	17.0	17.5	10.5	7.5	1.0
		7'-6"	7.0	9.0	9.5	1.0		
		8'-0"	0.5	2.5	3.0			
2x6	1.9	10'-0"	20.0	21.5	22.0	14.5	14.5	11.5
		10'-6"	13.5	15.5	15.5	9.0	9.0	6.0
		11'-0"	8.5	10.0	10.5	4.0	4.0	0.5
		11'-6"	4.0	5.5	5.5			
2x8	2.5	13'-0"	17.5	18.5	19.0	11.5	11.5	9.0
		13'-6"	12.5	14.0	14.0	7.5	7.5	5.5
		14'-0"	8.5	10.0	10.0	3.5	4.0	2.0
		14'-6"	5.0	6.0	6.5		0.5	
2x10	3.2	16'-0"	17.0	18.0	18.0	11.0	10.5	8.0
		16'-6"	13.0	14.5	14.5	7.5	7.5	5.0
		17'-0"	9.5	11.0	11.0	4.0	4.5	2.5
		17'-6"	6.5	7.5	8.0	1.0	1.5	
2x12	3.9	19'-0"	14.5	15.5	15.5	8.0	8.0	6.0
		19'-6"	11.5	12.5	12.5	5.5	5.5	3.5
		20'-0"	8.5	9.5	9.5	2.5	3.0	1.5
		20'-6"	6.0	7.0	7.0		0.5	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	6'-6"						
		7'-0"						36.0
		7'-6"				33.5	32.0	22.5
		8'-0"	20.5	26.0	28.0	22.5	21.5	11.5
2x6	3.2	10'-0"						
		10'-6"						
		11'-0"				12.0	12.0	9.0
		11'-6"	10.5			7.0	7.0	
2x8	3.8	13'-0"						
		13'-6"						
		14'-0"				9.5	9.5	7.0
		14'-6"	10.0			5.5	6.0	
2x10	4.5	16'-0"						
		16'-6"						10.5
		17'-0"				10.5	10.0	7.5
		17'-6"				7.0	7.0	
2x12	5.2	19'-0"						
		19'-6"						9.0
		20'-0"				9.0	9.0	6.0
		20'-6"				6.0	6.0	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-12-50-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	6'-6"	21.5	23.5	24.0	14.5	13.0	3.0
		7'-0"	11.5	13.5	14.0	5.0	1.5	
		7'-6"	3.5	5.5	6.0			
		8'-0"						
2x6	1.9	10'-0"	16.5	18.5	18.5	9.0	8.0	4.5
		10'-6"	10.5	12.0	12.0	3.0	2.5	
		11'-0"	5.0	6.5	7.0			
		11'-6"	0.5	2.0	2.5			
2x8	2.5	13'-0"	14.0	15.5	15.5	6.0	5.5	2.0
		13'-6"	9.5	10.5	11.0	1.5	1.0	
		14'-0"	5.0	6.5	6.5			
		14'-6"	1.5	3.0	3.0			
2x10	3.2	16'-0"	13.5	15.0	14.5	5.0	4.5	1.0
		16'-6"	10.0	11.0	11.0	1.5	1.0	
		17'-0"	6.5	7.5	7.5			
		17'-6"	3.5	4.5	4.5			
2x12	3.9	19'-0"	11.5	12.5	12.0	2.5	2.0	
		19'-6"	8.5	9.0	9.0			
		20'-0"	5.5	6.5	6.0			
		20'-6"	2.5	3.5	3.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	6'-6"						43.5
		7'-0"				41.5	38.5	29.0
		7'-6"	28.0			27.5	26.0	15.5
		8'-0"	17.5	22.5	24.5	17.0	15.5	
2x6	3.2	10'-0"						12.5
		10'-6"				12.5	11.5	7.0
		11'-0"	12.5			6.5	6.0	
		11'-6"	7.0	9.5	10.0			
2x8	3.8	13'-0"						7.5
		13'-6"				8.5	7.5	
		14'-0"	11.0					
		14'-6"	6.5	8.5	8.5			
2x10	4.5	16'-0"				12.5	11.5	7.0
		16'-6"				8.5	7.5	
		17'-0"						
		17'-6"	8.5	10.0	10.5			
2x12	5.2	19'-0"				9.5	8.5	
		19'-6"				6.5	5.5	
		20'-0"						
		20'-6"	8.5	9.5	10.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-12-50-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	6'-6"	22.0	24.0	24.0	13.0	11.0	
		7'-0"	12.0	14.0	14.0	3.5		
		7'-6"	4.0	6.0	6.0			
		8'-0"						
2x6	1.9	10'-0"	17.0	18.5	18.5	7.5	6.0	1.0
		10'-6"	11.0	12.5	12.5	1.5	0.5	
		11'-0"	5.5	7.0	7.0			
		11'-6"	1.0	2.5	2.5			
2x8	2.5	13'-0"	14.5	15.5	15.5	4.5	3.0	
		13'-6"	10.0	11.0	11.0			
		14'-0"	5.5	7.0	7.0			
		14'-6"	2.0	3.0	3.5			
2x10	3.2	16'-0"	14.0	15.0	15.0	3.5	2.0	
		16'-6"	10.5	11.5	11.0			
		17'-0"	7.0	8.0	8.0			
		17'-6"	4.0	5.0	4.5			
2x12	3.9	19'-0"	12.0	12.5	12.5	1.0		
		19'-6"	8.5	9.5	9.0			
		20'-0"	6.0	6.5	6.5			
		20'-6"	3.0	4.0	4.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	6'-6"						40.0
		7'-0"				40.0	36.0	26.0
		7'-6"	28.5			26.5	23.5	12.0
		8'-0"	18.0	23.0	25.0	15.5	13.0	
2x6	3.2	10'-0"						9.5
		10'-6"				11.0	9.0	
		11'-0"				5.0		
		11'-6"	7.5	9.5	10.0			
2x8	3.8	13'-0"				12.0	10.0	
		13'-6"				7.0	5.0	
		14'-0"						
		14'-6"	7.0	8.5	9.0			
2x10	4.5	16'-0"				11.0	9.0	
		16'-6"				7.0	5.0	
		17'-0"						
		17'-6"	9.0	10.5	10.5			
2x12	5.2	19'-0"				8.5	6.5	
		19'-6"				5.0		
		20'-0"						
		20'-6"	9.0	10.0	10.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-12-60-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	6'-6"	19.5	22.0	22.5	15.5	16.0	8.0
		7'-0"	9.5	12.0	12.5	6.0	4.0	
		7'-6"	2.0	4.0	4.5			
		8'-0"						
2x6	1.9	10'-0"	15.0	16.5	17.0	10.0	11.0	9.0
		10'-6"	8.5	10.5	11.0	4.5	5.5	3.5
		11'-0"	3.5	5.0	5.5		0.5	
		11'-6"		0.5	1.0			
2x8	2.5	13'-0"	12.0	13.5	14.0	7.0	8.0	6.5
		13'-6"	7.5	9.0	9.5	3.0	4.0	3.0
		14'-0"	3.5	5.0	5.5		0.5	
		14'-6"		1.0	1.5			
2x10	3.2	16'-0"	12.0	13.0	13.5	6.5	7.0	6.0
		16'-6"	8.0	9.5	9.5	3.0	4.0	3.0
		17'-0"	4.5	6.0	6.0		1.0	
		17'-6"	1.5	2.5	3.0			
2x12	3.9	19'-0"	9.5	10.5	10.5	3.5	4.5	3.5
		19'-6"	6.5	7.5	7.5	1.0	2.0	1.0
		20'-0"	3.5	4.5	4.5			
		20'-6"	1.0	2.0	2.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	6'-6"						
		7'-0"					41.0	34.0
		7'-6"	26.0	32.0	34.5	29.0	28.5	20.0
		8'-0"	15.5	21.0	23.0	18.0	18.0	9.5
2x6	3.2	10'-0"						
		10'-6"				14.0		11.5
		11'-0"	10.5	13.0		7.5	8.5	6.5
		11'-6"	5.0	7.5	8.5			
2x8	3.8	13'-0"						
		13'-6"				9.5	10.0	8.0
		14'-0"	9.0	11.0		5.0	6.0	
		14'-6"		6.5	7.5			
2x10	4.5	16'-0"						
		16'-6"				9.5	10.0	8.0
		17'-0"	10.5			6.0	6.5	5.0
		17'-6"	7.0	8.5	9.0			
2x12	5.2	19'-0"				11.0	11.5	9.0
		19'-6"				7.5	8.0	6.5
		20'-0"	9.5	11.0	11.5		5.5	
		20'-6"	6.5	8.0	8.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-12-60-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	6'-6"	16.0	18.5	19.0	10.0	9.5	1.0
		7'-0"	6.5	8.5	9.0	0.5		
		7'-6"		0.5	1.0			
		8'-0"						
2x6	1.9	10'-0"	11.5	13.5	13.5	4.5	4.5	2.0
		10'-6"	5.5	7.0	7.5			
		11'-0"		1.5	2.0			
		11'-6"						
2x8	2.5	13'-0"	9.0	10.5	10.5	1.5	1.5	
		13'-6"	4.5	5.5	6.0			
		14'-0"		1.5	2.0			
		14'-6"						
2x10	3.2	16'-0"	8.5	10.0	10.0	0.5	1.0	
		16'-6"	5.0	6.0	6.0			
		17'-0"	1.5	2.5	2.5			
		17'-6"						
2x12	3.9	19'-0"	6.5	7.5	7.0			
		19'-6"	3.0	4.0	4.0			
		20'-0"	0.5	1.5	1.5			
		20'-6"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	6'-6"						41.0
		7'-0"				36.5	35.0	27.0
		7'-6"	23.0	28.5	31.0	23.0	22.5	13.0
		8'-0"	12.5	17.5	20.0	12.0	12.0	
2x6	3.2	10'-0"				15.0	14.5	10.5
		10'-6"				8.0	8.0	
		11'-0"	7.5	10.0	10.5			
		11'-6"			5.0			
2x8	3.8	13'-0"				9.0	8.5	5.5
		13'-6"	10.5					
		14'-0"	5.5	7.5	8.0			
		14'-6"						
2x10	4.5	16'-0"				8.0	7.5	
		16'-6"	11.0					
		17'-0"	7.0	9.0	9.0			
		17'-6"		5.0	5.5			
2x12	5.2	19'-0"				5.0	5.0	
		19'-6"	9.5	11.0	11.0			
		20'-0"	6.5	8.0	8.0			
		20'-6"			5.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-12-60-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	6'-6"	17.0	19.5	19.5	9.0	7.5	
		7'-0"	7.5	9.5	10.0			
		7'-6"		1.5	2.0			
		8'-0"						
2x6	1.9	10'-0"	12.5	14.0	14.0	3.5	2.5	
		10'-6"	6.5	8.0	8.0			
		11'-0"	1.0	2.5	3.0			
		11'-6"						
2x8	2.5	13'-0"	10.0	11.5	11.5	0.5		
		13'-6"	5.5	6.5	6.5			
		14'-0"	1.0	2.5	2.5			
		14'-6"						
2x10	3.2	16'-0"	9.5	10.5	10.5			
		16'-6"	6.0	7.0	7.0			
		17'-0"	2.5	3.5	3.5			
		17'-6"		0.5	0.5			
2x12	3.9	19'-0"	7.5	8.0	8.0			
		19'-6"	4.0	5.0	5.0			
		20'-0"	1.5	2.0	2.0			
		20'-6"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	6'-6"						38.0
		7'-0"				35.5	33.0	23.5
		7'-6"	24.0	29.5	32.0	22.0	20.5	10.0
		8'-0"	13.5	18.5	20.5	11.0	10.0	
2x6	3.2	10'-0"				14.0	12.5	7.0
		10'-6"				7.0	6.0	
		11'-0"	8.5	11.0	11.5			
		11'-6"		5.0	6.0			
2x8	3.8	13'-0"				8.0	7.0	
		13'-6"						
		14'-0"	6.5	8.5	9.0			
		14'-6"						
2x10	4.5	16'-0"				7.0	6.0	
		16'-6"						
		17'-0"	8.0	10.0	10.0			
		17'-6"		6.0	6.5			
2x12	5.2	19'-0"						
		19'-6"	10.5	12.0	12.0			
		20'-0"	7.5	8.5	8.5			
		20'-6"		5.5	5.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-16-50-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	5'-6"	30.0	32.0	32.5	25.0	24.0	20.0
		6'-0"	18.0	20.0	20.5	13.5	13.0	8.5
		6'-6"	8.5	10.5	11.0	4.5	5.0	
		7'-0"	1.5	3.0	3.5			
2x6	1.4	8'-6"	24.5	26.0	26.0	18.5	18.0	14.5
		9'-0"	17.0	18.5	18.5	11.5	11.5	9.0
		9'-6"	10.5	12.0	12.0	5.5	6.0	4.0
		10'-0"	5.0	6.5	7.0	0.5	1.0	
2x8	1.9	11'-0"	22.5	23.5	23.5	16.0	15.5	12.5
		11'-6"	16.5	18.0	18.0	10.5	10.5	8.0
		12'-0"	11.5	12.5	13.0	6.0	6.0	4.5
		12'-6"	7.0	8.5	8.5	2.0	2.5	1.0
2x10	2.4	14'-0"	17.5	18.5	18.5	11.0	11.0	8.5
		14'-6"	13.5	14.5	14.5	7.0	7.5	5.5
		15'-0"	9.5	10.5	10.5	3.5	4.0	2.5
		15'-6"	6.0	7.0	7.0	0.5	1.0	
2x12	3.0	16'-6"	16.5	17.0	17.0	9.5	9.5	7.0
		17'-0"	13.0	13.5	13.5	6.0	6.5	4.5
		17'-6"	9.5	10.5	10.0	3.0	3.5	2.0
		18'-0"	6.5	7.5	7.5	0.5	1.0	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	5'-6"						
		6'-0"						
		6'-6"				37.5	36.0	29.5
		7'-0"	23.5	28.5	30.5	24.5	24.0	18.5
2x6	2.4	8'-6"						
		9'-0"						
		9'-6"						11.0
		10'-0"	12.5			8.5	8.5	6.0
2x8	2.8	11'-0"						
		11'-6"						
		12'-0"						10.0
		12'-6"				8.0	8.0	6.0
2x10	3.3	14'-0"						
		14'-6"						
		15'-0"				10.0	10.0	7.5
		15'-6"				6.5	6.5	
2x12	3.9	16'-6"						
		17'-0"						10.0
		17'-6"				10.0	10.0	7.5
		18'-0"				6.5	7.0	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-16-50-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	5'-6"	27.0	29.0	29.0	19.0	17.5	13.0
		6'-0"	15.0	16.5	17.0	7.5	7.0	1.5
		6'-6"	5.5	7.0	7.5			
		7'-0"						
2x6	1.4	8'-6"	21.0	22.5	22.5	12.5	11.5	7.5
		9'-0"	13.5	15.0	15.0	5.5	5.0	2.0
		9'-6"	7.5	8.5	9.0			
		10'-0"	2.0	3.0	3.5			
2x8	1.9	11'-0"	19.0	20.0	20.0	10.5	9.5	5.5
		11'-6"	13.5	14.5	14.5	5.0	4.5	1.0
		12'-0"	8.5	9.5	9.5			
		12'-6"	4.0	5.0	5.0			
2x10	2.4	14'-0"	14.5	15.5	15.0	5.5	5.0	1.5
		14'-6"	10.0	11.0	11.0	1.5	1.0	
		15'-0"	6.5	7.5	7.0			
		15'-6"	3.0	4.0	3.5			
2x12	3.0	16'-6"	13.0	14.0	13.5	4.0	3.0	
		17'-0"	9.5	10.5	10.0	0.5		
		17'-6"	6.5	7.0	7.0			
		18'-0"	3.5	4.0	4.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	5'-6"						
		6'-0"						35.5
		6'-6"				31.5	29.5	22.0
		7'-0"	20.5	25.0	27.0	19.0	17.5	11.5
2x6	2.4	8'-6"						
		9'-0"					15.0	10.0
		9'-6"				9.0	8.0	
		10'-0"	9.0	11.0	11.5			
2x8	2.8	11'-0"						
		11'-6"				12.5	11.5	7.0
		12'-0"				7.0	6.5	
		12'-6"	9.5	11.0	11.5			
2x10	3.3	14'-0"					12.0	7.5
		14'-6"				8.5	7.5	
		15'-0"						
		15'-6"	8.5	10.0	10.0			
2x12	3.9	16'-6"				11.5	10.5	6.5
		17'-0"				7.5	7.0	
		17'-6"						
		18'-0"	9.5	10.5	10.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-16-50-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	5'-6"	27.5	29.5	29.5	17.5	15.5	9.5
		6'-0"	15.5	17.0	17.0	6.0	4.5	
		6'-6"	6.0	7.5	7.5			
		7'-0"			0.5			
2x6	1.4	8'-6"	21.5	23.0	23.0	11.5	9.5	4.0
		9'-0"	14.0	15.5	15.5	4.0	3.0	
		9'-6"	8.0	9.0	9.0			
		10'-0"	2.5	3.5	3.5			
2x8	1.9	11'-0"	19.5	20.5	20.5	9.0	7.0	2.0
		11'-6"	14.0	15.0	14.5	3.5	2.0	
		12'-0"	8.5	10.0	9.5			
		12'-6"	4.5	5.5	5.5			
2x10	2.4	14'-0"	15.0	15.5	15.5	4.0	2.5	
		14'-6"	10.5	11.5	11.0			
		15'-0"	7.0	7.5	7.5			
		15'-6"	3.5	4.0	4.0			
2x12	3.0	16'-6"	13.5	14.0	13.5	2.5	1.0	
		17'-0"	10.0	10.5	10.0			
		17'-6"	6.5	7.5	7.0			
		18'-0"	3.5	4.5	4.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	5'-6"						
		6'-0"					42.5	32.0
		6'-6"				30.0	27.5	19.0
		7'-0"	21.0	25.5	27.5	17.5	15.5	8.0
2x6	2.4	8'-6"						14.0
		9'-0"				14.5	12.5	6.5
		9'-6"				7.5	6.0	
		10'-0"	9.5	11.5	12.0			
2x8	2.8	11'-0"						9.0
		11'-6"				11.0	9.0	
		12'-0"				5.5		
		12'-6"	10.0					
2x10	3.3	14'-0"				11.5	10.0	
		14'-6"				7.0	5.5	
		15'-0"						
		15'-6"	9.0	10.0	10.0			
2x12	3.9	16'-6"				10.0	8.0	
		17'-0"				6.0		
		17'-6"						
		18'-0"	10.0	11.0	10.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-16-60-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	5'-6"	25.0	27.0	27.5	20.5	20.5	17.5
		6'-0"	13.0	15.0	15.5	9.0	9.5	6.0
		6'-6"	3.5	5.5	6.0		1.5	
		7'-0"						
2x6	1.4	8'-6"	19.5	21.0	21.0	14.0	14.5	12.5
		9'-0"	12.0	13.5	13.5	7.0	8.0	6.5
		9'-6"	5.5	7.0	7.5	1.0	2.5	1.5
		10'-0"		1.5	2.0			
2x8	1.9	11'-0"	17.0	18.5	18.5	11.5	12.0	10.5
		11'-6"	11.5	13.0	13.0	6.0	7.0	6.0
		12'-0"	6.5	8.0	8.0	1.5	2.5	2.0
		12'-6"	2.0	3.5	3.5			
2x10	2.4	14'-0"	12.5	13.5	13.5	6.5	7.5	6.5
		14'-6"	8.5	9.5	9.5	2.5	4.0	3.0
		15'-0"	4.5	5.5	5.5		0.5	
		15'-6"	1.0	2.0	2.5			
2x12	3.0	16'-6"	11.0	12.0	12.0	5.0	6.0	5.0
		17'-0"	7.5	8.5	8.5	1.5	3.0	2.0
		17'-6"	4.5	5.5	5.5			
		18'-0"	1.5	2.5	2.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	5'-6"						
		6'-0"						
		6'-6"	31.0			33.0	32.0	27.0
		7'-0"	18.5	23.5	25.5	20.0	20.5	16.0
2x6	2.4	8'-6"						
		9'-0"						
		9'-6"				10.0	11.0	9.0
		10'-0"	7.5	9.5	10.0		5.0	
2x8	2.8	11'-0"						
		11'-6"						
		12'-0"				8.5	9.0	7.5
		12'-6"	8.0	9.5	10.0			
2x10	3.3	14'-0"						
		14'-6"				10.0	10.5	8.5
		15'-0"	10.5			5.5	6.5	5.0
		15'-6"	6.5	8.0	8.5			
2x12	3.9	16'-6"				13.0		11.0
		17'-0"				9.0	9.5	8.0
		17'-6"	11.0			5.5	6.5	5.0
		18'-0"	7.5	9.0	9.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-16-60-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	5'-6"	22.0	24.0	24.0	14.5	14.0	10.5
		6'-0"	9.5	11.5	12.0	3.0	3.5	
		6'-6"	0.5	2.0	2.5			
		7'-0"						
2x6	1.4	8'-6"	16.0	17.5	17.5	8.0	8.0	5.5
		9'-0"	8.5	10.0	10.0	1.0	1.5	
		9'-6"	2.0	3.5	4.0			
		10'-0"						
2x8	1.9	11'-0"	14.0	15.0	15.0	5.5	6.0	3.0
		11'-6"	8.0	9.5	9.5	0.5	1.0	
		12'-0"	3.0	4.5	4.5			
		12'-6"						
2x10	2.4	14'-0"	9.5	10.5	10.5	1.0	1.5	
		14'-6"	5.0	6.0	6.0			
		15'-0"	1.0	2.5	2.5			
		15'-6"						
2x12	3.0	16'-6"	8.0	9.0	8.5			
		17'-0"	4.5	5.5	5.0			
		17'-6"	1.0	2.0	2.0			
		18'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	5'-6"						
		6'-0"				43.5	41.0	33.0
		6'-6"	27.5	33.0	35.5	27.0	26.0	20.0
		7'-0"	15.0	20.0	22.0	14.5	14.0	9.0
2x6	2.4	8'-6"						
		9'-0"				11.5	11.5	8.0
		9'-6"	10.5	13.0	13.5			
		10'-0"		6.0	7.0			
2x8	2.8	11'-0"						10.0
		11'-6"				8.0	8.0	5.0
		12'-0"	9.5	11.5	11.5			
		12'-6"		6.0	6.5			
2x10	3.3	14'-0"				8.5	8.5	5.5
		14'-6"	12.0					
		15'-0"	7.5	9.0	9.0			
		15'-6"		5.0	5.0			
2x12	3.9	16'-6"				7.0	7.0	
		17'-0"	11.5		12.5			
		17'-6"	7.5	9.0	9.0			
		18'-0"		5.5	5.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-16-60-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	5'-6"	23.0	25.0	25.0	13.5	12.5	7.5
		6'-0"	10.5	12.5	12.5	2.0	1.5	
		6'-6"	1.5	3.0	3.5			
		7'-0"						
2x6	1.4	8'-6"	17.0	18.5	18.5	7.0	6.5	2.0
		9'-0"	9.5	11.0	11.0			
		9'-6"	3.0	4.5	4.5			
		10'-0"						
2x8	1.9	11'-0"	15.0	16.0	16.0	4.5	4.0	
		11'-6"	9.0	10.5	10.5			
		12'-0"	4.0	5.5	5.5			
		12'-6"		1.0	1.0			
2x10	2.4	14'-0"	10.5	11.0	11.0			
		14'-6"	6.0	7.0	7.0			
		15'-0"	2.0	3.0	3.0			
		15'-6"						
2x12	3.0	16'-6"	9.0	9.5	9.5			
		17'-0"	5.5	6.0	6.0			
		17'-6"	2.0	3.0	2.5			
		18'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	5'-6"						
		6'-0"				42.5	39.5	30.0
		6'-6"	28.5	34.0	36.0	26.0	24.0	16.5
		7'-0"	16.0	21.0	23.0	13.5	12.0	6.0
2x6	2.4	8'-6"						11.5
		9'-0"				10.5	9.5	
		9'-6"	11.5	13.5	14.0			
		10'-0"	5.0	7.0	7.5			
2x8	2.8	11'-0"				13.5	12.0	7.0
		11'-6"				7.0	6.0	
		12'-0"	10.5					
		12'-6"	5.5	7.0	7.5			
2x10	3.3	14'-0"				7.5	6.5	
		14'-6"						
		15'-0"	8.5	9.5	9.5			
		15'-6"		5.5	6.0			
2x12	3.9	16'-6"				6.0	5.0	
		17'-0"						
		17'-6"	8.5	10.0	9.5			
		18'-0"	5.0	6.5	6.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-19.2-50-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-0"	32.0	34.0	34.0	26.5	25.5	21.0
		5'-6"	18.5	20.5	20.5	13.5	13.5	11.0
		6'-0"	8.5	10.0	10.5	4.0	4.5	1.5
		6'-6"	0.5	2.5	2.5			
2x6	1.2	7'-6"	30.5	32.0	31.5	24.0	23.0	19.0
		8'-0"	21.5	22.5	22.5	15.5	15.0	12.0
		8'-6"	14.0	15.0	15.5	8.5	8.5	6.5
		9'-0"	7.5	9.0	9.0	2.5	3.0	1.5
2x8	1.6	10'-0"	24.0	25.0	25.0	17.5	17.0	14.0
		10'-6"	17.5	18.5	18.5	11.5	11.5	9.0
		11'-0"	12.0	13.0	13.0	6.5	6.5	4.5
		11'-6"	7.5	8.5	8.5	2.0	2.5	1.0
2x10	2.0	12'-6"	21.5	22.5	22.0	14.5	14.5	11.5
		13'-0"	16.5	17.5	17.5	10.0	10.0	8.0
		13'-6"	12.0	13.0	13.0	6.0	6.0	4.5
		14'-0"	8.0	9.0	9.0	2.5	3.0	1.5
2x12	2.5	14'-6"	22.0	23.0	22.5	15.0	14.5	11.5
		15'-0"	18.0	18.5	18.5	11.0	10.5	8.5
		15'-6"	14.0	14.5	14.5	7.0	7.5	5.5
		16'-0"	10.5	11.0	11.0	4.0	4.5	2.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-0"						
		5'-6"						
		6'-0"				37.5	36.0	29.5
		6'-6"	23.5	28.0	30.0	24.0	23.5	18.5
2x6	2.0	7'-6"						
		8'-0"						
		8'-6"						
		9'-0"				11.0	11.0	8.5
2x8	2.4	10'-0"						
		10'-6"						
		11'-0"						10.5
		11'-6"				8.0	8.5	6.0
2x10	2.8	12'-6"						
		13'-0"						
		13'-6"						10.0
		14'-0"				8.5	9.0	6.5
2x12	3.2	14'-6"						
		15'-0"						
		15'-6"						
		16'-0"				11.0	10.5	8.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-19.2-50-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-0"	29.0	30.5	30.5	20.5	19.0	14.0
		5'-6"	15.5	17.0	17.5	8.0	7.5	3.5
		6'-0"	5.5	7.0	7.0			
		6'-6"						
2x6	1.2	7'-6"	27.0	28.5	28.5	18.0	17.0	12.0
		8'-0"	18.0	19.5	19.5	9.5	9.0	5.0
		8'-6"	10.5	12.0	12.0	2.5	2.5	
		9'-0"	4.5	5.5	5.5			
2x8	1.6	10'-0"	20.5	21.5	21.5	11.5	10.5	6.5
		10'-6"	14.5	15.5	15.0	5.5	5.0	2.0
		11'-0"	9.0	10.0	10.0	0.5	0.5	
		11'-6"	4.0	5.0	5.0			
2x10	2.0	12'-6"	18.0	19.0	19.0	9.0	8.0	4.5
		13'-0"	13.5	14.0	14.0	4.5	4.0	0.5
		13'-6"	9.0	10.0	9.5			
		14'-0"	5.0	6.0	5.5			
2x12	2.5	14'-6"	19.0	19.5	19.0	9.0	8.5	4.5
		15'-0"	14.5	15.5	15.0	5.0	4.5	1.5
		15'-6"	10.5	11.5	11.0	1.5	1.0	
		16'-0"	7.0	8.0	7.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-0"						
		5'-6"						37.0
		6'-0"				32.0	30.0	22.5
		6'-6"	20.0	25.0	26.5	18.5	17.0	11.5
2x6	2.0	7'-6"						
		8'-0"						14.5
		8'-6"				12.5	11.5	7.5
		9'-0"	12.5			5.5	5.0	
2x8	2.4	10'-0"						
		10'-6"					12.5	8.0
		11'-0"				7.5	7.0	
		11'-6"	10.0	11.5	11.5			
2x10	2.8	12'-6"						11.0
		13'-0"				12.0	11.0	7.0
		13'-6"				7.0	6.5	
		14'-0"	11.0					
2x12	3.2	14'-6"						11.5
		15'-0"				13.0	12.0	8.0
		15'-6"				9.0	8.0	
		16'-0"				5.0		

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-19.2-50-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-0"	29.5	31.0	31.0	19.0	17.0	11.0
		5'-6"	16.0	17.5	17.5	6.5	5.0	0.5
		6'-0"	6.0	7.0	7.5			
		6'-6"						
2x6	1.2	7'-6"	27.5	29.0	28.5	16.5	14.5	9.0
		8'-0"	18.5	20.0	19.5	8.0	6.5	2.0
		8'-6"	11.0	12.0	12.0	1.0		
		9'-0"	5.0	6.0	6.0			
2x8	1.6	10'-0"	21.0	22.0	21.5	10.0	8.5	3.5
		10'-6"	15.0	15.5	15.5	4.0	3.0	
		11'-0"	9.5	10.0	10.0			
		11'-6"	4.5	5.5	5.5			
2x10	2.0	12'-6"	18.5	19.5	19.0	7.5	6.0	1.0
		13'-0"	14.0	14.5	14.0	3.0	1.5	
		13'-6"	9.5	10.0	10.0			
		14'-0"	5.5	6.0	6.0			
2x12	2.5	14'-6"	19.5	20.0	19.5	7.5	6.0	1.0
		15'-0"	15.0	15.5	15.0	3.5	2.0	
		15'-6"	11.0	11.5	11.0			
		16'-0"	7.5	8.0	7.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-0"						
		5'-6"					44.0	33.5
		6'-0"				30.5	27.5	19.0
		6'-6"	20.5	25.0	27.0	17.0	15.0	8.0
2x6	2.0	7'-6"						
		8'-0"						11.0
		8'-6"				11.0	9.5	
		9'-0"	13.0					
2x8	2.4	10'-0"						10.5
		10'-6"				12.0	10.5	5.0
		11'-0"				6.0		
		11'-6"	10.5					
2x10	2.8	12'-6"						8.0
		13'-0"				10.5	8.5	
		13'-6"				6.0		
		14'-0"						
2x12	3.2	14'-6"						8.5
		15'-0"				12.0	10.0	
		15'-6"				7.5	6.0	
		16'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-19.2-60-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-0"	27.0	29.0	29.0	22.0	22.0	19.0
		5'-6"	13.5	15.5	16.0	9.0	10.0	8.5
		6'-0"	3.5	5.0	5.5		1.0	
		6'-6"						
2x6	1.2	7'-6"	25.5	27.0	27.0	19.5	19.5	17.0
		8'-0"	16.5	17.5	18.0	11.0	11.5	10.0
		8'-6"	9.0	10.0	10.5	4.0	5.0	4.0
		9'-0"	2.5	4.0	4.0			
2x8	1.6	10'-0"	19.0	20.0	20.0	13.0	13.5	11.5
		10'-6"	12.5	13.5	14.0	7.0	8.0	6.5
		11'-0"	7.0	8.0	8.5	1.5	3.0	2.5
		11'-6"	2.0	3.5	3.5			
2x10	2.0	12'-6"	16.5	17.5	17.5	10.0	11.0	9.0
		13'-0"	11.5	12.5	12.5	5.5	6.5	5.5
		13'-6"	7.0	8.0	8.0	1.5	2.5	2.0
		14'-0"	3.0	4.0	4.5			
2x12	2.5	14'-6"	17.0	18.0	17.5	10.5	11.0	9.5
		15'-0"	12.5	13.5	13.5	6.5	7.0	6.0
		15'-6"	9.0	9.5	9.5	2.5	4.0	3.0
		16'-0"	5.0	6.0	6.0		0.5	0.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-0"						
		5'-6"						
		6'-0"	31.5	37.0		33.0	32.5	27.5
		6'-6"	18.5	23.0	25.0	19.5	20.0	16.5
2x6	2.0	7'-6"						
		8'-0"						
		8'-6"				14.0	14.5	12.0
		9'-0"	10.5	12.5	13.0	6.5	7.5	6.0
2x8	2.4	10'-0"						
		10'-6"						
		11'-0"				9.0	9.5	8.0
		11'-6"	8.0	10.0	10.0		5.0	
2x10	2.8	12'-6"						
		13'-0"						
		13'-6"				8.5	9.0	7.5
		14'-0"	9.0	10.5	11.0		5.0	
2x12	3.2	14'-6"						
		15'-0"						
		15'-6"				10.0	11.0	9.0
		16'-0"	12.0			6.5	7.0	6.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-19.2-60-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-0"	23.5	25.5	26.0	16.0	15.5	12.0
		5'-6"	10.5	12.0	12.5	3.5	4.0	1.5
		6'-0"		2.0	2.5			
		6'-6"						
2x6	1.2	7'-6"	22.0	23.5	23.5	13.5	13.5	10.0
		8'-0"	13.0	14.5	14.5	5.0	5.5	3.0
		8'-6"	5.5	7.0	7.0			
		9'-0"		0.5	1.0			
2x8	1.6	10'-0"	15.5	17.0	16.5	7.0	7.0	4.5
		10'-6"	9.0	10.5	10.5	1.0	1.5	
		11'-0"	3.5	5.0	5.0			
		11'-6"						
2x10	2.0	12'-6"	13.0	14.0	14.0	4.5	4.5	2.0
		13'-0"	8.0	9.0	9.0		0.5	
		13'-6"	4.0	5.0	4.5			
		14'-0"		1.0	1.0			
2x12	2.5	14'-6"	14.0	14.5	14.5	4.5	4.5	2.5
		15'-0"	9.5	10.5	10.0	0.5	1.0	
		15'-6"	5.5	6.5	6.0			
		16'-0"	2.0	3.0	2.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-0"						
		5'-6"				45.0	42.5	34.5
		6'-0"	28.5	33.5	35.5	27.5	26.0	20.0
		6'-6"	15.0	20.0	21.5	14.0	13.5	9.0
2x6	2.0	7'-6"						
		8'-0"				16.5		12.0
		8'-6"				8.0	8.0	5.0
		9'-0"	7.5	9.5	9.5			
2x8	2.4	10'-0"						11.5
		10'-6"				9.0	9.0	6.0
		11'-0"	10.5	12.0	12.5			
		11'-6"	5.0	6.5	7.0			
2x10	2.8	12'-6"				13.0	12.5	9.0
		13'-0"				7.5	7.5	
		13'-6"	10.5	12.0	12.0			
		14'-0"	6.0	7.5	7.5			
2x12	3.2	14'-6"				13.5	13.0	9.5
		15'-0"				8.5	8.5	5.5
		15'-6"						
		16'-0"	9.0	10.0	10.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-19.2-60-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-0"	24.5	26.5	26.5	15.0	13.5	8.5
		5'-6"	11.5	13.0	13.0	2.5	2.0	
		6'-0"	1.0	2.5	3.0			
		6'-6"						
2x6	1.2	7'-6"	23.0	24.5	24.0	12.5	11.5	6.5
		8'-0"	14.0	15.5	15.0	4.0	3.5	
		8'-6"	6.5	7.5	7.5			
		9'-0"		1.5	1.5			
2x8	1.6	10'-0"	16.5	17.5	17.5	6.0	5.0	1.0
		10'-6"	10.0	11.5	11.0			
		11'-0"	4.5	5.5	5.5			
		11'-6"		1.0	1.0			
2x10	2.0	12'-6"	14.0	15.0	14.5	3.5	2.5	
		13'-0"	9.0	10.0	10.0			
		13'-6"	5.0	5.5	5.5			
		14'-0"	1.0	1.5	1.5			
2x12	2.5	14'-6"	15.0	15.5	15.0	3.5	3.0	
		15'-0"	10.5	11.0	11.0			
		15'-6"	6.5	7.0	7.0			
		16'-0"	3.0	3.5	3.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-0"						
		5'-6"				44.0	41.0	31.5
		6'-0"	29.5	34.5	36.5	26.5	24.5	17.0
		6'-6"	16.0	20.5	22.5	13.0	11.5	6.0
2x6	2.0	7'-6"						
		8'-0"				15.5	14.0	9.0
		8'-6"				7.0	6.0	
		9'-0"	8.0	10.0	10.5			
2x8	2.4	10'-0"					13.5	8.5
		10'-6"				8.0	7.0	
		11'-0"	11.5					
		11'-6"	6.0	7.5	7.5			
2x10	2.8	12'-6"				12.0	10.5	6.0
		13'-0"				6.5	5.5	
		13'-6"	11.5					
		14'-0"	7.0	8.0	8.0			
2x12	3.2	14'-6"				12.5	11.0	6.0
		15'-0"				7.5	6.5	
		15'-6"						
		16'-0"	9.5	11.0	10.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-24-50-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-0"	52.5	54.5	54.5	46.0	43.5	37.5
		4'-6"	32.5	34.0	34.0	26.5	25.5	21.5
		5'-0"	18.0	19.5	19.5	12.5	12.5	10.0
		5'-6"	7.0	8.5	9.0	2.5	3.0	1.5
2x6	1.0	6'-6"	36.5	38.0	37.5	29.5	28.0	24.0
		7'-0"	25.5	26.5	26.5	19.0	18.5	15.5
		7'-6"	16.5	18.0	18.0	10.5	10.5	8.5
		8'-0"	9.5	10.5	10.5	4.0	4.5	3.0
2x8	1.3	9'-0"	24.0	25.0	25.0	17.5	17.0	14.0
		9'-6"	17.0	18.5	18.0	11.0	11.0	8.5
		10'-0"	11.5	12.5	12.5	5.5	6.0	4.0
		10'-6"	6.5	7.0	7.5	0.5	1.5	
2x10	1.6	11'-0"	24.5	25.5	25.5	17.5	17.0	14.0
		11'-6"	19.0	20.0	19.5	12.0	12.0	9.5
		12'-0"	14.0	14.5	14.5	7.5	7.5	5.5
		12'-6"	9.5	10.5	10.0	3.5	4.0	2.5
2x12	2.0	13'-0"	23.0	23.5	23.0	15.5	15.0	12.5
		13'-6"	18.0	19.0	18.5	11.0	11.0	8.5
		14'-0"	14.0	14.5	14.0	7.0	7.0	5.5
		14'-6"	10.0	10.5	10.5	3.5	4.0	2.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-0"						
		4'-6"						
		5'-0"						
		5'-6"				35.5	34.0	28.5
2x6	1.6	6'-6"						
		7'-0"						
		7'-6"						
		8'-0"				13.0	13.0	10.5
2x8	1.9	9'-0"						
		9'-6"						
		10'-0"						10.0
		10'-6"				7.0	7.5	5.5
2x10	2.2	11'-0"						
		11'-6"						
		12'-0"						
		12'-6"				10.0	10.0	7.5
2x12	2.6	13'-0"						
		13'-6"						
		14'-0"						
		14'-6"				10.5	10.5	8.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-24-50-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-0"	49.5	51.5	51.0	40.0	37.0	30.0
		4'-6"	29.0	31.0	31.0	20.5	19.0	14.5
		5'-0"	14.5	16.0	16.0	7.0	6.5	3.0
		5'-6"	4.0	5.5	5.5			
2x6	1.0	6'-6"	33.5	34.5	34.0	23.5	22.0	17.0
		7'-0"	22.0	23.5	23.0	13.5	12.0	8.0
		7'-6"	13.5	14.5	14.5	5.0	4.5	1.5
		8'-0"	6.0	7.0	7.0			
2x8	1.3	9'-0"	21.0	22.0	21.5	11.5	10.5	7.0
		9'-6"	14.0	15.0	14.5	5.0	4.5	1.5
		10'-0"	8.0	9.0	9.0			
		10'-6"	3.0	4.0	4.0			
2x10	1.6	11'-0"	21.5	22.5	22.0	12.0	11.0	7.0
		11'-6"	15.5	16.5	16.0	6.5	6.0	2.5
		12'-0"	10.5	11.5	11.0	1.5	1.5	
		12'-6"	6.0	7.0	7.0			
2x12	2.0	13'-0"	19.5	20.5	20.0	9.5	9.0	5.0
		13'-6"	15.0	15.5	15.0	5.0	4.5	1.5
		14'-0"	10.5	11.0	11.0	1.0	1.0	
		14'-6"	6.5	7.5	7.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-0"						
		4'-6"						
		5'-0"						36.5
		5'-6"	32.0			30.0	28.0	21.0
2x6	1.6	6'-6"						
		7'-0"						
		7'-6"				15.5	14.5	10.0
		8'-0"				7.5	7.0	
2x8	1.9	9'-0"						
		9'-6"				13.5	12.0	8.0
		10'-0"				7.0	6.0	
		10'-6"	9.0	10.5	10.5			
2x10	2.2	11'-0"						
		11'-6"						9.0
		12'-0"				9.0	8.5	
		12'-6"						
2x12	2.6	13'-0"						12.5
		13'-6"				13.5	12.5	8.0
		14'-0"				9.0	8.0	
		14'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-24-50-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-0"	50.0	51.5	51.5	38.5	35.0	27.0
		4'-6"	29.5	31.0	31.0	19.0	17.0	11.0
		5'-0"	15.0	16.5	16.5	5.5	4.0	
		5'-6"	4.5	5.5	5.5			
2x6	1.0	6'-6"	33.5	35.0	34.5	22.0	19.5	13.5
		7'-0"	22.5	24.0	23.5	12.0	10.0	5.0
		7'-6"	14.0	15.0	14.5	3.5	2.0	
		8'-0"	6.5	7.5	7.5			
2x8	1.3	9'-0"	21.5	22.0	22.0	10.0	8.5	3.5
		9'-6"	14.5	15.5	15.0	3.5	2.5	
		10'-0"	8.5	9.5	9.0			
		10'-6"	3.5	4.5	4.0			
2x10	1.6	11'-0"	22.0	22.5	22.0	10.5	8.5	3.5
		11'-6"	16.0	17.0	16.5	5.0	3.5	
		12'-0"	11.0	12.0	11.5			
		12'-6"	6.5	7.5	7.0			
2x12	2.0	13'-0"	20.0	20.5	20.0	8.5	6.5	2.0
		13'-6"	15.5	16.0	15.5	4.0	2.5	
		14'-0"	11.0	11.5	11.0			
		14'-6"	7.0	7.5	7.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-0"						
		4'-6"						
		5'-0"					43.0	33.0
		5'-6"	32.5			28.5	25.5	18.0
2x6	1.6	6'-6"						
		7'-0"						15.0
		7'-6"				14.5	12.5	6.5
		8'-0"				6.0		
2x8	1.9	9'-0"						11.0
		9'-6"				12.0	10.0	
		10'-0"				5.5		
		10'-6"	9.5	11.0	10.5			
2x10	2.2	11'-0"						11.0
		11'-6"				13.0	11.0	6.0
		12'-0"				7.5	6.0	
		12'-6"						
2x12	2.6	13'-0"						9.0
		13'-6"				12.0	10.0	5.0
		14'-0"				7.5	6.0	
		14'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-24-60-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-0"	47.5	49.5	49.5	41.5	40.0	35.0
		4'-6"	27.5	29.0	29.5	22.0	22.0	19.0
		5'-0"	13.0	14.5	15.0	8.0	9.0	7.5
		5'-6"	2.0	3.5	4.0			
2x6	1.0	6'-6"	31.5	33.0	32.5	25.0	24.5	21.5
		7'-0"	20.5	21.5	22.0	14.5	15.0	13.0
		7'-6"	11.5	13.0	13.0	6.0	7.0	6.0
		8'-0"	4.0	5.5	5.5		1.0	0.5
2x8	1.3	9'-0"	19.0	20.0	20.0	13.0	13.5	11.5
		9'-6"	12.0	13.5	13.5	6.5	7.5	6.5
		10'-0"	6.0	7.5	7.5	1.0	2.0	1.5
		10'-6"	1.0	2.5	2.5			
2x10	1.6	11'-0"	19.5	20.5	20.5	13.0	13.5	11.5
		11'-6"	14.0	15.0	14.5	7.5	8.5	7.5
		12'-0"	9.0	10.0	9.5	3.0	4.0	3.5
		12'-6"	4.5	5.5	5.5			
2x12	2.0	13'-0"	18.0	18.5	18.5	11.0	11.5	10.0
		13'-6"	13.0	14.0	13.5	6.5	7.5	6.5
		14'-0"	8.5	9.5	9.5	2.5	3.5	3.0
		14'-6"	5.0	5.5	5.5		0.5	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-0"						
		4'-6"						
		5'-0"						
		5'-6"	30.0	35.0	37.5	31.0	30.5	26.0
2x6	1.6	6'-6"						
		7'-0"						
		7'-6"						
		8'-0"	13.0			8.5	9.5	8.0
2x8	1.9	9'-0"						
		9'-6"						
		10'-0"				8.0	9.0	7.5
		10'-6"	7.0	8.5	9.0			
2x10	2.2	11'-0"						
		11'-6"						
		12'-0"				10.5	11.0	9.5
		12'-6"	11.0			5.5	6.5	5.5
2x12	2.6	13'-0"						
		13'-6"						
		14'-0"				10.0	11.0	9.0
		14'-6"	11.5			6.0	7.0	5.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-24-60-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-0"	44.5	46.5	46.5	35.5	33.5	28.0
		4'-6"	24.0	26.0	26.0	16.0	15.5	12.0
		5'-0"	9.5	11.0	11.5	2.5	3.0	0.5
		5'-6"		0.5	0.5			
2x6	1.0	6'-6"	28.0	29.5	29.5	19.0	18.5	14.5
		7'-0"	17.0	18.5	18.5	8.5	8.5	6.0
		7'-6"	8.0	9.5	9.5	0.5	1.0	
		8'-0"	1.0	2.0	2.5			
2x8	1.3	9'-0"	16.0	17.0	16.5	7.0	7.0	4.5
		9'-6"	9.0	10.0	10.0	0.5	1.0	
		10'-0"	3.0	4.0	4.0			
		10'-6"						
2x10	1.6	11'-0"	16.5	17.5	17.0	7.5	7.5	4.5
		11'-6"	10.5	11.5	11.5	2.0	2.5	
		12'-0"	5.5	6.5	6.5			
		12'-6"	1.0	2.0	2.0			
2x12	2.0	13'-0"	14.5	15.5	15.0	5.0	5.5	3.0
		13'-6"	10.0	10.5	10.0	0.5	1.0	
		14'-0"	5.5	6.0	6.0			
		14'-6"	1.5	2.5	2.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-0"						
		4'-6"						
		5'-0"				44.0	42.0	34.0
		5'-6"	27.0	32.0	34.0	25.5	24.5	19.0
2x6	1.6	6'-6"						
		7'-0"						
		7'-6"				11.0	11.0	7.5
		8'-0"	9.5	11.5	12.0			
2x8	1.9	9'-0"						12.0
		9'-6"				8.5	8.5	5.5
		10'-0"	10.0	11.5	11.5			
		10'-6"		5.5	5.5			
2x10	2.2	11'-0"						12.0
		11'-6"				10.0	10.0	7.0
		12'-0"					5.0	
		12'-6"	7.5	9.0	9.0			
2x12	2.6	13'-0"				14.0		10.0
		13'-6"				9.0	9.0	6.0
		14'-0"						
		14'-6"	8.5	9.5	9.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-2-24-60-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-0"	45.5	47.0	47.0	34.5	32.0	24.5
		4'-6"	25.0	26.5	26.5	15.0	13.5	9.0
		5'-0"	10.5	12.0	12.0	1.5	1.0	
		5'-6"		1.0	1.5			
2x6	1.0	6'-6"	29.0	30.5	30.0	18.0	16.5	11.5
		7'-0"	18.0	19.5	19.0	7.5	7.0	3.0
		7'-6"	9.0	10.5	10.0			
		8'-0"	2.0	3.0	3.0			
2x8	1.3	9'-0"	16.5	18.0	17.5	6.0	5.5	1.5
		9'-6"	10.0	11.0	10.5			
		10'-0"	4.0	5.0	5.0			
		10'-6"						
2x10	1.6	11'-0"	17.5	18.0	18.0	6.5	5.5	1.5
		11'-6"	11.5	12.5	12.0	1.0	0.5	
		12'-0"	6.5	7.5	7.0			
		12'-6"	2.0	3.0	2.5			
2x12	2.0	13'-0"	15.5	16.0	15.5	4.0	3.5	
		13'-6"	10.5	11.5	11.0			
		14'-0"	6.5	7.0	6.5			
		14'-6"	2.5	3.0	3.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-0"						
		4'-6"						
		5'-0"				43.0	40.0	31.0
		5'-6"	28.0	33.0	34.5	24.5	22.5	15.5
2x6	1.6	6'-6"						
		7'-0"						13.0
		7'-6"				10.0	9.0	
		8'-0"	10.5	12.5	12.5			
2x8	1.9	9'-0"						9.0
		9'-6"				7.5	7.0	
		10'-0"	11.0	12.0	12.0			
		10'-6"	5.0	6.5	6.5			
2x10	2.2	11'-0"						9.0
		11'-6"				9.0	8.0	
		12'-0"						
		12'-6"	8.5	9.5	9.5			
2x12	2.6	13'-0"				13.0	12.0	7.0
		13'-6"				8.0	7.0	
		14'-0"						
		14'-6"	9.5	10.5	10.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-12-50-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-6"	48.5	49.5	49.0	40.5	38.0	33.0
		5'-0"	31.0	32.0	32.0	24.0	23.0	19.5
		5'-6"	18.0	19.0	19.0	12.0	11.5	9.5
		6'-0"	8.5	9.5	9.5	2.5	3.0	2.0
2x6	1.9	7'-6"	28.5	29.5	29.0	21.0	20.0	16.5
		8'-0"	20.0	20.5	20.0	12.5	12.5	10.0
		8'-6"	12.5	13.5	13.0	6.0	6.5	4.5
		9'-0"	6.5	7.5	7.0	0.5	1.0	
2x8	2.5	9'-6"	28.5	29.0	28.5	20.5	20.0	16.5
		10'-0"	21.5	22.0	22.0	14.0	14.0	11.0
		10'-6"	15.5	16.0	16.0	8.5	8.5	6.5
		11'-0"	10.5	11.0	10.5	3.5	4.0	2.5
2x10	3.2	12'-0"	24.0	24.5	24.0	16.0	15.5	12.5
		12'-6"	18.5	19.0	18.5	11.0	11.0	8.5
		13'-0"	14.0	14.5	14.0	6.5	7.0	5.0
		13'-6"	10.0	10.5	10.0	3.0	3.0	1.5
2x12	3.9	14'-0"	23.5	23.5	23.0	15.0	14.5	11.5
		14'-6"	19.0	19.0	18.5	11.0	10.5	8.0
		15'-0"	14.5	15.0	14.5	7.0	7.0	5.0
		15'-6"	11.0	11.0	11.0	3.5	4.0	2.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	4'-6"						
		5'-0"						
		5'-6"						
		6'-0"				38.0	36.5	30.0
2x6	3.2	7'-6"						
		8'-0"						
		8'-6"						12.0
		9'-0"				9.0	9.0	6.5
2x8	3.8	9'-6"						
		10'-0"						
		10'-6"						
		11'-0"				10.5	10.0	7.5
2x10	4.5	12'-0"						
		12'-6"						
		13'-0"						10.5
		13'-6"				9.5	9.0	7.0
2x12	5.2	14'-0"						
		14'-6"						
		15'-0"						11.0
		15'-6"				10.5	10.0	7.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-12-50-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-6"	45.0	46.5	45.5	34.5	32.0	25.5
		5'-0"	28.0	29.0	28.5	18.0	16.5	12.0
		5'-6"	15.0	16.0	15.5	6.0	5.5	2.5
		6'-0"	5.0	6.0	6.0			
2x6	1.9	7'-6"	25.0	26.0	25.5	15.0	14.0	9.5
		8'-0"	16.5	17.0	17.0	7.0	6.0	3.0
		8'-6"	9.5	10.0	9.5			
		9'-0"	3.5	4.0	4.0			
2x8	2.5	9'-6"	25.5	26.0	25.5	15.0	13.5	9.5
		10'-0"	18.5	19.0	18.5	8.5	7.5	4.0
		10'-6"	12.5	13.0	12.5	2.5	2.5	
		11'-0"	7.0	7.5	7.5			
2x10	3.2	12'-0"	21.0	21.0	20.5	10.0	9.0	5.5
		12'-6"	15.5	16.0	15.5	5.5	4.5	1.5
		13'-0"	10.5	11.0	10.5	1.0	0.5	
		13'-6"	6.5	7.0	6.5			
2x12	3.9	14'-0"	20.0	20.5	19.5	9.0	8.0	4.5
		14'-6"	15.5	15.5	15.0	5.0	4.5	1.0
		15'-0"	11.5	11.5	11.0	1.0	0.5	
		15'-6"	7.5	8.0	7.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	4'-6"						
		5'-0"						
		5'-6"						37.5
		6'-0"	37.0			32.5	30.0	23.0
2x6	3.2	7'-6"						
		8'-0"						12.0
		8'-6"				10.0	9.0	5.0
		9'-0"	11.5	12.5	12.5			
2x8	3.8	9'-6"						
		10'-0"						10.5
		10'-6"				10.5	9.5	5.5
		11'-0"						
2x10	4.5	12'-0"						
		12'-6"					12.0	7.5
		13'-0"				8.0	7.0	
		13'-6"						
2x12	5.2	14'-0"						11.5
		14'-6"				13.0	12.0	7.5
		15'-0"				8.5	7.5	
		15'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-12-50-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-6"	45.5	46.5	46.0	33.0	30.0	22.5
		5'-0"	28.5	29.0	28.5	16.5	14.5	9.0
		5'-6"	15.5	16.0	16.0	4.5	3.0	
		6'-0"	5.5	6.5	6.0			
2x6	1.9	7'-6"	25.5	26.5	25.5	13.5	11.5	6.0
		8'-0"	17.0	17.5	17.0	5.5	4.0	
		8'-6"	10.0	10.5	10.0			
		9'-0"	4.0	4.5	4.0			
2x8	2.5	9'-6"	26.0	26.5	25.5	13.5	11.5	6.0
		10'-0"	19.0	19.0	18.5	7.0	5.5	0.5
		10'-6"	13.0	13.0	12.5	1.0		
		11'-0"	7.5	8.0	7.5			
2x10	3.2	12'-0"	21.0	21.5	21.0	9.0	7.0	2.0
		12'-6"	16.0	16.0	15.5	4.0	2.5	
		13'-0"	11.0	11.5	11.0			
		13'-6"	7.0	7.5	7.0			
2x12	3.9	14'-0"	20.5	20.5	20.0	8.0	6.0	1.0
		14'-6"	16.0	16.0	15.5	3.5	2.0	
		15'-0"	12.0	12.0	11.5			
		15'-6"	8.0	8.0	7.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	4'-6"						
		5'-0"						
		5'-6"				48.0	44.0	34.0
		6'-0"				31.0	28.0	20.0
2x6	3.2	7'-6"						
		8'-0"					14.5	8.5
		8'-6"				8.5	7.0	
		9'-0"	12.0	13.0	13.0			
2x8	3.8	9'-6"						
		10'-0"						7.5
		10'-6"				9.0	7.0	
		11'-0"						
2x10	4.5	12'-0"						9.0
		12'-6"				12.0	9.5	
		13'-0"				6.5	5.0	
		13'-6"						
2x12	5.2	14'-0"						8.5
		14'-6"				11.5	9.5	
		15'-0"				7.5	5.5	
		15'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-12-60-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-6"	43.5	44.5	44.5	36.0	34.5	30.5
		5'-0"	26.0	27.0	27.0	19.5	19.5	17.0
		5'-6"	13.0	14.0	14.0	7.5	8.0	7.0
		6'-0"	3.5	4.5	4.5			
2x6	1.9	7'-6"	23.5	24.5	24.0	16.5	16.5	14.5
		8'-0"	14.5	15.5	15.5	8.0	9.0	7.5
		8'-6"	7.5	8.5	8.5	1.5	2.5	2.0
		9'-0"	1.5	2.5	2.5			
2x8	2.5	9'-6"	23.5	24.0	24.0	16.0	16.5	14.0
		10'-0"	16.5	17.0	17.0	9.5	10.0	8.5
		10'-6"	10.5	11.0	11.0	4.0	5.0	4.0
		11'-0"	5.0	6.0	6.0		0.5	
2x10	3.2	12'-0"	19.0	19.5	19.0	11.5	12.0	10.0
		12'-6"	13.5	14.0	14.0	6.5	7.5	6.0
		13'-0"	9.0	9.5	9.0	2.0	3.5	2.5
		13'-6"	4.5	5.5	5.0			
2x12	3.9	14'-0"	18.0	18.5	18.0	10.5	11.0	9.5
		14'-6"	13.5	14.0	13.5	6.0	7.0	6.0
		15'-0"	9.5	10.0	9.5	2.5	3.5	2.5
		15'-6"	6.0	6.0	6.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	4'-6"						
		5'-0"						
		5'-6"						
		6'-0"	35.0	39.0	40.5	33.5	32.5	28.0
2x6	3.2	7'-6"						
		8'-0"						
		8'-6"				11.5	12.0	10.0
		9'-0"	9.5	11.0	11.0		5.5	
2x8	3.8	9'-6"						
		10'-0"						
		10'-6"				11.5	12.0	10.0
		11'-0"	12.0			6.0	6.5	5.5
2x10	4.5	12'-0"						
		12'-6"						
		13'-0"				9.5	10.0	8.0
		13'-6"	11.0		12.0	5.0	5.5	
2x12	5.2	14'-0"						
		14'-6"						
		15'-0"				10.0	10.5	8.5
		15'-6"				6.0	6.5	5.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-12-60-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-6"	40.0	41.5	41.0	30.0	28.5	23.5
		5'-0"	22.5	24.0	23.5	13.5	13.0	10.0
		5'-6"	10.0	11.0	11.0	1.5	2.0	
		6'-0"		1.0	1.0			
2x6	1.9	7'-6"	20.0	21.0	20.5	10.5	10.5	7.5
		8'-0"	11.5	12.0	12.0	2.5	2.5	0.5
		8'-6"	4.5	5.0	5.0			
		9'-0"						
2x8	2.5	9'-6"	20.5	21.0	20.5	10.5	10.0	7.0
		10'-0"	13.0	14.0	13.5	4.0	4.0	1.5
		10'-6"	7.0	8.0	7.5			
		11'-0"	2.0	2.5	2.5			
2x10	3.2	12'-0"	15.5	16.0	15.5	5.5	5.5	3.0
		12'-6"	10.5	11.0	10.5	1.0	1.0	
		13'-0"	5.5	6.0	6.0			
		13'-6"	1.5	2.0	1.5			
2x12	3.9	14'-0"	15.0	15.5	14.5	4.5	4.5	2.0
		14'-6"	10.5	11.0	10.0	0.5	1.0	
		15'-0"	6.5	6.5	6.0			
		15'-6"	2.5	3.0	2.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	4'-6"						
		5'-0"						
		5'-6"				45.0	42.5	35.0
		6'-0"	31.5	36.0	37.0	28.0	26.5	21.0
2x6	3.2	7'-6"						
		8'-0"				13.5	13.0	9.5
		8'-6"	13.5	15.0	15.0	5.5	5.5	
		9'-0"	6.5	7.5	8.0			
2x8	3.8	9'-6"						
		10'-0"				12.5	12.0	8.5
		10'-6"				5.5	5.5	
		11'-0"	8.5	9.5	9.5			
2x10	4.5	12'-0"						10.0
		12'-6"				8.5	8.5	5.5
		13'-0"						
		13'-6"	8.0	9.0	8.5			
2x12	5.2	14'-0"				13.5	13.0	9.5
		14'-6"				8.5	8.5	5.0
		15'-0"						
		15'-6"	9.5	10.0	10.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-12-60-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-6"	41.0	42.0	41.5	29.0	26.5	20.5
		5'-0"	23.5	24.5	24.5	12.5	11.5	6.5
		5'-6"	11.0	11.5	11.5	0.5		
		6'-0"	1.0	2.0	2.0			
2x6	1.9	7'-6"	21.0	22.0	21.5	9.5	8.5	4.0
		8'-0"	12.5	13.0	12.5	1.5	1.0	
		8'-6"	5.0	6.0	5.5			
		9'-0"						
2x8	2.5	9'-6"	21.0	22.0	21.0	9.5	8.0	4.0
		10'-0"	14.0	15.0	14.5	3.0	2.0	
		10'-6"	8.0	8.5	8.5			
		11'-0"	3.0	3.5	3.0			
2x10	3.2	12'-0"	16.5	17.0	16.5	4.5	4.0	
		12'-6"	11.5	11.5	11.0			
		13'-0"	6.5	7.0	6.5			
		13'-6"	2.5	3.0	2.5			
2x12	3.9	14'-0"	16.0	16.0	15.5	3.5	3.0	
		14'-6"	11.5	11.5	11.0			
		15'-0"	7.5	7.5	7.0			
		15'-6"	3.5	4.0	3.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	4'-6"						
		5'-0"						
		5'-6"				44.0	40.5	32.0
		6'-0"	32.5	36.5	38.0	27.0	24.5	17.5
2x6	3.2	7'-6"						14.5
		8'-0"				12.5	11.5	6.5
		8'-6"	14.5					
		9'-0"	7.5	8.5	8.5			
2x8	3.8	9'-6"						11.5
		10'-0"				11.5	10.0	5.5
		10'-6"						
		11'-0"	9.5	10.5	10.0			
2x10	4.5	12'-0"				13.5	12.0	7.0
		12'-6"				7.5	6.5	
		13'-0"						
		13'-6"	9.0	9.5	9.5			
2x12	5.2	14'-0"				12.5	11.0	6.0
		14'-6"				7.5	6.5	
		15'-0"						
		15'-6"	10.5	11.0	10.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-16-50-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	4'-0"	44.5	46.0	45.5	37.0	35.0	30.0
		4'-6"	26.5	27.5	27.5	19.5	19.0	16.0
		5'-0"	13.5	14.5	14.5	7.5	7.5	6.0
		5'-6"	4.0	4.5	5.0			
2x6	1.4	6'-0"	41.5	42.5	42.0	33.5	31.5	27.0
		6'-6"	29.5	30.0	29.5	21.5	21.0	17.5
		7'-0"	19.5	20.0	20.0	12.5	12.5	10.0
		7'-6"	11.5	12.5	12.0	5.0	5.5	4.0
2x8	1.9	8'-0"	33.5	34.5	34.0	25.5	24.5	20.5
		8'-6"	25.0	25.5	25.5	17.5	17.0	14.0
		9'-0"	18.0	18.5	18.0	10.5	10.5	8.5
		9'-6"	11.5	12.5	12.0	5.0	5.0	3.5
2x10	2.4	10'-0"	30.5	31.0	30.5	22.0	21.5	18.0
		10'-6"	23.5	24.0	23.5	16.0	15.5	12.5
		11'-0"	18.0	18.5	18.0	10.5	10.5	8.0
		11'-6"	12.5	13.5	13.0	5.5	6.0	4.0
2x12	3.0	12'-0"	26.0	26.5	25.5	17.5	17.0	14.0
		12'-6"	20.5	21.0	20.5	12.5	12.5	10.0
		13'-0"	16.0	16.0	15.5	8.0	8.0	6.0
		13'-6"	11.5	12.0	11.5	4.0	4.5	3.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	4'-0"						
		4'-6"						
		5'-0"						
		5'-6"	33.0	37.0	38.0	31.0	29.5	24.5
2x6	2.4	6'-0"						
		6'-6"						
		7'-0"						
		7'-6"				15.0		11.5
2x8	2.8	8'-0"						
		8'-6"						
		9'-0"						
		9'-6"				12.0	12.0	9.5
2x10	3.3	10'-0"						
		10'-6"						
		11'-0"						
		11'-6"						10.0
2x12	3.9	12'-0"						
		12'-6"						
		13'-0"						
		13'-6"				11.5	11.0	8.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-16-50-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	4'-0"	41.5	42.5	42.0	31.0	29.0	23.0
		4'-6"	23.5	24.5	24.0	14.0	13.0	9.0
		5'-0"	10.5	11.0	11.0	1.5	1.5	
		5'-6"	0.5	1.5	1.5			
2x6	1.4	6'-0"	38.5	39.0	38.5	27.5	25.5	20.0
		6'-6"	26.0	27.0	26.0	16.0	14.5	10.5
		7'-0"	16.5	17.0	16.5	6.5	6.0	3.0
		7'-6"	8.5	9.0	8.5			
2x8	1.9	8'-0"	30.5	31.0	30.5	20.0	18.5	13.5
		8'-6"	22.0	22.5	22.0	11.5	10.5	7.0
		9'-0"	14.5	15.0	14.5	5.0	4.5	1.5
		9'-6"	8.5	9.0	8.5			
2x10	2.4	10'-0"	27.0	27.5	27.0	16.5	15.0	11.0
		10'-6"	20.5	21.0	20.5	10.0	9.0	5.5
		11'-0"	14.5	15.0	14.5	4.5	4.0	1.0
		11'-6"	9.5	10.0	9.5			
2x12	3.0	12'-0"	22.5	23.0	22.0	12.0	10.5	7.0
		12'-6"	17.5	17.5	17.0	7.0	6.0	3.0
		13'-0"	12.5	13.0	12.0	2.5	2.0	
		13'-6"	8.5	8.5	8.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	4'-0"						
		4'-6"						
		5'-0"				42.0	39.5	31.5
		5'-6"	30.0	33.5	34.5	25.0	23.5	17.5
2x6	2.4	6'-0"						
		6'-6"						
		7'-0"						12.0
		7'-6"				9.0	8.5	
2x8	2.8	8'-0"						
		8'-6"						
		9'-0"				13.0	12.0	8.0
		9'-6"				6.5	5.5	
2x10	3.3	10'-0"						
		10'-6"						
		11'-0"				12.5	11.5	7.5
		11'-6"				7.0	6.5	
2x12	3.9	12'-0"						
		12'-6"						9.5
		13'-0"				10.5	9.5	5.5
		13'-6"				5.5	5.0	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-16-50-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	4'-0"	42.0	43.0	42.5	29.5	26.5	19.5
		4'-6"	24.0	24.5	24.0	12.5	10.5	5.5
		5'-0"	11.0	11.5	11.0			
		5'-6"	1.0	2.0	1.5			
2x6	1.4	6'-0"	39.0	39.5	38.5	26.0	23.0	16.5
		6'-6"	26.5	27.0	26.5	14.5	12.5	7.0
		7'-0"	17.0	17.5	16.5	5.0	4.0	
		7'-6"	9.0	9.5	9.0			
2x8	1.9	8'-0"	31.0	31.5	30.5	18.5	16.0	10.5
		8'-6"	22.5	23.0	22.0	10.0	8.5	3.5
		9'-0"	15.0	15.5	15.0	3.5	2.0	
		9'-6"	9.0	9.5	9.0			
2x10	2.4	10'-0"	27.5	28.0	27.0	15.0	13.0	7.5
		10'-6"	21.0	21.5	20.5	8.5	7.0	2.0
		11'-0"	15.0	15.5	15.0	3.0	2.0	
		11'-6"	10.0	10.5	9.5			
2x12	3.0	12'-0"	23.0	23.5	22.5	10.5	8.5	3.5
		12'-6"	18.0	18.0	17.0	5.5	4.0	
		13'-0"	13.0	13.0	12.5	1.0		
		13'-6"	9.0	9.0	8.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	4'-0"						
		4'-6"						
		5'-0"				40.5	37.0	28.0
		5'-6"	30.5	34.0	34.5	23.5	21.0	14.0
2x6	2.4	6'-0"						
		6'-6"						
		7'-0"				17.0	14.5	9.0
		7'-6"				7.5	6.0	
2x8	2.8	8'-0"						
		8'-6"						11.0
		9'-0"				11.5	9.5	
		9'-6"				5.0		
2x10	3.3	10'-0"						
		10'-6"						9.5
		11'-0"				11.0	9.5	
		11'-6"				5.5		
2x12	3.9	12'-0"						11.0
		12'-6"					12.0	6.5
		13'-0"				9.0	7.0	
		13'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-16-60-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	4'-0"	39.5	41.0	40.5	32.5	31.5	27.5
		4'-6"	21.5	22.5	22.5	15.0	15.5	13.5
		5'-0"	8.5	9.5	9.5	3.0	4.0	3.5
		5'-6"						
2x6	1.4	6'-0"	36.5	37.5	37.0	28.5	28.0	24.5
		6'-6"	24.0	25.0	25.0	17.0	17.5	15.0
		7'-0"	14.5	15.0	15.0	8.0	8.5	7.5
		7'-6"	6.5	7.5	7.0	0.5	2.0	1.5
2x8	1.9	8'-0"	28.5	29.5	29.0	21.0	21.0	18.5
		8'-6"	20.0	20.5	20.5	13.0	13.5	11.5
		9'-0"	13.0	13.5	13.5	6.0	7.0	6.0
		9'-6"	6.5	7.5	7.0	0.5	1.5	1.5
2x10	2.4	10'-0"	25.5	26.0	25.5	17.5	18.0	15.5
		10'-6"	18.5	19.0	19.0	11.5	12.0	10.5
		11'-0"	13.0	13.5	13.0	6.0	7.0	6.0
		11'-6"	7.5	8.5	8.0	1.0	2.5	2.0
2x12	3.0	12'-0"	21.0	21.5	21.0	13.0	13.5	11.5
		12'-6"	15.5	16.0	15.5	8.0	9.0	7.5
		13'-0"	10.5	11.0	11.0	3.5	4.5	4.0
		13'-6"	6.5	7.0	6.5		1.0	0.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	4'-0"						
		4'-6"						
		5'-0"				43.5	42.0	36.5
		5'-6"	28.0	32.0	33.0	26.5	26.0	22.0
2x6	2.4	6'-0"						
		6'-6"						
		7'-0"						
		7'-6"				10.5	11.0	9.5
2x8	2.8	8'-0"						
		8'-6"						
		9'-0"						
		9'-6"				7.5	8.5	7.0
2x10	3.3	10'-0"						
		10'-6"						
		11'-0"						
		11'-6"				8.5	9.0	7.5
2x12	3.9	12'-0"						
		12'-6"						
		13'-0"				11.5	12.0	10.0
		13'-6"				7.0	7.5	6.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-16-60-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	4'-0"	36.5	37.5	37.0	26.5	25.5	20.5
		4'-6"	18.5	19.5	19.0	9.5	9.5	6.5
		5'-0"	5.0	6.0	6.0			
		5'-6"						
2x6	1.4	6'-0"	33.5	34.0	33.5	23.0	22.0	17.5
		6'-6"	21.0	22.0	21.5	11.5	11.0	8.0
		7'-0"	11.0	12.0	11.5	2.0	2.5	0.5
		7'-6"	3.5	4.0	4.0			
2x8	1.9	8'-0"	25.5	26.0	25.5	15.5	14.5	11.5
		8'-6"	17.0	17.5	17.0	7.0	7.0	4.5
		9'-0"	9.5	10.0	10.0	0.5	1.0	
		9'-6"	3.5	4.0	4.0			
2x10	2.4	10'-0"	22.0	22.5	22.0	12.0	11.5	8.5
		10'-6"	15.5	16.0	15.5	5.5	5.5	3.0
		11'-0"	9.5	10.0	9.5		0.5	
		11'-6"	4.5	5.0	4.5			
2x12	3.0	12'-0"	17.5	18.0	17.5	7.5	7.0	4.5
		12'-6"	12.0	12.5	12.0	2.5	2.5	0.5
		13'-0"	7.5	8.0	7.5			
		13'-6"	3.0	3.5	3.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	4'-0"						
		4'-6"						
		5'-0"	41.5			37.5	36.0	29.5
		5'-6"	25.0	28.5	29.5	20.5	20.0	15.0
2x6	2.4	6'-0"						
		6'-6"						
		7'-0"				13.5	13.5	10.0
		7'-6"	13.0	14.0	14.0		5.0	
2x8	2.8	8'-0"						
		8'-6"						12.0
		9'-0"				8.5	8.5	5.5
		9'-6"	10.5	11.5	11.5			
2x10	3.3	10'-0"						
		10'-6"						10.5
		11'-0"				8.0	8.0	5.0
		11'-6"	11.5	12.5	12.0			
2x12	3.9	12'-0"						12.0
		12'-6"				11.0	10.5	7.5
		13'-0"				5.5	5.5	
		13'-6"	10.5	11.0	11.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-16-60-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	4'-0"	37.5	38.5	38.0	25.5	23.5	17.5
		4'-6"	19.0	20.0	20.0	8.5	7.5	3.5
		5'-0"	6.0	7.0	7.0			
		5'-6"						
2x6	1.4	6'-0"	34.5	35.0	34.5	22.0	20.0	14.5
		6'-6"	22.0	22.5	22.0	10.5	9.0	5.0
		7'-0"	12.0	13.0	12.5	1.0	0.5	
		7'-6"	4.0	5.0	4.5			
2x8	1.9	8'-0"	26.5	27.0	26.5	14.5	13.0	8.0
		8'-6"	17.5	18.5	18.0	6.0	5.5	1.5
		9'-0"	10.5	11.0	10.5			
		9'-6"	4.5	5.0	4.5			
2x10	2.4	10'-0"	23.0	23.5	23.0	11.0	9.5	5.5
		10'-6"	16.5	17.0	16.0	4.5	4.0	
		11'-0"	10.5	11.0	10.5			
		11'-6"	5.5	6.0	5.5			
2x12	3.0	12'-0"	18.5	19.0	18.0	6.5	5.5	1.5
		12'-6"	13.0	13.5	13.0	1.5	0.5	
		13'-0"	8.5	8.5	8.0			
		13'-6"	4.0	4.5	4.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	4'-0"						
		4'-6"						45.0
		5'-0"				36.5	34.0	26.0
		5'-6"	26.0	29.5	30.5	19.5	18.0	12.0
2x6	2.4	6'-0"						
		6'-6"						16.0
		7'-0"				12.5	11.5	6.5
		7'-6"	14.0	15.0	14.5			
2x8	2.8	8'-0"						
		8'-6"						9.0
		9'-0"				7.5	6.5	
		9'-6"	11.5	12.5	12.0			
2x10	3.3	10'-0"						
		10'-6"				13.5	12.0	7.0
		11'-0"				7.0	6.0	
		11'-6"						
2x12	3.9	12'-0"						9.0
		12'-6"				10.0	8.5	
		13'-0"						
		13'-6"	11.5	12.0	11.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-19.2-50-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	52.5	54.0	53.5	44.5	42.5	36.5
		4'-0"	31.0	32.0	31.5	23.5	23.0	19.5
		4'-6"	15.5	16.5	16.5	9.5	9.5	7.5
		5'-0"	5.0	5.5	5.5			
2x6	1.2	5'-6"	41.5	42.5	41.5	33.0	31.5	27.0
		6'-0"	28.5	29.0	28.5	20.5	20.0	17.0
		6'-6"	18.0	18.5	18.5	11.0	11.0	9.0
		7'-0"	10.0	10.5	10.0	3.5	4.0	2.5
2x8	1.6	7'-6"	30.5	31.0	30.5	22.5	21.5	18.0
		8'-0"	21.5	22.0	22.0	14.0	14.0	11.5
		8'-6"	14.5	15.0	14.5	7.5	7.5	6.0
		9'-0"	8.5	9.0	8.5	2.0	2.5	1.0
2x10	2.0	9'-0"	33.0	33.5	33.0	25.0	23.5	20.0
		9'-6"	25.5	26.0	25.5	17.5	17.0	14.0
		10'-0"	19.0	19.5	19.0	11.5	11.5	9.0
		10'-6"	13.5	14.0	13.5	6.0	6.5	5.0
2x12	2.5	11'-0"	26.0	26.5	25.5	17.5	17.0	14.0
		11'-6"	20.0	20.5	20.0	12.5	12.0	9.5
		12'-0"	15.0	15.5	15.0	7.5	7.5	6.0
		12'-6"	10.5	11.0	10.5	3.5	4.0	2.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	3'-6"						
		4'-0"						
		4'-6"						
		5'-0"	35.0			33.0	31.5	26.5
2x6	2.0	5'-6"						
		6'-0"						
		6'-6"						
		7'-0"				13.0	13.0	10.0
2x8	2.4	7'-6"						
		8'-0"						
		8'-6"						
		9'-0"				8.5	8.5	6.5
2x10	2.8	9'-0"						
		9'-6"						
		10'-0"						
		10'-6"						10.5
2x12	3.2	11'-0"						
		11'-6"						
		12'-0"						
		12'-6"				10.5	10.5	8.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-19.2-50-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	49.5	50.5	50.0	38.5	36.0	29.5
		4'-0"	27.5	28.5	28.0	18.0	16.5	12.0
		4'-6"	12.5	13.5	13.0	3.5	3.0	0.5
		5'-0"	1.5	2.5	2.0			
2x6	1.2	5'-6"	38.0	39.0	38.5	27.5	25.5	20.0
		6'-0"	25.0	25.5	25.0	15.0	13.5	9.5
		6'-6"	15.0	15.5	15.0	5.0	4.5	1.5
		7'-0"	6.5	7.0	7.0			
2x8	1.6	7'-6"	27.0	27.5	27.0	16.5	15.5	11.0
		8'-0"	18.5	19.0	18.5	8.5	7.5	4.5
		8'-6"	11.0	11.5	11.5	1.5	1.5	
		9'-0"	5.0	5.5	5.5			
2x10	2.0	9'-0"	29.5	30.5	29.5	19.0	17.5	13.0
		9'-6"	22.0	22.5	22.0	12.0	11.0	7.0
		10'-0"	15.5	16.0	15.5	5.5	5.0	2.0
		10'-6"	10.0	10.5	10.0	0.5		
2x12	2.5	11'-0"	22.5	23.0	22.5	12.0	11.0	7.0
		11'-6"	17.0	17.0	16.5	6.5	6.0	2.5
		12'-0"	12.0	12.0	11.5	2.0	1.5	
		12'-6"	7.5	7.5	7.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	3'-6"						
		4'-0"						
		4'-6"				46.0	43.5	35.5
		5'-0"	32.0	35.5	36.5	27.0	25.5	19.5
2x6	2.0	5'-6"						
		6'-0"						
		6'-6"				16.5	15.5	11.0
		7'-0"				7.0	6.5	
2x8	2.4	7'-6"						
		8'-0"						11.5
		8'-6"				9.5	8.5	5.0
		9'-0"	12.0					
2x10	2.8	9'-0"						
		9'-6"						
		10'-0"					13.0	8.5
		10'-6"				8.0	7.0	
2x12	3.2	11'-0"						
		11'-6"						9.5
		12'-0"				9.5	9.0	5.0
		12'-6"				5.0		

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-19.2-50-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	50.0	51.0	50.5	37.5	34.0	26.0
		4'-0"	28.0	29.0	28.5	16.5	14.5	9.0
		4'-6"	13.0	13.5	13.0	2.0	1.0	
		5'-0"	2.0	2.5	2.5			
2x6	1.2	5'-6"	38.5	39.5	38.5	26.0	23.0	16.5
		6'-0"	25.5	26.0	25.5	13.5	11.5	6.5
		6'-6"	15.0	15.5	15.0	3.5	2.5	
		7'-0"	7.0	7.5	7.0			
2x8	1.6	7'-6"	27.5	28.0	27.5	15.0	13.0	7.5
		8'-0"	19.0	19.5	18.5	7.0	5.5	1.0
		8'-6"	11.5	12.0	11.5			
		9'-0"	5.5	6.0	5.5			
2x10	2.0	9'-0"	30.0	30.5	30.0	17.5	15.0	9.5
		9'-6"	22.5	23.0	22.0	10.5	8.5	3.5
		10'-0"	16.0	16.5	16.0	4.0	3.0	
		10'-6"	10.5	11.0	10.5			
2x12	2.5	11'-0"	23.0	23.5	22.5	10.5	8.5	3.5
		11'-6"	17.5	17.5	17.0	5.0	3.5	
		12'-0"	12.5	12.5	12.0	0.5		
		12'-6"	8.0	8.0	7.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	3'-6"						
		4'-0"						
		4'-6"				45.0	41.0	32.0
		5'-0"	32.5	36.0	36.5	25.5	23.0	16.0
2x6	2.0	5'-6"						
		6'-0"						
		6'-6"				15.0	13.0	7.5
		7'-0"				5.5		
2x8	2.4	7'-6"						
		8'-0"						8.0
		8'-6"				8.0	6.5	
		9'-0"						
2x10	2.8	9'-0"						
		9'-6"						11.0
		10'-0"				12.5	10.5	5.5
		10'-6"				6.5	5.0	
2x12	3.2	11'-0"						11.5
		11'-6"				14.0	11.5	6.5
		12'-0"				8.5	6.5	
		12'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-19.2-60-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	47.5	49.0	48.5	40.0	38.5	34.0
		4'-0"	25.5	27.0	26.5	19.0	19.0	17.0
		4'-6"	10.5	11.5	11.5	4.5	6.0	5.0
		5'-0"		0.5	1.0			
2x6	1.2	5'-6"	36.0	37.5	37.0	28.5	28.0	24.5
		6'-0"	23.0	24.0	23.5	16.0	16.5	14.5
		6'-6"	13.0	13.5	13.5	6.5	7.5	6.5
		7'-0"	4.5	5.5	5.5		0.5	
2x8	1.6	7'-6"	25.0	26.0	25.5	18.0	18.0	16.0
		8'-0"	16.5	17.5	17.0	9.5	10.5	9.0
		8'-6"	9.5	10.0	10.0	3.0	4.0	3.5
		9'-0"	3.5	4.0	4.0			
2x10	2.0	9'-0"	28.0	28.5	28.0	20.0	20.0	17.5
		9'-6"	20.5	21.0	20.5	13.0	13.5	12.0
		10'-0"	14.0	14.5	14.0	7.0	8.0	7.0
		10'-6"	8.0	9.0	8.5	1.5	3.0	2.5
2x12	2.5	11'-0"	21.0	21.5	21.0	13.0	13.5	12.0
		11'-6"	15.0	15.5	15.0	8.0	8.5	7.5
		12'-0"	10.0	10.5	10.0	3.0	4.0	3.5
		12'-6"	5.5	6.0	6.0		0.5	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	3'-6"						
		4'-0"						
		4'-6"				47.5		40.0
		5'-0"	30.0	34.0	35.0	28.5	28.0	24.0
2x6	2.0	5'-6"						
		6'-0"						
		6'-6"						
		7'-0"	14.0			8.5	9.0	8.0
2x8	2.4	7'-6"						
		8'-0"						
		8'-6"				10.5	11.5	10.0
		9'-0"	10.0	11.0	11.0		5.0	
2x10	2.8	9'-0"						
		9'-6"						
		10'-0"						
		10'-6"				9.0	10.0	8.5
2x12	3.2	11'-0"						
		11'-6"						
		12'-0"				11.0	11.5	10.0
		12'-6"				6.0	7.0	6.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-19.2-60-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	44.5	45.5	45.0	34.0	32.5	27.0
		4'-0"	22.5	23.5	23.5	13.5	13.0	10.0
		4'-6"	7.5	8.5	8.0			
		5'-0"						
2x6	1.2	5'-6"	33.0	34.0	33.5	23.0	22.0	17.5
		6'-0"	20.0	20.5	20.5	10.5	10.0	7.5
		6'-6"	9.5	10.5	10.0	0.5	1.0	
		7'-0"	1.5	2.0	2.0			
2x8	1.6	7'-6"	22.0	22.5	22.0	12.0	12.0	8.5
		8'-0"	13.5	14.0	13.5	4.0	4.0	2.0
		8'-6"	6.0	6.5	6.5			
		9'-0"		0.5	0.5			
2x10	2.0	9'-0"	24.5	25.5	24.5	14.5	14.0	10.5
		9'-6"	17.0	17.5	17.0	7.5	7.5	5.0
		10'-0"	10.5	11.0	11.0	1.0	1.5	
		10'-6"	5.0	5.5	5.0			
2x12	2.5	11'-0"	17.5	18.0	17.5	7.5	7.5	5.0
		11'-6"	12.0	12.5	12.0	2.0	2.5	0.5
		12'-0"	7.0	7.0	7.0			
		12'-6"	2.5	2.5	2.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	3'-6"						
		4'-0"						
		4'-6"				41.5	39.5	33.0
		5'-0"	27.0	30.5	31.5	22.5	22.0	17.0
2x6	2.0	5'-6"						
		6'-0"						
		6'-6"				12.0	12.0	8.5
		7'-0"	11.0	12.0	12.0			
2x8	2.4	7'-6"						
		8'-0"				13.0	12.5	9.0
		8'-6"				5.0	5.0	
		9'-0"	7.0	7.5	7.5			
2x10	2.8	9'-0"						
		9'-6"						12.0
		10'-0"				9.5	9.5	6.5
		10'-6"	12.5		13.0			
2x12	3.2	11'-0"						12.5
		11'-6"				10.5	10.5	7.5
		12'-0"				5.0	5.5	
		12'-6"	9.5	10.0	10.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-19.2-60-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	45.5	46.5	46.0	33.0	30.5	24.0
		4'-0"	23.5	24.5	24.0	12.5	11.0	6.5
		4'-6"	8.5	9.0	9.0			
		5'-0"						
2x6	1.2	5'-6"	34.0	35.0	34.0	22.0	20.0	14.5
		6'-0"	21.0	21.5	21.0	9.5	8.5	4.0
		6'-6"	10.5	11.0	11.0			
		7'-0"	2.5	3.0	2.5			
2x8	1.6	7'-6"	23.0	23.5	23.0	11.0	10.0	5.5
		8'-0"	14.5	15.0	14.5	3.0	2.5	
		8'-6"	7.0	7.5	7.0			
		9'-0"	1.0	1.5	1.0			
2x10	2.0	9'-0"	25.5	26.0	25.5	13.5	12.0	7.5
		9'-6"	18.0	18.5	18.0	6.5	5.5	1.5
		10'-0"	11.5	12.0	11.5			
		10'-6"	6.0	6.5	6.0			
2x12	2.5	11'-0"	18.5	19.0	18.0	6.5	5.5	1.5
		11'-6"	13.0	13.0	12.5	1.0	0.5	
		12'-0"	8.0	8.0	7.5			
		12'-6"	3.5	3.5	3.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	3'-6"						
		4'-0"						
		4'-6"				40.5	38.0	30.0
		5'-0"	28.0	31.5	32.5	21.5	20.0	14.0
2x6	2.0	5'-6"						
		6'-0"						15.5
		6'-6"				11.0	10.0	5.5
		7'-0"	12.0	13.0	12.5			
2x8	2.4	7'-6"						
		8'-0"				12.0	10.5	6.0
		8'-6"						
		9'-0"	7.5	8.5	8.5			
2x10	2.8	9'-0"						
		9'-6"						9.0
		10'-0"				8.5	7.5	
		10'-6"						
2x12	3.2	11'-0"						9.5
		11'-6"				9.5	8.5	
		12'-0"						
		12'-6"	10.5	11.0	10.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-24-50-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	3'-0"	60.5	62.5	62.0	53.0	50.0	43.5
		3'-6"	34.5	35.5	35.0	27.0	26.0	22.5
		4'-0"	17.0	17.5	17.5	10.5	10.5	8.5
		4'-6"	4.5	5.5	5.5			
2x6	1.0	5'-0"	39.0	40.0	39.5	31.0	29.5	25.5
		5'-6"	25.0	26.0	25.5	18.0	17.5	14.5
		6'-0"	15.0	15.5	15.0	8.0	8.5	6.5
		6'-6"	6.5	7.0	7.0	0.5	1.0	
2x8	1.3	6'-6"	35.0	36.0	35.5	27.0	26.0	22.5
		7'-0"	25.0	25.5	25.0	17.5	17.0	14.0
		7'-6"	16.5	17.0	16.5	9.5	9.5	7.5
		8'-0"	9.5	10.0	10.0	3.0	3.5	2.0
2x10	1.6	8'-0"	34.0	35.0	34.5	26.0	25.0	21.5
		8'-6"	25.5	26.5	26.0	18.0	17.5	14.5
		9'-0"	18.5	19.0	19.0	11.5	11.5	9.0
		9'-6"	12.5	13.0	12.5	5.5	6.0	4.5
2x12	2.0	9'-6"	31.0	31.5	31.0	23.0	22.0	18.5
		10'-0"	24.0	24.5	24.0	16.5	16.0	13.0
		10'-6"	18.0	18.5	18.0	10.5	10.5	8.5
		11'-0"	13.0	13.5	13.0	5.5	6.0	4.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	3'-0"						
		3'-6"						
		4'-0"						
		4'-6"	35.5			33.0	32.0	27.0
2x6	1.6	5'-0"						
		5'-6"						
		6'-0"						
		6'-6"				9.5	9.5	7.5
2x8	1.9	6'-6"						
		7'-0"						
		7'-6"						
		8'-0"				10.0	10.0	8.0
2x10	2.2	8'-0"						
		8'-6"						
		9'-0"						
		9'-6"						10.5
2x12	2.6	9'-6"						
		10'-0"						
		10'-6"						
		11'-0"						10.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-24-50-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	3'-0"	57.5	59.0	58.5	47.0	44.0	36.5
		3'-6"	31.0	32.0	31.5	21.5	20.0	15.0
		4'-0"	13.5	14.5	14.0	4.5	4.0	1.5
		4'-6"	1.5	2.0	2.0			
2x6	1.0	5'-0"	35.5	36.5	36.0	25.5	23.5	18.5
		5'-6"	22.0	23.0	22.5	12.0	11.5	7.5
		6'-0"	11.5	12.0	12.0	2.0	2.0	
		6'-6"	3.5	4.0	3.5			
2x8	1.3	6'-6"	32.0	32.5	32.0	21.5	20.0	15.0
		7'-0"	21.5	22.0	21.5	11.5	10.5	7.0
		7'-6"	13.0	13.5	13.5	3.5	3.0	0.5
		8'-0"	6.5	7.0	6.5			
2x10	1.6	8'-0"	31.0	31.5	31.0	20.5	19.0	14.5
		8'-6"	22.5	23.0	22.5	12.5	11.5	7.5
		9'-0"	15.5	16.0	15.5	5.5	5.0	2.0
		9'-6"	9.5	9.5	9.5			
2x12	2.0	9'-6"	28.0	28.5	27.5	17.0	15.5	11.5
		10'-0"	21.0	21.5	20.5	10.5	9.5	6.0
		10'-6"	15.0	15.5	14.5	5.0	4.5	1.5
		11'-0"	9.5	10.0	9.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	3'-0"						
		3'-6"						
		4'-0"				48.5	46.0	37.5
		4'-6"	32.0	35.5	36.5	27.5	25.5	20.0
2x6	1.6	5'-0"						
		5'-6"						
		6'-0"				13.0	12.0	8.5
		6'-6"	12.0	13.0	13.0			
2x8	1.9	6'-6"						
		7'-0"						
		7'-6"				12.0	11.0	7.0
		8'-0"						
2x10	2.2	8'-0"						
		8'-6"						
		9'-0"					13.0	9.0
		9'-6"				7.0	6.5	
2x12	2.6	9'-6"						
		10'-0"						
		10'-6"				13.5	12.0	8.5
		11'-0"				7.5	7.0	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-24-50-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	3'-0"	58.0	59.5	59.0	45.5	41.5	33.0
		3'-6"	31.5	32.5	32.0	20.0	17.5	12.0
		4'-0"	14.0	15.0	14.5	3.0	2.0	
		4'-6"	2.0	2.5	2.5			
2x6	1.0	5'-0"	36.0	37.0	36.5	24.0	21.0	15.0
		5'-6"	22.5	23.0	22.5	11.0	9.0	4.5
		6'-0"	12.0	12.5	12.0	1.0		
		6'-6"	4.0	4.5	4.0			
2x8	1.3	6'-6"	32.5	33.0	32.5	20.0	17.5	12.0
		7'-0"	22.0	22.5	22.0	10.0	8.5	3.5
		7'-6"	13.5	14.0	13.5	2.0	1.0	
		8'-0"	6.5	7.0	6.5			
2x10	1.6	8'-0"	31.5	32.0	31.0	19.0	16.5	11.0
		8'-6"	23.0	23.5	22.5	11.0	9.0	4.0
		9'-0"	16.0	16.0	15.5	4.0	3.0	
		9'-6"	9.5	10.0	9.5			
2x12	2.0	9'-6"	28.5	28.5	28.0	15.5	13.5	8.0
		10'-0"	21.5	21.5	21.0	9.0	7.5	2.5
		10'-6"	15.5	15.5	15.0	3.5	2.0	
		11'-0"	10.0	10.5	9.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	3'-0"						
		3'-6"						
		4'-0"				47.5	43.5	34.5
		4'-6"	32.5	36.0	37.0	26.0	23.5	16.5
2x6	1.6	5'-0"						
		5'-6"						15.0
		6'-0"				11.5	10.0	5.0
		6'-6"	12.5	13.5	13.5			
2x8	1.9	6'-6"						
		7'-0"						11.5
		7'-6"				10.5	8.5	
		8'-0"						
2x10	2.2	8'-0"						
		8'-6"						12.0
		9'-0"				12.5	10.5	5.5
		9'-6"				6.0		
2x12	2.6	9'-6"						
		10'-0"						10.5
		10'-6"				12.0	10.0	5.0
		11'-0"				6.0		

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-24-60-B

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	3'-0"	55.5	57.5	57.0	48.5	46.5	41.0
		3'-6"	29.0	30.5	30.5	22.5	22.5	20.0
		4'-0"	11.5	13.0	12.5	6.0	7.0	6.0
		4'-6"		0.5	0.5			
2x6	1.0	5'-0"	34.0	35.0	34.5	26.5	26.0	23.0
		5'-6"	20.0	21.0	21.0	13.5	14.0	12.5
		6'-0"	9.5	10.5	10.5	3.5	4.5	4.0
		6'-6"	1.5	2.0	2.0			
2x8	1.3	6'-6"	30.0	31.0	30.5	22.5	22.5	20.0
		7'-0"	19.5	20.5	20.5	13.0	13.5	12.0
		7'-6"	11.5	12.0	12.0	5.0	6.0	5.0
		8'-0"	4.5	5.0	5.0			
2x10	1.6	8'-0"	29.0	30.0	29.5	21.5	21.5	19.0
		8'-6"	20.5	21.5	21.0	13.5	14.0	12.5
		9'-0"	13.5	14.0	14.0	7.0	7.5	7.0
		9'-6"	7.5	8.0	8.0	1.0	2.5	2.0
2x12	2.0	9'-6"	26.0	26.5	26.0	18.5	18.5	16.0
		10'-0"	19.0	19.5	19.5	11.5	12.5	11.0
		10'-6"	13.0	13.5	13.5	6.0	7.0	6.0
		11'-0"	8.0	8.5	8.0	1.0	2.5	2.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	3'-0"						
		3'-6"						
		4'-0"						
		4'-6"	30.0	34.0	35.0	28.5	28.5	24.5
2x6	1.6	5'-0"						
		5'-6"						
		6'-0"				14.5	15.0	13.0
		6'-6"	10.5	11.5	11.5	5.0	6.0	5.0
2x8	1.9	6'-6"						
		7'-0"						
		7'-6"				13.0		12.0
		8'-0"	11.5	12.5	12.5	5.5	6.5	5.5
2x10	2.2	8'-0"						
		8'-6"						
		9'-0"						
		9'-6"				8.5	9.5	8.0
2x12	2.6	9'-6"						
		10'-0"						
		10'-6"						
		11'-0"				9.0	9.5	8.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-24-60-C

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	3'-0"	52.5	54.0	54.0	42.5	40.5	34.0
		3'-6"	26.0	27.0	27.0	17.0	16.5	13.0
		4'-0"	8.5	9.5	9.5		0.5	
		4'-6"						
2x6	1.0	5'-0"	30.5	31.5	31.0	21.0	20.0	16.0
		5'-6"	17.0	18.0	17.5	7.5	8.0	5.5
		6'-0"	6.5	7.0	7.0			
		6'-6"						
2x8	1.3	6'-6"	27.0	27.5	27.0	17.0	16.5	13.0
		7'-0"	16.5	17.5	17.0	7.0	7.0	4.5
		7'-6"	8.0	8.5	8.5			
		8'-0"	1.0	2.0	1.5			
2x10	1.6	8'-0"	26.0	26.5	26.0	16.0	15.5	12.0
		8'-6"	17.5	18.0	17.5	7.5	8.0	5.5
		9'-0"	10.0	11.0	10.5	1.0	1.5	
		9'-6"	4.0	4.5	4.5			
2x12	2.0	9'-6"	23.0	23.5	23.0	12.5	12.0	9.0
		10'-0"	16.0	16.5	16.0	6.0	6.0	3.5
		10'-6"	10.0	10.5	10.0	0.5	1.0	
		11'-0"	4.5	5.0	4.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	3'-0"						
		3'-6"						
		4'-0"				44.0	42.0	35.5
		4'-6"	27.0	30.5	32.0	23.0	22.0	17.5
2x6	1.6	5'-0"						
		5'-6"						
		6'-0"				8.5	8.5	6.0
		6'-6"	7.0	8.0	8.0			
2x8	1.9	6'-6"						
		7'-0"						12.5
		7'-6"				7.5	7.5	5.0
		8'-0"	8.0	9.0	9.0			
2x10	2.2	8'-0"						
		8'-6"						
		9'-0"				9.5	9.0	6.5
		9'-6"	11.5	12.5	12.0			
2x12	2.6	9'-6"						
		10'-0"						11.5
		10'-6"				9.0	8.5	6.0
		11'-0"	12.0	13.0	12.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DFL-3-24-60-D

Design Assumptions

Wood Species =	Douglas Fir-Larch	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	3'-0"	53.5	55.0	54.5	41.5	38.5	31.0
		3'-6"	27.0	28.0	27.5	16.0	14.5	9.5
		4'-0"	9.5	10.5	10.0			
		4'-6"						
2x6	1.0	5'-0"	31.5	32.5	32.0	20.0	18.0	13.0
		5'-6"	18.0	18.5	18.0	6.5	6.0	2.0
		6'-0"	7.5	8.0	7.5			
		6'-6"						
2x8	1.3	6'-6"	28.0	28.5	28.0	16.0	14.5	9.5
		7'-0"	17.5	18.0	17.5	6.0	5.0	1.5
		7'-6"	9.0	9.5	9.0			
		8'-0"	2.0	2.5	2.5			
2x10	1.6	8'-0"	27.0	27.5	27.0	15.0	13.5	9.0
		8'-6"	18.5	19.0	18.5	6.5	6.0	2.0
		9'-0"	11.0	11.5	11.0			
		9'-6"	5.0	5.5	5.0			
2x12	2.0	9'-6"	24.0	24.5	23.5	11.5	10.5	6.0
		10'-0"	17.0	17.0	16.5	5.0	4.0	0.5
		10'-6"	11.0	11.0	10.5			
		11'-0"	5.5	6.0	5.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	3'-0"						
		3'-6"						
		4'-0"				43.0	40.5	32.5
		4'-6"	28.0	31.5	32.5	22.0	20.0	14.5
2x6	1.6	5'-0"						
		5'-6"						13.0
		6'-0"				7.5	6.5	
		6'-6"	8.0	9.0	9.0			
2x8	1.9	6'-6"						
		7'-0"					14.0	9.5
		7'-6"				6.5	5.5	
		8'-0"	9.0	10.0	9.5			
2x10	2.2	8'-0"						
		8'-6"						10.0
		9'-0"				8.5	7.5	
		9'-6"	12.5		13.0			
2x12	2.6	9'-6"						
		10'-0"				14.5	13.0	8.5
		10'-6"				8.0	6.5	
		11'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-12-50-B

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	6'-6"	25.0	22.5	20.0	8.0	4.5	
		7'-0"	12.0	10.0	8.0			
		7'-6"	2.5	1.0				
		8'-0"						
2x6	1.9	10'-0"	28.5	26.0	23.0	10.5	7.0	0.5
		10'-6"	19.0	17.0	14.5	3.0	0.5	
		11'-0"	11.5	9.5	7.5			
		11'-6"	5.0	3.5	1.5			
2x8	2.5	13'-0"	31.0	28.5	25.0	12.5	8.0	1.5
		13'-6"	23.5	21.0	18.0	6.5	3.0	
		14'-0"	16.5	14.5	12.0	1.0		
		14'-6"	11.0	9.0	6.5			
2x10	3.2	16'-0"	38.5	35.5	32.0	18.5	13.0	5.0
		16'-6"	31.5	28.5	25.5	12.5	8.0	1.0
		17'-0"	25.0	22.5	19.5	7.5	4.0	
		17'-6"	19.5	17.5	14.5	3.0		
2x12	3.9	19'-0"	40.0	40.5	36.5	22.5	16.5	7.5
		19'-6"	35.5	34.5	30.5	17.0	12.0	4.0
		20'-0"	31.0	28.5	25.5	12.5	8.0	1.0
		20'-6"	26.0	23.5	20.5	8.5	4.5	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	6'-6"					47.0	31.5
		7'-0"				37.0	29.5	17.5
		7'-6"	43.0	39.5	35.5	21.5	16.0	7.5
		8'-0"	28.0	25.5	22.0	10.0	6.0	
2x6	3.2	10'-0"						14.5
		10'-6"				21.5	16.0	7.5
		11'-0"				13.0	8.5	
		11'-6"	22.5	20.0	17.5	5.5		
2x8	3.8	13'-0"						14.5
		13'-6"					18.0	9.0
		14'-0"				17.0	12.0	
		14'-6"				10.5	6.5	
2x10	4.5	16'-0"						19.5
		16'-6"						14.5
		17'-0"					20.0	10.0
		17'-6"				20.0	14.5	6.0
2x12	5.2	19'-0"						
		19'-6"						18.5
		20'-0"						14.0
		20'-6"					20.5	10.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-12-50-C

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	6'-6"	22.0	19.5	16.5	2.0		
		7'-0"	9.0	7.0	4.5			
		7'-6"						
		8'-0"						
2x6	1.9	10'-0"	25.5	22.5	19.5	5.0	0.5	
		10'-6"	16.0	13.5	11.0			
		11'-0"	8.0	6.0	4.0			
		11'-6"	1.5					
2x8	2.5	13'-0"	28.0	25.0	21.5	6.5	2.0	
		13'-6"	20.0	17.5	14.5	0.5		
		14'-0"	13.5	11.0	8.5			
		14'-6"	7.5	5.5	3.5			
2x10	3.2	16'-0"	35.5	32.0	28.5	12.5	7.0	
		16'-6"	28.5	25.5	22.0	7.0	2.0	
		17'-0"	22.0	19.5	16.0	2.0		
		17'-6"	16.5	14.0	11.0			
2x12	3.9	19'-0"	37.0	37.0	33.0	16.5	10.0	0.5
		19'-6"	32.0	31.0	27.0	11.5	6.0	
		20'-0"	28.0	25.5	22.0	7.0	2.0	
		20'-6"	23.0	20.5	17.0	2.5		

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	6'-6"				52.0	41.0	24.5
		7'-0"			50.0	31.5	23.0	10.5
		7'-6"	39.5	36.5	32.5	16.0	10.0	
		8'-0"	24.5	22.0	18.5			
2x6	3.2	10'-0"				26.5	19.0	7.5
		10'-6"				16.0	10.0	
		11'-0"			22.0	7.0		
		11'-6"	19.5	17.0	14.0			
2x8	3.8	13'-0"					19.0	7.5
		13'-6"				18.5	12.0	
		14'-0"				11.5	5.5	
		14'-6"			20.0	5.0		
2x10	4.5	16'-0"						12.5
		16'-6"					19.5	7.5
		17'-0"				20.5	13.5	
		17'-6"				14.5	8.5	
2x12	5.2	19'-0"						16.0
		19'-6"						11.5
		20'-0"					19.0	7.0
		20'-6"				21.5	14.5	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-12-50-D

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	6'-6"	22.5	19.5	16.5	1.0		
		7'-0"	9.5	7.0	5.0			
		7'-6"						
		8'-0"						
2x6	1.9	10'-0"	26.0	23.0	20.0	3.5		
		10'-6"	16.5	14.0	11.0			
		11'-0"	8.5	6.5	4.0			
		11'-6"	2.0	0.5				
2x8	2.5	13'-0"	28.5	25.5	22.0	5.0		
		13'-6"	20.5	18.0	15.0			
		14'-0"	14.0	11.5	8.5			
		14'-6"	8.0	6.0	3.5			
2x10	3.2	16'-0"	36.0	32.5	28.5	11.0	4.5	
		16'-6"	28.5	25.5	22.0	5.5		
		17'-0"	22.5	19.5	16.5	0.5		
		17'-6"	17.0	14.5	11.5			
2x12	3.9	19'-0"	37.5	37.5	33.5	15.0	8.0	
		19'-6"	32.5	31.5	27.5	10.0	3.5	
		20'-0"	28.5	25.5	22.0	5.5		
		20'-6"	23.5	20.5	17.5	1.0		

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	6'-6"				50.5	38.5	21.0
		7'-0"			50.0	30.0	21.0	7.0
		7'-6"	40.0	36.5	32.5	14.5	7.5	
		8'-0"	25.0	22.5	19.0			
2x6	3.2	10'-0"				25.0	16.5	
		10'-6"				14.5	7.5	
		11'-0"			22.5	5.5		
		11'-6"	20.0	17.0	14.0			
2x8	3.8	13'-0"				25.5	17.0	
		13'-6"				17.0	9.5	
		14'-0"				10.0		
		14'-6"			20.0			
2x10	4.5	16'-0"					24.0	9.5
		16'-6"					17.0	
		17'-0"				19.0	11.5	
		17'-6"				13.0	6.0	
2x12	5.2	19'-0"						13.0
		19'-6"					22.5	8.0
		20'-0"					17.0	
		20'-6"				20.0	12.0	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-12-60-B

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	6'-6"	20.0	17.5	15.0	3.5	1.0	
		7'-0"	7.0	5.0	3.0			
		7'-6"						
		8'-0"						
2x6	1.9	10'-0"	23.5	21.0	18.0	6.0	3.0	
		10'-6"	14.0	12.0	9.5			
		11'-0"	6.5	4.5	2.5			
		11'-6"						
2x8	2.5	13'-0"	26.0	23.5	20.0	8.0	4.5	
		13'-6"	18.0	16.0	13.0	2.0		
		14'-0"	11.5	9.5	7.0			
		14'-6"	5.5	4.0	2.0			
2x10	3.2	16'-0"	33.5	30.5	27.0	14.0	9.5	2.5
		16'-6"	26.5	23.5	20.5	8.0	4.5	
		17'-0"	20.0	17.5	15.0	3.0	0.5	
		17'-6"	14.5	12.5	9.5			
2x12	3.9	19'-0"	35.0	35.5	31.5	18.0	13.0	5.0
		19'-6"	30.5	29.5	26.0	12.5	8.5	1.5
		20'-0"	26.0	23.5	20.5	8.0	4.5	
		20'-6"	21.0	18.5	15.5	4.0	1.0	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	6'-6"				53.5	43.5	29.0
		7'-0"		53.5	48.5	32.5	26.0	15.5
		7'-6"	38.0	34.5	31.0	17.0	12.5	5.0
		8'-0"	23.0	20.5	17.5	5.5		
2x6	3.2	10'-0"					21.5	12.0
		10'-6"				17.0	12.5	5.0
		11'-0"		24.0	21.0	8.5	5.0	
		11'-6"	17.5	15.0	12.5			
2x8	3.8	13'-0"					22.0	12.0
		13'-6"				20.0	14.5	6.5
		14'-0"				12.5	8.5	
		14'-6"		21.5	18.5	6.0		
2x10	4.5	16'-0"						17.5
		16'-6"					22.0	12.0
		17'-0"				22.0	16.5	7.5
		17'-6"				15.5	11.0	
2x12	5.2	19'-0"						21.0
		19'-6"						16.0
		20'-0"					22.0	12.0
		20'-6"				23.0	17.0	8.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-12-60-C

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	6'-6"	17.0	14.5	11.5			
		7'-0"	4.0	2.0				
		7'-6"						
		8'-0"						
2x6	1.9	10'-0"	20.5	18.0	14.5	0.5		
		10'-6"	11.0	8.5	6.0			
		11'-0"	3.0	1.0				
		11'-6"						
2x8	2.5	13'-0"	22.5	20.0	17.0	2.0		
		13'-6"	15.0	12.5	9.5			
		14'-0"	8.5	6.0	3.5			
		14'-6"	2.5	0.5				
2x10	3.2	16'-0"	30.5	27.0	23.5	8.0	3.5	
		16'-6"	23.0	20.5	17.0	2.5		
		17'-0"	17.0	14.5	11.5			
		17'-6"	11.0	9.0	6.5			
2x12	3.9	19'-0"	32.0	32.0	28.5	12.0	6.5	
		19'-6"	27.0	26.0	22.5	7.0	2.5	
		20'-0"	22.5	20.5	17.0	2.0		
		20'-6"	18.0	15.5	12.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	6'-6"				47.5	37.5	22.0
		7'-0"	54.0	50.0	45.0	27.0	19.5	8.5
		7'-6"	34.5	31.5	27.5	11.5	6.5	
		8'-0"	19.5	17.0	14.0			
2x6	3.2	10'-0"				22.0	15.5	5.0
		10'-6"				11.5	6.0	
		11'-0"	23.5	20.5	17.5			
		11'-6"	14.0	12.0	9.0			
2x8	3.8	13'-0"				22.5	15.5	5.0
		13'-6"				14.0	8.5	
		14'-0"			22.0	6.5		
		14'-6"	18.5	18.0	15.0			
2x10	4.5	16'-0"					22.5	10.5
		16'-6"				23.0	16.0	5.0
		17'-0"				16.0	10.0	
		17'-6"				10.0	5.0	
2x12	5.2	19'-0"						14.0
		19'-6"					21.0	9.0
		20'-0"				22.5	15.5	5.0
		20'-6"				17.0	10.5	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-12-60-D

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	6'-6"	18.0	15.0	12.0			
		7'-0"	4.5	3.0	0.5			
		7'-6"						
		8'-0"						
2x6	1.9	10'-0"	21.5	18.5	15.5			
		10'-6"	12.0	9.5	7.0			
		11'-0"	4.0	2.0				
		11'-6"						
2x8	2.5	13'-0"	23.5	21.0	17.5	1.0		
		13'-6"	16.0	13.5	10.5			
		14'-0"	9.0	7.0	4.5			
		14'-6"	3.5	1.5				
2x10	3.2	16'-0"	31.5	28.0	24.5	7.0	1.5	
		16'-6"	24.0	21.0	18.0	1.5		
		17'-0"	18.0	15.0	12.0			
		17'-6"	12.0	10.0	7.0			
2x12	3.9	19'-0"	33.0	33.0	29.0	11.0	5.0	
		19'-6"	28.0	27.0	23.0	6.0	0.5	
		20'-0"	23.5	21.0	18.0	1.0		
		20'-6"	19.0	16.0	13.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.5	6'-6"				46.5	35.5	19.0
		7'-0"	55.0	51.0	46.0	26.0	17.5	5.0
		7'-6"	35.5	32.0	28.0	10.5		
		8'-0"	20.5	18.0	14.5			
2x6	3.2	10'-0"				21.0	13.5	
		10'-6"				10.5		
		11'-0"	24.5	21.5	18.0			
		11'-6"	15.0	12.5	9.5			
2x8	3.8	13'-0"				21.5	14.0	
		13'-6"				13.0	6.5	
		14'-0"			23.0	5.5		
		14'-6"	19.0	19.0	15.5			
2x10	4.5	16'-0"					20.5	7.0
		16'-6"				22.0	14.0	
		17'-0"				15.0	8.0	
		17'-6"				9.0		
2x12	5.2	19'-0"					25.5	10.5
		19'-6"					19.5	6.0
		20'-0"				21.5	14.0	
		20'-6"				16.0	9.0	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-16-50-B

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	5'-6"	41.0	38.0	34.0	20.5	15.5	7.5
		6'-0"	22.5	20.0	17.5	6.0	3.0	
		6'-6"	9.0	7.5	5.5			
		7'-0"						
2x6	1.4	8'-6"	44.5	41.5	37.5	23.5	17.5	9.0
		9'-0"	31.0	28.5	25.0	13.0	8.5	2.0
		9'-6"	20.5	18.0	15.5	4.5	1.5	
		10'-0"	12.0	10.0	7.5			
2x8	1.9	11'-0"	48.5	45.5	41.5	27.0	20.5	11.0
		11'-6"	38.0	34.5	31.0	18.0	13.0	5.0
		12'-0"	28.5	25.5	22.5	10.5	6.5	
		12'-6"	20.5	18.0	15.5	4.0	1.0	
2x10	2.4	14'-0"	43.5	45.5	41.5	27.0	20.5	11.0
		14'-6"	37.0	37.0	33.0	19.5	14.5	6.0
		15'-0"	31.5	29.5	26.0	13.5	9.0	2.0
		15'-6"	25.5	23.0	20.0	8.0	4.5	
2x12	3.0	16'-6"	43.5	47.5	49.0	33.5	26.0	15.0
		17'-0"	38.0	42.0	41.0	26.5	20.0	10.5
		17'-6"	33.0	37.0	34.5	20.5	15.0	6.5
		18'-0"	28.5	31.5	28.5	15.0	10.5	3.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	5'-6"						
		6'-0"					43.5	29.0
		6'-6"				33.0	25.5	15.0
		7'-0"	37.0	34.0	30.5	17.5	12.5	
2x6	2.4	8'-6"						
		9'-0"						16.5
		9'-6"				23.5	17.5	8.5
		10'-0"				13.5	9.0	
2x8	2.8	11'-0"						
		11'-6"						20.0
		12'-0"						13.0
		12'-6"				21.5	16.0	7.0
2x10	3.3	14'-0"						
		14'-6"						
		15'-0"						15.5
		15'-6"					20.5	10.5
2x12	3.9	16'-6"						
		17'-0"						
		17'-6"						
		18'-0"						17.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-16-50-C

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	5'-6"	37.5	34.5	30.5	15.0	9.0	
		6'-0"	19.0	16.5	14.0			
		6'-6"	6.0	4.0	2.0			
		7'-0"						
2x6	1.4	8'-6"	41.5	38.0	34.0	17.5	11.5	2.0
		9'-0"	28.0	25.0	22.0	7.0	2.5	
		9'-6"	17.0	15.0	12.0			
		10'-0"	8.5	6.5	4.5			
2x8	1.9	11'-0"	45.5	42.0	38.0	21.0	14.5	4.0
		11'-6"	34.5	31.5	27.5	12.0	6.5	
		12'-0"	25.0	22.5	19.0	4.5	0.5	
		12'-6"	17.0	14.5	12.0			
2x10	2.4	14'-0"	40.0	42.0	38.0	21.0	14.0	4.0
		14'-6"	34.0	33.5	30.0	14.0	8.0	
		15'-0"	28.0	26.0	22.5	7.5	2.5	
		15'-6"	22.0	19.5	16.5	2.0		
2x12	3.0	16'-6"	40.0	44.5	45.5	27.5	20.0	8.0
		17'-0"	35.0	38.5	38.0	21.0	14.0	3.5
		17'-6"	30.0	33.5	31.0	15.0	9.0	
		18'-0"	25.0	28.5	25.0	9.5	4.0	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	5'-6"						41.5
		6'-0"				48.0	37.5	22.0
		6'-6"		49.5	45.0	27.0	19.5	8.0
		7'-0"	34.0	31.0	27.0	11.5	6.0	
2x6	2.4	8'-6"						19.5
		9'-0"					21.5	9.5
		9'-6"				17.5	11.5	
		10'-0"			23.0	8.0		
2x8	2.8	11'-0"						21.0
		11'-6"						13.0
		12'-0"				24.5	17.0	6.0
		12'-6"				15.5	9.5	
2x10	3.3	14'-0"						21.0
		14'-6"						14.0
		15'-0"					20.5	8.5
		15'-6"				21.0	14.0	
2x12	3.9	16'-6"						
		17'-0"						20.5
		17'-6"						15.0
		18'-0"					22.5	10.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-16-50-D

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	5'-6"	38.0	35.0	31.0	13.5	7.0	
		6'-0"	19.5	17.0	14.0			
		6'-6"	6.5	4.5	2.0			
		7'-0"						
2x6	1.4	8'-6"	42.0	38.5	34.0	16.0	9.0	
		9'-0"	28.5	25.5	22.0	5.5		
		9'-6"	17.5	15.0	12.5			
		10'-0"	9.0	7.0	4.5			
2x8	1.9	11'-0"	46.0	42.5	38.0	19.5	12.0	0.5
		11'-6"	35.0	31.5	28.0	10.5	4.5	
		12'-0"	25.5	22.5	19.5	3.0		
		12'-6"	17.5	15.0	12.0			
2x10	2.4	14'-0"	40.5	42.5	38.0	19.5	12.0	0.5
		14'-6"	34.5	34.0	30.0	12.5	6.0	
		15'-0"	28.5	26.5	23.0	6.0	0.5	
		15'-6"	22.5	20.0	16.5	0.5		
2x12	3.0	16'-6"	40.5	44.5	46.0	26.0	17.5	4.5
		17'-0"	35.0	39.0	38.0	19.5	11.5	
		17'-6"	30.0	34.0	31.0	13.5	6.5	
		18'-0"	25.5	29.0	25.0	8.0	2.0	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	5'-6"						38.5
		6'-0"				46.5	35.0	18.5
		6'-6"		50.0	45.0	25.5	17.0	
		7'-0"	34.5	31.0	27.5	10.0		
2x6	2.4	8'-6"						16.5
		9'-0"					19.5	6.0
		9'-6"				16.0	9.0	
		10'-0"			23.0	6.5		
2x8	2.8	11'-0"						17.5
		11'-6"					23.5	9.5
		12'-0"				23.0	14.5	
		12'-6"				14.0	7.5	
2x10	3.3	14'-0"						17.5
		14'-6"						11.0
		15'-0"					18.0	5.0
		15'-6"				19.5	12.0	
2x12	3.9	16'-6"						23.0
		17'-0"						17.0
		17'-6"						11.5
		18'-0"					20.5	6.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-16-60-B

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	5'-6"	36.0	33.0	29.5	16.0	12.0	5.0
		6'-0"	17.5	15.0	12.5	1.5		
		6'-6"	4.0	2.5	0.5			
		7'-0"						
2x6	1.4	8'-6"	39.5	36.5	32.5	19.0	14.0	6.5
		9'-0"	26.0	23.5	20.5	8.5	5.0	
		9'-6"	15.5	13.0	10.5			
		10'-0"	6.5	5.0	3.0			
2x8	1.9	11'-0"	43.5	40.5	36.5	22.5	17.0	8.5
		11'-6"	32.5	29.5	26.5	13.5	9.5	3.0
		12'-0"	23.0	20.5	18.0	6.0	3.0	
		12'-6"	15.5	13.0	10.5			
2x10	2.4	14'-0"	38.5	40.5	36.5	22.5	17.0	8.5
		14'-6"	32.0	32.0	28.5	15.0	11.0	4.0
		15'-0"	26.0	24.5	21.0	9.0	5.5	
		15'-6"	20.0	18.0	15.0	3.5	0.5	
2x12	3.0	16'-6"	38.5	42.5	44.0	29.0	22.5	13.0
		17'-0"	33.0	37.0	36.5	22.0	16.5	8.5
		17'-6"	28.0	32.0	29.5	16.0	11.5	4.0
		18'-0"	23.5	26.5	23.5	10.5	7.0	0.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	5'-6"						46.5
		6'-0"				49.5	40.0	26.5
		6'-6"	51.5	48.0	43.5	28.5	22.0	12.5
		7'-0"	32.0	29.0	25.5	13.0	9.0	
2x6	2.4	8'-6"						
		9'-0"					24.5	14.5
		9'-6"				19.0	14.0	6.5
		10'-0"		24.5	21.5	9.0	5.5	
2x8	2.8	11'-0"						
		11'-6"						17.5
		12'-0"					19.5	10.5
		12'-6"				17.0	12.0	5.0
2x10	3.3	14'-0"						
		14'-6"						19.0
		15'-0"						13.0
		15'-6"				22.0	16.5	8.0
2x12	3.9	16'-6"						
		17'-0"						
		17'-6"						19.5
		18'-0"						14.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-16-60-C

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	5'-6"	32.5	29.5	26.0	10.5	5.5	
		6'-0"	14.0	12.0	9.0			
		6'-6"	1.0					
		7'-0"						
2x6	1.4	8'-6"	36.5	33.0	29.0	13.0	8.0	
		9'-0"	23.0	20.0	17.0	2.5		
		9'-6"	12.0	10.0	7.5			
		10'-0"	3.5	1.5				
2x8	1.9	11'-0"	40.5	37.0	33.0	16.5	11.0	1.5
		11'-6"	29.5	26.5	23.0	7.5	3.0	
		12'-0"	20.0	17.5	14.5			
		12'-6"	12.0	10.0	7.0			
2x10	2.4	14'-0"	35.0	37.0	33.0	16.5	10.5	1.5
		14'-6"	28.5	28.5	25.0	9.5	4.5	
		15'-0"	23.0	21.0	18.0	3.0		
		15'-6"	17.0	14.5	11.5			
2x12	3.0	16'-6"	35.0	39.5	40.5	23.0	16.5	5.5
		17'-0"	29.5	33.5	33.0	16.5	10.5	1.0
		17'-6"	24.5	28.5	26.0	10.5	5.5	
		18'-0"	20.0	23.5	20.0	5.0	0.5	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	5'-6"						39.5
		6'-0"				43.5	34.0	19.5
		6'-6"	48.5	44.5	40.0	22.5	16.0	5.5
		7'-0"	29.0	26.0	22.5	7.0		
2x6	2.4	8'-6"						17.5
		9'-0"				25.0	18.0	7.5
		9'-6"				13.0	8.0	
		10'-0"	20.5	21.5	18.0			
2x8	2.8	11'-0"						18.5
		11'-6"					22.5	10.5
		12'-0"				20.0	13.5	
		12'-6"				11.0	6.0	
2x10	3.3	14'-0"						18.5
		14'-6"					24.5	12.0
		15'-0"				24.0	17.0	6.0
		15'-6"				16.5	10.5	
2x12	3.9	16'-6"						
		17'-0"						18.0
		17'-6"						12.5
		18'-0"				25.0	19.0	7.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-16-60-D

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.9	5'-6"	33.5	30.5	26.5	9.5	3.5	
		6'-0"	15.0	12.5	10.0			
		6'-6"	1.5					
		7'-0"						
2x6	1.4	8'-6"	37.0	34.0	30.0	12.0	6.0	
		9'-0"	24.0	21.0	17.5	1.5		
		9'-6"	13.0	11.0	8.0			
		10'-0"	4.5	2.5				
2x8	1.9	11'-0"	41.0	38.0	33.5	15.5	9.0	
		11'-6"	30.5	27.5	23.5	6.5	1.0	
		12'-0"	21.0	18.0	15.0			
		12'-6"	13.0	10.5	8.0			
2x10	2.4	14'-0"	36.0	38.0	34.0	15.5	9.0	
		14'-6"	29.5	29.5	25.5	8.5	2.5	
		15'-0"	24.0	22.0	18.5	2.0		
		15'-6"	18.0	15.5	12.5			
2x12	3.0	16'-6"	36.0	40.0	41.5	22.0	14.5	2.5
		17'-0"	30.5	34.5	33.5	15.5	8.5	
		17'-6"	25.5	29.5	27.0	9.5	3.5	
		18'-0"	21.0	24.5	20.5	4.0		

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.8	5'-6"					57.5	36.5
		6'-0"				42.5	32.0	16.5
		6'-6"	49.5	45.5	40.5	21.5	14.0	
		7'-0"	30.0	26.5	23.0	6.0		
2x6	2.4	8'-6"						14.0
		9'-0"				24.0	16.0	
		9'-6"				12.0	6.0	
		10'-0"	21.5	22.0	19.0			
2x8	2.8	11'-0"						15.5
		11'-6"					20.5	7.5
		12'-0"				19.0	11.5	
		12'-6"				10.0		
2x10	3.3	14'-0"						15.5
		14'-6"					22.5	9.0
		15'-0"				23.0	15.0	
		15'-6"				15.5	8.5	
2x12	3.9	16'-6"						21.0
		17'-0"						15.0
		17'-6"					23.5	9.5
		18'-0"				24.0	17.0	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-19.2-50-B

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-0"	50.0	46.5	42.5	28.0	21.5	12.0
		5'-6"	27.5	25.0	22.0	10.0	6.5	0.5
		6'-0"	12.0	10.5	8.0			
		6'-6"	1.0					
2x6	1.2	7'-6"	60.0	59.0	54.0	38.0	30.5	19.0
		8'-0"	45.0	41.5	37.5	23.5	18.0	9.0
		8'-6"	30.5	28.0	25.0	12.5	8.5	1.5
		9'-0"	19.5	17.5	14.5	3.5	0.5	
2x8	1.6	10'-0"	51.5	55.0	50.5	35.0	27.5	16.5
		10'-6"	42.0	42.0	38.0	24.0	18.5	9.5
		11'-0"	34.0	31.5	28.0	15.0	10.5	3.5
		11'-6"	25.0	22.5	19.5	8.0	4.5	
2x10	2.0	12'-6"	49.5	54.5	56.0	39.5	31.5	19.5
		13'-0"	42.5	47.0	45.0	30.0	23.5	13.5
		13'-6"	35.5	40.0	36.0	22.0	16.5	8.0
		14'-0"	29.5	31.5	28.0	15.0	10.5	3.5
2x12	2.5	14'-6"	53.0	57.0	58.5	51.0	42.0	27.5
		15'-0"	46.0	50.5	51.5	42.5	34.0	21.5
		15'-6"	40.0	44.0	45.5	34.5	27.0	16.0
		16'-0"	34.5	38.5	39.5	27.0	20.5	11.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-0"						
		5'-6"						35.0
		6'-0"				38.0	30.0	18.5
		6'-6"	40.5	37.5	34.0	20.0	15.0	6.5
2x6	2.0	7'-6"						
		8'-0"						
		8'-6"						16.5
		9'-0"				22.5	17.0	8.0
2x8	2.4	10'-0"						
		10'-6"						
		11'-0"						17.5
		11'-6"					20.5	11.0
2x10	2.8	12'-6"						
		13'-0"						
		13'-6"						
		14'-0"						17.5
2x12	3.2	14'-6"						
		15'-0"						
		15'-6"						
		16'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-19.2-50-C

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-0"	46.5	43.0	39.0	22.0	15.5	5.0
		5'-6"	24.5	22.0	18.5	4.5		
		6'-0"	9.0	7.0	4.5			
		6'-6"						
2x6	1.2	7'-6"	56.5	55.5	50.5	32.0	24.0	12.0
		8'-0"	41.5	38.0	34.0	18.0	11.5	2.0
		8'-6"	27.5	24.5	21.5	6.5	2.0	
		9'-0"	16.5	14.0	11.5			
2x8	1.6	10'-0"	48.5	52.0	47.0	29.0	21.5	9.5
		10'-6"	39.0	39.0	35.0	18.5	12.0	2.5
		11'-0"	31.0	28.0	24.5	9.5	4.5	
		11'-6"	21.5	19.0	16.0	2.0		
2x10	2.0	12'-6"	46.5	51.0	52.5	33.5	25.0	12.5
		13'-0"	39.0	43.5	41.5	24.5	17.0	6.0
		13'-6"	32.5	36.5	32.5	16.5	10.5	1.0
		14'-0"	26.5	28.0	24.5	9.5	4.5	
2x12	2.5	14'-6"	49.5	54.0	55.0	45.0	35.5	20.5
		15'-0"	43.0	47.0	48.0	36.5	27.5	14.5
		15'-6"	37.0	41.0	42.0	28.5	20.5	9.0
		16'-0"	31.5	35.0	36.0	21.5	14.5	4.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-0"						51.5
		5'-6"				56.5	45.0	28.0
		6'-0"			50.5	32.0	23.5	11.5
		6'-6"	37.5	34.0	30.5	14.5	8.5	
2x6	2.0	7'-6"						
		8'-0"						20.0
		8'-6"					21.0	9.5
		9'-0"				16.5	10.5	
2x8	2.4	10'-0"						
		10'-6"						18.5
		11'-0"					23.0	10.5
		11'-6"				21.0	14.0	
2x10	2.8	12'-6"						
		13'-0"						
		13'-6"						16.5
		14'-0"					22.5	10.5
2x12	3.2	14'-6"						
		15'-0"						
		15'-6"						
		16'-0"						21.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-19.2-50-D

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-0"	47.0	43.5	39.0	20.5	13.0	1.5
		5'-6"	25.0	22.0	19.0	3.0		
		6'-0"	9.5	7.5	5.0			
		6'-6"						
2x6	1.2	7'-6"	57.0	56.0	51.0	31.0	22.0	8.5
		8'-0"	42.0	38.5	34.5	16.5	9.5	
		8'-6"	28.0	25.0	21.5	5.0		
		9'-0"	16.5	14.5	11.5			
2x8	1.6	10'-0"	49.0	52.0	47.5	27.5	19.0	6.0
		10'-6"	39.5	39.0	35.0	17.0	10.0	
		11'-0"	31.5	28.5	25.0	8.0	2.0	
		11'-6"	22.0	19.5	16.5	0.5		
2x10	2.0	12'-6"	47.0	51.5	52.5	32.0	23.0	9.0
		13'-0"	39.5	44.0	42.0	23.0	15.0	3.0
		13'-6"	33.0	37.0	33.0	15.0	8.0	
		14'-0"	27.0	28.5	25.0	8.0	2.0	
2x12	2.5	14'-6"	50.0	54.5	55.5	43.5	33.5	17.0
		15'-0"	43.5	47.5	48.5	35.0	25.5	11.0
		15'-6"	37.5	41.0	42.0	27.0	18.5	5.5
		16'-0"	32.0	35.5	36.5	20.0	12.0	0.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-0"						48.0
		5'-6"				55.0	42.5	24.5
		6'-0"			50.5	30.5	21.5	8.0
		6'-6"	38.0	34.5	30.5	13.0	6.5	
2x6	2.0	7'-6"						
		8'-0"						16.5
		8'-6"				27.5	19.0	6.0
		9'-0"				15.0	8.5	
2x8	2.4	10'-0"						
		10'-6"						15.5
		11'-0"					20.5	7.0
		11'-6"				19.5	12.0	
2x10	2.8	12'-6"						
		13'-0"						20.5
		13'-6"						13.5
		14'-0"					20.5	7.0
2x12	3.2	14'-6"						
		15'-0"						
		15'-6"						
		16'-0"						17.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-19.2-60-B

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-0"	45.0	41.5	37.5	23.5	18.0	10.0
		5'-6"	22.5	20.0	17.5	5.5	3.0	
		6'-0"	7.0	5.5	3.0			
		6'-6"						
2x6	1.2	7'-6"	54.5	54.0	49.0	33.5	26.5	16.5
		8'-0"	39.5	36.5	32.5	19.0	14.5	7.0
		8'-6"	25.5	23.0	20.0	8.0	5.0	
		9'-0"	14.5	12.5	10.0			
2x8	1.6	10'-0"	46.5	50.0	45.5	30.5	24.0	14.5
		10'-6"	37.0	37.0	33.5	19.5	15.0	7.0
		11'-0"	29.0	26.5	23.0	10.5	7.0	1.0
		11'-6"	20.0	17.5	14.5	3.5	1.0	
2x10	2.0	12'-6"	44.5	49.5	51.0	35.0	28.0	17.0
		13'-0"	37.0	42.0	40.5	25.5	20.0	11.0
		13'-6"	30.5	35.0	31.0	17.5	13.0	5.5
		14'-0"	24.5	26.5	23.5	10.5	7.0	1.0
2x12	2.5	14'-6"	47.5	52.5	53.5	46.5	38.5	25.5
		15'-0"	41.0	45.5	46.5	38.0	30.5	19.0
		15'-6"	35.0	39.0	40.5	29.5	23.5	13.5
		16'-0"	29.5	33.5	34.5	22.5	17.0	8.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-0"						
		5'-6"					47.5	32.5
		6'-0"			49.0	33.5	26.5	16.0
		6'-6"	35.5	32.5	29.0	15.5	11.5	
2x6	2.0	7'-6"						
		8'-0"						
		8'-6"					24.0	14.0
		9'-0"				18.0	13.0	6.0
2x8	2.4	10'-0"						
		10'-6"						
		11'-0"						15.0
		11'-6"				22.0	16.5	8.5
2x10	2.8	12'-6"						
		13'-0"						
		13'-6"						
		14'-0"						15.0
2x12	3.2	14'-6"						
		15'-0"						
		15'-6"						
		16'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-19.2-60-C

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-0"	41.5	38.0	34.0	17.5	12.0	2.5
		5'-6"	19.5	17.0	14.0			
		6'-0"	4.0	2.0				
		6'-6"						
2x6	1.2	7'-6"	51.5	50.5	46.0	27.5	20.5	9.5
		8'-0"	36.5	33.0	29.5	13.5	8.0	
		8'-6"	22.5	19.5	16.5	2.0		
		9'-0"	11.0	9.0	6.5			
2x8	1.6	10'-0"	43.5	47.0	42.0	24.5	18.0	7.0
		10'-6"	34.0	34.0	30.0	14.0	8.5	
		11'-0"	25.5	23.0	20.0	5.0	1.0	
		11'-6"	16.5	14.0	11.5			
2x10	2.0	12'-6"	41.5	46.5	47.5	29.0	21.5	10.0
		13'-0"	34.0	38.5	37.0	20.0	13.5	4.0
		13'-6"	27.5	31.5	27.5	12.0	7.0	
		14'-0"	21.5	23.0	20.0	5.0	1.0	
2x12	2.5	14'-6"	44.5	49.0	50.0	40.5	32.0	18.5
		15'-0"	38.0	42.0	43.5	32.0	24.0	12.0
		15'-6"	32.0	36.0	37.0	24.0	17.0	6.5
		16'-0"	26.5	30.0	31.5	16.5	11.0	1.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-0"						49.0
		5'-6"				52.0	41.5	25.5
		6'-0"	51.5	50.5	45.5	27.5	20.0	9.0
		6'-6"	32.5	29.0	25.5	10.0	5.0	
2x6	2.0	7'-6"						
		8'-0"						17.5
		8'-6"				24.5	17.5	7.0
		9'-0"				12.0	7.0	
2x8	2.4	10'-0"						
		10'-6"						16.5
		11'-0"				26.5	19.0	8.0
		11'-6"				16.0	10.5	
2x10	2.8	12'-6"						
		13'-0"						21.5
		13'-6"						14.5
		14'-0"				26.5	19.0	8.0
2x12	3.2	14'-6"						
		15'-0"						
		15'-6"						
		16'-0"						18.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-19.2-60-D

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-0"	42.5	39.0	34.5	16.5	10.0	
		5'-6"	20.5	17.5	14.5			
		6'-0"	5.0	3.0	0.5			
		6'-6"						
2x6	1.2	7'-6"	52.5	51.5	46.5	26.5	18.5	6.5
		8'-0"	37.5	34.0	30.0	12.5	6.5	
		8'-6"	23.5	20.5	17.0	1.0		
		9'-0"	12.0	10.0	7.0			
2x8	1.6	10'-0"	44.5	47.5	43.0	23.5	16.0	4.0
		10'-6"	35.0	34.5	30.5	13.0	6.5	
		11'-0"	26.5	24.0	20.5	4.0		
		11'-6"	17.5	15.0	12.0			
2x10	2.0	12'-6"	42.5	47.0	48.0	28.0	19.5	7.0
		13'-0"	35.0	39.5	37.5	19.0	11.5	0.5
		13'-6"	28.5	32.5	28.5	11.0	5.0	
		14'-0"	22.5	24.0	20.5	4.0		
2x12	2.5	14'-6"	45.5	50.0	51.0	39.5	30.5	15.0
		15'-0"	39.0	43.0	44.0	31.0	22.0	9.0
		15'-6"	33.0	36.5	37.5	23.0	15.0	3.5
		16'-0"	27.5	31.0	32.0	15.5	9.0	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.5	5'-0"						46.0
		5'-6"				51.0	39.5	22.5
		6'-0"	52.5	51.5	46.5	26.5	18.5	6.0
		6'-6"	33.5	30.0	26.5	9.0		
2x6	2.0	7'-6"						
		8'-0"						14.5
		8'-6"				23.5	16.0	
		9'-0"				11.0	5.0	
2x8	2.4	10'-0"						23.0
		10'-6"						13.0
		11'-0"				25.5	17.5	5.0
		11'-6"				15.0	8.5	
2x10	2.8	12'-6"						
		13'-0"						18.5
		13'-6"					25.5	11.5
		14'-0"				25.5	17.5	5.0
2x12	3.2	14'-6"						
		15'-0"						
		15'-6"						22.0
		16'-0"						15.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-24-50-B

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-0"	81.0	81.5	82.0	68.0	56.0	39.0
		4'-6"	59.0	55.0	50.5	35.0	27.5	17.0
		5'-0"	32.0	29.5	26.0	13.5	9.5	3.0
		5'-6"	14.5	12.5	10.0			
2x6	1.0	6'-6"	69.0	75.5	75.5	57.0	46.5	31.5
		7'-0"	53.0	57.5	53.0	37.0	29.5	18.0
		7'-6"	40.0	39.5	35.5	22.0	16.5	8.0
		8'-0"	28.0	25.5	22.5	10.5	6.5	0.5
2x8	1.3	9'-0"	52.5	57.5	59.5	43.0	34.5	22.0
		9'-6"	42.5	47.0	45.0	30.0	23.5	13.5
		10'-0"	33.5	36.5	33.0	19.5	14.5	6.5
		10'-6"	26.0	26.0	23.0	11.0	7.0	0.5
2x10	1.6	11'-0"	55.0	60.0	61.5	54.0	44.5	29.5
		11'-6"	46.0	51.0	52.5	42.0	34.0	21.5
		12'-0"	38.5	43.0	44.5	32.0	25.0	14.5
		12'-6"	32.0	36.0	37.0	23.0	17.5	8.5
2x12	2.0	13'-0"	54.0	58.5	59.5	52.0	49.5	35.5
		13'-6"	46.5	51.0	52.0	44.5	41.5	27.5
		14'-0"	40.0	44.0	45.5	38.0	33.0	21.0
		14'-6"	34.5	38.0	39.0	32.0	26.0	15.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-0"						
		4'-6"						
		5'-0"						40.0
		5'-6"				41.5	33.0	21.0
2x6	1.6	6'-6"						
		7'-0"						
		7'-6"						
		8'-0"						14.5
2x8	1.9	9'-0"						
		9'-6"						
		10'-0"						
		10'-6"						13.5
2x10	2.2	11'-0"						
		11'-6"						
		12'-0"						
		12'-6"						
2x12	2.6	13'-0"						
		13'-6"						
		14'-0"						
		14'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-24-50-C

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-0"	78.0	78.0	78.5	62.0	50.0	32.0
		4'-6"	55.5	51.5	47.0	29.0	21.5	10.0
		5'-0"	29.0	26.0	23.0	8.0	3.5	
		5'-6"	11.0	9.0	6.5			
2x6	1.0	6'-6"	66.0	72.5	72.0	51.0	40.5	24.5
		7'-0"	50.0	54.0	49.5	31.0	23.0	11.0
		7'-6"	37.0	36.0	32.0	16.0	10.0	1.0
		8'-0"	25.0	22.0	19.0	4.5	0.5	
2x8	1.3	9'-0"	49.0	54.5	56.0	37.0	28.0	15.0
		9'-6"	39.0	43.5	41.5	24.0	17.0	6.5
		10'-0"	30.5	33.0	29.5	13.5	8.0	
		10'-6"	22.5	22.5	19.5	5.0	0.5	
2x10	1.6	11'-0"	51.5	56.5	58.0	48.5	38.0	22.5
		11'-6"	43.0	47.5	49.0	36.5	27.5	14.5
		12'-0"	35.5	39.5	41.0	26.0	18.5	7.5
		12'-6"	28.5	32.5	33.5	17.5	11.0	1.5
2x12	2.0	13'-0"	50.5	55.0	56.5	46.5	43.5	28.0
		13'-6"	43.5	47.5	48.5	39.0	35.5	20.5
		14'-0"	37.0	41.0	42.0	32.5	27.0	14.0
		14'-6"	31.0	34.5	35.5	26.5	19.5	8.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-0"						
		4'-6"						
		5'-0"					50.0	33.0
		5'-6"				35.5	27.0	14.0
2x6	1.6	6'-6"						
		7'-0"						
		7'-6"						18.5
		8'-0"				26.5	19.0	7.5
2x8	1.9	9'-0"						
		9'-6"						
		10'-0"						14.5
		10'-6"				25.0	17.5	6.5
2x10	2.2	11'-0"						
		11'-6"						
		12'-0"						
		12'-6"						18.0
2x12	2.6	13'-0"						
		13'-6"						
		14'-0"						
		14'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-24-50-D

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-0"	78.5	78.5	79.0	60.5	47.5	28.5
		4'-6"	56.0	52.0	47.0	27.5	19.0	6.5
		5'-0"	29.5	26.5	23.0	6.5	1.0	
		5'-6"	11.5	9.5	7.0			
2x6	1.0	6'-6"	66.5	72.5	72.5	49.5	38.0	21.0
		7'-0"	50.0	54.5	49.5	29.5	21.0	8.0
		7'-6"	37.0	36.5	32.5	14.5	8.0	
		8'-0"	25.5	22.5	19.5	3.0		
2x8	1.3	9'-0"	49.5	55.0	56.5	35.5	26.0	11.5
		9'-6"	39.5	44.0	41.5	22.5	15.0	3.0
		10'-0"	30.5	33.5	29.5	12.0	6.0	
		10'-6"	23.0	23.0	20.0	3.5		
2x10	1.6	11'-0"	52.0	57.0	58.5	47.0	36.0	19.5
		11'-6"	43.5	48.0	49.0	35.0	25.5	11.0
		12'-0"	36.0	40.0	41.0	24.5	16.5	4.0
		12'-6"	29.0	33.0	34.0	16.0	9.0	
2x12	2.0	13'-0"	51.0	55.5	56.5	45.0	41.0	25.0
		13'-6"	44.0	48.0	49.0	37.5	33.0	17.0
		14'-0"	37.5	41.0	42.0	31.0	24.5	10.5
		14'-6"	31.5	35.0	36.0	25.0	17.5	4.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-0"						
		4'-6"						
		5'-0"					48.0	29.5
		5'-6"				34.0	24.5	10.5
2x6	1.6	6'-6"						
		7'-0"						
		7'-6"						15.0
		8'-0"				25.0	16.5	
2x8	1.9	9'-0"						
		9'-6"						21.0
		10'-0"						11.0
		10'-6"				23.5	15.5	
2x10	2.2	11'-0"						
		11'-6"						
		12'-0"						22.5
		12'-6"						14.5
2x12	2.6	13'-0"						
		13'-6"						
		14'-0"						
		14'-6"						23.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-24-60-B

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-0"	76.0	76.5	77.0	63.5	52.5	36.5
		4'-6"	53.5	50.0	45.5	30.5	24.0	14.5
		5'-0"	27.0	24.5	21.5	9.0	6.0	0.5
		5'-6"	9.0	7.5	5.0			
2x6	1.0	6'-6"	64.0	70.5	71.0	52.5	43.0	29.5
		7'-0"	48.0	52.5	48.0	32.5	26.0	16.0
		7'-6"	35.0	34.5	30.5	17.5	13.0	6.0
		8'-0"	23.0	20.5	17.5	6.0	3.0	
2x8	1.3	9'-0"	47.5	53.0	54.5	38.5	31.0	19.5
		9'-6"	37.0	42.0	40.0	25.5	20.0	11.0
		10'-0"	28.5	31.5	28.0	15.0	11.0	4.0
		10'-6"	21.0	21.0	18.0	6.5	3.5	
2x10	1.6	11'-0"	49.5	55.0	56.5	49.5	41.0	27.5
		11'-6"	41.0	46.0	47.5	37.5	30.0	19.0
		12'-0"	33.5	38.0	39.5	27.5	21.5	12.0
		12'-6"	27.0	31.0	32.0	18.5	14.0	6.5
2x12	2.0	13'-0"	49.0	53.5	55.0	47.5	46.0	33.0
		13'-6"	41.5	46.0	47.5	40.0	38.0	25.5
		14'-0"	35.0	39.0	40.5	33.5	29.5	18.5
		14'-6"	29.5	33.0	34.5	27.5	22.5	13.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-0"						
		4'-6"						
		5'-0"						37.5
		5'-6"			43.5	37.0	29.5	18.5
2x6	1.6	6'-6"						
		7'-0"						
		7'-6"						
		8'-0"					21.5	12.5
2x8	1.9	9'-0"						
		9'-6"						
		10'-0"						19.5
		10'-6"					20.5	11.5
2x10	2.2	11'-0"						
		11'-6"						
		12'-0"						
		12'-6"						
2x12	2.6	13'-0"						
		13'-6"						
		14'-0"						
		14'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-24-60-C

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-0"	73.0	73.5	74.0	57.5	46.5	29.5
		4'-6"	50.5	46.5	42.0	24.5	18.0	7.5
		5'-0"	24.0	21.0	18.0	3.5		
		5'-6"	6.0	4.0	2.0			
2x6	1.0	6'-6"	60.5	67.5	67.5	46.5	37.0	22.0
		7'-0"	44.5	49.0	44.5	26.5	19.5	9.0
		7'-6"	31.5	31.0	27.5	11.5	6.5	
		8'-0"	19.5	17.0	14.0			
2x8	1.3	9'-0"	44.0	49.5	51.5	32.5	24.5	12.5
		9'-6"	34.0	38.5	36.5	19.5	13.5	4.0
		10'-0"	25.0	28.0	24.5	9.0	4.5	
		10'-6"	17.5	17.5	14.5	0.5		
2x10	1.6	11'-0"	46.5	51.5	53.0	44.0	34.5	20.5
		11'-6"	38.0	42.5	44.0	32.0	24.0	12.0
		12'-0"	30.5	34.5	36.0	21.5	15.0	5.0
		12'-6"	23.5	27.5	28.5	12.5	7.5	
2x12	2.0	13'-0"	45.5	50.0	51.5	41.5	40.0	26.0
		13'-6"	38.5	42.5	44.0	34.5	32.0	18.0
		14'-0"	32.0	36.0	37.0	28.0	23.5	11.5
		14'-6"	26.0	29.5	31.0	22.0	16.0	6.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-0"						
		4'-6"						
		5'-0"				42.0	46.5	30.5
		5'-6"		39.5	40.0	31.0	23.5	11.5
2x6	1.6	6'-6"						
		7'-0"						
		7'-6"						16.0
		8'-0"				22.0	15.5	5.5
2x8	1.9	9'-0"						
		9'-6"						22.0
		10'-0"					24.0	12.0
		10'-6"				20.5	14.0	
2x10	2.2	11'-0"						
		11'-6"						
		12'-0"						23.5
		12'-6"						15.5
2x12	2.6	13'-0"						
		13'-6"						
		14'-0"						
		14'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table DF-HIST-24-60-D

Design Assumptions

Wood Species =	Douglas Fir	Wood Grade =	(refer to narritive)
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	33.6 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	4'-0"	74.0	74.0	74.5	56.5	44.5	26.5
		4'-6"	51.5	47.5	43.0	23.5	16.0	4.5
		5'-0"	25.0	22.0	18.5	2.5		
		5'-6"	7.0	5.0	2.5			
2x6	1.0	6'-6"	61.5	68.0	68.0	45.5	35.0	19.0
		7'-0"	45.5	50.0	45.0	25.5	17.5	5.5
		7'-6"	32.5	32.0	28.0	10.5	5.0	
		8'-0"	20.5	18.0	15.0			
2x8	1.3	9'-0"	45.0	50.5	52.0	31.5	23.0	9.5
		9'-6"	35.0	39.5	37.0	18.5	11.5	1.0
		10'-0"	26.0	29.0	25.0	8.0	2.5	
		10'-6"	18.5	18.5	15.5			
2x10	1.6	11'-0"	47.5	52.5	54.0	43.0	32.5	17.0
		11'-6"	39.0	43.5	45.0	31.0	22.0	9.0
		12'-0"	31.5	35.5	37.0	20.5	13.0	2.0
		12'-6"	24.5	28.5	29.5	11.5	5.5	
2x12	2.0	13'-0"	46.5	51.0	52.0	41.0	38.0	23.0
		13'-6"	39.5	43.5	44.5	33.5	30.0	15.0
		14'-0"	33.0	36.5	37.5	27.0	21.5	8.5
		14'-6"	27.0	30.5	31.5	21.0	14.0	2.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.2	4'-0"						
		4'-6"						55.5
		5'-0"				41.0	44.5	27.5
		5'-6"		40.0	40.5	30.0	21.5	8.5
2x6	1.6	6'-6"						
		7'-0"						
		7'-6"					27.5	13.0
		8'-0"				21.0	13.5	
2x8	1.9	9'-0"						
		9'-6"						18.5
		10'-0"					22.5	9.0
		10'-6"				19.5	12.0	
2x10	2.2	11'-0"						
		11'-6"						
		12'-0"						20.5
		12'-6"						12.5
2x12	2.6	13'-0"						
		13'-6"						
		14'-0"						
		14'-6"						21.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-12-50-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	6'-6"	27.5	30.5	31.0	21.0	16.0	7.5
		7'-0"	17.5	20.0	20.0	8.0	4.5	
		7'-6"	9.0	11.0	9.0			
		8'-0"	2.5	2.0	0.5			
2x6	1.7	10'-6"	16.5	18.5	19.0	12.5	11.0	3.5
		11'-0"	11.0	13.0	13.5	7.0	4.0	
		11'-6"	6.0	8.0	8.5	1.0		
		12'-0"	2.0	3.5	4.5			
2x8	2.2	13'-6"	16.0	17.5	18.0	11.0	11.0	6.0
		14'-0"	11.5	13.0	13.5	7.0	7.0	1.5
		14'-6"	7.5	9.0	9.5	3.0	3.5	
		15'-0"	4.0	5.5	6.0			
2x10	2.8	17'-0"	13.0	14.5	14.5	8.0	8.0	5.5
		17'-6"	9.5	11.0	11.5	4.5	5.0	3.0
		18'-0"	6.5	8.0	8.5	1.5	2.5	
		18'-6"	3.5	5.0	5.5			
2x12	3.4	19'-6"	15.0	16.5	16.5	9.5	9.5	7.0
		20'-0"	12.0	13.5	13.5	6.5	6.5	4.5
		20'-6"	9.5	10.5	10.5	4.0	4.0	2.5
		21'-0"	6.5	8.0	8.0	1.5	2.0	0.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-6"						
		7'-0"					47.5	32.0
		7'-6"				37.0	31.0	19.0
		8'-0"	22.0	28.0	30.5	24.0	18.0	9.0
2x6	2.7	10'-6"						17.5
		11'-0"					15.5	11.5
		11'-6"				10.0	10.0	5.5
		12'-0"	8.0	10.5	11.5	5.0	5.5	
2x8	3.3	13'-6"						
		14'-0"						10.0
		14'-6"				9.0	9.0	6.5
		15'-0"	8.5			5.0	5.5	
2x10	3.9	17'-0"						
		17'-6"				11.0	10.5	8.0
		18'-0"				7.5	7.5	5.0
		18'-6"	8.5	10.5			5.0	
2x12	4.5	19'-6"						
		20'-0"						10.0
		20'-6"				10.5	10.0	7.5
		21'-0"				7.5	7.5	5.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-12-50-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	6'-6"	24.5	27.0	27.5	15.5	9.5	0.5
		7'-0"	14.0	16.5	16.5	2.5		
		7'-6"	5.5	8.0	5.5			
		8'-0"						
2x6	1.7	10'-6"	13.5	15.5	16.0	6.5	4.5	
		11'-0"	8.0	9.5	10.0	1.0		
		11'-6"	3.0	4.5	5.0			
		12'-0"		0.5	1.0			
2x8	2.2	13'-6"	12.5	14.5	14.5	5.0	4.5	
		14'-0"	8.0	10.0	10.0	1.0	1.0	
		14'-6"	4.0	6.0	6.0			
		15'-0"	0.5	2.5	2.5			
2x10	2.8	17'-0"	9.5	11.0	11.5	2.0	1.5	
		17'-6"	6.5	8.0	8.0			
		18'-0"	3.5	4.5	5.0			
		18'-6"	0.5	2.0	2.0			
2x12	3.4	19'-6"	12.0	13.0	13.0	3.5	3.0	
		20'-0"	9.0	10.0	10.0	0.5	0.5	
		20'-6"	6.0	7.5	7.5			
		21'-0"	3.5	4.5	4.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-6"						42.0
		7'-0"				45.5	41.5	25.0
		7'-6"				31.0	24.5	12.0
		8'-0"	19.0	24.5	27.0	18.5	12.0	
2x6	2.7	10'-6"					15.5	10.5
		11'-0"				10.0	9.0	
		11'-6"	9.5	12.5	13.0			
		12'-0"		7.0	8.0			
2x8	3.3	13'-6"				12.5	11.5	7.0
		14'-0"				7.5	7.0	
		14'-6"	9.5					
		15'-0"	5.5	7.5	8.0			
2x10	3.9	17'-0"				9.0	8.0	
		17'-6"				5.0		
		18'-0"	8.5	10.5	11.0			
		18'-6"	5.0	7.0	7.5			
2x12	4.5	19'-6"				11.0	10.0	5.5
		20'-0"				7.5	7.0	
		20'-6"						
		21'-0"	9.0	10.5	11.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-12-50-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	6'-6"	25.0	27.5	28.0	14.0	7.5	
		7'-0"	14.5	17.0	17.0	1.0		
		7'-6"	6.0	8.0	5.5			
		8'-0"						
2x6	1.7	10'-6"	14.0	16.0	16.0	5.0	2.5	
		11'-0"	8.0	10.0	10.5			
		11'-6"	3.5	5.0	5.5			
		12'-0"		0.5	1.0			
2x8	2.2	13'-6"	13.0	14.5	14.5	4.0	2.5	
		14'-0"	8.5	10.0	10.5			
		14'-6"	4.5	6.0	6.5			
		15'-0"	1.0	2.5	3.0			
2x10	2.8	17'-0"	10.0	11.5	11.5	0.5		
		17'-6"	7.0	8.0	8.0			
		18'-0"	3.5	5.0	5.0			
		18'-6"	1.0	2.0	2.5			
2x12	3.4	19'-6"	12.5	13.5	13.5	2.0	1.0	
		20'-0"	9.5	10.5	10.5			
		20'-6"	6.5	7.5	7.5			
		21'-0"	4.0	5.0	5.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-6"						39.0
		7'-0"				44.0	39.0	21.5
		7'-6"				29.5	22.5	8.5
		8'-0"	19.5	25.0	27.5	17.0	9.5	
2x6	2.7	10'-6"				15.0	13.0	7.0
		11'-0"				8.5	7.0	
		11'-6"	10.0	12.5				
		12'-0"	5.0	7.5	8.0			
2x8	3.3	13'-6"				11.0	9.0	
		14'-0"				6.0		
		14'-6"	10.0					
		15'-0"	6.0	8.0	8.5			
2x10	3.9	17'-0"				7.5	5.5	
		17'-6"						
		18'-0"	9.0	11.0	11.0			
		18'-6"	5.5	7.5	8.0			
2x12	4.5	19'-6"				9.5	7.5	
		20'-0"				6.0		
		20'-6"						
		21'-0"	9.5	11.0	11.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-12-60-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	6'-6"	22.5	25.5	26.5	16.5	12.5	5.0
		7'-0"	12.0	15.0	15.0	3.5	1.0	
		7'-6"	4.0	6.0	4.0			
		8'-0"						
2x6	1.7	10'-6"	11.5	13.5	14.5	8.0	7.5	1.0
		11'-0"	6.0	8.0	8.5	2.5	0.5	
		11'-6"	1.0	3.0	3.5			
		12'-0"						
2x8	2.2	13'-6"	10.5	12.5	13.0	6.5	7.5	3.5
		14'-0"	6.5	8.0	8.5	2.5	3.5	
		14'-6"	2.5	4.0	4.5			
		15'-0"		0.5	1.0			
2x10	2.8	17'-0"	8.0	9.5	10.0	3.5	4.5	3.5
		17'-6"	4.5	6.0	6.5		1.5	0.5
		18'-0"	1.5	3.0	3.5			
		18'-6"			0.5			
2x12	3.4	19'-6"	10.0	11.5	11.5	5.0	6.0	4.5
		20'-0"	7.0	8.5	8.5	2.0	3.0	2.0
		20'-6"	4.0	5.5	6.0		0.5	
		21'-0"	1.5	3.0	3.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-6"						47.0
		7'-0"				46.5	44.0	29.5
		7'-6"	28.0		37.5	32.5	27.5	16.5
		8'-0"	17.0	23.0	26.0	19.5	14.5	6.5
2x6	2.7	10'-6"						15.0
		11'-0"				11.5	12.0	9.5
		11'-6"	7.5	10.5	11.5	5.5	6.5	
		12'-0"		5.5	6.5			
2x8	3.3	13'-6"						11.5
		14'-0"				9.0	9.5	7.5
		14'-6"	7.5	10.0	11.0		5.5	
		15'-0"		6.0	6.5			
2x10	3.9	17'-0"				10.0	10.5	8.5
		17'-6"	10.0			6.5	7.0	5.5
		18'-0"	6.5	8.5	9.5			
		18'-6"		5.5	6.0			
2x12	4.5	19'-6"				12.0		10.5
		20'-0"				9.0	9.5	7.5
		20'-6"	10.0			6.0	6.5	5.0
		21'-0"	7.0	9.0	9.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-12-60-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	6'-6"	19.5	22.0	23.0	11.0	6.0	
		7'-0"	9.0	11.5	11.5			
		7'-6"	0.5	3.0	0.5			
		8'-0"						
2x6	1.7	10'-6"	8.5	10.5	11.0	2.0	1.0	
		11'-0"	2.5	4.5	5.5			
		11'-6"			0.5			
		12'-0"						
2x8	2.2	13'-6"	7.5	9.5	9.5	0.5	1.0	
		14'-0"	3.0	5.0	5.5			
		14'-6"		1.0	1.5			
		15'-0"						
2x10	2.8	17'-0"	4.5	6.0	6.5			
		17'-6"	1.5	3.0	3.0			
		18'-0"						
		18'-6"						
2x12	3.4	19'-6"	7.0	8.0	8.5			
		20'-0"	4.0	5.0	5.5			
		20'-6"	1.0	2.5	2.5			
		21'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-6"						40.0
		7'-0"				41.0	38.0	22.5
		7'-6"	25.0	31.0	34.0	26.5	21.0	9.5
		8'-0"	14.0	19.5	22.5	14.0	8.5	
2x6	2.7	10'-6"				12.0	12.0	8.0
		11'-0"	10.5	13.5		5.5	5.5	
		11'-6"		7.5	8.5			
		12'-0"						
2x8	3.3	13'-6"				8.0	8.0	
		14'-0"	9.0	11.5				
		14'-6"		6.5	7.5			
		15'-0"						
2x10	3.9	17'-0"	11.0					
		17'-6"	7.0	9.0	9.5			
		18'-0"		5.5	6.0			
		18'-6"						
2x12	4.5	19'-6"				6.5	6.5	
		20'-0"	10.5	12.0				
		20'-6"	7.0	9.0	9.0			
		21'-0"		5.5	6.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-12-60-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	6'-6"	20.5	23.0	23.5	10.0	4.0	
		7'-0"	10.0	12.5	12.5			
		7'-6"	1.5	3.5	1.5			
		8'-0"						
2x6	1.7	10'-6"	9.5	11.5	11.5	1.0		
		11'-0"	3.5	5.5	6.0			
		11'-6"		0.5	1.0			
		12'-0"						
2x8	2.2	13'-6"	8.5	10.0	10.5			
		14'-0"	4.0	5.5	6.0			
		14'-6"		1.5	2.0			
		15'-0"						
2x10	2.8	17'-0"	5.5	7.0	7.0			
		17'-6"	2.0	3.5	4.0			
		18'-0"		0.5	1.0			
		18'-6"						
2x12	3.4	19'-6"	8.0	9.0	9.0			
		20'-0"	5.0	6.0	6.0			
		20'-6"	2.0	3.0	3.0			
		21'-0"		0.5	0.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-6"					53.5	36.5
		7'-0"				40.0	36.0	19.5
		7'-6"	26.0	32.0	35.0	25.5	19.0	6.5
		8'-0"	15.0	20.5	23.0	13.0	6.5	
2x6	2.7	10'-6"				11.0	10.0	5.0
		11'-0"	11.5					
		11'-6"	5.5	8.0	9.0			
		12'-0"						
2x8	3.3	13'-6"				7.0	6.0	
		14'-0"	10.0					
		14'-6"	5.5	7.5	8.0			
		15'-0"						
2x10	3.9	17'-0"						
		17'-6"	8.0	10.0	10.0			
		18'-0"		6.5	6.5			
		18'-6"						
2x12	4.5	19'-6"				5.5		
		20'-0"	11.0					
		20'-6"	8.0	9.5	10.0			
		21'-0"	5.0	6.5	7.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-16-50-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	34.0	36.5	37.0	29.5	28.0	18.0
		6'-0"	21.0	23.5	24.0	17.0	13.5	6.0
		6'-6"	11.0	13.0	14.0	5.0	2.0	
		7'-0"	3.0	5.0	5.5			
2x6	1.3	9'-0"	20.0	22.0	22.5	15.0	15.0	11.5
		9'-6"	13.5	15.0	15.5	9.0	9.0	4.5
		10'-0"	7.5	9.5	10.0	3.5	4.0	
		10'-6"	3.0	4.5	5.0			
2x8	1.7	11'-6"	20.0	21.5	22.0	14.5	14.5	11.5
		12'-0"	14.5	16.0	16.5	9.5	9.5	7.5
		12'-6"	10.0	11.5	11.5	5.0	5.5	3.5
		13'-0"	6.0	7.5	7.5	1.0	2.0	
2x10	2.1	14'-6"	17.0	18.0	18.5	11.0	11.0	8.5
		15'-0"	13.0	14.0	14.0	7.5	7.5	5.5
		15'-6"	9.0	10.5	10.5	4.0	4.5	2.5
		16'-0"	6.0	7.0	7.5	0.5	1.5	
2x12	2.6	17'-0"	16.5	17.5	17.5	10.5	10.0	8.0
		17'-6"	13.0	14.0	14.0	7.0	7.0	5.0
		18'-0"	10.0	11.0	11.0	4.0	4.5	2.5
		18'-6"	7.0	8.0	8.0	1.5	2.0	0.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						
		6'-0"						
		6'-6"				41.0	39.5	28.5
		7'-0"	25.5	31.0		27.5	26.0	15.5
2x6	2.1	9'-0"						
		9'-6"						14.5
		10'-0"				12.0	12.0	9.0
		10'-6"	9.5	11.5	12.5	6.0	6.5	
2x8	2.5	11'-6"						
		12'-0"						
		12'-6"				11.5		9.0
		13'-0"				7.0	7.5	5.0
2x10	2.9	14'-6"						
		15'-0"						
		15'-6"				10.5	10.0	7.5
		16'-0"				6.5	7.0	
2x12	3.4	17'-0"						
		17'-6"						11.0
		18'-0"				11.0	10.5	8.0
		18'-6"				7.5	7.5	5.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-16-50-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	30.5	33.0	33.5	23.5	22.0	11.0
		6'-0"	18.0	20.0	20.5	11.0	7.5	
		6'-6"	8.0	10.0	10.5			
		7'-0"		2.0	2.0			
2x6	1.3	9'-0"	17.0	18.5	19.0	9.5	8.5	4.5
		9'-6"	10.0	12.0	12.0	3.0	2.5	
		10'-0"	4.5	6.0	6.5			
		10'-6"		1.0	1.5			
2x8	1.7	11'-6"	17.0	18.5	18.5	9.0	8.0	4.5
		12'-0"	11.5	13.0	13.0	3.5	3.5	
		12'-6"	6.5	8.0	8.5			
		13'-0"	2.5	4.0	4.0			
2x10	2.1	14'-6"	13.5	15.0	15.0	5.5	5.0	1.5
		15'-0"	9.5	11.0	11.0	1.5	1.5	
		15'-6"	6.0	7.0	7.0			
		16'-0"	2.5	3.5	4.0			
2x12	2.6	17'-0"	13.5	14.5	14.0	4.5	4.0	0.5
		17'-6"	10.0	11.0	10.5	1.0	1.0	
		18'-0"	6.5	7.5	7.5			
		18'-6"	3.5	4.5	4.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						
		6'-0"						39.0
		6'-6"				35.5	33.0	21.0
		7'-0"	22.0	27.5	30.0	22.0	19.5	8.0
2x6	2.1	9'-0"						13.5
		9'-6"				12.5	11.5	7.5
		10'-0"	12.0			6.0	5.5	
		10'-6"	6.0	8.5	9.0			
2x8	2.5	11'-6"						11.0
		12'-0"				11.0	10.0	6.0
		12'-6"				6.0	5.5	
		13'-0"	8.0	10.0	10.5			
2x10	2.9	14'-6"					12.0	7.5
		15'-0"				8.5	7.5	
		15'-6"						
		16'-0"	8.0	9.5	10.0			
2x12	3.4	17'-0"				12.5	11.0	7.0
		17'-6"				8.5	7.5	
		18'-0"				5.0		
		18'-6"	9.5	11.0	11.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-16-50-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	31.0	33.5	33.5	22.0	19.5	7.5
		6'-0"	18.0	20.5	20.5	9.5	5.0	
		6'-6"	8.5	10.0	10.5			
		7'-0"	0.5	2.5	2.5			
2x6	1.3	9'-0"	17.5	19.0	19.0	8.0	6.5	1.0
		9'-6"	10.5	12.0	12.5	1.5	0.5	
		10'-0"	5.0	6.5	6.5			
		10'-6"		1.5	1.5			
2x8	1.7	11'-6"	17.0	18.5	18.5	7.5	6.0	1.0
		12'-0"	12.0	13.5	13.5	2.5	1.0	
		12'-6"	7.0	8.5	8.5			
		13'-0"	3.0	4.5	4.5			
2x10	2.1	14'-6"	14.0	15.5	15.0	4.0	2.5	
		15'-0"	10.0	11.0	11.0			
		15'-6"	6.5	7.5	7.5			
		16'-0"	3.0	4.0	4.0			
2x12	2.6	17'-0"	13.5	14.5	14.5	3.0	1.5	
		17'-6"	10.0	11.0	11.0			
		18'-0"	7.0	8.0	7.5			
		18'-6"	4.0	5.0	5.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						
		6'-0"					47.0	35.5
		6'-6"				34.0	31.0	18.0
		7'-0"	22.5	28.0	30.0	20.5	17.5	5.0
2x6	2.1	9'-0"						10.5
		9'-6"				11.5	9.5	
		10'-0"	12.5					
		10'-6"	6.5	8.5	9.5			
2x8	2.5	11'-6"						7.5
		12'-0"				9.5	8.0	
		12'-6"						
		13'-0"	8.5	10.0	10.5			
2x10	2.9	14'-6"				11.5	9.5	
		15'-0"				7.0	5.5	
		15'-6"						
		16'-0"	8.5	10.0	10.0			
2x12	3.4	17'-0"				11.0	9.0	
		17'-6"				7.0	5.5	
		18'-0"						
		18'-6"	10.0	11.5	11.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-16-60-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	29.0	31.5	32.0	25.0	24.5	16.0
		6'-0"	16.0	18.5	19.0	12.5	10.0	3.5
		6'-6"	6.0	8.0	9.0	0.5		
		7'-0"		0.5	0.5			
2x6	1.3	9'-0"	15.0	17.0	17.5	10.5	11.5	9.0
		9'-6"	8.5	10.0	10.5	4.5	5.5	2.0
		10'-0"	2.5	4.5	5.0		0.5	
		10'-6"						
2x8	1.7	11'-6"	15.0	16.5	17.0	10.0	11.0	9.0
		12'-0"	9.5	11.0	11.5	5.0	6.0	5.0
		12'-6"	5.0	6.5	7.0	0.5	2.0	1.5
		13'-0"	0.5	2.5	2.5			
2x10	2.1	14'-6"	12.0	13.5	13.5	6.5	7.5	6.0
		15'-0"	7.5	9.0	9.5	3.0	4.0	3.0
		15'-6"	4.0	5.5	5.5		1.0	
		16'-0"	0.5	2.0	2.5			
2x12	2.6	17'-0"	11.5	12.5	12.5	5.5	6.5	5.5
		17'-6"	8.0	9.0	9.0	2.5	3.5	3.0
		18'-0"	4.5	6.0	6.0		1.0	0.5
		18'-6"	2.0	3.0	3.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						
		6'-0"						43.5
		6'-6"				36.5	36.0	26.0
		7'-0"	20.0	26.0	28.5	23.0	22.5	13.0
2x6	2.1	9'-0"						
		9'-6"				14.0		12.0
		10'-0"	10.0	12.5	13.5	7.5	8.5	6.5
		10'-6"		6.5	7.5			
2x8	2.5	11'-6"						
		12'-0"				12.5		10.5
		12'-6"	11.0			7.0	8.0	6.5
		13'-0"	6.0	8.0	9.0			
2x10	2.9	14'-6"						
		15'-0"				10.0	10.5	8.5
		15'-6"	10.0			5.5	6.5	5.5
		16'-0"	6.0	8.0	8.5			
2x12	3.4	17'-0"						
		17'-6"				9.5	10.5	8.5
		18'-0"	11.0			6.0	7.0	5.5
		18'-6"	7.5	9.5	9.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-16-60-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	25.5	28.0	28.5	19.0	18.5	8.5
		6'-0"	12.5	15.0	15.5	6.5	3.5	
		6'-6"	2.5	5.0	5.5			
		7'-0"						
2x6	1.3	9'-0"	12.0	13.5	14.0	5.0	5.0	2.0
		9'-6"	5.0	7.0	7.5			
		10'-0"		1.0	1.5			
		10'-6"						
2x8	1.7	11'-6"	11.5	13.5	13.5	4.5	4.5	2.0
		12'-0"	6.5	8.0	8.0			
		12'-6"	1.5	3.0	3.5			
		13'-0"						
2x10	2.1	14'-6"	8.5	10.0	10.0	1.0	1.5	
		15'-0"	4.5	6.0	6.0			
		15'-6"	1.0	2.0	2.5			
		16'-0"						
2x12	2.6	17'-0"	8.0	9.5	9.0		0.5	
		17'-6"	4.5	6.0	6.0			
		18'-0"	1.5	2.5	2.5			
		18'-6"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						
		6'-0"					45.5	36.5
		6'-6"	30.0	36.0		31.0	29.5	19.0
		7'-0"	17.0	22.5	25.0	17.5	16.0	6.0
2x6	2.1	9'-0"				16.0	15.5	11.5
		9'-6"	13.5			8.0	8.0	5.0
		10'-0"	7.0	9.5	10.0			
		10'-6"						
2x8	2.5	11'-6"				12.5	12.0	8.5
		12'-0"				6.5	6.5	
		12'-6"	7.5	9.5	10.5			
		13'-0"		5.0	5.5			
2x10	2.9	14'-6"				8.5	8.5	5.0
		15'-0"	11.0					
		15'-6"	6.5	8.5	9.0			
		16'-0"			5.0			
2x12	3.4	17'-0"				7.5	7.5	
		17'-6"	11.5					
		18'-0"	8.0	9.5	9.5			
		18'-6"		6.0	6.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-16-60-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	26.5	29.0	29.5	18.0	16.5	5.5
		6'-0"	13.5	16.0	16.5	5.5	2.0	
		6'-6"	3.5	6.0	6.5			
		7'-0"						
2x6	1.3	9'-0"	13.0	14.5	14.5	4.0	3.0	
		9'-6"	6.0	7.5	8.0			
		10'-0"	0.5	2.0	2.0			
		10'-6"						
2x8	1.7	11'-6"	12.5	14.0	14.0	3.5	2.5	
		12'-0"	7.5	9.0	9.0			
		12'-6"	2.5	4.0	4.0			
		13'-0"						
2x10	2.1	14'-6"	9.5	11.0	11.0			
		15'-0"	5.5	6.5	6.5			
		15'-6"	2.0	3.0	3.0			
		16'-0"						
2x12	2.6	17'-0"	9.0	10.0	10.0			
		17'-6"	5.5	6.5	6.5			
		18'-0"	2.5	3.5	3.5			
		18'-6"		0.5	0.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						
		6'-0"					43.5	33.5
		6'-6"	31.0			30.0	27.5	15.5
		7'-0"	18.0	23.5	25.5	16.5	14.5	
2x6	2.1	9'-0"				15.0	13.5	8.0
		9'-6"				7.0	6.5	
		10'-0"	8.0	10.0	11.0			
		10'-6"			5.0			
2x8	2.5	11'-6"				11.5	10.0	5.5
		12'-0"				5.5	5.0	
		12'-6"	8.5	10.5	11.0			
		13'-0"		6.0	6.0			
2x10	2.9	14'-6"				7.5	6.5	
		15'-0"						
		15'-6"	7.5	9.5	9.5			
		16'-0"		5.5	6.0			
2x12	3.4	17'-0"				6.5	5.5	
		17'-6"						
		18'-0"	9.0	10.5	10.5			
		18'-6"	5.5	7.0	7.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-19.2-50-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	5'-0"	36.0	38.5	38.5	31.0	29.5	24.0
		5'-6"	22.0	24.0	24.5	17.5	17.0	9.5
		6'-0"	11.0	13.0	13.5	7.0	5.0	
		6'-6"	2.5	4.5	5.0			
2x6	1.0	8'-0"	25.0	26.5	27.0	19.5	19.0	15.5
		8'-6"	17.0	18.5	19.0	12.0	12.0	9.5
		9'-0"	10.5	12.0	12.0	5.5	6.0	4.0
		9'-6"	4.5	6.0	6.5		1.0	
2x8	1.4	10'-6"	21.0	22.5	22.5	15.5	15.0	12.0
		11'-0"	15.5	16.5	17.0	10.0	10.0	7.5
		11'-6"	10.0	11.5	12.0	5.0	5.5	3.5
		12'-0"	5.5	7.0	7.5	1.0	1.5	0.5
2x10	1.8	13'-0"	20.5	21.5	21.5	14.0	14.0	11.0
		13'-6"	15.5	17.0	17.0	9.5	10.0	7.5
		14'-0"	11.5	12.5	12.5	6.0	6.0	4.0
		14'-6"	7.5	9.0	9.0	2.0	3.0	1.5
2x12	2.1	15'-6"	17.5	18.5	18.5	11.0	11.0	8.5
		16'-0"	14.0	15.0	15.0	7.5	8.0	6.0
		16'-6"	10.5	11.5	11.5	4.5	5.0	3.0
		17'-0"	7.0	8.0	8.0	1.5	2.0	0.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"						
		6'-0"					39.5	32.5
		6'-6"	25.5	30.5	33.0	27.0	26.5	18.0
2x6	1.7	8'-0"						
		8'-6"						
		9'-0"						11.5
		9'-6"	12.0			8.5	8.5	6.0
2x8	2.0	10'-6"						
		11'-0"						
		11'-6"				12.0		9.0
		12'-0"				7.0	7.5	5.0
2x10	2.4	13'-0"						
		13'-6"						
		14'-0"						9.5
		14'-6"				8.5	8.5	6.5
2x12	2.8	15'-6"						
		16'-0"						
		16'-6"				11.5	11.0	8.5
		17'-0"				8.0	8.0	6.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-19.2-50-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	5'-0"	33.0	35.0	35.5	25.0	23.5	17.0
		5'-6"	18.5	20.5	21.0	11.5	11.0	2.5
		6'-0"	8.0	9.5	10.0	1.5		
		6'-6"		1.5	2.0			
2x6	1.0	8'-0"	21.5	23.5	23.5	13.5	12.5	8.5
		8'-6"	14.0	15.5	15.5	6.0	5.5	2.5
		9'-0"	7.0	8.5	9.0			
		9'-6"	1.5	3.0	3.0			
2x8	1.4	10'-6"	18.0	19.5	19.5	9.5	9.0	5.0
		11'-0"	12.0	13.5	13.5	4.0	3.5	0.5
		11'-6"	7.0	8.5	8.5			
		12'-0"	2.5	4.0	4.0			
2x10	1.8	13'-0"	17.0	18.0	18.0	8.5	7.5	4.0
		13'-6"	12.5	13.5	13.5	4.0	3.5	0.5
		14'-0"	8.0	9.0	9.0			
		14'-6"	4.5	5.5	5.5			
2x12	2.1	15'-6"	14.5	15.5	15.0	5.5	5.0	1.5
		16'-0"	10.5	11.5	11.5	2.0	1.5	
		16'-6"	7.0	8.0	8.0			
		17'-0"	4.0	5.0	5.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"						41.0
		6'-0"				35.5	33.5	25.5
		6'-6"	22.0	27.0	29.5	21.5	20.0	10.5
2x6	1.7	8'-0"						
		8'-6"						10.5
		9'-0"				9.0	8.5	
		9'-6"	8.5	11.0	11.5			
2x8	2.0	10'-6"						12.0
		11'-0"				11.5	11.0	6.5
		11'-6"				6.0	5.5	
		12'-0"	8.0	10.0	10.0			
2x10	2.4	13'-0"						10.5
		13'-6"				11.5	10.5	6.5
		14'-0"				7.0	6.0	
		14'-6"	10.0					
2x12	2.8	15'-6"					12.5	8.0
		16'-0"				9.5	8.5	
		16'-6"				5.5	5.0	
		17'-0"	10.0	11.5	11.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-19.2-50-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	5'-0"	33.0	35.5	35.5	24.0	21.0	13.5
		5'-6"	19.0	21.0	21.0	10.0	8.5	
		6'-0"	8.0	10.0	10.5			
		6'-6"		1.5	2.0			
2x6	1.0	8'-0"	22.0	24.0	23.5	12.5	10.5	5.0
		8'-6"	14.0	15.5	15.5	4.5	3.5	
		9'-0"	7.5	9.0	9.0			
		9'-6"	2.0	3.5	3.5			
2x8	1.4	10'-6"	18.5	19.5	19.5	8.0	6.5	1.5
		11'-0"	12.5	14.0	13.5	2.5	1.5	
		11'-6"	7.5	8.5	8.5			
		12'-0"	3.0	4.0	4.0			
2x10	1.8	13'-0"	17.5	18.5	18.5	7.0	5.5	0.5
		13'-6"	13.0	14.0	13.5	2.5	1.5	
		14'-0"	8.5	9.5	9.5			
		14'-6"	5.0	6.0	5.5			
2x12	2.1	15'-6"	15.0	15.5	15.5	4.0	2.5	
		16'-0"	11.0	12.0	11.5	0.5		
		16'-6"	7.5	8.5	8.0			
		17'-0"	4.5	5.0	5.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"						37.5
		6'-0"				34.0	31.0	22.0
		6'-6"	22.5	27.5	29.5	20.0	18.0	7.5
2x6	1.7	8'-0"						15.0
		8'-6"				15.5	13.5	7.5
		9'-0"				7.5	6.0	
		9'-6"	9.0	11.0	11.5			
2x8	2.0	10'-6"						8.5
		11'-0"				10.5	8.5	
		11'-6"						
		12'-0"	8.5	10.0	10.5			
2x10	2.4	13'-0"						7.0
		13'-6"				10.0	8.0	
		14'-0"				5.5		
		14'-6"	10.5					
2x12	2.8	15'-6"				12.0	10.0	
		16'-0"				8.0	6.5	
		16'-6"						
		17'-0"	10.5	12.0	11.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-19.2-60-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	5'-0"	31.0	33.5	34.0	26.5	26.0	22.0
		5'-6"	16.5	19.0	19.5	13.0	13.5	7.0
		6'-0"	6.0	8.0	8.5	2.5	1.5	
		6'-6"			0.5			
2x6	1.0	8'-0"	20.0	21.5	22.0	15.0	15.5	13.0
		8'-6"	12.0	13.5	14.0	7.5	8.5	7.0
		9'-0"	5.0	7.0	7.5	1.0	2.5	1.5
		9'-6"		1.0	1.5			
2x8	1.4	10'-6"	16.0	17.5	18.0	11.0	11.5	10.0
		11'-0"	10.0	11.5	12.0	5.5	6.5	5.5
		11'-6"	5.0	6.5	7.0	0.5	2.0	1.5
		12'-0"	0.5	2.0	2.5			
2x10	1.8	13'-0"	15.0	16.5	16.5	9.5	10.5	9.0
		13'-6"	10.5	12.0	12.0	5.0	6.0	5.0
		14'-0"	6.5	7.5	8.0	1.0	2.5	2.0
		14'-6"	2.5	4.0	4.0			
2x12	2.1	15'-6"	12.5	13.5	13.5	6.5	7.5	6.5
		16'-0"	9.0	10.0	10.0	3.0	4.5	3.5
		16'-6"	5.5	6.5	6.5		1.5	1.0
		17'-0"	2.0	3.0	3.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"						
		6'-0"				37.0	36.0	30.0
		6'-6"	20.0	25.5	28.0	22.5	23.0	15.5
2x6	1.7	8'-0"						
		8'-6"						
		9'-0"	13.5			10.5	11.0	9.0
		9'-6"	7.0	9.0	10.0		5.0	
2x8	2.0	10'-6"						
		11'-0"						
		11'-6"	11.5			7.5	8.5	7.0
		12'-0"	6.0	8.0	9.0			
2x10	2.4	13'-0"						
		13'-6"				12.5		11.0
		14'-0"				8.0	9.0	7.5
		14'-6"	8.5	10.0	10.5		5.0	
2x12	2.8	15'-6"						
		16'-0"				10.5	11.0	9.5
		16'-6"				7.0	7.5	6.5
		17'-0"	8.5	10.0	10.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-19.2-60-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	5'-0"	27.5	30.0	30.5	20.5	20.0	14.5
		5'-6"	13.5	15.5	16.0	7.0	7.0	
		6'-0"	2.5	4.5	5.5			
		6'-6"						
2x6	1.0	8'-0"	16.5	18.5	18.5	9.0	9.0	6.0
		8'-6"	8.5	10.5	10.5	1.5	2.0	
		9'-0"	2.0	3.5	4.0			
		9'-6"						
2x8	1.4	10'-6"	13.0	14.5	14.5	5.0	5.5	3.0
		11'-0"	7.0	8.5	8.5			
		11'-6"	2.0	3.5	3.5			
		12'-0"						
2x10	1.8	13'-0"	12.0	13.0	13.0	4.0	4.0	1.5
		13'-6"	7.0	8.5	8.5			
		14'-0"	3.0	4.5	4.5			
		14'-6"		0.5	0.5			
2x12	2.1	15'-6"	9.5	10.5	10.5	1.0	1.5	
		16'-0"	5.5	6.5	6.5			
		16'-6"	2.0	3.0	3.0			
		17'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"						38.5
		6'-0"	31.0	36.5		31.0	30.0	23.0
		6'-6"	17.0	22.5	24.5	17.0	16.5	8.5
2x6	1.7	8'-0"						
		8'-6"				12.0	12.0	8.5
		9'-0"	10.0	12.5	13.5		5.0	
		9'-6"		6.0	6.5			
2x8	2.0	10'-6"				13.5		9.5
		11'-0"				7.0	7.5	
		11'-6"	8.0	10.0	10.5			
		12'-0"		5.0	5.5			
2x10	2.4	13'-0"				12.0	12.0	8.5
		13'-6"				7.0	7.0	
		14'-0"	9.5	11.0	11.5			
		14'-6"	5.0	7.0	7.0			
2x12	2.8	15'-6"				9.0	9.0	5.5
		16'-0"				5.0	5.0	
		16'-6"	8.5	10.0	10.5			
		17'-0"	5.0	6.5	6.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-19.2-60-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	5'-0"	28.5	31.0	31.0	19.5	18.0	11.5
		5'-6"	14.5	16.5	17.0	6.0	5.5	
		6'-0"	3.5	5.5	6.0			
		6'-6"						
2x6	1.0	8'-0"	17.5	19.5	19.5	8.0	7.5	3.0
		8'-6"	9.5	11.0	11.5	0.5		
		9'-0"	3.0	4.5	4.5			
		9'-6"						
2x8	1.4	10'-6"	14.0	15.0	15.0	4.0	3.5	
		11'-0"	8.0	9.5	9.5			
		11'-6"	3.0	4.0	4.0			
		12'-0"						
2x10	1.8	13'-0"	13.0	14.0	14.0	3.0	2.0	
		13'-6"	8.0	9.5	9.5			
		14'-0"	4.0	5.0	5.0			
		14'-6"		1.5	1.5			
2x12	2.1	15'-6"	10.5	11.5	11.0			
		16'-0"	6.5	7.5	7.0			
		16'-6"	3.0	4.0	4.0			
		17'-0"		1.0	0.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"						35.5
		6'-0"	31.5			30.0	28.0	20.0
		6'-6"	18.0	23.0	25.5	16.0	14.5	5.0
2x6	1.7	8'-0"						13.0
		8'-6"				11.0	10.0	5.5
		9'-0"	11.0	13.5	14.0			
		9'-6"		6.5	7.0			
2x8	2.0	10'-6"				12.5	11.5	6.5
		11'-0"				6.0	5.5	
		11'-6"	9.0	11.0	11.0			
		12'-0"		5.5	6.0			
2x10	2.4	13'-0"				11.0	10.0	5.0
		13'-6"				6.0	5.0	
		14'-0"	10.5	12.0	12.0			
		14'-6"	6.0	7.5	8.0			
2x12	2.8	15'-6"				8.0	7.0	
		16'-0"						
		16'-6"	9.5	11.0	11.0			
		17'-0"	6.0	7.5	7.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-24-50-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-6"	36.5	38.5	39.0	31.0	30.0	25.0
		5'-0"	21.0	23.0	23.5	16.5	16.0	12.5
		5'-6"	9.5	11.5	12.0	5.5	6.0	0.5
		6'-0"	1.0	2.5	3.0			
2x6	0.8	7'-0"	29.5	31.0	31.0	23.5	22.5	19.0
		7'-6"	20.0	21.5	21.5	14.5	14.5	11.5
		8'-0"	12.0	13.5	14.0	7.0	7.5	5.5
		8'-6"	6.0	7.0	7.5	1.0	2.0	0.5
2x8	1.1	9'-6"	21.0	22.0	22.0	15.0	14.5	12.0
		10'-0"	14.5	16.0	16.0	9.0	9.0	7.0
		10'-6"	9.0	10.5	10.5	4.0	4.5	3.0
		11'-0"	4.5	5.5	6.0			
2x10	1.4	11'-6"	23.0	24.0	24.0	16.5	16.0	13.0
		12'-0"	17.5	18.5	18.5	11.5	11.5	9.0
		12'-6"	12.5	14.0	14.0	7.0	7.0	5.0
		13'-0"	8.5	9.5	9.5	3.0	3.5	2.0
2x12	1.7	13'-6"	22.0	23.0	23.0	15.5	15.0	12.0
		14'-0"	17.5	18.5	18.5	11.0	11.0	8.5
		14'-6"	13.5	14.5	14.0	7.0	7.5	5.5
		15'-0"	9.5	10.5	10.5	3.5	4.0	2.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-6"						
		5'-0"						
		5'-6"						31.5
		6'-0"	23.5	28.5	30.5	24.5	24.0	19.0
2x6	1.4	7'-0"						
		7'-6"						
		8'-0"						
		8'-6"				9.5	9.5	7.5
2x8	1.6	9'-6"						
		10'-0"						
		10'-6"				10.5	10.5	8.0
		11'-0"	10.0			5.5	6.0	
2x10	1.9	11'-6"						
		12'-0"						
		12'-6"						11.0
		13'-0"				9.5	9.5	7.0
2x12	2.2	13'-6"						
		14'-0"						
		14'-6"						
		15'-0"				10.5	10.5	8.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-24-50-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-6"	33.0	35.5	35.5	25.5	23.5	18.0
		5'-0"	18.0	19.5	20.0	10.5	10.0	5.5
		5'-6"	6.5	8.0	8.5			
		6'-0"						
2x6	0.8	7'-0"	26.0	27.5	27.5	17.5	16.5	12.0
		7'-6"	16.5	18.0	18.0	8.5	8.0	4.5
		8'-0"	9.0	10.5	10.5	1.5	1.0	
		8'-6"	2.5	4.0	4.0			
2x8	1.1	9'-6"	17.5	19.0	19.0	9.0	8.5	5.0
		10'-0"	11.5	12.5	12.5	3.0	3.0	
		10'-6"	6.0	7.0	7.0			
		11'-0"	1.0	2.5	2.5			
2x10	1.4	11'-6"	19.5	20.5	20.5	10.5	10.0	6.0
		12'-0"	14.0	15.5	15.0	5.5	5.0	2.0
		12'-6"	9.5	10.5	10.5	1.0	1.0	
		13'-0"	5.0	6.0	6.0			
2x12	1.7	13'-6"	19.0	20.0	19.5	9.5	8.5	5.0
		14'-0"	14.5	15.0	15.0	5.0	4.5	1.5
		14'-6"	10.0	11.0	11.0	1.5	1.0	
		15'-0"	6.5	7.5	7.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-6"						
		5'-0"						
		5'-6"				34.0	31.5	24.5
		6'-0"	20.0	25.0	27.0	19.0	18.0	12.0
2x6	1.4	7'-0"						
		7'-6"						13.5
		8'-0"				11.0	10.5	6.5
		8'-6"	10.0	12.0	12.5			
2x8	1.6	9'-6"						11.5
		10'-0"				11.0	10.0	6.0
		10'-6"				5.0		
		11'-0"	7.0	8.5	8.5			
2x10	1.9	11'-6"						
		12'-0"					12.5	8.0
		12'-6"				8.5	7.5	
		13'-0"	11.5					
2x12	2.2	13'-6"						12.5
		14'-0"				13.5	12.5	8.0
		14'-6"				9.0	8.0	
		15'-0"				5.0		

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-24-50-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-6"	33.5	35.5	35.5	24.0	21.5	14.5
		5'-0"	18.0	20.0	20.0	9.0	7.5	2.0
		5'-6"	7.0	8.5	8.5			
		6'-0"						
2x6	0.8	7'-0"	26.5	28.0	28.0	16.0	14.0	8.5
		7'-6"	17.0	18.5	18.5	7.0	6.0	1.0
		8'-0"	9.5	10.5	10.5			
		8'-6"	3.0	4.0	4.5			
2x8	1.1	9'-6"	18.0	19.0	19.0	7.5	6.0	1.5
		10'-0"	12.0	13.0	12.5	1.5	0.5	
		10'-6"	6.5	7.5	7.5			
		11'-0"	1.5	2.5	2.5			
2x10	1.4	11'-6"	20.0	21.0	20.5	9.0	7.5	2.5
		12'-0"	14.5	15.5	15.5	4.0	3.0	
		12'-6"	10.0	11.0	10.5			
		13'-0"	5.5	6.5	6.5			
2x12	1.7	13'-6"	19.5	20.0	19.5	8.0	6.5	1.5
		14'-0"	15.0	15.5	15.0	4.0	2.5	
		14'-6"	10.5	11.5	11.0			
		15'-0"	7.0	7.5	7.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-6"						
		5'-0"						37.0
		5'-6"				32.5	29.5	21.0
		6'-0"	20.5	25.5	27.0	17.5	15.5	8.5
2x6	1.4	7'-0"						
		7'-6"						10.5
		8'-0"				9.5	8.0	
		8'-6"	10.5	12.5	13.0			
2x8	1.6	9'-6"						8.5
		10'-0"				9.5	7.5	
		10'-6"						
		11'-0"	7.5	9.0	9.0			
2x10	1.9	11'-6"						9.5
		12'-0"				12.0	10.0	5.0
		12'-6"				7.0	5.5	
		13'-0"						
2x12	2.2	13'-6"						9.0
		14'-0"				12.0	10.0	5.0
		14'-6"				7.5	6.0	
		15'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-24-60-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-6"	31.5	33.5	34.0	26.5	26.5	23.0
		5'-0"	16.0	18.0	18.5	12.0	12.5	10.0
		5'-6"	4.5	6.5	7.0	1.0	2.5	
		6'-0"						
2x6	0.8	7'-0"	24.5	26.0	26.0	19.0	19.0	16.5
		7'-6"	15.0	16.5	17.0	10.0	10.5	9.0
		8'-0"	7.0	8.5	9.0	2.5	4.0	3.0
		8'-6"	0.5	2.0	2.5			
2x8	1.1	9'-6"	15.5	17.0	17.5	10.5	11.0	9.5
		10'-0"	9.5	11.0	11.0	4.5	5.5	4.5
		10'-6"	4.0	5.5	5.5		1.0	0.5
		11'-0"		0.5	1.0			
2x10	1.4	11'-6"	17.5	19.0	19.0	12.0	12.5	11.0
		12'-0"	12.5	13.5	13.5	7.0	7.5	6.5
		12'-6"	7.5	9.0	9.0	2.5	3.5	3.0
		13'-0"	3.5	4.5	4.5			
2x12	1.7	13'-6"	17.0	18.0	18.0	11.0	11.5	10.0
		14'-0"	12.5	13.5	13.5	6.5	7.5	6.5
		14'-6"	8.5	9.5	9.5	2.5	4.0	3.0
		15'-0"	4.5	5.5	5.5		0.5	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-6"						
		5'-0"						
		5'-6"	32.5			35.0	34.5	29.0
		6'-0"	18.5	23.5	25.5	20.0	20.5	16.5
2x6	1.4	7'-0"						
		7'-6"						
		8'-0"				12.5	13.0	11.0
		8'-6"	8.5	10.5	11.5	5.0	6.0	5.0
2x8	1.6	9'-6"						
		10'-0"				12.0		11.0
		10'-6"	10.5			6.0	7.0	6.0
		11'-0"	5.0	7.0	7.5			
2x10	1.9	11'-6"						
		12'-0"						
		12'-6"				9.5	10.5	8.5
		13'-0"	9.5	11.0	11.5	5.0	6.0	5.0
2x12	2.2	13'-6"						
		14'-0"						
		14'-6"				10.0	11.0	9.0
		15'-0"	11.5			6.0	7.0	6.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-24-60-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-6"	28.0	30.5	30.5	21.0	20.0	15.5
		5'-0"	12.5	14.5	15.0	6.0	6.5	3.0
		5'-6"	1.5	3.0	3.5			
		6'-0"						
2x6	0.8	7'-0"	21.0	23.0	23.0	13.0	13.0	9.5
		7'-6"	11.5	13.0	13.5	4.0	4.5	2.0
		8'-0"	4.0	5.5	5.5			
		8'-6"						
2x8	1.1	9'-6"	12.5	14.0	14.0	4.5	5.0	2.5
		10'-0"	6.0	7.5	7.5			
		10'-6"	1.0	2.0	2.5			
		11'-0"						
2x10	1.4	11'-6"	14.5	15.5	15.5	6.0	6.0	3.5
		12'-0"	9.0	10.5	10.5	1.0	1.5	
		12'-6"	4.5	5.5	5.5			
		13'-0"		1.0	1.5			
2x12	1.7	13'-6"	14.0	15.0	14.5	5.0	5.0	3.0
		14'-0"	9.5	10.0	10.0	0.5	1.0	
		14'-6"	5.0	6.0	6.0			
		15'-0"	1.5	2.5	2.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-6"						
		5'-0"						38.0
		5'-6"	29.5	35.0	37.5	29.0	28.0	22.0
		6'-0"	15.0	20.0	22.0	14.5	14.0	9.5
2x6	1.4	7'-0"						
		7'-6"				15.5	15.0	11.5
		8'-0"	13.0			6.5	7.0	
		8'-6"	5.0	7.5	8.0			
2x8	1.6	9'-6"				13.0	13.0	9.5
		10'-0"				6.5	6.5	
		10'-6"	7.0	9.0	9.5			
		11'-0"						
2x10	1.9	11'-6"						10.5
		12'-0"				9.0	9.0	6.0
		12'-6"	11.0					
		13'-0"	6.5	8.0	8.0			
2x12	2.2	13'-6"				14.0	13.5	10.0
		14'-0"				9.0	9.0	6.0
		14'-6"	12.5					
		15'-0"	8.0	9.5	9.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-1-24-60-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.1
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-6"	29.0	31.0	31.5	20.0	18.0	12.5
		5'-0"	13.5	15.5	16.0	5.0	4.5	
		5'-6"	2.5	4.0	4.5			
		6'-0"						
2x6	0.8	7'-0"	22.0	23.5	23.5	12.0	11.0	6.5
		7'-6"	12.5	14.0	14.0	3.0	2.5	
		8'-0"	5.0	6.0	6.5			
		8'-6"						
2x8	1.1	9'-6"	13.5	14.5	14.5	3.5	3.0	
		10'-0"	7.0	8.5	8.5			
		10'-6"	2.0	3.0	3.0			
		11'-0"						
2x10	1.4	11'-6"	15.5	16.5	16.5	5.0	4.5	0.5
		12'-0"	10.0	11.0	11.0			
		12'-6"	5.5	6.5	6.0			
		13'-0"	1.0	2.0	2.0			
2x12	1.7	13'-6"	15.0	15.5	15.5	4.0	3.5	
		14'-0"	10.0	11.0	11.0			
		14'-6"	6.0	7.0	6.5			
		15'-0"	2.5	3.0	3.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-6"						
		5'-0"				48.0	44.5	35.0
		5'-6"	30.5	36.0	38.0	28.0	26.0	19.0
		6'-0"	16.0	21.0	23.0	13.5	12.5	6.5
2x6	1.4	7'-0"						
		7'-6"				14.5	13.5	8.0
		8'-0"	13.5			5.5	5.0	
		8'-6"	6.0	8.0	8.5			
2x8	1.6	9'-6"				12.0	11.0	6.0
		10'-0"				5.5		
		10'-6"	8.0	9.5	10.0			
		11'-0"						
2x10	1.9	11'-6"				14.0	12.5	7.5
		12'-0"				8.0	7.0	
		12'-6"						
		13'-0"	7.0	8.5	9.0			
2x12	2.2	13'-6"				13.0	11.5	7.0
		14'-0"				8.0	7.0	
		14'-6"						
		15'-0"	9.0	10.5	10.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-12-50-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	6'-0"	30.5	33.0	33.5	26.5	21.5	12.0
		6'-6"	19.0	21.5	22.0	12.5	8.5	2.0
		7'-0"	10.0	12.0	12.0	1.5		
		7'-6"	2.5	4.5	2.5			
2x6	1.7	10'-0"	15.0	17.0	17.0	10.5	10.5	3.5
		10'-6"	9.0	11.0	11.5	5.0	4.0	
		11'-0"	4.0	6.0	6.5	0.5		
		11'-6"		1.5	2.0			
2x8	2.2	12'-6"	17.5	19.0	19.5	12.5	12.0	9.5
		13'-0"	12.5	14.5	14.5	8.0	8.0	5.0
		13'-6"	8.5	10.0	10.5	4.0	4.0	0.5
		14'-0"	4.5	6.0	6.5		1.0	
2x10	2.8	16'-0"	12.5	14.0	14.0	7.5	7.5	5.0
		16'-6"	9.0	10.5	10.5	4.0	4.5	2.5
		17'-0"	6.0	7.0	7.5	1.0	1.5	
		17'-6"	3.0	4.5	4.5			
2x12	3.4	18'-6"	14.0	15.0	15.0	8.0	8.0	5.5
		19'-0"	10.5	12.0	12.0	5.0	5.0	3.0
		19'-6"	7.5	9.0	9.0	2.0	2.5	1.0
		20'-0"	5.0	6.0	6.5		0.5	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-0"						
		6'-6"						37.5
		7'-0"				38.5	35.5	22.5
		7'-6"	23.0	28.5	31.5	26.0	21.5	11.5
2x6	2.7	10'-0"						15.5
		10'-6"				13.5	13.5	10.0
		11'-0"	10.5			8.0	8.0	5.0
		11'-6"	5.5	8.0	9.0			
2x8	3.3	12'-6"						
		13'-0"						11.0
		13'-6"				10.0	10.0	7.0
		14'-0"	9.5			5.5	6.0	
2x10	3.9	16'-0"						10.5
		16'-6"				10.0	10.0	7.5
		17'-0"				6.5	7.0	
		17'-6"	7.5	9.5	10.0			
2x12	4.5	18'-6"						
		19'-0"				11.5	11.5	8.5
		19'-6"				8.5	8.5	6.0
		20'-0"	10.5			5.5	5.5	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-12-50-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	6'-0"	27.0	29.5	30.0	20.5	15.0	5.0
		6'-6"	15.5	18.0	18.5	6.5	2.0	
		7'-0"	6.5	8.5	8.5			
		7'-6"		1.0				
2x6	1.7	10'-0"	11.5	13.5	14.0	4.5	4.0	
		10'-6"	6.0	7.5	8.0			
		11'-0"	1.0	2.5	3.0			
		11'-6"						
2x8	2.2	12'-6"	14.5	16.0	16.0	6.5	6.0	2.5
		13'-0"	9.5	11.0	11.0	2.0	1.5	
		13'-6"	5.0	6.5	7.0			
		14'-0"	1.5	3.0	3.0			
2x10	2.8	16'-0"	9.5	10.5	11.0	1.5	1.0	
		16'-6"	6.0	7.0	7.5			
		17'-0"	2.5	4.0	4.0			
		17'-6"		1.0	1.0			
2x12	3.4	18'-6"	10.5	11.5	11.5	2.0	1.5	
		19'-0"	7.5	8.5	8.5			
		19'-6"	4.5	5.5	5.5			
		20'-0"	2.0	3.0	3.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-0"						51.0
		6'-6"					45.0	30.5
		7'-0"				32.5	29.5	15.5
		7'-6"	20.0	25.5	28.0	20.0	15.0	
2x6	2.7	10'-0"				14.5	13.0	8.5
		10'-6"				8.0	7.0	
		11'-0"	7.5	10.0	10.5			
		11'-6"		5.0	5.5			
2x8	3.3	12'-6"						8.5
		13'-0"				9.0	8.0	
		13'-6"	10.5					
		14'-0"	6.0	8.0	9.0			
2x10	3.9	16'-0"				8.0	7.5	
		16'-6"						
		17'-0"	8.0	9.5	10.0			
		17'-6"		6.0	6.5			
2x12	4.5	18'-6"				9.0	8.5	
		19'-0"				6.0	5.0	
		19'-6"	10.5					
		20'-0"	7.0	9.0	9.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-12-50-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	6'-0"	27.5	30.0	30.5	19.0	13.0	1.5
		6'-6"	16.0	18.5	19.0	5.5		
		7'-0"	7.0	9.0	9.0			
		7'-6"		1.5				
2x6	1.7	10'-0"	12.0	14.0	14.0	3.0	2.0	
		10'-6"	6.5	8.0	8.5			
		11'-0"	1.5	3.0	3.5			
		11'-6"						
2x8	2.2	12'-6"	14.5	16.0	16.5	5.0	3.5	
		13'-0"	10.0	11.5	11.5	0.5		
		13'-6"	5.5	7.0	7.0			
		14'-0"	1.5	3.0	3.5			
2x10	2.8	16'-0"	10.0	11.0	11.0			
		16'-6"	6.5	7.5	7.5			
		17'-0"	3.0	4.5	4.5			
		17'-6"		1.5	1.5			
2x12	3.4	18'-6"	11.0	12.0	12.0	0.5		
		19'-0"	8.0	9.0	8.5			
		19'-6"	5.0	6.0	6.0			
		20'-0"	2.5	3.5	3.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-0"						47.5
		6'-6"					42.5	27.5
		7'-0"				31.0	27.0	12.5
		7'-6"	20.5	25.5	28.0	18.5	13.0	
2x6	2.7	10'-0"				13.0	11.0	5.0
		10'-6"				6.5	5.0	
		11'-0"	8.0	10.5	11.0			
		11'-6"		5.0	6.0			
2x8	3.3	12'-6"				12.5	10.5	5.0
		13'-0"				7.5	6.0	
		13'-6"						
		14'-0"	6.5	8.5	9.0			
2x10	3.9	16'-0"				6.5	5.0	
		16'-6"						
		17'-0"	8.0	10.0	10.0			
		17'-6"	5.0	6.5	7.0			
2x12	4.5	18'-6"				8.0	6.0	
		19'-0"						
		19'-6"	11.0					
		20'-0"	7.5	9.0	9.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-12-60-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	6'-0"	25.5	28.0	29.0	22.0	18.0	9.5
		6'-6"	14.0	16.5	17.0	8.0	5.0	
		7'-0"	4.5	7.0	7.0			
		7'-6"						
2x6	1.7	10'-0"	10.0	12.0	12.5	6.0	7.0	1.5
		10'-6"	4.0	6.0	6.5	0.5	0.5	
		11'-0"		1.0	1.5			
		11'-6"						
2x8	2.2	12'-6"	12.5	14.0	14.5	8.0	8.5	7.0
		13'-0"	7.5	9.5	10.0	3.5	4.5	2.5
		13'-6"	3.5	5.0	5.5		0.5	
		14'-0"		1.0	1.5			
2x10	2.8	16'-0"	7.5	9.0	9.5	2.5	4.0	3.0
		16'-6"	4.0	5.5	6.0		1.0	
		17'-0"	0.5	2.0	2.5			
		17'-6"						
2x12	3.4	18'-6"	8.5	10.0	10.0	3.5	4.5	3.5
		19'-0"	5.5	7.0	7.0	0.5	1.5	1.0
		19'-6"	2.5	4.0	4.0			
		20'-0"		1.0	1.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-0"						
		6'-6"					47.5	35.5
		7'-0"	30.0			34.0	32.0	20.5
		7'-6"	18.0	23.5	26.5	21.5	17.5	9.0
2x6	2.7	10'-0"						13.0
		10'-6"	11.5			9.0	10.0	8.0
		11'-0"	5.5	8.5	9.5			
		11'-6"						
2x8	3.3	12'-6"						
		13'-0"				10.0	11.0	8.5
		13'-6"	8.5	11.0		5.5	6.5	5.0
		14'-0"		6.5	7.5			
2x10	3.9	16'-0"				9.5	10.0	8.0
		16'-6"	9.5			5.5	6.5	5.0
		17'-0"	6.0	8.0	8.5			
		17'-6"			5.0			
2x12	4.5	18'-6"				10.5	11.0	9.0
		19'-0"				7.0	8.0	6.0
		19'-6"	8.5	10.0	10.5		5.0	
		20'-0"	5.5	7.0	7.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-12-60-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	6'-0"	22.0	24.5	25.5	16.0	11.5	2.5
		6'-6"	10.5	13.0	13.5	2.0		
		7'-0"	1.5	3.5	4.0			
		7'-6"						
2x6	1.7	10'-0"	6.5	8.5	9.0		0.5	
		10'-6"	1.0	2.5	3.0			
		11'-0"						
		11'-6"						
2x8	2.2	12'-6"	9.0	11.0	11.0	2.0	2.5	
		13'-0"	4.5	6.0	6.5			
		13'-6"		1.5	2.0			
		14'-0"						
2x10	2.8	16'-0"	4.0	5.5	6.0			
		16'-6"	0.5	2.0	2.5			
		17'-0"						
		17'-6"						
2x12	3.4	18'-6"	5.5	6.5	6.5			
		19'-0"	2.5	3.5	3.5			
		19'-6"		0.5	0.5			
		20'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-0"						48.5
		6'-6"				43.5	41.5	28.5
		7'-0"	26.5	33.0	36.0	28.0	26.0	13.5
		7'-6"	15.0	20.5	23.0	15.5	11.5	
2x6	2.7	10'-0"				10.0	9.5	6.0
		10'-6"	8.0	11.0	12.0			
		11'-0"		5.0	6.0			
		11'-6"						
2x8	3.3	12'-6"				9.5	9.5	6.0
		13'-0"	10.5					
		13'-6"	5.5	7.5	8.5			
		14'-0"						
2x10	3.9	16'-0"	10.5					
		16'-6"	6.5	8.5	9.0			
		17'-0"			5.0			
		17'-6"						
2x12	4.5	18'-6"						
		19'-0"	8.5	10.5	10.5			
		19'-6"	5.0	7.0	7.0			
		20'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-12-60-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	6'-0"	23.0	25.5	26.0	15.0	10.0	
		6'-6"	11.5	14.0	14.5	1.0		
		7'-0"	2.5	4.5	4.5			
		7'-6"						
2x6	1.7	10'-0"	7.5	9.5	9.5			
		10'-6"	2.0	3.5	4.0			
		11'-0"						
		11'-6"						
2x8	2.2	12'-6"	10.0	12.0	12.0	1.0	0.5	
		13'-0"	5.5	7.0	7.0			
		13'-6"	1.0	2.5	3.0			
		14'-0"						
2x10	2.8	16'-0"	5.0	6.5	6.5			
		16'-6"	1.5	3.0	3.0			
		17'-0"						
		17'-6"						
2x12	3.4	18'-6"	6.5	7.5	7.5			
		19'-0"	3.5	4.5	4.5			
		19'-6"	0.5	1.5	1.5			
		20'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-0"						45.5
		6'-6"				42.5	39.5	25.0
		7'-0"	27.5	34.0	36.5	27.0	24.0	10.0
		7'-6"	16.0	21.5	23.5	14.5	9.5	
2x6	2.7	10'-0"				9.0	8.0	
		10'-6"	9.0	12.0	12.5			
		11'-0"		6.0	6.5			
		11'-6"						
2x8	3.3	12'-6"				8.5	7.5	
		13'-0"						
		13'-6"	6.5	8.5	9.0			
		14'-0"						
2x10	3.9	16'-0"	11.5					
		16'-6"	7.5	9.0	9.5			
		17'-0"		5.5	6.0			
		17'-6"						
2x12	4.5	18'-6"						
		19'-0"	9.5	11.0	11.0			
		19'-6"	6.0	8.0	8.0			
		20'-0"			5.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-16-50-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	24.5	26.5	27.0	20.0	19.5	11.0
		6'-0"	13.0	15.0	15.5	9.0	6.5	0.5
		6'-6"	4.5	6.5	7.0			
		7'-0"						
2x6	1.3	8'-6"	19.5	21.0	21.0	14.0	14.0	11.0
		9'-0"	12.5	14.0	14.5	7.5	8.0	5.0
		9'-6"	6.5	8.0	8.5	2.0	2.5	
		10'-0"	1.5	3.0	3.5			
2x8	1.7	11'-0"	17.5	19.0	19.0	12.0	12.0	9.5
		11'-6"	12.0	13.5	14.0	7.0	7.0	5.0
		12'-0"	7.5	9.0	9.0	2.5	3.0	1.5
		12'-6"	3.5	4.5	5.0			
2x10	2.1	13'-6"	18.0	19.0	19.0	12.0	11.5	9.0
		14'-0"	13.5	14.5	14.5	7.5	8.0	5.5
		14'-6"	9.5	10.5	10.5	4.0	4.5	2.5
		15'-0"	6.0	7.0	7.0	0.5	1.0	
2x12	2.6	16'-0"	16.0	17.0	17.0	9.5	9.5	7.5
		16'-6"	12.5	13.5	13.5	6.0	6.5	4.5
		17'-0"	9.0	10.0	10.0	3.0	3.5	2.0
		17'-6"	6.0	7.0	7.0	0.5	1.0	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						
		6'-0"						35.0
		6'-6"	27.5			30.0	28.5	19.5
		7'-0"	16.5	21.5	23.5	18.0	17.0	8.5
2x6	2.1	8'-6"						
		9'-0"						13.0
		9'-6"				10.5	10.5	7.5
		10'-0"	8.0	10.0	10.5		5.0	
2x8	2.5	11'-0"						
		11'-6"						10.5
		12'-0"				9.0	9.0	6.5
		12'-6"	8.5	10.5	11.0			
2x10	2.9	13'-6"						
		14'-0"						
		14'-6"				10.5	10.5	7.5
		15'-0"				6.5	6.5	
2x12	3.4	16'-0"						
		16'-6"						10.0
		17'-0"				10.0	9.5	7.0
		17'-6"				6.5	6.5	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-16-50-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	21.0	23.0	23.5	14.0	13.0	4.0
		6'-0"	10.0	12.0	12.5	3.5		
		6'-6"	1.0	3.0	3.5			
		7'-0"						
2x6	1.3	8'-6"	16.0	17.5	18.0	8.5	7.5	4.0
		9'-0"	9.0	10.5	11.0	1.5	1.5	
		9'-6"	3.0	4.5	5.0			
		10'-0"						
2x8	1.7	11'-0"	14.5	15.5	15.5	6.0	5.5	2.0
		11'-6"	9.0	10.5	10.5	1.0	1.0	
		12'-0"	4.0	5.5	5.5			
		12'-6"		1.5	1.5			
2x10	2.1	13'-6"	14.5	15.5	15.5	6.0	5.5	2.0
		14'-0"	10.0	11.5	11.0	2.0	1.5	
		14'-6"	6.0	7.5	7.5			
		15'-0"	2.5	3.5	4.0			
2x12	2.6	16'-0"	12.5	13.5	13.5	4.0	3.5	
		16'-6"	9.0	10.0	10.0	0.5		
		17'-0"	6.0	6.5	6.5			
		17'-6"	2.5	3.5	3.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						44.0
		6'-0"				39.0	36.5	28.0
		6'-6"	24.5	30.0	32.0	24.0	22.5	12.5
		7'-0"	13.0	18.0	20.0	12.5	11.0	
2x6	2.1	8'-6"						12.5
		9'-0"				11.5	10.5	6.0
		9'-6"	10.5	13.0	13.5			
		10'-0"		6.5	7.5			
2x8	2.5	11'-0"						8.5
		11'-6"				8.0	7.5	
		12'-0"	10.0					
		12'-6"	5.0	7.0	7.5			
2x10	2.9	13'-6"						8.0
		14'-0"				9.0	8.0	
		14'-6"						
		15'-0"	8.0	9.5	10.0			
2x12	3.4	16'-0"				11.5	10.5	6.5
		16'-6"				7.5	7.0	
		17'-0"						
		17'-6"	8.5	10.0	10.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-16-50-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	21.5	23.5	24.0	12.5	11.0	0.5
		6'-0"	10.5	12.0	12.5	2.0		
		6'-6"	1.5	3.5	3.5			
		7'-0"						
2x6	1.3	8'-6"	16.5	18.0	18.0	7.0	5.5	0.5
		9'-0"	9.5	11.0	11.0	0.5		
		9'-6"	3.5	5.0	5.0			
		10'-0"						
2x8	1.7	11'-0"	14.5	16.0	16.0	4.5	3.5	
		11'-6"	9.5	10.5	10.5			
		12'-0"	4.5	6.0	6.0			
		12'-6"	0.5	2.0	2.0			
2x10	2.1	13'-6"	15.0	16.0	16.0	4.5	3.0	
		14'-0"	10.5	11.5	11.5	0.5		
		14'-6"	6.5	7.5	7.5			
		15'-0"	3.0	4.0	4.0			
2x12	2.6	16'-0"	13.0	14.0	13.5	2.5	1.0	
		16'-6"	9.5	10.5	10.0			
		17'-0"	6.0	7.0	7.0			
		17'-6"	3.0	4.0	4.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						40.5
		6'-0"				37.5	34.0	24.5
		6'-6"	25.0	30.0	32.5	22.5	20.0	9.0
		7'-0"	13.5	18.5	20.5	11.0	8.5	
2x6	2.1	8'-6"						9.5
		9'-0"				10.0	8.0	
		9'-6"	11.0	13.0	13.5			
		10'-0"	5.0	7.0	7.5			
2x8	2.5	11'-0"				12.5	10.5	5.0
		11'-6"				6.5	5.0	
		12'-0"	10.5					
		12'-6"	5.5	7.5	7.5			
2x10	2.9	13'-6"				12.5	10.5	5.0
		14'-0"				7.5	6.0	
		14'-6"						
		15'-0"	8.5	10.0	10.0			
2x12	3.4	16'-0"				10.0	8.0	
		16'-6"				6.0		
		17'-0"						
		17'-6"	9.0	10.5	10.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-16-60-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	19.0	21.5	22.0	15.5	16.0	8.5
		6'-0"	8.0	10.0	11.0	4.5	3.0	
		6'-6"		1.5	2.0			
		7'-0"						
2x6	1.3	8'-6"	14.0	16.0	16.5	9.5	10.5	9.0
		9'-0"	7.0	9.0	9.5	3.0	4.5	3.0
		9'-6"	1.5	3.0	3.5			
		10'-0"						
2x8	1.7	11'-0"	12.5	14.0	14.0	7.5	8.5	7.0
		11'-6"	7.0	8.5	9.0	2.5	3.5	3.0
		12'-0"	2.5	4.0	4.5			
		12'-6"						
2x10	2.1	13'-6"	12.5	14.0	14.0	7.5	8.0	6.5
		14'-0"	8.5	9.5	10.0	3.0	4.5	3.5
		14'-6"	4.5	5.5	6.0		1.0	0.5
		15'-0"	0.5	2.0	2.5			
2x12	2.6	16'-0"	11.0	12.0	12.0	5.0	6.0	5.0
		16'-6"	7.0	8.5	8.5	1.5	3.0	2.0
		17'-0"	4.0	5.0	5.0			
		17'-6"	1.0	2.0	2.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						
		6'-0"				40.0	39.0	32.5
		6'-6"	22.5	28.0	30.5	25.0	25.0	17.5
		7'-0"	11.5	16.5	18.5	13.5	13.5	6.0
2x6	2.1	8'-6"						
		9'-0"				12.5	13.0	11.0
		9'-6"	8.5	11.0	12.0	5.5	7.0	5.5
		10'-0"		5.0	6.0			
2x8	2.5	11'-0"						
		11'-6"				9.5	10.0	8.5
		12'-0"	8.0	10.0	10.5		5.5	
		12'-6"		5.5	6.0			
2x10	2.9	13'-6"						
		14'-0"				10.0	11.0	9.0
		14'-6"	10.5			6.0	7.0	5.5
		15'-0"	6.0	8.0	8.5			
2x12	3.4	16'-0"				13.0		11.0
		16'-6"				9.0	9.5	8.0
		17'-0"	10.0	12.0	12.0	5.0	6.0	5.0
		17'-6"	6.5	8.0	8.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-16-60-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	16.0	18.0	18.5	9.5	9.5	1.5
		6'-0"	4.5	7.0	7.5			
		6'-6"						
		7'-0"						
2x6	1.3	8'-6"	11.0	12.5	13.0	4.0	4.0	1.5
		9'-0"	4.0	5.5	6.0			
		9'-6"						
		10'-0"						
2x8	1.7	11'-0"	9.0	10.5	11.0	1.5	2.0	
		11'-6"	4.0	5.5	5.5			
		12'-0"		0.5	1.0			
		12'-6"						
2x10	2.1	13'-6"	9.5	10.5	11.0	1.5	2.0	
		14'-0"	5.0	6.5	6.5			
		14'-6"	1.0	2.5	2.5			
		15'-0"						
2x12	2.6	16'-0"	7.5	8.5	8.5			
		16'-6"	4.0	5.0	5.0			
		17'-0"	0.5	1.5	1.5			
		17'-6"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						41.5
		6'-0"	33.5			34.5	33.0	25.5
		6'-6"	19.5	25.0	27.0	19.5	19.0	10.0
		7'-0"	8.0	13.0	15.0	8.0	7.5	
2x6	2.1	8'-6"				15.0	14.5	10.5
		9'-0"	12.5			7.0	7.0	
		9'-6"	5.5	8.0	8.5			
		10'-0"						
2x8	2.5	11'-0"				9.5	9.5	6.0
		11'-6"	10.0					
		12'-0"	5.0	7.0	7.5			
		12'-6"						
2x10	2.9	13'-6"				9.0	9.0	6.0
		14'-0"	11.5					
		14'-6"	7.0	9.0	9.0			
		15'-0"			5.0			
2x12	3.4	16'-0"				7.0	7.0	
		16'-6"	11.0	12.5	12.5			
		17'-0"	7.0	8.5	8.5			
		17'-6"		5.0	5.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-16-60-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	17.0	19.0	19.5	8.5	7.5	
		6'-0"	5.5	7.5	8.0			
		6'-6"						
		7'-0"						
2x6	1.3	8'-6"	12.0	13.5	13.5	3.0	2.5	
		9'-0"	5.0	6.5	6.5			
		9'-6"		0.5	1.0			
		10'-0"						
2x8	1.7	11'-0"	10.0	11.5	11.5	0.5		
		11'-6"	5.0	6.0	6.0			
		12'-0"		1.5	1.5			
		12'-6"						
2x10	2.1	13'-6"	10.5	11.5	11.5	0.5		
		14'-0"	6.0	7.0	7.0			
		14'-6"	2.0	3.0	3.0			
		15'-0"						
2x12	2.6	16'-0"	8.5	9.5	9.5			
		16'-6"	5.0	6.0	5.5			
		17'-0"	1.5	2.5	2.5			
		17'-6"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						38.5
		6'-0"				33.5	31.0	22.5
		6'-6"	20.5	25.5	28.0	18.5	17.0	7.0
		7'-0"	9.0	14.0	16.0	7.0	5.5	
2x6	2.1	8'-6"				14.0	12.5	7.5
		9'-0"	13.5			6.0	5.0	
		9'-6"	6.5	8.5	9.5			
		10'-0"						
2x8	2.5	11'-0"				8.5	7.5	
		11'-6"	11.0					
		12'-0"	6.0	7.5	8.0			
		12'-6"						
2x10	2.9	13'-6"				8.0	7.0	
		14'-0"						
		14'-6"	8.0	9.5	10.0			
		15'-0"		5.5	5.5			
2x12	3.4	16'-0"				6.0	5.0	
		16'-6"	12.0					
		17'-0"	8.0	9.5	9.5			
		17'-6"		6.0	6.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-19.2-50-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	5'-0"	26.0	28.5	28.5	21.5	20.5	16.0
		5'-6"	14.0	15.5	16.0	9.5	9.5	3.5
		6'-0"	4.5	6.0	6.5	0.5		
		6'-6"						
2x6	1.0	7'-6"	25.0	26.5	27.0	19.5	19.0	15.5
		8'-0"	16.5	18.0	18.5	11.5	11.5	9.0
		8'-6"	9.5	11.0	11.5	4.5	5.0	3.5
		9'-0"	4.0	5.0	5.5			
2x8	1.4	10'-0"	19.0	20.5	20.5	13.5	13.0	10.5
		10'-6"	13.0	14.5	14.5	7.5	8.0	6.0
		11'-0"	8.0	9.5	9.5	3.0	3.5	2.0
		11'-6"	3.5	5.0	5.0			
2x10	1.8	12'-6"	17.0	18.0	18.0	11.0	11.0	8.5
		13'-0"	12.5	13.5	13.5	6.5	7.0	5.0
		13'-6"	8.5	9.5	9.5	3.0	3.5	2.0
		14'-0"	4.5	6.0	6.0			
2x12	2.1	14'-6"	18.0	19.0	18.5	11.5	11.0	8.5
		15'-0"	14.0	14.5	14.5	7.5	7.5	5.5
		15'-6"	10.0	11.0	11.0	4.0	4.5	3.0
		16'-0"	7.0	7.5	7.5	1.0	1.5	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"						36.5
		6'-0"	28.5			30.0	29.0	23.5
		6'-6"	16.5	21.0	23.0	17.5	17.5	10.5
2x6	1.7	7'-6"						
		8'-0"						
		8'-6"				14.0	13.5	10.5
		9'-0"	11.0	13.0		7.0	7.5	5.0
2x8	2.0	10'-0"						
		10'-6"						
		11'-0"				9.5	9.5	7.0
		11'-6"	9.0	10.5	11.0		5.0	
2x10	2.4	12'-6"						
		13'-0"						10.5
		13'-6"				9.0	9.5	7.0
		14'-0"	10.0			5.0	5.5	
2x12	2.8	14'-6"						
		15'-0"						
		15'-6"				11.0	11.0	8.5
		16'-0"				7.5	7.5	5.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-19.2-50-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	5'-0"	23.0	25.0	25.0	15.5	14.5	9.0
		5'-6"	10.5	12.5	12.5	3.5	3.5	
		6'-0"	1.0	3.0	3.5			
		6'-6"						
2x6	1.0	7'-6"	22.0	23.5	23.5	13.5	12.5	8.5
		8'-0"	13.5	15.0	15.0	5.5	5.0	2.0
		8'-6"	6.5	8.0	8.0			
		9'-0"	0.5	2.0	2.0			
2x8	1.4	10'-0"	16.0	17.0	17.0	7.5	7.0	3.5
		10'-6"	10.0	11.0	11.0	2.0	1.5	
		11'-0"	5.0	6.0	6.0			
		11'-6"	0.5	1.5	1.5			
2x10	1.8	12'-6"	14.0	15.0	14.5	5.0	4.5	1.5
		13'-0"	9.0	10.0	10.0	1.0	0.5	
		13'-6"	5.0	6.0	6.0			
		14'-0"	1.5	2.5	2.5			
2x12	2.1	14'-6"	14.5	15.5	15.0	5.5	5.0	1.5
		15'-0"	10.5	11.5	11.0	1.5	1.5	
		15'-6"	7.0	7.5	7.5			
		16'-0"	3.5	4.5	4.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"				40.5	38.0	29.5
		6'-0"	25.5	30.5	32.5	24.5	23.0	16.0
		6'-6"	13.5	18.0	20.0	12.0	11.0	
2x6	1.7	7'-6"						
		8'-0"					15.0	10.0
		8'-6"				8.0	7.5	
		9'-0"	7.5	9.5	10.0			
2x8	2.0	10'-0"						10.0
		10'-6"				9.5	8.5	
		11'-0"	11.0					
		11'-6"	5.5	7.5	7.5			
2x10	2.4	12'-6"				13.0	12.0	7.5
		13'-0"				8.0	7.0	
		13'-6"	11.0					
		14'-0"	7.0	8.5	8.5			
2x12	2.8	14'-6"					12.5	8.0
		15'-0"				9.0	8.5	
		15'-6"				5.0		
		16'-0"	9.5	11.0	11.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-19.2-50-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	5'-0"	23.5	25.5	25.5	14.0	12.0	6.0
		5'-6"	11.0	12.5	13.0	2.5	1.0	
		6'-0"	1.5	3.0	3.5			
		6'-6"						
2x6	1.0	7'-6"	22.5	23.5	23.5	12.0	10.5	5.0
		8'-0"	14.0	15.0	15.0	4.0	3.0	
		8'-6"	7.0	8.0	8.0			
		9'-0"	1.0	2.0	2.5			
2x8	1.4	10'-0"	16.5	17.5	17.5	6.0	4.5	
		10'-6"	10.5	11.5	11.5	0.5		
		11'-0"	5.5	6.5	6.5			
		11'-6"	1.0	2.0	2.0			
2x10	1.8	12'-6"	14.5	15.0	15.0	4.0	2.5	
		13'-0"	9.5	10.5	10.5			
		13'-6"	5.5	6.5	6.5			
		14'-0"	2.0	3.0	2.5			
2x12	2.1	14'-6"	15.0	16.0	15.5	4.0	2.5	
		15'-0"	11.0	12.0	11.5			
		15'-6"	7.5	8.0	8.0			
		16'-0"	4.0	4.5	4.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"				39.0	35.5	26.5
		6'-0"	26.0	31.0	33.0	23.0	20.5	13.0
		6'-6"	14.0	18.0	20.0	10.5	9.0	
2x6	1.7	7'-6"						15.0
		8'-0"				14.5	12.5	7.0
		8'-6"				6.5	5.0	
		9'-0"	8.0	10.0	10.5			
2x8	2.0	10'-0"					12.5	6.5
		10'-6"				8.0	6.5	
		11'-0"						
		11'-6"	6.0	7.5	8.0			
2x10	2.4	12'-6"				11.5	9.5	
		13'-0"				6.5	5.0	
		13'-6"						
		14'-0"	7.5	8.5	9.0			
2x12	2.8	14'-6"				12.0	10.0	5.0
		15'-0"				7.5	6.0	
		15'-6"						
		16'-0"	10.0	11.5	11.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-19.2-60-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	5'-0"	21.0	23.5	24.0	17.0	17.0	14.0
		5'-6"	8.5	10.5	11.5	5.0	6.0	1.0
		6'-0"		1.0	2.0			
		6'-6"						
2x6	1.0	7'-6"	20.0	21.5	22.0	15.0	15.0	13.0
		8'-0"	11.5	13.0	13.5	7.0	8.0	6.5
		8'-6"	4.5	6.0	6.5		1.5	1.0
		9'-0"			0.5			
2x8	1.4	10'-0"	14.0	15.5	15.5	9.0	9.5	8.0
		10'-6"	8.0	9.5	10.0	3.0	4.5	3.5
		11'-0"	3.0	4.5	4.5			
		11'-6"			0.5			
2x10	1.8	12'-6"	12.0	13.0	13.5	6.5	7.5	6.0
		13'-0"	7.5	8.5	9.0	2.0	3.5	2.5
		13'-6"	3.0	4.5	4.5			
		14'-0"		1.0	1.0			
2x12	2.1	14'-6"	13.0	14.0	14.0	6.5	7.5	6.5
		15'-0"	8.5	9.5	9.5	3.0	4.0	3.5
		15'-6"	5.0	6.0	6.0		1.0	0.5
		16'-0"	1.5	2.5	3.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"				42.0		34.5
		6'-0"	23.5	29.0	31.0	25.5	25.5	21.0
		6'-6"	11.5	16.0	18.5	13.0	14.0	8.0
2x6	1.7	7'-6"						
		8'-0"						
		8'-6"	12.5			9.5	10.0	8.5
		9'-0"	5.5	8.0	8.5			
2x8	2.0	10'-0"						
		10'-6"				10.5	11.0	9.5
		11'-0"	9.0	11.0	11.5	5.0	6.0	5.0
		11'-6"		5.5	6.5			
2x10	2.4	12'-6"						
		13'-0"				9.0	10.0	8.0
		13'-6"	9.5	11.0	11.5		6.0	
		14'-0"	5.0	6.5	7.0			
2x12	2.8	14'-6"						
		15'-0"				10.5	11.0	9.0
		15'-6"	11.5			6.5	7.5	6.0
		16'-0"	8.0	9.5	9.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-19.2-60-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	5'-0"	18.0	20.0	20.5	11.0	11.0	7.0
		5'-6"	5.5	7.5	8.0			
		6'-0"						
		6'-6"						
2x6	1.0	7'-6"	16.5	18.5	18.5	9.0	9.0	6.0
		8'-0"	8.0	10.0	10.0	1.0	1.5	
		8'-6"	1.5	3.0	3.0			
		9'-0"						
2x8	1.4	10'-0"	11.0	12.0	12.5	3.0	3.5	1.0
		10'-6"	5.0	6.0	6.5			
		11'-0"		1.0	1.5			
		11'-6"						
2x10	1.8	12'-6"	8.5	10.0	10.0	0.5	1.0	
		13'-0"	4.0	5.5	5.5			
		13'-6"		1.0	1.5			
		14'-0"						
2x12	2.1	14'-6"	9.5	10.5	10.5	1.0	1.5	
		15'-0"	5.5	6.5	6.5			
		15'-6"	2.0	2.5	2.5			
		16'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"				36.0	34.5	27.5
		6'-0"	20.5	25.5	28.0	20.0	19.5	14.0
		6'-6"	8.5	13.0	15.0	7.5	7.5	
2x6	1.7	7'-6"						
		8'-0"				11.5	11.5	8.0
		8'-6"	9.5	12.0	12.5			
		9'-0"			5.5			
2x8	2.0	10'-0"				11.0	11.0	7.5
		10'-6"	11.5				5.0	
		11'-0"	6.0	7.5	8.0			
		11'-6"						
2x10	2.4	12'-6"				8.5	8.5	5.5
		13'-0"	11.0					
		13'-6"	6.0	7.5	8.0			
		14'-0"						
2x12	2.8	14'-6"				9.0	9.0	6.0
		15'-0"					5.0	
		15'-6"	8.5	10.0	10.0			
		16'-0"		6.0	6.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-19.2-60-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	5'-0"	19.0	21.0	21.0	10.0	9.0	3.5
		5'-6"	6.5	8.5	8.5			
		6'-0"						
		6'-6"						
2x6	1.0	7'-6"	17.5	19.0	19.0	8.0	7.0	3.0
		8'-0"	9.0	10.5	11.0			
		8'-6"	2.0	3.5	4.0			
		9'-0"						
2x8	1.4	10'-0"	12.0	13.0	13.0	2.0	1.5	
		10'-6"	6.0	7.0	7.0			
		11'-0"	0.5	2.0	2.0			
		11'-6"						
2x10	1.8	12'-6"	9.5	11.0	10.5			
		13'-0"	5.0	6.0	6.0			
		13'-6"	1.0	2.0	2.0			
		14'-0"						
2x12	2.1	14'-6"	10.5	11.5	11.0			
		15'-0"	6.5	7.5	7.0			
		15'-6"	3.0	3.5	3.5			
		16'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						42.0
		5'-6"				35.0	32.5	24.0
		6'-0"	21.0	26.5	28.5	19.0	17.5	10.5
		6'-6"	9.0	13.5	15.5	6.5	6.0	
2x6	1.7	7'-6"						13.0
		8'-0"				10.5	9.5	5.0
		8'-6"	10.5	12.5	13.0			
		9'-0"		5.5	6.0			
2x8	2.0	10'-0"				10.0	9.0	
		10'-6"						
		11'-0"	6.5	8.5	8.5			
		11'-6"						
2x10	2.4	12'-6"				7.5	6.5	
		13'-0"	11.5					
		13'-6"	7.0	8.5	8.5			
		14'-0"						
2x12	2.8	14'-6"				8.0	7.0	
		15'-0"						
		15'-6"	9.5	10.5	10.5			
		16'-0"	5.5	7.0	7.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-24-50-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-0"	45.5	48.0	48.0	39.5	38.0	32.0
		4'-6"	26.5	28.5	29.0	21.5	21.0	17.5
		5'-0"	13.0	15.0	15.5	8.5	9.0	6.0
		5'-6"	3.0	5.0	5.5			
2x6	0.8	6'-6"	31.0	32.5	32.5	24.5	23.5	20.0
		7'-0"	20.5	22.0	22.0	15.0	14.5	12.0
		7'-6"	12.5	13.5	14.0	7.0	7.5	5.5
		8'-0"	5.5	7.0	7.0	0.5	1.5	
2x8	1.1	8'-6"	27.0	28.5	28.5	20.5	20.0	16.5
		9'-0"	19.5	20.5	20.5	13.5	13.5	10.5
		9'-6"	13.0	14.0	14.5	7.5	7.5	5.5
		10'-0"	7.5	8.5	9.0	2.0	3.0	1.5
2x10	1.4	11'-0"	20.0	21.0	21.0	13.5	13.5	11.0
		11'-6"	15.0	16.0	15.5	8.5	9.0	6.5
		12'-0"	10.0	11.0	11.0	4.0	4.5	3.0
		12'-6"	6.0	7.0	7.0	0.5	1.0	
2x12	1.7	13'-0"	18.5	19.5	19.0	12.0	11.5	9.5
		13'-6"	14.0	15.0	15.0	7.5	8.0	6.0
		14'-0"	10.0	11.0	11.0	4.0	4.5	3.0
		14'-6"	6.5	7.5	7.5	0.5	1.0	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-0"						
		4'-6"						
		5'-0"						
		5'-6"	27.5	32.5		28.5	27.5	22.5
2x6	1.4	6'-6"						
		7'-0"						
		7'-6"						
		8'-0"				9.0	9.0	7.0
2x8	1.6	8'-6"						
		9'-0"						
		9'-6"						
		10'-0"				9.0	9.0	6.5
2x10	1.9	11'-0"						
		11'-6"						
		12'-0"				11.0	11.0	8.5
		12'-6"				6.5	7.0	5.0
2x12	2.2	13'-0"						
		13'-6"						
		14'-0"				11.0	11.0	8.5
		14'-6"				7.0	7.0	5.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-24-50-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-0"	42.5	44.5	44.5	34.0	31.5	25.0
		4'-6"	23.5	25.5	25.5	16.0	14.5	10.0
		5'-0"	10.0	11.5	12.0	3.0	2.5	
		5'-6"		1.5	2.0			
2x6	0.8	6'-6"	27.5	29.0	29.0	19.0	17.5	13.0
		7'-0"	17.5	18.5	18.5	9.0	8.5	5.0
		7'-6"	9.0	10.5	10.5	1.0	1.0	
		8'-0"	2.0	3.5	3.5			
2x8	1.1	8'-6"	24.0	25.0	25.0	15.0	13.5	9.5
		9'-0"	16.0	17.5	17.5	7.5	7.0	3.5
		9'-6"	10.0	11.0	11.0	1.5	1.5	
		10'-0"	4.5	5.5	5.5			
2x10	1.4	11'-0"	17.0	18.0	17.5	8.0	7.5	4.0
		11'-6"	11.5	12.5	12.5	3.0	2.5	
		12'-0"	7.0	7.5	7.5			
		12'-6"	2.5	3.5	3.5			
2x12	1.7	13'-0"	15.5	16.0	16.0	6.0	5.5	2.5
		13'-6"	11.0	11.5	11.5	2.0	1.5	
		14'-0"	7.0	7.5	7.5			
		14'-6"	3.5	4.0	4.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-0"						
		4'-6"						
		5'-0"				40.0	37.5	29.5
		5'-6"	24.5	29.0	31.0	23.0	21.5	15.5
2x6	1.4	6'-6"						
		7'-0"						14.0
		7'-6"				11.0	10.0	6.0
		8'-0"	10.0	12.0	12.0			
2x8	1.6	8'-6"						
		9'-0"						10.5
		9'-6"				9.0	8.5	
		10'-0"	10.5					
2x10	1.9	11'-0"						10.5
		11'-6"				10.5	9.5	5.5
		12'-0"				5.0	5.0	
		12'-6"	8.5	10.0	10.0			
2x12	2.2	13'-0"						9.0
		13'-6"				9.5	8.5	5.0
		14'-0"				5.0		
		14'-6"	9.5	10.5	10.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-24-50-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-0"	43.0	45.0	45.0	32.5	29.5	22.0
		4'-6"	24.0	25.5	25.5	14.5	12.5	7.0
		5'-0"	10.5	12.0	12.0	1.5	0.5	
		5'-6"	0.5	2.0	2.0			
2x6	0.8	6'-6"	28.0	29.5	29.0	17.5	15.0	9.5
		7'-0"	18.0	19.0	19.0	7.5	6.0	1.5
		7'-6"	9.5	10.5	10.5			
		8'-0"	2.5	4.0	4.0			
2x8	1.1	8'-6"	24.5	25.5	25.0	13.5	11.5	6.0
		9'-0"	16.5	18.0	17.5	6.0	5.0	
		9'-6"	10.0	11.5	11.0			
		10'-0"	4.5	5.5	5.5			
2x10	1.4	11'-0"	17.5	18.5	18.0	6.5	5.0	0.5
		11'-6"	12.0	13.0	12.5	1.5	0.5	
		12'-0"	7.5	8.0	8.0			
		12'-6"	3.0	4.0	3.5			
2x12	1.7	13'-0"	16.0	16.5	16.0	4.5	3.0	
		13'-6"	11.5	12.0	11.5	0.5		
		14'-0"	7.5	8.0	7.5			
		14'-6"	3.5	4.5	4.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-0"						
		4'-6"						
		5'-0"				38.5	35.5	26.0
		5'-6"	25.0	29.5	31.5	21.5	19.0	12.0
2x6	1.4	6'-6"						
		7'-0"						10.5
		7'-6"				9.5	8.0	
		8'-0"	10.5	12.0	12.5			
2x8	1.6	8'-6"						
		9'-0"					12.5	7.0
		9'-6"				7.5	6.0	
		10'-0"	11.0					
2x10	1.9	11'-0"					13.0	7.0
		11'-6"				9.0	7.5	
		12'-0"						
		12'-6"	9.0	10.0	10.0			
2x12	2.2	13'-0"				13.0	11.0	5.5
		13'-6"				8.0	6.5	
		14'-0"						
		14'-6"	10.0	11.0	11.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-24-60-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-0"	40.5	43.0	43.0	35.0	34.5	30.0
		4'-6"	21.5	23.5	24.0	17.0	17.5	15.0
		5'-0"	8.0	10.0	10.5	4.0	5.5	3.5
		5'-6"			0.5			
2x6	0.8	6'-6"	25.5	27.5	27.5	20.0	20.0	17.5
		7'-0"	15.5	17.0	17.0	10.5	11.0	9.5
		7'-6"	7.0	8.5	9.0	2.5	4.0	3.0
		8'-0"	0.5	2.0	2.0			
2x8	1.1	8'-6"	22.0	23.5	23.5	16.0	16.5	14.0
		9'-0"	14.5	15.5	16.0	9.0	9.5	8.5
		9'-6"	8.0	9.0	9.5	3.0	4.0	3.5
		10'-0"	2.5	3.5	4.0			
2x10	1.4	11'-0"	15.0	16.5	16.5	9.0	10.0	8.5
		11'-6"	9.5	11.0	11.0	4.0	5.5	4.5
		12'-0"	5.0	6.0	6.0		1.0	0.5
		12'-6"	1.0	2.0	2.0			
2x12	1.7	13'-0"	13.5	14.5	14.5	7.5	8.0	7.0
		13'-6"	9.0	10.0	10.0	3.0	4.5	3.5
		14'-0"	5.0	6.0	6.0		1.0	0.5
		14'-6"	1.5	2.5	2.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-0"						
		4'-6"						
		5'-0"				41.5		34.0
		5'-6"	22.5	27.5	29.5	24.0	24.0	20.0
2x6	1.4	6'-6"						
		7'-0"						
		7'-6"				12.5	13.0	11.0
		8'-0"	8.0	10.0	11.0		5.5	
2x8	1.6	8'-6"						
		9'-0"						
		9'-6"				10.5	11.0	9.5
		10'-0"	8.5	10.5	10.5		5.5	
2x10	1.9	11'-0"						
		11'-6"				11.5		10.5
		12'-0"	11.5			6.5	7.5	6.0
		12'-6"	6.5	8.0	8.5			
2x12	2.2	13'-0"						
		13'-6"				11.0	11.5	9.5
		14'-0"	12.0			6.5	7.5	6.0
		14'-6"	7.5	9.0	9.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-24-60-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-0"	37.5	39.5	39.5	29.5	28.0	23.0
		4'-6"	18.5	20.5	20.5	11.0	11.0	8.0
		5'-0"	5.0	6.5	7.0			
		5'-6"						
2x6	0.8	6'-6"	22.5	24.0	24.0	14.5	14.0	10.5
		7'-0"	12.0	13.5	14.0	4.5	5.0	2.5
		7'-6"	4.0	5.5	5.5			
		8'-0"						
2x8	1.1	8'-6"	19.0	20.0	20.0	10.5	10.0	7.0
		9'-0"	11.0	12.5	12.5	3.0	3.5	1.5
		9'-6"	4.5	6.0	6.0			
		10'-0"		0.5	0.5			
2x10	1.4	11'-0"	12.0	13.0	13.0	3.5	3.5	1.5
		11'-6"	6.5	7.5	7.5			
		12'-0"	1.5	3.0	3.0			
		12'-6"						
2x12	1.7	13'-0"	10.5	11.0	11.0	1.5	2.0	
		13'-6"	6.0	6.5	6.5			
		14'-0"	2.0	2.5	2.5			
		14'-6"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-0"						
		4'-6"						
		5'-0"	36.0			35.5	34.0	27.0
		5'-6"	19.5	24.0	26.5	18.5	18.0	13.0
2x6	1.4	6'-6"						
		7'-0"				16.0	15.5	12.0
		7'-6"	13.0			6.5	6.5	
		8'-0"	5.0	7.0	7.5			
2x8	1.6	8'-6"						
		9'-0"				11.5	11.5	8.0
		9'-6"	11.5				5.0	
		10'-0"	5.5	7.0	7.5			
2x10	1.9	11'-0"				12.0	11.5	8.5
		11'-6"				6.0	6.0	
		12'-0"	8.0	9.5	10.0			
		12'-6"		5.0	5.0			
2x12	2.2	13'-0"				10.0	9.5	6.5
		13'-6"				5.0	5.0	
		14'-0"	8.5	10.0	10.0			
		14'-6"		5.5	5.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-2-24-60-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-0"	38.5	40.5	40.5	28.5	26.0	19.5
		4'-6"	19.5	21.0	21.5	10.0	9.0	5.0
		5'-0"	6.0	7.5	7.5			
		5'-6"						
2x6	0.8	6'-6"	23.5	25.0	25.0	13.5	12.0	7.5
		7'-0"	13.0	14.5	14.5	3.5	3.0	
		7'-6"	5.0	6.0	6.0			
		8'-0"						
2x8	1.1	8'-6"	19.5	21.0	20.5	9.5	8.5	4.0
		9'-0"	12.0	13.5	13.0	2.0	1.5	
		9'-6"	5.5	7.0	7.0			
		10'-0"		1.5	1.5			
2x10	1.4	11'-0"	13.0	14.0	13.5	2.5	2.0	
		11'-6"	7.5	8.5	8.0			
		12'-0"	2.5	3.5	3.5			
		12'-6"						
2x12	1.7	13'-0"	11.5	12.0	11.5	0.5		
		13'-6"	7.0	7.5	7.5			
		14'-0"	3.0	3.5	3.5			
		14'-6"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-0"						
		4'-6"						43.5
		5'-0"				34.5	32.0	24.0
		5'-6"	20.5	25.0	27.0	17.5	16.0	10.0
2x6	1.4	6'-6"						
		7'-0"				15.0	14.0	8.5
		7'-6"	14.0			5.5	5.0	
		8'-0"	6.0	7.5	8.0			
2x8	1.6	8'-6"						12.0
		9'-0"				10.5	9.5	5.0
		9'-6"						
		10'-0"	6.5	8.0	8.0			
2x10	1.9	11'-0"				11.0	9.5	5.0
		11'-6"				5.0		
		12'-0"	9.0	10.5	10.5			
		12'-6"		5.5	6.0			
2x12	2.2	13'-0"				9.0	8.0	
		13'-6"						
		14'-0"	9.5	10.5	10.5			
		14'-6"	5.5	6.5	6.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-12-50-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-6"	43.5	44.5	44.5	36.0	34.0	29.0
		5'-0"	27.0	28.0	28.0	20.5	19.5	16.5
		5'-6"	14.5	16.0	16.0	9.0	9.0	7.0
		6'-0"	5.5	6.5	6.5		1.0	
2x6	1.7	7'-6"	24.5	25.5	25.5	17.5	17.0	14.0
		8'-0"	16.5	17.5	17.0	10.0	10.0	7.5
		8'-6"	9.5	10.5	10.5	3.5	4.0	2.5
		9'-0"	4.0	5.0	4.5			
2x8	2.2	9'-6"	25.0	25.5	25.5	17.5	17.0	14.0
		10'-0"	18.5	19.0	18.5	11.0	11.0	9.0
		10'-6"	12.5	13.5	13.0	6.0	6.0	4.5
		11'-0"	7.5	8.5	8.0	1.5	2.0	0.5
2x10	2.8	12'-0"	20.5	21.5	21.0	13.0	13.0	10.5
		12'-6"	15.5	16.5	16.0	8.5	8.5	6.5
		13'-0"	11.0	12.0	11.5	4.5	4.5	3.0
		13'-6"	7.0	8.0	7.5	0.5	1.0	
2x12	3.4	14'-0"	20.0	20.5	20.0	12.5	12.0	9.5
		14'-6"	16.0	16.0	16.0	8.5	8.5	6.0
		15'-0"	12.0	12.5	12.0	4.5	5.0	3.0
		15'-6"	8.5	9.0	8.5	1.5	2.0	0.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	4'-6"						
		5'-0"						
		5'-6"						
		6'-0"				33.0	31.5	26.0
2x6	2.7	7'-6"						
		8'-0"						
		8'-6"				12.5	12.5	10.0
		9'-0"	11.5	13.0	13.0	6.0	6.5	
2x8	3.3	9'-6"						
		10'-0"						
		10'-6"						10.0
		11'-0"				7.5	8.0	5.5
2x10	3.9	12'-0"						
		12'-6"						
		13'-0"				11.0	11.0	8.5
		13'-6"				7.0	7.0	5.0
2x12	4.5	14'-0"						
		14'-6"						
		15'-0"				12.0	11.5	9.0
		15'-6"				8.0	8.0	6.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-12-50-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-6"	40.0	41.5	41.0	30.0	28.0	22.0
		5'-0"	23.5	25.0	24.5	14.5	13.5	9.5
		5'-6"	11.5	12.5	12.5	3.0	2.5	
		6'-0"	2.0	3.0	3.5			
2x6	1.7	7'-6"	21.5	22.5	22.0	12.0	11.0	7.0
		8'-0"	13.0	14.0	13.5	4.0	3.5	0.5
		8'-6"	6.5	7.0	7.0			
		9'-0"	0.5	1.5	1.5			
2x8	2.2	9'-6"	21.5	22.5	22.0	11.5	10.5	7.0
		10'-0"	15.0	15.5	15.5	5.5	5.0	1.5
		10'-6"	9.5	10.0	9.5			
		11'-0"	4.5	5.0	4.5			
2x10	2.8	12'-0"	17.5	18.0	17.5	7.5	6.5	3.0
		12'-6"	12.5	13.0	12.5	2.5	2.5	
		13'-0"	8.0	8.5	8.0			
		13'-6"	4.0	4.5	4.0			
2x12	3.4	14'-0"	17.0	17.0	16.5	6.5	6.0	2.5
		14'-6"	12.5	13.0	12.5	2.5	2.0	
		15'-0"	8.5	9.0	8.5			
		15'-6"	5.0	5.5	5.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	4'-6"						
		5'-0"						
		5'-6"				43.5	40.5	32.5
		6'-0"	31.0	35.0	36.5	27.0	25.5	19.0
2x6	2.7	7'-6"						
		8'-0"				15.0	13.5	9.0
		8'-6"				7.0	6.5	
		9'-0"	8.5	9.5	9.5			
2x8	3.3	9'-6"						
		10'-0"					12.5	8.0
		10'-6"				7.5	6.5	
		11'-0"	10.5	11.5	11.5			
2x10	3.9	12'-0"						10.0
		12'-6"				10.5	9.5	5.5
		13'-0"				5.5		
		13'-6"	10.0	11.0	10.5			
2x12	4.5	14'-0"						9.0
		14'-6"				10.5	9.0	5.5
		15'-0"				6.0	5.5	
		15'-6"	12.0		12.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-12-50-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-6"	40.5	42.0	41.0	28.5	25.5	18.5
		5'-0"	24.0	25.0	25.0	13.0	11.0	6.0
		5'-6"	12.0	13.0	12.5	1.5	0.5	
		6'-0"	2.5	3.5	3.5			
2x6	1.7	7'-6"	22.0	22.5	22.0	10.5	8.5	3.5
		8'-0"	13.5	14.5	14.0	2.5	1.5	
		8'-6"	7.0	7.5	7.0			
		9'-0"	1.0	2.0	1.5			
2x8	2.2	9'-6"	22.0	22.5	22.0	10.0	8.5	3.5
		10'-0"	15.5	16.0	15.5	4.0	2.5	
		10'-6"	10.0	10.5	10.0			
		11'-0"	5.0	5.5	5.0			
2x10	2.8	12'-0"	18.0	18.5	17.5	6.0	4.5	
		12'-6"	13.0	13.5	12.5	1.5		
		13'-0"	8.5	9.0	8.5			
		13'-6"	4.5	5.0	4.5			
2x12	3.4	14'-0"	17.5	17.5	17.0	5.0	3.5	
		14'-6"	13.0	13.5	12.5	1.0		
		15'-0"	9.0	9.5	9.0			
		15'-6"	5.5	6.0	5.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	4'-6"						
		5'-0"						
		5'-6"				42.0	38.5	29.0
		6'-0"	31.5	35.5	36.5	26.0	23.0	15.5
2x6	2.7	7'-6"						13.5
		8'-0"				13.5	11.5	6.0
		8'-6"				5.5		
		9'-0"	9.0	10.0	10.0			
2x8	3.3	9'-6"						10.5
		10'-0"				12.0	10.0	
		10'-6"				6.0		
		11'-0"	11.0		11.5			
2x10	3.9	12'-0"					12.0	6.5
		12'-6"				9.0	7.0	
		13'-0"						
		13'-6"	10.5	11.5	11.0			
2x12	4.5	14'-0"				13.5	11.5	6.0
		14'-6"				9.0	7.0	
		15'-0"						
		15'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-12-60-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-6"	38.5	39.5	39.5	31.5	30.5	27.0
		5'-0"	22.0	23.0	23.0	16.0	16.0	14.0
		5'-6"	9.5	11.0	11.0	4.5	5.5	4.5
		6'-0"	0.5	1.5	2.0			
2x6	1.7	7'-6"	19.5	20.5	20.5	13.0	13.5	11.5
		8'-0"	11.5	12.5	12.5	5.5	6.5	5.5
		8'-6"	4.5	5.5	5.5		0.5	
		9'-0"						
2x8	2.2	9'-6"	20.0	20.5	20.5	13.0	13.5	11.5
		10'-0"	13.0	14.0	14.0	6.5	7.5	6.5
		10'-6"	7.5	8.5	8.0	1.5	2.5	2.0
		11'-0"	2.5	3.5	3.5			
2x10	2.8	12'-0"	15.5	16.5	16.0	8.5	9.5	8.0
		12'-6"	10.5	11.5	11.0	4.0	5.0	4.0
		13'-0"	6.0	7.0	6.5		1.0	0.5
		13'-6"	2.0	3.0	2.5			
2x12	3.4	14'-0"	15.0	15.5	15.0	8.0	8.5	7.0
		14'-6"	10.5	11.0	11.0	4.0	4.5	4.0
		15'-0"	7.0	7.5	7.0		1.5	1.0
		15'-6"	3.5	4.0	3.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	4'-6"						
		5'-0"						
		5'-6"				44.5		37.0
		6'-0"	29.5	33.5	35.0	28.5	28.0	23.5
2x6	2.7	7'-6"						
		8'-0"						
		8'-6"	13.5			8.0	9.0	7.5
		9'-0"	6.5	8.0	8.0			
2x8	3.3	9'-6"						
		10'-0"						
		10'-6"				8.5	9.5	7.5
		11'-0"	8.5	10.0	10.0			
2x10	3.9	12'-0"						
		12'-6"				11.5	12.0	10.0
		13'-0"				6.5	7.5	6.0
		13'-6"	8.5	9.5	9.0			
2x12	4.5	14'-0"						
		14'-6"				11.5	12.0	10.0
		15'-0"				7.5	8.0	6.5
		15'-6"	10.0	10.5	10.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-12-60-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-6"	35.0	36.5	36.0	25.5	24.5	19.5
		5'-0"	18.5	20.0	19.5	10.0	10.0	7.0
		5'-6"	6.5	7.5	7.5			
		6'-0"						
2x6	1.7	7'-6"	16.5	17.5	17.0	7.0	7.5	4.5
		8'-0"	8.0	9.0	9.0			
		8'-6"	1.5	2.0	2.0			
		9'-0"						
2x8	2.2	9'-6"	16.5	17.5	17.0	7.0	7.0	4.5
		10'-0"	10.0	10.5	10.5	1.0	1.5	
		10'-6"	4.0	5.0	5.0			
		11'-0"						
2x10	2.8	12'-0"	12.5	13.0	12.5	3.0	3.0	1.0
		12'-6"	7.5	8.0	7.5			
		13'-0"	3.0	3.5	3.0			
		13'-6"						
2x12	3.4	14'-0"	12.0	12.5	12.0	2.0	2.0	
		14'-6"	7.5	8.0	7.5			
		15'-0"	3.5	4.0	3.5			
		15'-6"		0.5				

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	4'-6"						
		5'-0"						
		5'-6"				39.0	37.0	30.0
		6'-0"	26.0	30.0	31.5	22.5	22.0	16.5
2x6	2.7	7'-6"						14.5
		8'-0"				10.0	10.0	7.0
		8'-6"	10.0	11.5	11.5			
		9'-0"			5.0			
2x8	3.3	9'-6"						12.0
		10'-0"				9.0	9.0	6.0
		10'-6"	11.0	12.5	12.5			
		11'-0"	5.5	6.5	6.5			
2x10	3.9	12'-0"				11.0	11.0	7.5
		12'-6"				5.5	5.5	
		13'-0"	9.5	10.5	10.5			
		13'-6"	5.0	6.0	6.0			
2x12	4.5	14'-0"				10.5	10.0	7.0
		14'-6"				6.0	5.5	
		15'-0"	11.0	11.5	11.0			
		15'-6"	6.5	7.5	7.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-12-60-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	4'-6"	36.0	37.5	37.0	24.5	22.5	16.5
		5'-0"	19.5	20.5	20.5	9.0	8.0	4.0
		5'-6"	7.5	8.5	8.5			
		6'-0"						
2x6	1.7	7'-6"	17.5	18.0	17.5	6.0	5.5	1.5
		8'-0"	9.0	10.0	9.5			
		8'-6"	2.5	3.0	3.0			
		9'-0"						
2x8	2.2	9'-6"	17.5	18.0	17.5	6.0	5.0	1.5
		10'-0"	11.0	11.5	11.0			
		10'-6"	5.0	6.0	5.5			
		11'-0"		1.0	0.5			
2x10	2.8	12'-0"	13.5	14.0	13.5	2.0	1.5	
		12'-6"	8.5	9.0	8.5			
		13'-0"	4.0	4.5	4.0			
		13'-6"		0.5				
2x12	3.4	14'-0"	13.0	13.0	12.5	1.0	0.5	
		14'-6"	8.5	9.0	8.0			
		15'-0"	4.5	5.0	4.5			
		15'-6"	1.0	1.5	1.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	4'-6"						
		5'-0"						44.5
		5'-6"				38.0	35.0	27.0
		6'-0"	27.0	31.0	32.5	21.5	20.0	13.5
2x6	2.7	7'-6"						11.5
		8'-0"				9.0	8.0	
		8'-6"	11.0	12.5	12.5			
		9'-0"		5.5	5.5			
2x8	3.3	9'-6"					13.5	8.5
		10'-0"				8.0	7.0	
		10'-6"	12.0					
		11'-0"	6.5	7.5	7.5			
2x10	3.9	12'-0"				10.0	9.0	
		12'-6"						
		13'-0"	10.5	11.5	11.0			
		13'-6"	6.0	7.0	6.5			
2x12	4.5	14'-0"				9.5	8.0	
		14'-6"				5.0		
		15'-0"	11.5	12.5	12.0			
		15'-6"	7.5	8.5	8.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-16-50-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	64.5	66.5	66.0	56.5	53.5	46.5
		4'-0"	40.0	41.0	41.0	32.5	31.0	26.5
		4'-6"	23.0	24.0	24.0	16.5	16.0	13.0
		5'-0"	10.5	11.5	11.5	4.5	5.0	3.5
2x6	1.3	6'-0"	37.0	38.0	37.5	29.5	28.0	24.0
		6'-6"	25.5	26.5	26.0	18.5	18.0	15.0
		7'-0"	16.5	17.0	17.0	9.5	9.5	7.5
		7'-6"	9.0	9.5	9.5	2.5	3.0	2.0
2x8	1.7	8'-0"	30.0	30.5	30.0	22.0	21.5	18.0
		8'-6"	21.5	22.5	22.0	14.5	14.0	11.5
		9'-0"	15.0	15.5	15.0	8.0	8.0	6.0
		9'-6"	9.0	9.5	9.5	2.5	3.0	1.5
2x10	2.1	10'-0"	27.0	27.5	27.0	19.0	18.5	15.5
		10'-6"	20.5	21.0	20.5	13.0	13.0	10.5
		11'-0"	15.0	15.5	15.0	8.0	8.0	6.0
		11'-6"	10.0	10.5	10.5	3.5	3.5	2.5
2x12	2.6	12'-0"	22.5	23.0	22.5	14.5	14.5	11.5
		12'-6"	17.5	18.0	17.5	10.0	10.0	8.0
		13'-0"	13.0	13.5	13.0	5.5	6.0	4.5
		13'-6"	9.0	9.5	9.0	2.0	2.5	1.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	3'-6"						
		4'-0"						
		4'-6"						
		5'-0"				42.5	40.5	34.0
2x6	2.1	6'-0"						
		6'-6"						
		7'-0"						
		7'-6"				12.0	12.0	9.5
2x8	2.5	8'-0"						
		8'-6"						
		9'-0"						
		9'-6"				9.5	9.5	7.0
2x10	2.9	10'-0"						
		10'-6"						
		11'-0"						
		11'-6"				10.0	10.0	8.0
2x12	3.4	12'-0"						
		12'-6"						
		13'-0"						10.5
		13'-6"				9.0	9.0	6.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-16-50-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	61.5	63.0	62.5	50.5	47.0	39.0
		4'-0"	36.5	38.0	37.5	27.0	25.0	19.5
		4'-6"	19.5	20.5	20.5	10.5	9.5	6.0
		5'-0"	7.0	8.0	8.0			
2x6	1.3	6'-0"	34.0	35.0	34.5	23.5	22.0	17.0
		6'-6"	22.5	23.0	22.5	12.5	11.5	7.5
		7'-0"	13.0	13.5	13.5	4.0	3.5	0.5
		7'-6"	5.5	6.0	6.0			
2x8	1.7	8'-0"	26.5	27.5	26.5	16.5	15.0	11.0
		8'-6"	18.5	19.0	18.5	8.5	8.0	4.5
		9'-0"	11.5	12.0	12.0	2.0	2.0	
		9'-6"	6.0	6.5	6.0			
2x10	2.1	10'-0"	23.5	24.0	23.5	13.0	12.0	8.0
		10'-6"	17.0	17.5	17.0	7.0	6.5	3.5
		11'-0"	11.5	12.0	11.5	2.0	1.5	
		11'-6"	7.0	7.5	7.0			
2x12	2.6	12'-0"	19.5	20.0	19.0	9.0	8.0	4.5
		12'-6"	14.5	14.5	14.0	4.0	3.5	0.5
		13'-0"	10.0	10.0	9.5			
		13'-6"	5.5	6.0	5.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	3'-6"						
		4'-0"						
		4'-6"						
		5'-0"				36.5	34.0	27.0
2x6	2.1	6'-0"						
		6'-6"						
		7'-0"				14.5	13.5	9.5
		7'-6"				6.0	5.5	
2x8	2.5	8'-0"						
		8'-6"						11.5
		9'-0"				10.0	9.0	5.5
		9'-6"						
2x10	2.9	10'-0"						
		10'-6"						10.0
		11'-0"				9.5	8.5	5.0
		11'-6"						
2x12	3.4	12'-0"						12.0
		12'-6"				12.5	11.5	7.5
		13'-0"				7.5	6.5	
		13'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-16-50-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	62.0	63.5	62.5	49.0	45.0	36.0
		4'-0"	37.0	38.5	38.0	25.5	22.5	16.0
		4'-6"	20.0	21.0	20.5	9.0	7.5	2.5
		5'-0"	7.5	8.5	8.5			
2x6	1.3	6'-0"	34.5	35.0	34.5	22.0	19.5	13.5
		6'-6"	23.0	23.5	23.0	11.0	9.5	4.5
		7'-0"	13.5	14.0	13.5	2.5	1.0	
		7'-6"	6.0	6.5	6.0			
2x8	1.7	8'-0"	27.0	27.5	27.0	15.0	13.0	7.5
		8'-6"	19.0	19.5	19.0	7.0	5.5	1.0
		9'-0"	12.0	12.5	12.0	0.5		
		9'-6"	6.0	6.5	6.5			
2x10	2.1	10'-0"	24.0	24.5	24.0	12.0	10.0	5.0
		10'-6"	17.5	18.0	17.5	6.0	4.5	
		11'-0"	12.0	12.5	12.0	0.5		
		11'-6"	7.5	7.5	7.0			
2x12	2.6	12'-0"	20.0	20.0	19.5	7.5	6.0	1.0
		12'-6"	15.0	15.0	14.5	2.5	1.5	
		13'-0"	10.5	10.5	10.0			
		13'-6"	6.0	6.5	6.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	3'-6"						
		4'-0"						
		4'-6"						41.5
		5'-0"				35.0	32.0	23.5
2x6	2.1	6'-0"						
		6'-6"						15.0
		7'-0"				13.5	11.5	6.0
		7'-6"						
2x8	2.5	8'-0"						
		8'-6"						8.0
		9'-0"				8.5	7.0	
		9'-6"						
2x10	2.9	10'-0"						12.5
		10'-6"					12.0	6.5
		11'-0"				8.0	6.5	
		11'-6"						
2x12	3.4	12'-0"						8.5
		12'-6"				11.0	9.0	
		13'-0"				6.0		
		13'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-16-60-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	59.5	61.5	61.0	52.0	50.0	44.0
		4'-0"	35.0	36.5	36.0	28.0	27.5	24.5
		4'-6"	17.5	19.0	19.0	12.0	12.5	11.0
		5'-0"	5.5	6.5	6.5		1.5	1.0
2x6	1.3	6'-0"	32.0	33.0	33.0	25.0	24.5	21.5
		6'-6"	20.5	21.5	21.0	14.0	14.5	12.5
		7'-0"	11.0	12.0	12.0	5.0	6.0	5.5
		7'-6"	3.5	4.5	4.5			
2x8	1.7	8'-0"	24.5	25.5	25.5	17.5	18.0	15.5
		8'-6"	16.5	17.5	17.0	10.0	10.5	9.0
		9'-0"	9.5	10.5	10.5	3.5	4.5	4.0
		9'-6"	4.0	4.5	4.5			
2x10	2.1	10'-0"	21.5	22.5	22.0	14.5	15.0	13.0
		10'-6"	15.5	16.0	16.0	8.5	9.5	8.0
		11'-0"	10.0	10.5	10.5	3.5	4.5	3.5
		11'-6"	5.0	5.5	5.5			
2x12	2.6	12'-0"	17.5	18.0	17.5	10.0	11.0	9.5
		12'-6"	12.5	13.0	12.5	5.5	6.5	5.5
		13'-0"	8.0	8.5	8.0	1.0	2.5	2.0
		13'-6"	4.0	4.5	4.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	3'-6"						
		4'-0"						
		4'-6"						
		5'-0"				38.0	37.0	32.0
2x6	2.1	6'-0"						
		6'-6"						
		7'-0"				16.0		
		7'-6"	12.5	14.0	14.0	7.5	8.0	7.0
2x8	2.5	8'-0"						
		8'-6"						
		9'-0"				11.0	12.0	10.0
		9'-6"	10.5	11.5	11.5	5.0	6.0	5.0
2x10	2.9	10'-0"						
		10'-6"						
		11'-0"				11.0	11.5	10.0
		11'-6"	11.5			5.5	6.5	5.5
2x12	3.4	12'-0"						
		12'-6"						
		13'-0"				8.5	9.5	8.0
		13'-6"	11.0	11.5	11.5		5.5	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-16-60-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	56.5	58.0	57.5	46.0	43.5	37.0
		4'-0"	31.5	33.0	32.5	22.5	21.5	17.0
		4'-6"	14.5	15.5	15.5	6.0	6.0	4.0
		5'-0"	2.0	3.0	3.0			
2x6	1.3	6'-0"	29.0	30.0	29.5	19.0	18.5	14.5
		6'-6"	17.0	18.0	18.0	8.0	8.0	5.5
		7'-0"	8.0	9.0	8.5			
		7'-6"	0.5	1.0	1.0			
2x8	1.7	8'-0"	21.5	22.5	22.0	12.0	11.5	8.5
		8'-6"	13.5	14.0	13.5	4.0	4.5	2.0
		9'-0"	6.5	7.0	7.0			
		9'-6"	0.5	1.5	1.0			
2x10	2.1	10'-0"	18.5	19.0	18.5	8.5	8.5	6.0
		10'-6"	12.0	12.5	12.5	2.5	3.0	1.0
		11'-0"	6.5	7.0	7.0			
		11'-6"	1.5	2.5	2.0			
2x12	2.6	12'-0"	14.5	15.0	14.5	4.5	4.5	2.5
		12'-6"	9.0	9.5	9.5			
		13'-0"	4.5	5.0	5.0			
		13'-6"	0.5	1.0	1.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	3'-6"						
		4'-0"						
		4'-6"						43.0
		5'-0"	35.5	40.0	41.5	32.0	30.5	24.5
2x6	2.1	6'-0"						
		6'-6"						
		7'-0"				10.0	10.0	7.0
		7'-6"	9.5	10.5	11.0			
2x8	2.5	8'-0"						
		8'-6"				13.0	12.5	9.5
		9'-0"				5.5	5.5	
		9'-6"	7.5	8.5	8.5			
2x10	2.9	10'-0"						
		10'-6"				11.0	11.0	7.5
		11'-0"				5.0	5.0	
		11'-6"	8.5	9.5	9.0			
2x12	3.4	12'-0"				13.5	13.0	9.5
		12'-6"				8.0	8.0	5.0
		13'-0"	12.0	13.0	12.5			
		13'-6"	7.5	8.5	8.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-16-60-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	57.5	59.0	58.5	45.0	41.5	33.5
		4'-0"	32.5	34.0	33.5	21.5	19.5	14.0
		4'-6"	15.5	16.5	16.0	5.0	4.5	0.5
		5'-0"	3.0	4.0	4.0			
2x6	1.3	6'-0"	30.0	30.5	30.0	18.0	16.5	11.5
		6'-6"	18.0	19.0	18.5	7.0	6.0	2.5
		7'-0"	9.0	9.5	9.5			
		7'-6"	1.5	2.0	2.0			
2x8	1.7	8'-0"	22.5	23.0	22.5	11.0	9.5	5.5
		8'-6"	14.5	15.0	14.5	3.0	2.5	
		9'-0"	7.5	8.0	7.5			
		9'-6"	1.5	2.0	2.0			
2x10	2.1	10'-0"	19.5	20.0	19.5	7.5	6.5	2.5
		10'-6"	13.0	13.5	13.0	1.5	1.0	
		11'-0"	7.5	8.0	7.5			
		11'-6"	2.5	3.0	3.0			
2x12	2.6	12'-0"	15.5	15.5	15.0	3.5	2.5	
		12'-6"	10.0	10.5	10.0			
		13'-0"	5.5	6.0	5.5			
		13'-6"	1.5	2.0	1.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	3'-6"						
		4'-0"						
		4'-6"				53.0	49.0	39.5
		5'-0"	36.5	41.0	42.0	31.0	29.0	21.5
2x6	2.1	6'-0"						
		6'-6"						12.5
		7'-0"				9.0	8.0	
		7'-6"	10.5	11.5	11.5			
2x8	2.5	8'-0"						
		8'-6"				12.0	10.5	6.0
		9'-0"						
		9'-6"	8.5	9.5	9.0			
2x10	2.9	10'-0"						10.5
		10'-6"				10.0	9.0	
		11'-0"						
		11'-6"	9.5	10.0	10.0			
2x12	3.4	12'-0"				12.5	11.0	6.5
		12'-6"				7.0	6.0	
		13'-0"						
		13'-6"	8.5	9.0	8.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-19.2-50-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	3'-6"	47.5	49.0	48.5	40.0	38.0	33.0
		4'-0"	27.0	28.0	28.0	20.0	19.5	16.5
		4'-6"	12.5	13.5	13.5	6.5	7.0	5.0
		5'-0"	2.0	3.0	3.0			
2x6	1.0	5'-6"	37.0	38.0	37.5	29.0	28.0	24.0
		6'-0"	24.5	25.5	25.0	17.5	17.0	14.0
		6'-6"	15.0	15.5	15.5	8.0	8.5	6.5
		7'-0"	7.0	8.0	7.5	1.0	1.5	0.5
2x8	1.4	7'-6"	26.5	27.5	27.0	19.0	18.5	15.5
		8'-0"	18.5	19.0	19.0	11.5	11.5	9.0
		8'-6"	11.5	12.0	12.0	5.0	5.5	4.0
		9'-0"	6.0	6.5	6.5		0.5	
2x10	1.8	9'-0"	29.0	30.0	29.5	21.5	20.5	17.5
		9'-6"	22.0	22.5	22.0	14.5	14.5	12.0
		10'-0"	16.0	16.5	16.0	9.0	9.0	7.0
		10'-6"	10.5	11.0	11.0	4.0	4.0	3.0
2x12	2.1	11'-0"	22.5	23.0	22.5	15.0	14.5	12.0
		11'-6"	17.0	17.5	17.0	9.5	9.5	7.5
		12'-0"	12.5	13.0	12.5	5.0	5.5	4.0
		12'-6"	8.0	8.5	8.0	1.0	2.0	0.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	3'-6"						
		4'-0"						
		4'-6"						37.5
		5'-0"	30.0	34.0	35.0	28.0	27.5	22.5
2x6	1.7	5'-6"						
		6'-0"						
		6'-6"						
		7'-0"				10.0	10.0	8.0
2x8	2.0	7'-6"						
		8'-0"						
		8'-6"				12.5		10.0
		9'-0"				6.0	6.5	
2x10	2.4	9'-0"						
		9'-6"						
		10'-0"						
		10'-6"				11.0	11.0	8.5
2x12	2.8	11'-0"						
		11'-6"						
		12'-0"				12.5		10.0
		12'-6"				8.0	8.0	6.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-19.2-50-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	3'-6"	44.0	45.5	45.0	34.0	32.0	25.5
		4'-0"	23.5	24.5	24.5	14.5	13.5	9.5
		4'-6"	9.5	10.0	10.0	0.5	0.5	
		5'-0"						
2x6	1.0	5'-6"	33.5	34.5	34.0	23.5	22.0	17.0
		6'-0"	21.5	22.0	21.5	11.5	10.5	7.0
		6'-6"	11.5	12.5	12.0	2.5	2.0	
		7'-0"	4.0	4.5	4.5			
2x8	1.4	7'-6"	23.5	24.0	23.5	13.5	12.5	8.5
		8'-0"	15.0	16.0	15.5	5.5	5.0	2.0
		8'-6"	8.5	9.0	8.5			
		9'-0"	2.5	3.0	3.0			
2x10	1.8	9'-0"	26.0	26.5	26.0	15.5	14.5	10.5
		9'-6"	19.0	19.5	19.0	9.0	8.0	4.5
		10'-0"	12.5	13.0	12.5	3.0	2.5	
		10'-6"	7.5	8.0	7.5			
2x12	2.1	11'-0"	19.5	20.0	19.0	9.0	8.0	5.0
		11'-6"	14.0	14.5	14.0	4.0	3.5	0.5
		12'-0"	9.0	9.5	9.0			
		12'-6"	5.0	5.0	5.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	3'-6"						
		4'-0"						
		4'-6"				40.5	38.0	30.5
		5'-0"	27.0	30.5	31.5	22.5	21.0	15.5
2x6	1.7	5'-6"						
		6'-0"						
		6'-6"				13.0	12.0	8.0
		7'-0"	12.5	14.0	13.5			
2x8	2.0	7'-6"						
		8'-0"					13.0	9.0
		8'-6"				6.5	6.0	
		9'-0"	9.0	10.0	9.5			
2x10	2.4	9'-0"						
		9'-6"						12.0
		10'-0"				11.0	10.0	6.0
		10'-6"				5.0		
2x12	2.8	11'-0"						12.0
		11'-6"				12.0	11.0	7.5
		12'-0"				7.0	6.0	
		12'-6"	11.5	12.5	12.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-19.2-50-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	3'-6"	44.5	46.0	45.5	32.5	29.5	22.5
		4'-0"	24.0	25.0	24.5	13.0	11.0	6.0
		4'-6"	9.5	10.5	10.5			
		5'-0"						
2x6	1.0	5'-6"	34.0	35.0	34.5	22.0	19.5	13.5
		6'-0"	21.5	22.5	22.0	10.0	8.5	3.5
		6'-6"	12.0	12.5	12.0	1.0		
		7'-0"	4.5	5.0	4.5			
2x8	1.4	7'-6"	24.0	24.5	23.5	12.0	10.0	5.0
		8'-0"	15.5	16.0	15.5	4.0	3.0	
		8'-6"	9.0	9.5	9.0			
		9'-0"	3.0	3.5	3.0			
2x10	1.8	9'-0"	26.5	27.0	26.0	14.0	12.0	7.0
		9'-6"	19.0	19.5	19.0	7.5	6.0	1.5
		10'-0"	13.0	13.5	13.0	1.5	0.5	
		10'-6"	8.0	8.0	7.5			
2x12	2.1	11'-0"	20.0	20.0	19.5	7.5	6.0	1.5
		11'-6"	14.5	14.5	14.0	2.5	1.0	
		12'-0"	9.5	10.0	9.5			
		12'-6"	5.5	5.5	5.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	3'-6"						
		4'-0"						
		4'-6"				39.0	36.0	27.0
		5'-0"	27.5	31.0	32.0	21.0	19.0	12.0
2x6	1.7	5'-6"						
		6'-0"						14.0
		6'-6"				11.5	10.0	5.0
		7'-0"	13.0	14.0	14.0			
2x8	2.0	7'-6"						13.0
		8'-0"				12.5	10.5	5.5
		8'-6"				5.0		
		9'-0"	9.5	10.0	10.0			
2x10	2.4	9'-0"						
		9'-6"						8.5
		10'-0"				9.5	7.5	
		10'-6"						
2x12	2.8	11'-0"						9.0
		11'-6"				10.5	9.0	
		12'-0"				5.5		
		12'-6"			12.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-19.2-60-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	3'-6"	42.5	44.0	43.5	35.5	34.5	30.5
		4'-0"	21.5	23.0	23.0	15.5	16.0	14.0
		4'-6"	7.5	8.5	8.5	2.0	3.5	3.0
		5'-0"						
2x6	1.0	5'-6"	32.0	33.0	32.5	24.5	24.5	21.5
		6'-0"	19.5	20.5	20.5	13.0	13.5	12.0
		6'-6"	10.0	10.5	10.5	3.5	5.0	4.0
		7'-0"	2.0	3.0	3.0			
2x8	1.4	7'-6"	21.5	22.5	22.0	14.5	15.0	13.0
		8'-0"	13.5	14.0	14.0	7.0	8.0	7.0
		8'-6"	6.5	7.0	7.0	0.5	2.0	1.5
		9'-0"	0.5	1.5	1.5			
2x10	1.8	9'-0"	24.0	25.0	24.5	17.0	17.0	15.0
		9'-6"	17.0	17.5	17.5	10.0	11.0	9.5
		10'-0"	11.0	11.5	11.5	4.5	5.5	4.5
		10'-6"	5.5	6.0	6.0		0.5	0.5
2x12	2.1	11'-0"	17.5	18.0	17.5	10.5	11.0	9.5
		11'-6"	12.0	12.5	12.5	5.0	6.0	5.5
		12'-0"	7.5	8.0	7.5	0.5	2.0	1.5
		12'-6"	3.0	3.5	3.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	3'-6"						
		4'-0"						
		4'-6"				42.0	40.5	35.5
		5'-0"	25.0	29.0	30.0	23.5	23.5	20.5
2x6	1.7	5'-6"						
		6'-0"						
		6'-6"				14.5	15.0	13.0
		7'-0"	11.0	12.0	12.5	5.5	6.5	5.5
2x8	2.0	7'-6"						
		8'-0"						
		8'-6"				8.0	8.5	7.5
		9'-0"	7.0	8.0	8.0			
2x10	2.4	9'-0"						
		9'-6"						
		10'-0"				12.0		11.0
		10'-6"				6.5	7.5	6.0
2x12	2.8	11'-0"						
		11'-6"				13.5		
		12'-0"				8.0	9.0	7.5
		12'-6"	10.0	10.5	10.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-19.2-60-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	3'-6"	39.0	40.5	40.5	29.5	28.5	23.5
		4'-0"	18.5	19.5	19.5	10.0	10.0	7.0
		4'-6"	4.0	5.0	5.0			
		5'-0"						
2x6	1.0	5'-6"	28.5	29.5	29.5	19.0	18.0	14.5
		6'-0"	16.0	17.0	17.0	7.0	7.0	4.5
		6'-6"	6.5	7.5	7.0			
		7'-0"						
2x8	1.4	7'-6"	18.0	19.0	18.5	9.0	9.0	6.0
		8'-0"	10.0	11.0	10.5	1.0	1.5	
		8'-6"	3.0	4.0	3.5			
		9'-0"						
2x10	1.8	9'-0"	21.0	21.5	21.0	11.0	11.0	8.0
		9'-6"	13.5	14.5	14.0	4.5	4.5	2.5
		10'-0"	7.5	8.0	8.0			
		10'-6"	2.0	3.0	2.5			
2x12	2.1	11'-0"	14.5	15.0	14.5	4.5	4.5	2.5
		11'-6"	9.0	9.5	9.0			
		12'-0"	4.0	4.5	4.0			
		12'-6"		0.5				

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	3'-6"						
		4'-0"						
		4'-6"	39.5	44.0	45.5	36.0	34.5	28.5
		5'-0"	22.0	25.5	26.5	18.0	17.5	13.5
2x6	1.7	5'-6"						
		6'-0"						15.0
		6'-6"				8.5	8.5	6.0
		7'-0"	7.5	9.0	9.0			
2x8	2.0	7'-6"						
		8'-0"				9.5	9.5	6.5
		8'-6"	10.5	11.5	11.5			
		9'-0"		5.0	5.0			
2x10	2.4	9'-0"						
		9'-6"				13.0	12.5	9.5
		10'-0"				6.5	6.5	
		10'-6"	9.0	10.0	10.0			
2x12	2.8	11'-0"				13.5	13.0	10.0
		11'-6"				7.5	7.5	5.0
		12'-0"	11.5	12.5	12.0			
		12'-6"	6.5	7.5	7.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-19.2-60-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.7	3'-6"	40.0	41.5	41.0	28.5	26.5	20.0
		4'-0"	19.5	20.5	20.0	9.0	8.0	4.0
		4'-6"	5.0	6.0	6.0			
		5'-0"						
2x6	1.0	5'-6"	29.5	30.5	30.0	18.0	16.5	11.5
		6'-0"	17.0	18.0	17.5	6.0	5.5	1.5
		6'-6"	7.5	8.0	8.0			
		7'-0"		0.5				
2x8	1.4	7'-6"	19.0	20.0	19.5	8.0	7.0	3.0
		8'-0"	11.0	11.5	11.0			
		8'-6"	4.0	5.0	4.5			
		9'-0"						
2x10	1.8	9'-0"	22.0	22.5	22.0	10.0	9.0	5.0
		9'-6"	14.5	15.0	14.5	3.5	2.5	
		10'-0"	8.5	9.0	8.5			
		10'-6"	3.0	3.5	3.5			
2x12	2.1	11'-0"	15.5	15.5	15.0	3.5	3.0	
		11'-6"	10.0	10.0	9.5			
		12'-0"	5.0	5.5	5.0			
		12'-6"	1.0	1.0	0.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	3'-6"						
		4'-0"						46.0
		4'-6"	40.5			35.0	32.5	25.0
		5'-0"	22.5	26.5	27.5	17.0	15.5	10.0
2x6	1.7	5'-6"						
		6'-0"						12.0
		6'-6"				7.5	7.0	
		7'-0"	8.5	9.5	9.5			
2x8	2.0	7'-6"						11.0
		8'-0"				8.5	7.5	
		8'-6"	11.5	12.5	12.0			
		9'-0"	5.0	5.5	5.5			
2x10	2.4	9'-0"						13.0
		9'-6"				12.0	11.0	6.5
		10'-0"				5.5		
		10'-6"	10.0	11.0	10.5			
2x12	2.8	11'-0"				12.5	11.5	6.5
		11'-6"				6.5	5.5	
		12'-0"	12.5		12.5			
		12'-6"	7.5	8.0	8.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-24-50-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	3'-0"	55.0	57.0	57.0	48.0	45.5	39.5
		3'-6"	30.0	31.5	31.0	23.5	22.5	19.5
		4'-0"	13.5	14.5	14.5	7.5	8.0	6.0
		4'-6"	2.0	3.0	3.0			
2x6	0.8	5'-0"	34.5	35.5	35.5	27.5	26.5	22.5
		5'-6"	21.5	22.5	22.5	15.0	14.5	12.0
		6'-0"	12.0	12.5	12.5	5.5	6.0	4.5
		6'-6"	4.0	5.0	4.5			
2x8	1.1	6'-6"	31.0	32.0	31.5	23.5	23.0	19.5
		7'-0"	21.5	22.0	22.0	14.5	14.0	11.5
		7'-6"	13.5	14.0	14.0	7.0	7.0	5.5
		8'-0"	7.0	7.5	7.5	0.5	1.5	0.5
2x10	1.4	8'-0"	30.5	31.0	30.5	22.5	22.0	18.5
		8'-6"	22.5	23.0	22.5	15.0	15.0	12.0
		9'-0"	15.5	16.0	16.0	8.5	9.0	7.0
		9'-6"	10.0	10.5	10.0	3.0	3.5	2.5
2x12	1.7	9'-6"	27.5	28.0	27.5	19.5	19.0	16.0
		10'-0"	21.0	21.5	21.0	13.5	13.0	11.0
		10'-6"	15.0	15.5	15.5	8.0	8.0	6.5
		11'-0"	10.5	10.5	10.5	3.5	4.0	2.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	3'-0"						
		3'-6"						
		4'-0"						
		4'-6"	30.5	34.0	35.5	28.5	27.5	23.0
2x6	1.4	5'-0"						
		5'-6"						
		6'-0"						12.5
		6'-6"	12.5	13.5	13.5	6.5	7.0	5.5
2x8	1.6	6'-6"						
		7'-0"						
		7'-6"						
		8'-0"				7.5	7.5	6.0
2x10	1.9	8'-0"						
		8'-6"						
		9'-0"						
		9'-6"				10.0	10.5	8.0
2x12	2.2	9'-6"						
		10'-0"						
		10'-6"						
		11'-0"				10.5	10.5	8.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-24-50-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	3'-0"	52.0	54.0	53.5	42.0	39.5	32.5
		3'-6"	27.0	28.0	28.0	17.5	16.5	12.0
		4'-0"	10.5	11.5	11.0	2.0	1.5	
		4'-6"						
2x6	0.8	5'-0"	31.5	32.5	32.0	21.5	20.0	15.5
		5'-6"	18.5	19.5	19.0	9.0	8.5	5.0
		6'-0"	8.5	9.5	9.0			
		6'-6"	1.0	1.5	1.5			
2x8	1.1	6'-6"	28.0	29.0	28.5	18.0	16.5	12.5
		7'-0"	18.0	19.0	18.5	8.5	8.0	4.5
		7'-6"	10.0	11.0	10.5	1.0	1.0	
		8'-0"	3.5	4.0	4.0			
2x10	1.4	8'-0"	27.0	28.0	27.5	17.0	15.5	11.5
		8'-6"	19.0	19.5	19.5	9.5	8.5	5.0
		9'-0"	12.5	13.0	12.5	3.0	2.5	
		9'-6"	6.5	7.0	7.0			
2x12	1.7	9'-6"	24.5	25.0	24.5	14.0	13.0	9.0
		10'-0"	17.5	18.0	17.5	7.5	7.0	4.0
		10'-6"	12.0	12.5	12.0	2.0	2.0	
		11'-0"	7.0	7.5	7.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	3'-0"						
		3'-6"						
		4'-0"				43.0	40.5	33.0
		4'-6"	27.0	31.0	32.0	23.0	21.5	16.0
2x6	1.4	5'-0"						
		5'-6"						15.0
		6'-0"				10.0	9.0	5.5
		6'-6"	9.0	10.0	10.0			
2x8	1.6	6'-6"						
		7'-0"						12.0
		7'-6"				9.0	8.0	
		8'-0"	10.0	11.0	11.0			
2x10	1.9	8'-0"						
		8'-6"						12.5
		9'-0"				11.0	10.0	6.5
		9'-6"						
2x12	2.2	9'-6"						
		10'-0"						11.0
		10'-6"				10.5	9.5	6.0
		11'-0"				5.0		

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-24-50-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	3'-0"	52.5	54.0	53.5	40.5	37.0	29.0
		3'-6"	27.5	28.5	28.0	16.0	14.0	9.0
		4'-0"	11.0	11.5	11.5	0.5		
		4'-6"						
2x6	0.8	5'-0"	32.0	33.0	32.0	20.0	18.0	12.0
		5'-6"	19.0	19.5	19.0	7.5	6.0	1.5
		6'-0"	9.0	9.5	9.5			
		6'-6"	1.5	2.0	1.5			
2x8	1.1	6'-6"	28.5	29.0	28.5	16.5	14.5	9.0
		7'-0"	18.5	19.0	18.5	7.0	5.5	1.0
		7'-6"	10.5	11.0	10.5			
		8'-0"	4.0	4.5	4.0			
2x10	1.4	8'-0"	27.5	28.0	27.5	15.5	13.5	8.0
		8'-6"	19.5	20.0	19.5	8.0	6.5	2.0
		9'-0"	13.0	13.5	12.5	1.5	0.5	
		9'-6"	7.0	7.5	7.0			
2x12	1.7	9'-6"	25.0	25.0	24.5	12.5	10.5	5.5
		10'-0"	18.0	18.5	18.0	6.0	4.5	0.5
		10'-6"	12.5	13.0	12.0	1.0		
		11'-0"	7.5	8.0	7.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	3'-0"						
		3'-6"						
		4'-0"				41.5	38.0	29.5
		4'-6"	27.5	31.0	32.0	21.5	19.0	13.0
2x6	1.4	5'-0"						
		5'-6"						12.0
		6'-0"				8.5	7.0	
		6'-6"	9.5	10.5	10.5			
2x8	1.6	6'-6"						
		7'-0"						8.5
		7'-6"				7.5	6.0	
		8'-0"	10.5	11.5	11.0			
2x10	1.9	8'-0"						
		8'-6"						9.0
		9'-0"				9.5	7.5	
		9'-6"						
2x12	2.2	9'-6"						
		10'-0"					13.0	7.5
		10'-6"				9.0	7.0	
		11'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-24-60-B

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	3'-0"	50.0	52.0	52.0	43.5	42.0	37.0
		3'-6"	25.0	26.5	26.5	19.0	19.0	17.0
		4'-0"	8.5	9.5	9.5	3.0	4.5	4.0
		4'-6"						
2x6	0.8	5'-0"	29.5	31.0	30.5	23.0	22.5	20.0
		5'-6"	16.5	17.5	17.5	10.5	11.0	10.0
		6'-0"	6.5	7.5	7.5	1.0	2.5	2.0
		6'-6"						
2x8	1.1	6'-6"	26.0	27.0	27.0	19.0	19.5	17.0
		7'-0"	16.5	17.0	17.0	10.0	10.5	9.5
		7'-6"	8.5	9.0	9.0	2.0	3.5	3.0
		8'-0"	2.0	2.5	2.5			
2x10	1.4	8'-0"	25.0	26.0	26.0	18.0	18.5	16.0
		8'-6"	17.0	18.0	18.0	10.5	11.5	10.0
		9'-0"	10.5	11.0	11.0	4.0	5.5	4.5
		9'-6"	4.5	5.5	5.5			
2x12	1.7	9'-6"	22.5	23.0	23.0	15.0	15.5	13.5
		10'-0"	16.0	16.5	16.0	9.0	9.5	8.5
		10'-6"	10.0	11.0	10.5	3.5	4.5	4.0
		11'-0"	5.0	5.5	5.5		0.5	

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	3'-0"						
		3'-6"						
		4'-0"				44.5	43.0	38.0
		4'-6"	25.5	29.0	30.5	24.0	24.0	21.0
2x6	1.4	5'-0"						
		5'-6"						
		6'-0"				11.0	12.0	10.5
		6'-6"	7.0	8.5	8.5			
2x8	1.6	6'-6"						
		7'-0"						
		7'-6"				10.0	11.0	9.5
		8'-0"	8.5	9.5	9.5			
2x10	1.9	8'-0"						
		8'-6"						
		9'-0"				12.0		11.0
		9'-6"	11.5			5.5	6.5	6.0
2x12	2.2	9'-6"						
		10'-0"						
		10'-6"				11.5	12.0	10.5
		11'-0"	12.5			6.0	7.0	6.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-24-60-C

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	3'-0"	47.0	49.0	48.5	37.5	36.0	30.0
		3'-6"	22.0	23.0	23.0	13.0	13.0	10.0
		4'-0"	5.5	6.5	6.5			
		4'-6"						
2x6	0.8	5'-0"	26.5	27.5	27.0	17.0	16.5	13.0
		5'-6"	13.5	14.5	14.0	4.5	5.0	3.0
		6'-0"	3.5	4.5	4.0			
		6'-6"						
2x8	1.1	6'-6"	23.0	24.0	23.5	13.5	13.0	10.0
		7'-0"	13.0	14.0	13.5	4.0	4.5	2.5
		7'-6"	5.0	6.0	5.5			
		8'-0"						
2x10	1.4	8'-0"	22.0	23.0	22.5	12.5	12.0	9.0
		8'-6"	14.0	14.5	14.5	4.5	5.0	3.0
		9'-0"	7.0	8.0	7.5			
		9'-6"	1.5	2.0	2.0			
2x12	1.7	9'-6"	19.0	20.0	19.5	9.5	9.5	6.5
		10'-0"	12.5	13.0	13.0	3.0	3.5	1.5
		10'-6"	7.0	7.5	7.0			
		11'-0"	2.0	2.5	2.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	3'-0"						
		3'-6"						
		4'-0"				38.5	37.0	30.5
		4'-6"	22.0	26.0	27.0	18.5	18.0	14.0
2x6	1.4	5'-0"						
		5'-6"				17.0	16.5	13.0
		6'-0"	13.5	14.5	15.0	5.5	5.5	
		6'-6"		5.0	5.5			
2x8	1.6	6'-6"						
		7'-0"				13.0	13.0	9.5
		7'-6"	12.5					
		8'-0"	5.0	6.0	6.0			
2x10	1.9	8'-0"						
		8'-6"				13.5	13.5	10.0
		9'-0"				6.0	6.5	
		9'-6"	8.5	9.5	9.0			
2x12	2.2	9'-6"						
		10'-0"				12.0	12.0	9.0
		10'-6"				5.5	6.0	
		11'-0"	9.0	10.0	9.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table HF-3-24-60-D

Design Assumptions

Wood Species =	Hem-Fir	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	29.2 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	3'-0"	48.0	49.5	49.5	36.5	34.0	27.0
		3'-6"	22.5	24.0	23.5	12.0	11.0	6.5
		4'-0"	6.5	7.0	7.0			
		4'-6"						
2x6	0.8	5'-0"	27.5	28.5	28.0	16.0	14.5	10.0
		5'-6"	14.5	15.0	15.0	3.5	3.0	
		6'-0"	4.5	5.0	5.0			
		6'-6"						
2x8	1.1	6'-6"	24.0	24.5	24.0	12.5	11.0	7.0
		7'-0"	14.0	14.5	14.5	3.0	2.5	
		7'-6"	6.0	6.5	6.5			
		8'-0"						
2x10	1.4	8'-0"	23.0	23.5	23.0	11.5	10.5	6.0
		8'-6"	15.0	15.5	15.0	3.5	3.0	
		9'-0"	8.0	9.0	8.5			
		9'-6"	2.5	3.0	2.5			
2x12	1.7	9'-6"	20.0	20.5	20.0	8.5	7.5	3.5
		10'-0"	13.5	14.0	13.5	2.0	1.5	
		10'-6"	8.0	8.5	8.0			
		11'-0"	3.0	3.5	3.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.1	3'-0"						
		3'-6"						
		4'-0"				37.5	35.0	27.5
		4'-6"	23.0	26.5	27.5	17.5	16.0	10.5
2x6	1.4	5'-0"						
		5'-6"				16.0	14.5	10.0
		6'-0"	14.0	15.5	15.5			
		6'-6"	5.0	6.0	6.0			
2x8	1.6	6'-6"						
		7'-0"				12.0	11.0	6.5
		7'-6"						
		8'-0"	6.0	7.0	7.0			
2x10	1.9	8'-0"						
		8'-6"				12.5	11.5	7.0
		9'-0"				5.0		
		9'-6"	9.5	10.0	10.0			
2x12	2.2	9'-6"						11.5
		10'-0"				11.0	10.0	5.5
		10'-6"						
		11'-0"	10.0	11.0	10.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-12-50-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	6'-6"	21.5	23.5	24.5	17.0	12.0	4.5
		7'-0"	12.0	14.0	15.0	5.0	2.0	
		7'-6"	4.5	6.5	5.5			
		8'-0"						
2x6	1.6	10'-0"	17.0	19.0	19.5	12.5	12.5	7.0
		10'-6"	11.0	13.0	13.5	7.0	7.0	1.0
		11'-0"	6.0	8.0	8.5	2.0	1.0	
		11'-6"	1.5	3.5	4.0			
2x8	2.2	13'-0"	15.0	16.5	16.5	10.0	10.0	7.5
		13'-6"	10.5	12.0	12.0	5.5	6.0	3.5
		14'-0"	6.5	8.0	8.5	2.0	2.5	
		14'-6"	3.0	4.5	5.0			
2x10	2.7	16'-0"	14.5	16.0	16.0	9.0	9.0	7.0
		16'-6"	11.0	12.5	12.5	5.5	6.0	4.0
		17'-0"	7.5	9.0	9.5	2.5	3.0	1.5
		17'-6"	4.5	6.0	6.5		0.5	
2x12	3.3	19'-0"	12.5	14.0	14.0	7.0	7.0	4.5
		19'-6"	9.5	11.0	11.0	4.0	4.5	2.5
		20'-0"	7.0	8.0	8.0	1.5	2.0	0.5
		20'-6"	4.5	5.5	5.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-6"						43.5
		7'-0"				42.0	40.0	27.5
		7'-6"	26.5			29.5	26.0	15.5
		8'-0"	16.5	21.5	24.0	19.0	14.5	6.0
2x6	2.7	10'-0"						
		10'-6"						12.0
		11'-0"				10.0	10.0	7.5
		11'-6"	7.5	10.0	11.0	5.0	5.5	
2x8	3.2	13'-0"						
		13'-6"						9.0
		14'-0"				7.5	8.0	5.5
		14'-6"	7.5	9.5	10.0			
2x10	3.8	16'-0"						
		16'-6"						9.0
		17'-0"				8.5	8.5	6.0
		17'-6"	9.5			5.5	5.5	
2x12	4.4	19'-0"						10.5
		19'-6"				10.5	10.5	7.5
		20'-0"				7.5	7.5	5.0
		20'-6"	9.5			5.0	5.0	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-12-50-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	6'-6"	18.0	20.5	21.0	11.0	6.0	
		7'-0"	8.5	11.0	11.5			
		7'-6"	1.0	3.0	2.5			
		8'-0"						
2x6	1.6	10'-0"	14.0	15.5	16.0	6.5	6.0	
		10'-6"	8.0	9.5	10.0	1.0	1.0	
		11'-0"	3.0	4.5	5.0			
		11'-6"			0.5			
2x8	2.2	13'-0"	11.5	13.0	13.5	4.0	3.5	0.5
		13'-6"	7.0	8.5	9.0			
		14'-0"	3.0	4.5	5.0			
		14'-6"		1.0	1.5			
2x10	2.7	16'-0"	11.5	13.0	13.0	3.5	3.0	
		16'-6"	8.0	9.0	9.0			
		17'-0"	4.5	6.0	6.0			
		17'-6"	1.5	2.5	3.0			
2x12	3.3	19'-0"	9.5	10.5	10.5	1.0	0.5	
		19'-6"	6.5	7.5	7.5			
		20'-0"	3.5	4.5	4.5			
		20'-6"	1.0	2.0	2.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-6"						36.5
		7'-0"				36.5	34.0	20.5
		7'-6"	23.0	29.0	31.5	23.5	20.0	8.0
		8'-0"	13.5	18.5	20.5	13.0	8.0	
2x6	2.7	10'-0"						10.5
		10'-6"				10.0	9.5	5.0
		11'-0"	10.0	12.5	13.0			
		11'-6"		7.0	7.5			
2x8	3.2	13'-0"				11.0	10.0	6.0
		13'-6"				6.5	5.5	
		14'-0"	8.5	10.5	11.0			
		14'-6"		6.5	7.0			
2x10	3.8	16'-0"				10.5	9.5	5.5
		16'-6"				6.5	6.0	
		17'-0"	10.0					
		17'-6"	6.5	8.5	8.5			
2x12	4.4	19'-0"				8.0	7.0	
		19'-6"				5.0		
		20'-0"	9.5	11.0	11.0			
		20'-6"	6.5	8.0	8.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-12-50-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	6'-6"	18.5	20.5	21.0	9.5	3.5	
		7'-0"	9.0	11.0	11.5			
		7'-6"	1.5	3.5	2.5			
		8'-0"						
2x6	1.6	10'-0"	14.5	16.0	16.0	5.0	4.0	
		10'-6"	8.5	10.0	10.5			
		11'-0"	3.5	5.0	5.0			
		11'-6"		0.5	0.5			
2x8	2.2	13'-0"	12.0	13.5	13.5	2.5	1.5	
		13'-6"	7.5	9.0	9.0			
		14'-0"	3.5	5.0	5.0			
		14'-6"		1.5	1.5			
2x10	2.7	16'-0"	12.0	13.0	13.0	2.0	0.5	
		16'-6"	8.0	9.5	9.5			
		17'-0"	5.0	6.0	6.0			
		17'-6"	2.0	3.0	3.0			
2x12	3.3	19'-0"	10.0	11.0	10.5			
		19'-6"	7.0	8.0	7.5			
		20'-0"	4.0	5.0	5.0			
		20'-6"	1.5	2.5	2.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-6"					46.5	33.0
		7'-0"				35.0	31.5	17.0
		7'-6"	23.5	29.0	31.5	22.0	17.5	5.0
		8'-0"	14.0	18.5	21.0	11.5	6.0	
2x6	2.7	10'-0"				15.5	13.5	7.0
		10'-6"				8.5	7.0	
		11'-0"	10.0	12.5	13.0			
		11'-6"	5.0	7.5	8.0			
2x8	3.2	13'-0"				9.5	8.0	
		13'-6"				5.0		
		14'-0"	9.0	11.0	11.0			
		14'-6"	5.0	6.5	7.0			
2x10	3.8	16'-0"				9.0	7.5	
		16'-6"				5.0		
		17'-0"	10.5					
		17'-6"	7.0	8.5	9.0			
2x12	4.4	19'-0"				6.5	5.0	
		19'-6"						
		20'-0"	10.0	11.5	11.5			
		20'-6"	7.0	8.5	8.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-12-60-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	6'-6"	16.0	18.5	19.5	12.5	8.5	2.5
		7'-0"	7.0	9.0	10.0	0.5		
		7'-6"		1.5	1.0			
		8'-0"						
2x6	1.6	10'-0"	12.0	14.0	14.5	8.0	9.0	4.5
		10'-6"	6.0	8.0	8.5	2.5	3.5	
		11'-0"	1.0	3.0	3.5			
		11'-6"						
2x8	2.2	13'-0"	9.5	11.5	12.0	5.0	6.5	5.0
		13'-6"	5.0	7.0	7.5	1.0	2.5	1.0
		14'-0"	1.5	3.0	3.5			
		14'-6"						
2x10	2.7	16'-0"	9.5	11.0	11.5	4.5	5.5	4.5
		16'-6"	6.0	7.5	7.5	1.0	2.5	1.5
		17'-0"	2.5	4.0	4.5			
		17'-6"		1.0	1.5			
2x12	3.3	19'-0"	7.5	9.0	9.0	2.0	3.5	2.5
		19'-6"	4.5	6.0	6.0		1.0	
		20'-0"	2.0	3.0	3.5			
		20'-6"		0.5	0.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-6"						41.0
		7'-0"				37.5	36.5	25.0
		7'-6"	21.5	27.0	30.0	24.5	22.5	13.0
		8'-0"	11.5	16.5	19.0	14.5	11.0	
2x6	2.7	10'-0"						15.5
		10'-6"				11.5	12.0	9.5
		11'-0"	8.0	10.5	11.5	5.5	6.5	5.0
		11'-6"		5.0	6.0			
2x8	3.2	13'-0"				12.5		10.5
		13'-6"	11.0			7.5	8.5	6.5
		14'-0"	6.5	8.5	9.5			
		14'-6"			5.5			
2x10	3.8	16'-0"				11.5		10.0
		16'-6"				8.0	8.5	7.0
		17'-0"	8.0	10.0	10.5		5.0	
		17'-6"		6.5	7.0			
2x12	4.4	19'-0"				9.5	10.0	8.0
		19'-6"	10.5			6.0	7.0	5.5
		20'-0"	7.5	9.5	9.5			
		20'-6"		6.5	6.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-12-60-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	6'-6"	13.0	15.5	16.0	6.5	2.5	
		7'-0"	3.5	6.0	6.5			
		7'-6"						
		8'-0"						
2x6	1.6	10'-0"	8.5	10.5	11.0	2.0	2.5	
		10'-6"	3.0	4.5	5.0			
		11'-0"						
		11'-6"						
2x8	2.2	13'-0"	6.5	8.0	8.5			
		13'-6"	2.0	3.5	4.0			
		14'-0"						
		14'-6"						
2x10	2.7	16'-0"	6.5	8.0	8.0			
		16'-6"	2.5	4.0	4.5			
		17'-0"		1.0	1.0			
		17'-6"						
2x12	3.3	19'-0"	4.5	5.5	5.5			
		19'-6"	1.5	2.5	2.5			
		20'-0"						
		20'-6"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-6"					45.5	34.0
		7'-0"	30.5			32.0	30.5	18.0
		7'-6"	18.0	24.0	26.5	19.0	16.5	6.0
		8'-0"	8.0	13.5	16.0	8.5		
2x6	2.7	10'-0"				12.5	12.0	8.0
		10'-6"	10.5	13.5	14.5	5.5	5.5	
		11'-0"		7.5	8.0			
		11'-6"						
2x8	3.2	13'-0"				6.5	6.5	
		13'-6"	8.0	10.0	10.5			
		14'-0"		5.5	6.0			
		14'-6"						
2x10	3.8	16'-0"				6.0	6.0	
		16'-6"	8.5	10.5	11.0			
		17'-0"	5.0	7.0	7.0			
		17'-6"						
2x12	4.4	19'-0"	11.0					
		19'-6"	7.5	9.0	9.5			
		20'-0"		6.0	6.0			
		20'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-12-60-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	6'-6"	14.0	16.5	17.0	5.5	0.5	
		7'-0"	4.5	6.5	7.5			
		7'-6"						
		8'-0"						
2x6	1.6	10'-0"	9.5	11.5	12.0	1.0	0.5	
		10'-6"	4.0	5.5	6.0			
		11'-0"		0.5	1.0			
		11'-6"						
2x8	2.2	13'-0"	7.5	9.0	9.0			
		13'-6"	3.0	4.5	4.5			
		14'-0"		0.5	1.0			
		14'-6"						
2x10	2.7	16'-0"	7.5	8.5	8.5			
		16'-6"	3.5	5.0	5.0			
		17'-0"	0.5	1.5	1.5			
		17'-6"						
2x12	3.3	19'-0"	5.5	6.5	6.5			
		19'-6"	2.5	3.5	3.5			
		20'-0"		0.5	0.5			
		20'-6"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	6'-6"					43.5	31.0
		7'-0"	31.5			31.0	28.5	15.0
		7'-6"	19.0	24.5	27.5	18.0	14.5	
		8'-0"	9.0	14.0	16.5	7.5		
2x6	2.7	10'-0"				11.5	10.0	5.0
		10'-6"	11.5					
		11'-0"	5.5	8.0	9.0			
		11'-6"						
2x8	3.2	13'-0"				5.5	5.0	
		13'-6"	9.0	11.0	11.5			
		14'-0"		6.5	7.0			
		14'-6"						
2x10	3.8	16'-0"				5.0		
		16'-6"	9.5	11.5	12.0			
		17'-0"	6.0	7.5	8.0			
		17'-6"						
2x12	4.4	19'-0"						
		19'-6"	8.5	10.0	10.0			
		20'-0"	5.5	7.0	7.0			
		20'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-16-50-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	27.0	29.0	29.5	22.0	21.5	14.5
		6'-0"	15.0	17.0	17.5	11.0	10.0	3.0
		6'-6"	6.0	8.0	8.5	2.0		
		7'-0"		1.0	1.5			
2x6	1.2	8'-6"	21.5	23.0	23.5	16.0	16.0	13.0
		9'-0"	14.5	16.0	16.0	9.5	9.5	7.0
		9'-6"	8.0	10.0	10.0	3.5	4.0	2.0
		10'-0"	3.0	4.5	5.0			
2x8	1.6	11'-0"	19.5	21.0	21.0	14.0	13.5	11.0
		11'-6"	14.0	15.5	15.5	9.0	9.0	6.5
		12'-0"	9.5	10.5	11.0	4.0	4.5	3.0
		12'-6"	5.0	6.5	6.5		1.0	
2x10	2.1	14'-0"	15.5	16.5	16.5	9.5	9.5	7.0
		14'-6"	11.0	12.5	12.5	5.5	6.0	4.0
		15'-0"	7.5	9.0	9.0	2.0	2.5	1.5
		15'-6"	4.0	5.5	5.5			
2x12	2.5	16'-0"	18.0	19.0	19.0	11.5	11.5	9.0
		16'-6"	14.0	15.0	15.0	8.0	8.0	6.0
		17'-0"	11.0	12.0	11.5	5.0	5.0	3.5
		17'-6"	7.5	8.5	8.5	2.0	2.5	1.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						
		6'-0"						38.5
		6'-6"				33.0	32.0	24.0
		7'-0"	19.5	24.0	26.5	21.0	20.5	12.0
2x6	2.0	8'-6"						
		9'-0"						
		9'-6"				12.5	12.5	9.5
		10'-0"	10.0	12.0	13.0	6.5	6.5	
2x8	2.4	11'-0"						
		11'-6"						
		12'-0"				11.0	11.0	8.0
		12'-6"	10.5			6.0	6.5	
2x10	2.8	14'-0"						
		14'-6"						9.5
		15'-0"				8.5	8.5	6.0
		15'-6"	9.5			5.0	5.0	
2x12	3.3	16'-0"						
		16'-6"						
		17'-0"				11.5	11.5	9.0
		17'-6"				8.5	8.5	6.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-16-50-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	23.5	25.5	26.0	16.5	15.0	7.5
		6'-0"	12.0	14.0	14.5	5.5	3.5	
		6'-6"	3.0	5.0	5.5			
		7'-0"						
2x6	1.2	8'-6"	18.5	20.0	20.0	10.5	9.5	6.0
		9'-0"	11.0	12.5	13.0	3.5	3.5	
		9'-6"	5.0	6.5	6.5			
		10'-0"		1.5	1.5			
2x8	1.6	11'-0"	16.5	18.0	18.0	8.0	7.5	4.0
		11'-6"	11.0	12.0	12.5	3.0	2.5	
		12'-0"	6.0	7.5	7.5			
		12'-6"	2.0	3.0	3.5			
2x10	2.1	14'-0"	12.0	13.0	13.0	3.5	3.5	
		14'-6"	8.0	9.0	9.0			
		15'-0"	4.5	5.5	5.5			
		15'-6"	1.0	2.0	2.0			
2x12	2.5	16'-0"	14.5	15.5	15.5	5.5	5.0	1.5
		16'-6"	11.0	12.0	11.5	2.0	2.0	
		17'-0"	7.5	8.5	8.5			
		17'-6"	4.5	5.5	5.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						
		6'-0"					40.0	31.5
		6'-6"	27.5	33.0		27.5	25.5	17.0
		7'-0"	16.0	21.0	23.0	15.0	14.0	5.0
2x6	2.0	8'-6"						
		9'-0"				13.5	12.5	8.0
		9'-6"	13.0			6.5	6.0	
		10'-0"	6.5	9.0	9.5			
2x8	2.4	11'-0"						10.5
		11'-6"				10.5	9.5	5.5
		12'-0"				5.0		
		12'-6"	7.0	9.0	9.5			
2x10	2.8	14'-0"				11.0	10.0	6.0
		14'-6"				6.5	6.0	
		15'-0"	10.0					
		15'-6"	6.5	8.0	8.0			
2x12	3.3	16'-0"					12.5	8.0
		16'-6"				9.5	8.5	5.0
		17'-0"				6.0	5.5	
		17'-6"	10.5		12.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-16-50-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	24.0	26.0	26.5	15.0	13.0	4.0
		6'-0"	12.5	14.5	14.5	4.0	1.5	
		6'-6"	3.5	5.0	5.5			
		7'-0"						
2x6	1.2	8'-6"	18.5	20.5	20.0	9.0	7.5	2.5
		9'-0"	11.5	13.0	13.0	2.0	1.0	
		9'-6"	5.5	7.0	7.0			
		10'-0"	0.5	1.5	2.0			
2x8	1.6	11'-0"	17.0	18.0	18.0	6.5	5.0	0.5
		11'-6"	11.5	12.5	12.5	1.5	0.5	
		12'-0"	6.5	7.5	7.5			
		12'-6"	2.5	3.5	3.5			
2x10	2.1	14'-0"	12.5	13.5	13.5	2.0	1.0	
		14'-6"	8.5	9.5	9.5			
		15'-0"	4.5	6.0	5.5			
		15'-6"	1.5	2.5	2.5			
2x12	2.5	16'-0"	15.0	16.0	15.5	4.0	3.0	
		16'-6"	11.5	12.0	12.0	0.5		
		17'-0"	8.0	9.0	8.5			
		17'-6"	5.0	5.5	5.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						44.5
		6'-0"				41.5	37.5	28.0
		6'-6"	28.0	33.5		26.0	23.5	13.5
		7'-0"	16.5	21.5	23.5	13.5	12.0	
2x6	2.0	8'-6"						11.5
		9'-0"				12.0	10.5	
		9'-6"				5.0		
		10'-0"	7.0	9.0	9.5			
2x8	2.4	11'-0"					13.0	7.0
		11'-6"				9.0	7.0	
		12'-0"						
		12'-6"	7.5	9.5	9.5			
2x10	2.8	14'-0"				9.5	8.0	
		14'-6"				5.0		
		15'-0"	10.5					
		15'-6"	7.0	8.0	8.5			
2x12	3.3	16'-0"				12.5	10.5	5.0
		16'-6"				8.0	6.5	
		17'-0"						
		17'-6"	11.0					

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-16-60-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	21.5	24.0	24.5	17.5	18.0	12.5
		6'-0"	10.0	12.5	13.0	6.5	6.5	0.5
		6'-6"	1.0	3.0	4.0			
		7'-0"						
2x6	1.2	8'-6"	16.5	18.0	18.5	11.5	12.5	10.5
		9'-0"	9.0	11.0	11.5	5.0	6.0	5.0
		9'-6"	3.0	5.0	5.5		0.5	
		10'-0"						
2x8	1.6	11'-0"	14.5	16.0	16.5	9.5	10.0	8.5
		11'-6"	9.0	10.5	11.0	4.0	5.5	4.5
		12'-0"	4.0	5.5	6.0		1.0	0.5
		12'-6"		1.5	2.0			
2x10	2.1	14'-0"	10.0	11.5	11.5	5.0	6.0	5.0
		14'-6"	6.0	7.5	7.5	1.0	2.5	2.0
		15'-0"	2.5	4.0	4.0			
		15'-6"		0.5	0.5			
2x12	2.5	16'-0"	13.0	14.0	14.0	7.0	8.0	6.5
		16'-6"	9.0	10.0	10.5	3.5	4.5	3.5
		17'-0"	5.5	7.0	7.0		1.5	1.0
		17'-6"	2.5	3.5	4.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						
		6'-0"						36.0
		6'-6"	26.0	31.5	34.0	28.5	28.5	21.5
		7'-0"	14.0	19.5	21.5	16.5	17.0	9.5
2x6	2.0	8'-6"						
		9'-0"				15.0		13.0
		9'-6"	11.0	13.5		8.0	9.0	7.0
		10'-0"		7.0	8.0			
2x8	2.4	11'-0"						
		11'-6"				11.5		10.0
		12'-0"	10.0			6.5	7.5	6.0
		12'-6"	5.5	7.5	8.0			
2x10	2.8	14'-0"				12.5		11.0
		14'-6"				8.0	8.5	7.0
		15'-0"	8.5	10.0	10.5		5.0	
		15'-6"		6.0	6.5			
2x12	3.3	16'-0"						
		16'-6"				11.0	11.5	9.5
		17'-0"				7.0	8.0	6.5
		17'-6"	8.5	10.0	10.5		5.0	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-16-60-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	18.5	20.5	21.0	12.0	11.5	5.0
		6'-0"	7.0	9.0	9.5	1.0		
		6'-6"			0.5			
		7'-0"						
2x6	1.2	8'-6"	13.0	15.0	15.0	6.0	6.0	3.5
		9'-0"	6.0	7.5	8.0			
		9'-6"		1.5	2.0			
		10'-0"						
2x8	1.6	11'-0"	11.5	13.0	13.0	3.5	4.0	1.5
		11'-6"	6.0	7.5	7.5			
		12'-0"	1.0	2.5	2.5			
		12'-6"						
2x10	2.1	14'-0"	7.0	8.5	8.5			
		14'-6"	3.0	4.0	4.5			
		15'-0"		0.5	0.5			
		15'-6"						
2x12	2.5	16'-0"	9.5	10.5	10.5	1.0	1.5	
		16'-6"	6.0	7.0	7.0			
		17'-0"	2.5	3.5	3.5			
		17'-6"		0.5	0.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						45.5
		6'-0"				38.0	36.5	29.0
		6'-6"	22.5	28.0	30.5	23.0	22.0	14.5
		7'-0"	11.0	16.0	18.0	10.5	10.5	
2x6	2.0	8'-6"						12.5
		9'-0"				9.0	9.0	6.0
		9'-6"	7.5	10.0	11.0			
		10'-0"						
2x8	2.4	11'-0"				12.0	11.5	8.0
		11'-6"				6.0	6.0	
		12'-0"	7.0	9.0	9.5			
		12'-6"						
2x10	2.8	14'-0"				6.5	6.5	
		14'-6"	9.0	11.0	11.5			
		15'-0"	5.0	7.0	7.0			
		15'-6"						
2x12	3.3	16'-0"				9.0	9.0	6.0
		16'-6"				5.0	5.0	
		17'-0"	9.0	10.5	10.5			
		17'-6"	5.5	7.0	7.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-16-60-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	5'-6"	19.5	21.5	22.0	11.0	10.0	2.0
		6'-0"	8.0	10.0	10.0			
		6'-6"		0.5	1.0			
		7'-0"						
2x6	1.2	8'-6"	14.0	16.0	16.0	5.0	4.0	0.5
		9'-0"	7.0	8.5	8.5			
		9'-6"	1.0	2.5	2.5			
		10'-0"						
2x8	1.6	11'-0"	12.0	13.5	13.5	2.5	2.0	
		11'-6"	6.5	8.0	8.0			
		12'-0"	2.0	3.5	3.5			
		12'-6"						
2x10	2.1	14'-0"	8.0	9.0	9.0			
		14'-6"	4.0	5.0	5.0			
		15'-0"		1.5	1.5			
		15'-6"						
2x12	2.5	16'-0"	10.5	11.5	11.5			
		16'-6"	7.0	8.0	7.5			
		17'-0"	3.5	4.5	4.0			
		17'-6"	0.5	1.0	1.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	5'-6"						42.5
		6'-0"				37.0	34.5	26.0
		6'-6"	23.5	29.0	31.5	22.0	20.0	11.5
		7'-0"	12.0	17.0	19.0	9.5	9.0	
2x6	2.0	8'-6"				16.5	15.0	9.5
		9'-0"				8.0	7.0	
		9'-6"	8.5	11.0	11.5			
		10'-0"			5.0			
2x8	2.4	11'-0"				11.0	9.5	5.0
		11'-6"				5.0		
		12'-0"	8.0	10.0	10.0			
		12'-6"		5.0	5.0			
2x10	2.8	14'-0"				5.5		
		14'-6"	10.0	12.0	12.0			
		15'-0"	6.0	7.5	7.5			
		15'-6"						
2x12	3.3	16'-0"				8.0	7.0	
		16'-6"						
		17'-0"	10.0	11.5	11.5			
		17'-6"	6.5	8.0	8.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-19.2-50-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	5'-0"	28.5	30.5	31.0	23.5	23.0	19.0
		5'-6"	16.0	17.5	18.0	11.5	11.5	6.5
		6'-0"	6.0	8.0	8.5	2.0	2.0	
		6'-6"		0.5	1.0			
2x6	1.0	7'-6"	27.5	29.0	29.0	21.5	21.0	17.0
		8'-0"	18.5	20.0	20.5	13.5	13.0	10.5
		8'-6"	11.5	13.0	13.0	6.5	7.0	5.0
		9'-0"	5.5	7.0	7.0	0.5	1.5	
2x8	1.3	10'-0"	21.0	22.5	22.5	15.5	15.0	12.0
		10'-6"	15.0	16.5	16.5	9.5	9.5	7.5
		11'-0"	10.0	11.0	11.5	4.5	5.0	3.5
		11'-6"	5.5	6.5	6.5		1.0	
2x10	1.7	12'-6"	19.0	20.0	20.0	13.0	12.5	10.0
		13'-0"	14.5	15.5	15.5	8.5	8.5	6.5
		13'-6"	10.0	11.0	11.0	4.5	5.0	3.0
		14'-0"	6.5	7.5	7.5	1.0	1.5	
2x12	2.1	14'-6"	20.0	21.0	20.5	13.0	13.0	10.5
		15'-0"	15.5	16.5	16.5	9.0	9.5	7.0
		15'-6"	12.0	13.0	12.5	5.5	6.0	4.0
		16'-0"	8.5	9.5	9.5	2.5	3.0	1.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"						
		6'-0"				33.5	32.0	26.0
		6'-6"	19.5	24.0	26.0	20.5	20.0	14.0
2x6	1.7	7'-6"						
		8'-0"						
		8'-6"						12.5
		9'-0"				9.0	9.0	7.0
2x8	2.0	10'-0"						
		10'-6"						
		11'-0"				11.5	11.5	9.0
		11'-6"				6.5	6.5	
2x10	2.4	12'-6"						
		13'-0"						
		13'-6"				11.0	11.0	8.5
		14'-0"				7.0	7.0	5.0
2x12	2.7	14'-6"						
		15'-0"						
		15'-6"						10.0
		16'-0"				9.0	9.0	7.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-19.2-50-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	5'-0"	25.5	27.5	27.5	18.0	16.5	12.0
		5'-6"	12.5	14.5	15.0	5.5	5.0	
		6'-0"	3.0	4.5	5.0			
		6'-6"						
2x6	1.0	7'-6"	24.0	25.5	25.5	15.5	14.5	10.0
		8'-0"	15.5	17.0	17.0	7.5	7.0	3.5
		8'-6"	8.0	9.5	10.0	0.5	0.5	
		9'-0"	2.0	3.5	4.0			
2x8	1.3	10'-0"	18.0	19.0	19.0	9.5	8.5	5.0
		10'-6"	12.0	13.0	13.0	3.5	3.5	0.5
		11'-0"	6.5	8.0	8.0			
		11'-6"	2.0	3.0	3.5			
2x10	1.7	12'-6"	16.0	17.0	16.5	7.0	6.5	3.0
		13'-0"	11.0	12.0	12.0	2.5	2.5	
		13'-6"	7.0	8.0	8.0			
		14'-0"	3.0	4.0	4.0			
2x12	2.1	14'-6"	16.5	17.5	17.0	7.5	6.5	3.0
		15'-0"	12.5	13.5	13.0	3.5	3.0	
		15'-6"	8.5	9.5	9.5			
		16'-0"	5.0	6.0	6.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"					41.5	33.0
		6'-0"	28.5	33.5	36.0	27.5	26.0	19.0
		6'-6"	16.0	20.5	22.5	14.5	14.0	7.0
2x6	1.7	7'-6"						
		8'-0"						12.5
		8'-6"				10.0	9.5	5.5
		9'-0"	9.5	11.5	12.0			
2x8	2.0	10'-0"						12.0
		10'-6"				11.5	10.5	6.5
		11'-0"				5.5	5.0	
		11'-6"	7.5	9.5	9.5			
2x10	2.4	12'-6"						9.5
		13'-0"				10.0	9.0	5.0
		13'-6"				5.5	5.0	
		14'-0"	9.0	10.0	10.5			
2x12	2.7	14'-6"						10.0
		15'-0"				11.5	10.5	6.5
		15'-6"				7.0	6.5	
		16'-0"	11.5					

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-19.2-50-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	5'-0"	26.0	28.0	28.0	16.5	14.5	8.5
		5'-6"	13.0	15.0	15.0	4.0	3.0	
		6'-0"	3.5	5.0	5.5			
		6'-6"						
2x6	1.0	7'-6"	24.5	26.0	26.0	14.5	12.5	7.0
		8'-0"	16.0	17.0	17.0	6.0	4.5	
		8'-6"	8.5	10.0	10.0			
		9'-0"	2.5	4.0	4.0			
2x8	1.3	10'-0"	18.5	19.5	19.5	8.0	6.5	1.5
		10'-6"	12.5	13.5	13.5	2.5	1.0	
		11'-0"	7.0	8.0	8.0			
		11'-6"	2.5	3.5	3.5			
2x10	1.7	12'-6"	16.0	17.0	17.0	5.5	4.0	
		13'-0"	11.5	12.5	12.0	1.0		
		13'-6"	7.5	8.0	8.0			
		14'-0"	3.5	4.5	4.5			
2x12	2.1	14'-6"	17.0	18.0	17.5	6.0	4.5	
		15'-0"	13.0	13.5	13.5	2.0	1.0	
		15'-6"	9.0	10.0	9.5			
		16'-0"	5.5	6.5	6.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"				43.0	39.5	29.5
		6'-0"	29.0	34.0		26.0	23.5	16.0
		6'-6"	16.5	21.0	23.0	13.5	11.5	
2x6	1.7	7'-6"						
		8'-0"					15.0	9.0
		8'-6"				9.0	7.0	
		9'-0"	10.0	12.0	12.5			
2x8	2.0	10'-0"						8.5
		10'-6"				10.0	8.0	
		11'-0"						
		11'-6"	8.0	9.5	10.0			
2x10	2.4	12'-6"					11.5	6.0
		13'-0"				8.5	7.0	
		13'-6"						
		14'-0"	9.0	10.5	10.5			
2x12	2.7	14'-6"					12.5	6.5
		15'-0"				10.0	8.0	
		15'-6"				5.5		
		16'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-19.2-60-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	5'-0"	23.5	25.5	26.0	19.0	19.5	16.5
		5'-6"	10.5	13.0	13.5	7.0	8.0	4.0
		6'-0"	1.0	3.0	3.5			
		6'-6"						
2x6	1.0	7'-6"	22.0	24.0	24.0	17.0	17.5	15.0
		8'-0"	13.5	15.0	15.5	8.5	9.5	8.0
		8'-6"	6.5	8.0	8.5	2.0	3.5	2.5
		9'-0"	0.5	2.0	2.5			
2x8	1.3	10'-0"	16.0	17.5	17.5	10.5	11.5	10.0
		10'-6"	10.0	11.5	11.5	5.0	6.0	5.0
		11'-0"	5.0	6.0	6.5		1.5	1.0
		11'-6"		1.5	2.0			
2x10	1.7	12'-6"	14.0	15.0	15.5	8.5	9.0	7.5
		13'-0"	9.0	10.5	10.5	4.0	5.0	4.0
		13'-6"	5.0	6.0	6.5		1.5	1.0
		14'-0"	1.0	2.5	2.5			
2x12	2.1	14'-6"	14.5	16.0	15.5	8.5	9.5	8.0
		15'-0"	10.5	11.5	11.5	4.5	5.5	4.5
		15'-6"	7.0	8.0	8.0	1.0	2.5	2.0
		16'-0"	3.5	4.5	4.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"						37.5
		6'-0"	26.5	32.0	34.5	29.0	28.5	24.0
		6'-6"	14.0	19.0	21.0	16.0	16.5	12.0
2x6	1.7	7'-6"						
		8'-0"						
		8'-6"				11.5	12.0	10.0
		9'-0"	8.0	10.0	11.0		5.5	
2x8	2.0	10'-0"						
		10'-6"				12.5		11.0
		11'-0"	11.0			7.0	8.0	6.5
		11'-6"	6.0	7.5	8.0			
2x10	2.4	12'-6"						
		13'-0"				11.0	12.0	10.0
		13'-6"	11.0			6.5	7.5	6.0
		14'-0"	7.0	8.5	9.0			
2x12	2.7	14'-6"						
		15'-0"				12.5		11.0
		15'-6"				8.5	9.0	7.5
		16'-0"	10.0	11.0	11.5		5.5	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-19.2-60-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	5'-0"	20.5	22.5	23.0	13.5	13.0	9.5
		5'-6"	7.5	9.5	10.0	1.0	1.5	
		6'-0"						
		6'-6"						
2x6	1.0	7'-6"	19.0	20.5	21.0	11.0	11.0	8.0
		8'-0"	10.5	12.0	12.0	3.0	3.5	1.0
		8'-6"	3.0	4.5	5.0			
		9'-0"						
2x8	1.3	10'-0"	13.0	14.0	14.5	5.0	5.0	2.5
		10'-6"	7.0	8.0	8.5			
		11'-0"	1.5	3.0	3.0			
		11'-6"						
2x10	1.7	12'-6"	10.5	12.0	12.0	2.5	3.0	0.5
		13'-0"	6.0	7.0	7.0			
		13'-6"	1.5	3.0	3.0			
		14'-0"						
2x12	2.1	14'-6"	11.5	12.5	12.5	3.0	3.0	1.0
		15'-0"	7.5	8.5	8.0			
		15'-6"	3.5	4.5	4.5			
		16'-0"		1.0	1.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"				40.0	38.0	30.5
		6'-0"	23.5	29.0	31.0	23.0	22.5	17.0
		6'-6"	11.0	15.5	18.0	10.0	10.5	5.0
2x6	1.7	7'-6"						
		8'-0"				14.0	13.5	10.0
		8'-6"	11.5	14.0	14.5	5.5	6.0	
		9'-0"		6.5	7.5			
2x8	2.0	10'-0"				13.5	13.0	9.5
		10'-6"				7.0	7.0	
		11'-0"	8.0	9.5	10.0			
		11'-6"			5.0			
2x10	2.4	12'-6"				10.5	10.5	7.0
		13'-0"				5.5	5.5	
		13'-6"	8.0	9.5	10.0			
		14'-0"		5.5	5.5			
2x12	2.7	14'-6"				11.5	11.0	7.5
		15'-0"				6.5	6.5	
		15'-6"	10.5	12.0	12.0			
		16'-0"	6.5	8.0	8.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-19.2-60-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	5'-0"	21.0	23.5	23.5	12.5	11.0	6.5
		5'-6"	8.5	10.5	10.5			
		6'-0"		0.5	1.0			
		6'-6"						
2x6	1.0	7'-6"	20.0	21.5	21.5	10.0	9.0	4.5
		8'-0"	11.0	12.5	13.0	2.0	1.5	
		8'-6"	4.0	5.5	5.5			
		9'-0"						
2x8	1.3	10'-0"	14.0	15.0	15.0	4.0	3.5	
		10'-6"	7.5	9.0	9.0			
		11'-0"	2.5	3.5	4.0			
		11'-6"						
2x10	1.7	12'-6"	11.5	12.5	12.5	1.5	1.0	
		13'-0"	7.0	8.0	8.0			
		13'-6"	2.5	3.5	3.5			
		14'-0"						
2x12	2.1	14'-6"	12.5	13.5	13.0	2.0	1.0	
		15'-0"	8.5	9.0	9.0			
		15'-6"	4.5	5.5	5.0			
		16'-0"	1.0	2.0	2.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	5'-0"						
		5'-6"				39.0	36.0	27.5
		6'-0"	24.5	29.5	32.0	22.0	20.5	13.5
		6'-6"	12.0	16.5	18.5	9.0	8.5	
2x6	1.7	7'-6"						15.0
		8'-0"				13.0	12.0	7.0
		8'-6"	12.5					
		9'-0"	5.5	7.5	8.0			
2x8	2.0	10'-0"				12.5	11.5	6.5
		10'-6"				6.0	5.0	
		11'-0"	9.0	10.5	11.0			
		11'-6"		5.0	5.5			
2x10	2.4	12'-6"				9.5	8.5	
		13'-0"						
		13'-6"	9.0	10.5	10.5			
		14'-0"		6.0	6.0			
2x12	2.7	14'-6"				10.5	9.0	
		15'-0"				5.5	5.0	
		15'-6"	11.5		12.5			
		16'-0"	7.5	8.5	8.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-24-50-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-0"	48.0	50.5	50.5	42.5	40.5	34.5
		4'-6"	29.0	31.0	31.0	24.0	23.0	19.0
		5'-0"	15.0	17.0	17.0	10.5	10.5	8.5
		5'-6"	5.0	6.5	7.0	0.5	1.5	
2x6	0.8	6'-6"	33.0	34.5	34.5	27.0	26.0	22.0
		7'-0"	22.5	24.0	24.0	17.0	16.5	13.5
		7'-6"	14.0	15.5	15.5	8.5	9.0	7.0
		8'-0"	7.0	8.5	8.5	2.0	3.0	1.5
2x8	1.1	9'-0"	21.5	22.5	22.5	15.5	15.0	12.5
		9'-6"	15.0	16.0	16.0	9.0	9.0	7.0
		10'-0"	9.0	10.5	10.5	3.5	4.0	2.5
		10'-6"	4.5	5.5	5.5			
2x10	1.4	11'-0"	22.0	23.0	23.0	15.5	15.5	12.5
		11'-6"	16.5	17.5	17.5	10.5	10.5	8.0
		12'-0"	11.5	12.5	12.5	6.0	6.0	4.5
		12'-6"	7.5	8.5	8.5	2.0	2.5	1.0
2x12	1.7	13'-0"	20.5	21.5	21.0	13.5	13.5	11.0
		13'-6"	16.0	16.5	16.5	9.5	9.5	7.5
		14'-0"	12.0	12.5	12.5	5.5	6.0	4.0
		14'-6"	8.0	9.0	9.0	2.0	2.5	1.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	4'-0"						
		4'-6"						
		5'-0"						
		5'-6"	30.5			31.5	30.5	25.0
2x6	1.3	6'-6"						
		7'-0"						
		7'-6"						
		8'-0"				11.0	11.0	8.5
2x8	1.6	9'-0"						
		9'-6"						
		10'-0"				10.5	10.5	8.0
		10'-6"	10.0			5.5	5.5	
2x10	1.9	11'-0"						
		11'-6"						
		12'-0"						10.0
		12'-6"				8.0	8.5	6.5
2x12	2.2	13'-0"						
		13'-6"						
		14'-0"						10.0
		14'-6"				9.0	9.0	6.5

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-24-50-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-0"	45.0	47.5	47.5	36.5	34.0	27.5
		4'-6"	25.5	27.5	28.0	18.0	16.5	12.0
		5'-0"	12.0	13.5	14.0	4.5	4.5	1.0
		5'-6"	1.5	3.0	3.5			
2x6	0.8	6'-6"	30.0	31.5	31.5	21.0	19.5	14.5
		7'-0"	19.5	20.5	20.5	11.0	10.0	6.5
		7'-6"	11.0	12.0	12.0	3.0	2.5	
		8'-0"	4.0	5.0	5.0			
2x8	1.1	9'-0"	18.0	19.5	19.0	9.5	9.0	5.0
		9'-6"	11.5	12.5	12.5	3.5	3.0	
		10'-0"	6.0	7.0	7.0			
		10'-6"	1.0	2.0	2.0			
2x10	1.4	11'-0"	19.0	20.0	19.5	10.0	9.0	5.5
		11'-6"	13.5	14.5	14.0	4.5	4.0	1.0
		12'-0"	8.5	9.5	9.5			
		12'-6"	4.0	5.0	5.0			
2x12	1.7	13'-0"	17.0	18.0	17.5	8.0	7.0	4.0
		13'-6"	12.5	13.5	13.0	3.5	3.0	
		14'-0"	8.5	9.5	9.0			
		14'-6"	5.0	5.5	5.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	4'-0"						
		4'-6"						
		5'-0"				43.5	41.0	32.5
		5'-6"	27.0	32.0	34.0	26.0	24.0	18.0
2x6	1.3	6'-6"						
		7'-0"						
		7'-6"				13.0	12.5	8.0
		8'-0"	12.0	14.0	14.0	5.0	5.0	
2x8	1.6	9'-0"						12.5
		9'-6"				11.0	10.0	6.5
		10'-0"				5.0		
		10'-6"	6.5	8.0	8.5			
2x10	1.9	11'-0"						
		11'-6"				12.5	11.5	7.5
		12'-0"				7.0	6.5	
		12'-6"	10.0	11.5	11.5			
2x12	2.2	13'-0"						11.0
		13'-6"				11.5	10.5	6.5
		14'-0"				7.0	6.5	
		14'-6"	11.5					

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-24-50-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-0"	45.5	47.5	47.5	35.0	32.0	24.0
		4'-6"	26.0	28.0	28.0	16.5	14.5	8.5
		5'-0"	12.5	14.0	14.0	3.0	2.0	
		5'-6"	2.0	3.5	3.5			
2x6	0.8	6'-6"	30.0	31.5	31.5	19.5	17.5	11.5
		7'-0"	20.0	21.0	21.0	9.5	8.0	3.0
		7'-6"	11.5	12.5	12.5	1.5	0.5	
		8'-0"	4.5	5.5	5.5			
2x8	1.1	9'-0"	18.5	19.5	19.5	8.0	6.5	2.0
		9'-6"	12.0	13.0	13.0	2.0	0.5	
		10'-0"	6.5	7.5	7.5			
		10'-6"	1.5	2.5	2.5			
2x10	1.4	11'-0"	19.0	20.0	20.0	8.5	7.0	2.0
		11'-6"	13.5	14.5	14.5	3.0	2.0	
		12'-0"	9.0	10.0	9.5			
		12'-6"	4.5	5.5	5.5			
2x12	1.7	13'-0"	17.5	18.5	18.0	6.5	5.0	0.5
		13'-6"	13.0	14.0	13.5	2.0	1.0	
		14'-0"	9.0	9.5	9.5			
		14'-6"	5.5	6.0	5.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	4'-0"						
		4'-6"						
		5'-0"				42.0	38.5	29.0
		5'-6"	27.5	32.5	34.5	24.5	22.0	14.5
2x6	1.3	6'-6"						
		7'-0"						13.0
		7'-6"				12.0	10.0	
		8'-0"	12.5					
2x8	1.6	9'-0"						9.0
		9'-6"				9.5	8.0	
		10'-0"						
		10'-6"	7.0	8.5	8.5			
2x10	1.9	11'-0"						9.0
		11'-6"				11.0	9.0	
		12'-0"				5.5		
		12'-6"	10.5					
2x12	2.2	13'-0"					13.0	7.5
		13'-6"				10.0	8.5	
		14'-0"				5.5		
		14'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-24-60-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-0"	43.0	45.5	46.0	38.0	37.0	32.0
		4'-6"	24.0	26.0	26.5	19.0	19.5	17.0
		5'-0"	10.0	12.0	12.5	6.0	7.0	6.0
		5'-6"		1.5	2.0			
2x6	0.8	6'-6"	28.0	29.5	30.0	22.5	22.5	19.5
		7'-0"	17.5	19.0	19.5	12.5	13.0	11.0
		7'-6"	9.0	10.5	10.5	4.0	5.5	4.5
		8'-0"	2.0	3.5	4.0			
2x8	1.1	9'-0"	16.5	17.5	18.0	11.0	11.5	10.0
		9'-6"	9.5	11.0	11.0	4.5	5.5	5.0
		10'-0"	4.0	5.5	5.5		0.5	0.5
		10'-6"		0.5	0.5			
2x10	1.4	11'-0"	17.0	18.0	18.0	11.0	12.0	10.0
		11'-6"	11.5	12.5	12.5	6.0	7.0	6.0
		12'-0"	6.5	8.0	8.0	1.5	2.5	2.0
		12'-6"	2.5	3.5	3.5			
2x12	1.7	13'-0"	15.5	16.5	16.5	9.0	10.0	8.5
		13'-6"	11.0	12.0	11.5	5.0	6.0	5.0
		14'-0"	6.5	7.5	7.5	1.0	2.5	2.0
		14'-6"	3.0	4.0	4.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	4'-0"						
		4'-6"						
		5'-0"						
		5'-6"	25.5	30.5	33.0	27.0	27.0	22.5
2x6	1.3	6'-6"						
		7'-0"						
		7'-6"				14.5		13.0
		8'-0"	10.0	12.0	13.0	6.5	7.5	6.0
2x8	1.6	9'-0"						
		9'-6"				12.5		11.0
		10'-0"	10.5			6.0	7.0	6.0
		10'-6"	5.0	6.5	7.0			
2x10	1.9	11'-0"						
		11'-6"						
		12'-0"				8.5	9.5	8.0
		12'-6"	8.5	10.0	10.5		5.0	
2x12	2.2	13'-0"						
		13'-6"				13.0		11.5
		14'-0"				8.5	9.0	7.5
		14'-6"	9.5	11.0	11.0		5.5	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-24-60-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-0"	40.0	42.5	42.5	32.0	30.5	25.0
		4'-6"	20.5	22.5	23.0	13.5	13.0	10.0
		5'-0"	6.5	8.5	9.0		1.0	
		5'-6"						
2x6	0.8	6'-6"	24.5	26.5	26.5	16.5	16.0	12.5
		7'-0"	14.0	15.5	16.0	6.5	6.5	4.0
		7'-6"	5.5	7.0	7.5			
		8'-0"			0.5			
2x8	1.1	9'-0"	13.0	14.5	14.5	5.0	5.5	3.0
		9'-6"	6.5	7.5	8.0			
		10'-0"	1.0	2.0	2.0			
		10'-6"						
2x10	1.4	11'-0"	13.5	15.0	15.0	5.5	5.5	3.0
		11'-6"	8.0	9.5	9.5		0.5	
		12'-0"	3.5	4.5	4.5			
		12'-6"						
2x12	1.7	13'-0"	12.0	13.0	13.0	3.5	3.5	1.5
		13'-6"	7.5	8.5	8.5			
		14'-0"	3.5	4.5	4.0			
		14'-6"		0.5	0.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	4'-0"						
		4'-6"						
		5'-0"				39.0	37.5	30.0
		5'-6"	22.0	27.0	29.5	21.5	20.5	15.5
2x6	1.3	6'-6"						
		7'-0"						14.0
		7'-6"				8.5	8.5	5.5
		8'-0"	7.0	9.0	9.5			
2x8	1.6	9'-0"				14.0		10.0
		9'-6"				6.5	6.5	
		10'-0"	7.0	9.0	9.0			
		10'-6"						
2x10	1.9	11'-0"						10.0
		11'-6"				8.0	8.0	5.0
		12'-0"	10.0	11.5	12.0			
		12'-6"	5.0	6.5	7.0			
2x12	2.2	13'-0"				12.0	11.5	8.5
		13'-6"				7.0	7.0	
		14'-0"	10.5	12.0	12.0			
		14'-6"	6.0	7.5	7.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-1&2-24-60-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.1/No.2
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	4'-0"	41.0	43.0	43.0	31.0	28.5	22.0
		4'-6"	21.5	23.5	23.5	12.5	11.5	6.5
		5'-0"	7.5	9.5	9.5			
		5'-6"						
2x6	0.8	6'-6"	25.5	27.5	27.0	15.5	14.0	9.0
		7'-0"	15.0	16.5	16.5	5.5	5.0	1.0
		7'-6"	6.5	8.0	8.0			
		8'-0"		1.0	1.0			
2x8	1.1	9'-0"	14.0	15.0	15.0	4.0	3.5	
		9'-6"	7.5	8.5	8.5			
		10'-0"	2.0	3.0	3.0			
		10'-6"						
2x10	1.4	11'-0"	14.5	15.5	15.5	4.5	3.5	
		11'-6"	9.0	10.0	10.0			
		12'-0"	4.5	5.5	5.0			
		12'-6"		1.0	1.0			
2x12	1.7	13'-0"	13.0	14.0	13.5	2.5	2.0	
		13'-6"	8.5	9.5	9.0			
		14'-0"	4.5	5.0	5.0			
		14'-6"	0.5	1.5	1.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	4'-0"						
		4'-6"						
		5'-0"				38.0	35.5	27.0
		5'-6"	23.0	28.0	30.0	20.5	19.0	12.5
2x6	1.3	6'-6"						
		7'-0"					16.0	10.5
		7'-6"				7.5	7.0	
		8'-0"	8.0	9.5	10.0			
2x8	1.6	9'-0"				13.0	11.5	7.0
		9'-6"				5.5	5.0	
		10'-0"	8.0	10.0	10.0			
		10'-6"						
2x10	1.9	11'-0"				13.0	11.5	7.0
		11'-6"				7.0	6.0	
		12'-0"	11.0		12.5			
		12'-6"	6.0	7.5	7.5			
2x12	2.2	13'-0"				11.0	10.0	5.5
		13'-6"				6.0	5.0	
		14'-0"	11.5	12.5	12.5			
		14'-6"	7.0	8.5	8.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-12-50-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	4'-6"	43.0	44.5	44.0	36.0	34.0	29.0
		5'-0"	26.5	28.0	28.0	20.5	19.5	16.5
		5'-6"	14.5	16.0	16.0	9.0	9.0	7.0
		6'-0"	5.5	6.5	6.5		1.0	
2x6	1.6	7'-0"	34.5	35.5	35.0	27.0	25.5	21.5
		7'-6"	24.5	25.5	25.0	17.5	17.0	14.0
		8'-0"	16.5	17.0	17.0	10.0	10.0	7.5
		8'-6"	9.5	10.5	10.5	3.5	4.0	2.5
2x8	2.2	9'-6"	24.5	25.5	25.0	17.5	17.0	14.0
		10'-0"	18.0	19.0	18.5	11.0	11.0	9.0
		10'-6"	12.5	13.0	13.0	6.0	6.0	4.5
		11'-0"	7.5	8.5	8.0	1.5	2.0	0.5
2x10	2.7	12'-0"	20.5	21.0	21.0	13.0	13.0	10.5
		12'-6"	15.5	16.0	16.0	8.5	8.5	6.5
		13'-0"	11.0	11.5	11.5	4.5	4.5	3.0
		13'-6"	7.0	7.5	7.5	0.5	1.0	
2x12	3.3	14'-0"	20.0	20.5	20.0	12.5	12.0	9.5
		14'-6"	15.5	16.0	16.0	8.5	8.5	6.0
		15'-0"	12.0	12.5	12.0	4.5	5.0	3.5
		15'-6"	8.5	9.0	8.5	1.5	2.0	0.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	4'-6"						
		5'-0"						
		5'-6"						
		6'-0"				33.0	31.5	26.0
2x6	2.7	7'-0"						
		7'-6"						
		8'-0"						
		8'-6"				12.5	12.5	10.0
2x8	3.2	9'-6"						
		10'-0"						
		10'-6"						10.0
		11'-0"				7.5	8.0	5.5
2x10	3.8	12'-0"						
		12'-6"						
		13'-0"				11.0	11.0	8.5
		13'-6"				7.0	7.0	5.0
2x12	4.4	14'-0"						
		14'-6"						
		15'-0"				12.0	11.5	9.0
		15'-6"				8.0	8.0	6.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-12-50-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	4'-6"	40.0	41.0	41.0	30.0	28.0	22.0
		5'-0"	23.5	24.5	24.5	14.5	13.5	9.5
		5'-6"	11.5	12.5	12.5	3.0	3.0	
		6'-0"	2.0	3.0	3.0			
2x6	1.6	7'-0"	31.0	32.0	31.5	21.0	19.5	14.5
		7'-6"	21.0	22.0	21.5	11.5	11.0	7.0
		8'-0"	13.0	14.0	13.5	4.0	3.5	0.5
		8'-6"	6.5	7.0	7.0			
2x8	2.2	9'-6"	21.5	22.0	22.0	11.5	10.5	7.0
		10'-0"	15.0	15.5	15.0	5.5	5.0	1.5
		10'-6"	9.0	10.0	9.5			
		11'-0"	4.0	5.0	4.5			
2x10	2.7	12'-0"	17.5	18.0	17.5	7.5	6.5	3.5
		12'-6"	12.5	13.0	12.5	2.5	2.5	
		13'-0"	8.0	8.5	8.0			
		13'-6"	4.0	4.5	4.0			
2x12	3.3	14'-0"	16.5	17.0	16.5	6.5	6.0	2.5
		14'-6"	12.5	13.0	12.5	2.5	2.0	
		15'-0"	8.5	9.0	8.5			
		15'-6"	5.0	5.5	5.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	4'-6"						
		5'-0"						
		5'-6"				43.5	40.5	32.5
		6'-0"	30.5	35.0	36.0	27.0	25.5	19.0
2x6	2.7	7'-0"						
		7'-6"						
		8'-0"				14.5	13.5	9.0
		8'-6"				7.0	6.5	
2x8	3.2	9'-6"						
		10'-0"					12.5	8.0
		10'-6"				7.5	6.5	
		11'-0"	10.5	11.5	11.5			
2x10	3.8	12'-0"						10.0
		12'-6"				10.0	9.5	5.5
		13'-0"				5.5	5.0	
		13'-6"	10.0	11.0	10.5			
2x12	4.4	14'-0"						9.0
		14'-6"				10.5	9.5	5.5
		15'-0"				6.0	5.5	
		15'-6"	11.5		12.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-12-50-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	4'-6"	40.0	41.5	41.0	28.5	25.5	18.5
		5'-0"	24.0	25.0	24.5	13.0	11.0	6.0
		5'-6"	12.0	13.0	12.5	1.5	0.5	
		6'-0"	2.5	3.5	3.5			
2x6	1.6	7'-0"	31.5	32.5	32.0	19.5	17.0	11.5
		7'-6"	21.5	22.5	22.0	10.5	8.5	3.5
		8'-0"	13.5	14.5	14.0	2.5	1.5	
		8'-6"	6.5	7.5	7.0			
2x8	2.2	9'-6"	22.0	22.5	22.0	10.0	8.5	3.5
		10'-0"	15.5	16.0	15.5	4.0	2.5	
		10'-6"	9.5	10.5	10.0			
		11'-0"	4.5	5.5	5.0			
2x10	2.7	12'-0"	17.5	18.0	17.5	6.0	4.5	
		12'-6"	12.5	13.0	12.5	1.5		
		13'-0"	8.5	9.0	8.5			
		13'-6"	4.5	5.0	4.5			
2x12	3.3	14'-0"	17.0	17.5	17.0	5.0	3.5	
		14'-6"	13.0	13.0	12.5	1.0		
		15'-0"	9.0	9.5	9.0			
		15'-6"	5.5	6.0	5.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	4'-6"						
		5'-0"						
		5'-6"				42.0	38.0	29.0
		6'-0"	31.0	35.0	36.5	25.5	23.0	15.5
2x6	2.7	7'-0"						
		7'-6"						13.5
		8'-0"				13.5	11.5	6.0
		8'-6"				5.5		
2x8	3.2	9'-6"						11.0
		10'-0"				12.0	10.0	5.0
		10'-6"				6.0		
		11'-0"	11.0		11.5			
2x10	3.8	12'-0"					12.0	6.5
		12'-6"				9.0	7.0	
		13'-0"						
		13'-6"	10.5	11.0	11.0			
2x12	4.4	14'-0"				13.5	11.5	6.0
		14'-6"				9.0	7.0	
		15'-0"						
		15'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-12-60-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	4'-6"	38.0	39.5	39.5	31.5	30.5	27.0
		5'-0"	21.5	23.0	23.0	15.5	16.0	14.0
		5'-6"	9.5	11.0	11.0	4.5	5.5	4.5
		6'-0"	0.5	1.5	2.0			
2x6	1.6	7'-0"	29.0	30.5	30.0	22.5	22.0	19.5
		7'-6"	19.5	20.5	20.5	13.0	13.5	11.5
		8'-0"	11.0	12.0	12.5	5.5	6.5	5.5
		8'-6"	4.5	5.5	5.5		0.5	
2x8	2.2	9'-6"	19.5	20.5	20.5	13.0	13.5	11.5
		10'-0"	13.0	14.0	14.0	6.5	7.5	6.5
		10'-6"	7.5	8.5	8.0	1.5	2.5	2.0
		11'-0"	2.5	3.5	3.5			
2x10	2.7	12'-0"	15.5	16.0	16.0	8.5	9.5	8.0
		12'-6"	10.5	11.0	11.0	4.0	5.0	4.0
		13'-0"	6.0	6.5	6.5		1.0	0.5
		13'-6"	2.0	3.0	2.5			
2x12	3.3	14'-0"	15.0	15.5	15.0	8.0	8.5	7.0
		14'-6"	10.5	11.0	11.0	4.0	5.0	4.0
		15'-0"	6.5	7.5	7.0		1.5	1.0
		15'-6"	3.0	4.0	3.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	4'-6"						
		5'-0"						
		5'-6"				44.5		37.0
		6'-0"	29.0	33.0	35.0	28.5	28.0	23.5
2x6	2.7	7'-0"						
		7'-6"						
		8'-0"						
		8'-6"	13.0			8.0	9.0	7.5
2x8	3.2	9'-6"						
		10'-0"						
		10'-6"				8.5	9.5	8.0
		11'-0"	8.5	10.0	10.0			
2x10	3.8	12'-0"						
		12'-6"				11.5	12.0	10.0
		13'-0"				6.5	7.5	6.0
		13'-6"	8.0	9.0	9.0			
2x12	4.4	14'-0"						
		14'-6"				11.5	12.0	10.0
		15'-0"				7.5	8.0	6.5
		15'-6"	10.0	10.5	10.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-12-60-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	4'-6"	34.5	36.0	36.0	25.5	24.5	19.5
		5'-0"	18.5	19.5	19.5	10.0	10.0	7.0
		5'-6"	6.0	7.5	7.5			
		6'-0"						
2x6	1.6	7'-0"	26.0	27.0	27.0	16.5	16.0	12.5
		7'-6"	16.0	17.0	17.0	7.0	7.0	4.5
		8'-0"	8.0	9.0	9.0			
		8'-6"	1.0	2.0	2.0			
2x8	2.2	9'-6"	16.5	17.5	17.0	7.0	7.0	4.5
		10'-0"	10.0	10.5	10.5	1.0	1.5	
		10'-6"	4.0	5.0	5.0			
		11'-0"						
2x10	2.7	12'-0"	12.0	13.0	12.5	3.0	3.0	1.0
		12'-6"	7.0	8.0	7.5			
		13'-0"	2.5	3.5	3.0			
		13'-6"						
2x12	3.3	14'-0"	11.5	12.0	12.0	2.0	2.5	
		14'-6"	7.5	8.0	7.5			
		15'-0"	3.5	4.0	3.5			
		15'-6"		0.5				

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	4'-6"						
		5'-0"						
		5'-6"				38.5	37.0	30.0
		6'-0"	25.5	30.0	31.5	22.5	22.0	16.5
2x6	2.7	7'-0"						
		7'-6"						14.5
		8'-0"				10.0	10.0	7.0
		8'-6"	10.0	11.5	11.5			
2x8	3.2	9'-6"						12.0
		10'-0"				9.0	9.0	6.0
		10'-6"	11.0	12.5	12.0			
		11'-0"	5.5	6.5	6.5			
2x10	3.8	12'-0"				11.0	11.0	7.5
		12'-6"				5.5	5.5	
		13'-0"	9.5	10.5	10.5			
		13'-6"	5.0	6.0	6.0			
2x12	4.4	14'-0"				10.5	10.0	7.0
		14'-6"				6.0	6.0	
		15'-0"	10.5	11.5	11.0			
		15'-6"	6.5	7.5	7.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-12-60-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	12 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	4'-6"	35.5	37.0	36.5	24.5	22.5	16.5
		5'-0"	19.5	20.5	20.5	9.0	8.0	4.0
		5'-6"	7.0	8.5	8.5			
		6'-0"						
2x6	1.6	7'-0"	27.0	28.0	27.5	15.5	14.0	9.0
		7'-6"	17.0	18.0	17.5	6.0	5.5	1.5
		8'-0"	9.0	10.0	9.5			
		8'-6"	2.0	3.0	3.0			
2x8	2.2	9'-6"	17.5	18.0	17.5	6.0	5.5	1.5
		10'-0"	11.0	11.5	11.0			
		10'-6"	5.0	6.0	5.5			
		11'-0"		1.0	0.5			
2x10	2.7	12'-0"	13.0	13.5	13.5	2.0	1.0	
		12'-6"	8.0	8.5	8.5			
		13'-0"	3.5	4.5	4.0			
		13'-6"		0.5				
2x12	3.3	14'-0"	12.5	13.0	12.5	1.0	0.5	
		14'-6"	8.5	9.0	8.5			
		15'-0"	4.5	5.0	4.5			
		15'-6"	1.0	1.5	1.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	2.1	4'-6"						
		5'-0"						44.5
		5'-6"				37.5	35.0	27.0
		6'-0"	26.5	30.5	32.0	21.5	20.0	13.5
2x6	2.7	7'-0"						
		7'-6"						11.5
		8'-0"				9.0	8.0	
		8'-6"	11.0	12.5	12.5			
2x8	3.2	9'-6"						8.5
		10'-0"				8.0	7.0	
		10'-6"	12.0					
		11'-0"	6.5	7.5	7.5			
2x10	3.8	12'-0"				10.0	9.0	
		12'-6"						
		13'-0"	10.5	11.5	11.0			
		13'-6"	6.0	6.5	6.5			
2x12	4.4	14'-0"				9.5	8.0	
		14'-6"				5.0		
		15'-0"	11.5	12.5	12.0			
		15'-6"	7.5	8.0	8.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-16-50-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	63.5	66.0	65.5	56.0	53.0	46.0
		4'-0"	39.5	41.0	40.5	32.5	31.0	26.5
		4'-6"	22.5	23.5	23.5	16.0	16.0	13.0
		5'-0"	10.5	11.5	11.5	4.5	5.0	3.5
2x6	1.2	6'-0"	36.5	38.0	37.5	29.5	28.0	24.0
		6'-6"	25.0	26.0	26.0	18.5	18.0	15.0
		7'-0"	16.0	17.0	16.5	9.5	9.5	7.5
		7'-6"	8.5	9.5	9.5	2.5	3.0	2.0
2x8	1.6	8'-0"	29.5	30.5	30.0	22.0	21.0	18.0
		8'-6"	21.5	22.0	22.0	14.5	14.0	11.5
		9'-0"	14.5	15.5	15.0	8.0	8.0	6.0
		9'-6"	9.0	9.5	9.5	2.5	3.0	2.0
2x10	2.1	10'-0"	26.5	27.0	27.0	19.0	18.5	15.5
		10'-6"	20.0	21.0	20.5	13.0	13.0	10.5
		11'-0"	14.5	15.5	15.0	8.0	8.0	6.0
		11'-6"	10.0	10.5	10.5	3.5	3.5	2.5
2x12	2.5	12'-0"	22.5	23.0	22.5	14.5	14.5	11.5
		12'-6"	17.5	18.0	17.5	10.0	10.0	8.0
		13'-0"	13.0	13.5	13.0	5.5	6.0	4.5
		13'-6"	9.0	9.5	9.0	2.0	2.5	1.0

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	3'-6"						
		4'-0"						
		4'-6"						
		5'-0"				42.0	40.5	34.0
2x6	2.0	6'-0"						
		6'-6"						
		7'-0"						
		7'-6"				12.0	11.5	9.5
2x8	2.4	8'-0"						
		8'-6"						
		9'-0"						
		9'-6"				9.5	9.5	7.0
2x10	2.8	10'-0"						
		10'-6"						
		11'-0"						
		11'-6"				10.0	10.0	8.0
2x12	3.3	12'-0"						
		12'-6"						
		13'-0"						10.5
		13'-6"				9.0	9.0	7.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-16-50-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	60.5	62.5	62.0	50.5	47.0	39.0
		4'-0"	36.0	37.5	37.5	26.5	25.0	19.5
		4'-6"	19.0	20.5	20.0	10.5	9.5	6.0
		5'-0"	7.0	8.0	8.0			
2x6	1.2	6'-0"	33.5	34.5	34.0	23.5	22.0	17.0
		6'-6"	22.0	23.0	22.5	12.5	11.5	7.5
		7'-0"	13.0	13.5	13.5	4.0	3.5	0.5
		7'-6"	5.5	6.0	6.0			
2x8	1.6	8'-0"	26.0	27.0	26.5	16.0	15.0	11.0
		8'-6"	18.0	19.0	18.5	8.5	8.0	4.5
		9'-0"	11.5	12.0	11.5	2.0	2.0	
		9'-6"	5.5	6.0	6.0			
2x10	2.1	10'-0"	23.0	24.0	23.5	13.0	12.0	8.0
		10'-6"	17.0	17.5	17.0	7.0	6.5	3.5
		11'-0"	11.5	12.0	11.5	2.0	1.5	
		11'-6"	6.5	7.0	7.0			
2x12	2.5	12'-0"	19.0	19.5	19.0	9.0	8.0	4.5
		12'-6"	14.0	14.5	14.0	4.0	3.5	0.5
		13'-0"	9.5	10.0	9.5			
		13'-6"	5.5	6.0	5.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	3'-6"						
		4'-0"						
		4'-6"						
		5'-0"				36.5	34.0	27.0
2x6	2.0	6'-0"						
		6'-6"						
		7'-0"				14.5	13.5	9.5
		7'-6"				6.0	5.5	
2x8	2.4	8'-0"						
		8'-6"						11.5
		9'-0"				10.0	9.0	5.5
		9'-6"						
2x10	2.8	10'-0"						
		10'-6"						10.0
		11'-0"				9.5	8.5	5.0
		11'-6"						
2x12	3.3	12'-0"						12.0
		12'-6"				12.5	11.5	7.5
		13'-0"				7.5	6.5	
		13'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-16-50-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	61.0	63.0	62.5	49.0	44.5	35.5
		4'-0"	36.5	38.0	37.5	25.0	22.5	16.0
		4'-6"	19.5	20.5	20.5	9.0	7.5	2.5
		5'-0"	7.5	8.5	8.0			
2x6	1.2	6'-0"	34.0	35.0	34.5	22.0	19.5	13.5
		6'-6"	22.5	23.5	23.0	11.0	9.5	4.5
		7'-0"	13.0	14.0	13.5	2.5	1.0	
		7'-6"	6.0	6.5	6.0			
2x8	1.6	8'-0"	26.5	27.5	27.0	15.0	13.0	7.5
		8'-6"	18.5	19.0	18.5	7.0	5.5	1.0
		9'-0"	12.0	12.5	12.0	0.5		
		9'-6"	6.0	6.5	6.0			
2x10	2.1	10'-0"	23.5	24.5	23.5	11.5	10.0	5.0
		10'-6"	17.5	18.0	17.5	5.5	4.5	
		11'-0"	12.0	12.5	12.0	0.5		
		11'-6"	7.0	7.5	7.0			
2x12	2.5	12'-0"	19.5	20.0	19.5	7.5	6.0	1.5
		12'-6"	14.5	15.0	14.5	2.5	1.5	
		13'-0"	10.0	10.5	10.0			
		13'-6"	6.0	6.5	6.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	3'-6"						
		4'-0"						
		4'-6"						41.5
		5'-0"				35.0	32.0	23.5
2x6	2.0	6'-0"						
		6'-6"						15.0
		7'-0"				13.0	11.5	6.0
		7'-6"						
2x8	2.4	8'-0"						
		8'-6"						8.0
		9'-0"				8.5	7.0	
		9'-6"						
2x10	2.8	10'-0"						12.5
		10'-6"					12.0	6.5
		11'-0"				8.0	6.5	
		11'-6"						
2x12	3.3	12'-0"						8.5
		12'-6"				11.0	9.0	
		13'-0"				6.0		
		13'-6"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-16-60-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	58.5	61.0	60.5	51.5	49.5	44.0
		4'-0"	34.5	36.0	36.0	28.0	27.5	24.0
		4'-6"	17.5	18.5	19.0	11.5	12.5	11.0
		5'-0"	5.0	6.5	6.5		1.5	1.0
2x6	1.2	6'-0"	31.5	33.0	32.5	25.0	24.5	21.5
		6'-6"	20.0	21.0	21.0	13.5	14.5	12.5
		7'-0"	11.0	12.0	12.0	5.0	6.0	5.5
		7'-6"	3.5	4.5	4.5			
2x8	1.6	8'-0"	24.5	25.5	25.0	17.5	17.5	15.5
		8'-6"	16.0	17.0	17.0	10.0	10.5	9.0
		9'-0"	9.5	10.5	10.5	3.5	4.5	4.0
		9'-6"	3.5	4.5	4.5			
2x10	2.1	10'-0"	21.5	22.0	22.0	14.5	15.0	13.0
		10'-6"	15.0	16.0	15.5	8.5	9.0	8.0
		11'-0"	9.5	10.5	10.0	3.5	4.5	4.0
		11'-6"	4.5	5.5	5.5			
2x12	2.5	12'-0"	17.5	18.0	17.5	10.0	11.0	9.5
		12'-6"	12.0	13.0	12.5	5.5	6.5	5.5
		13'-0"	7.5	8.5	8.0	1.0	2.5	2.0
		13'-6"	3.5	4.5	4.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	3'-6"						
		4'-0"						
		4'-6"						
		5'-0"	38.0			37.5	37.0	31.5
2x6	2.0	6'-0"						
		6'-6"						
		7'-0"				16.0		
		7'-6"	12.5	14.0	14.0	7.5	8.0	7.0
2x8	2.4	8'-0"						
		8'-6"						
		9'-0"				11.0	12.0	10.0
		9'-6"	10.5	11.5	11.5	5.0	6.0	5.0
2x10	2.8	10'-0"						
		10'-6"						
		11'-0"				11.0	11.5	10.0
		11'-6"	11.5			5.5	6.5	5.5
2x12	3.3	12'-0"						
		12'-6"						
		13'-0"				8.5	9.5	8.0
		13'-6"	10.5	11.5	11.5		5.5	

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-16-60-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	55.5	57.5	57.0	46.0	43.5	37.0
		4'-0"	31.0	32.5	32.5	22.0	21.5	17.0
		4'-6"	14.0	15.5	15.5	6.0	6.0	3.5
		5'-0"	2.0	3.0	3.0			
2x6	1.2	6'-0"	28.5	29.5	29.5	19.0	18.5	14.5
		6'-6"	17.0	18.0	17.5	8.0	8.0	5.5
		7'-0"	7.5	8.5	8.5			
		7'-6"		1.0	1.0			
2x8	1.6	8'-0"	21.0	22.0	21.5	11.5	11.5	8.5
		8'-6"	13.0	14.0	13.5	4.0	4.5	2.0
		9'-0"	6.0	7.0	7.0			
		9'-6"	0.5	1.0	1.0			
2x10	2.1	10'-0"	18.0	19.0	18.5	8.5	8.5	6.0
		10'-6"	12.0	12.5	12.5	2.5	3.0	1.0
		11'-0"	6.5	7.0	7.0			
		11'-6"	1.5	2.0	2.0			
2x12	2.5	12'-0"	14.0	14.5	14.0	4.5	4.5	2.5
		12'-6"	9.0	9.5	9.0			
		13'-0"	4.5	5.0	4.5			
		13'-6"	0.5	1.0	1.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	3'-6"						
		4'-0"						
		4'-6"						42.5
		5'-0"	34.5	39.5	41.0	32.0	30.5	24.5
2x6	2.0	6'-0"						
		6'-6"						
		7'-0"				10.0	10.0	7.0
		7'-6"	9.0	10.5	10.5			
2x8	2.4	8'-0"						
		8'-6"				13.0	12.5	9.5
		9'-0"				5.5	5.5	
		9'-6"	7.0	8.0	8.0			
2x10	2.8	10'-0"						
		10'-6"				11.0	11.0	7.5
		11'-0"				5.0	5.0	
		11'-6"	8.0	9.0	9.0			
2x12	3.3	12'-0"				13.5	13.0	9.5
		12'-6"				8.0	8.0	5.0
		13'-0"	12.0	13.0	12.5			
		13'-6"	7.5	8.0	8.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-16-60-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	16 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.8	3'-6"	56.5	58.5	58.0	45.0	41.5	33.5
		4'-0"	32.0	33.5	33.0	21.0	19.5	14.0
		4'-6"	15.0	16.0	16.0	5.0	4.0	0.5
		5'-0"	3.0	4.0	4.0			
2x6	1.2	6'-0"	29.5	30.5	30.0	18.0	16.5	11.5
		6'-6"	18.0	19.0	18.5	7.0	6.0	2.5
		7'-0"	8.5	9.5	9.0			
		7'-6"	1.0	2.0	2.0			
2x8	1.6	8'-0"	22.0	23.0	22.5	10.5	9.5	5.5
		8'-6"	14.0	14.5	14.5	3.0	2.5	
		9'-0"	7.0	8.0	7.5			
		9'-6"	1.5	2.0	2.0			
2x10	2.1	10'-0"	19.0	20.0	19.5	7.5	6.5	2.5
		10'-6"	13.0	13.5	13.0	1.5	1.0	
		11'-0"	7.5	8.0	7.5			
		11'-6"	2.5	3.0	3.0			
2x12	2.5	12'-0"	15.0	15.5	15.0	3.5	2.5	
		12'-6"	10.0	10.5	10.0			
		13'-0"	5.5	6.0	5.5			
		13'-6"	1.5	2.0	1.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.6	3'-6"						
		4'-0"						
		4'-6"				52.5	49.0	39.5
		5'-0"	35.5	40.0	41.5	31.0	28.5	21.5
2x6	2.0	6'-0"						
		6'-6"						12.5
		7'-0"				9.0	8.0	
		7'-6"	10.0	11.5	11.5			
2x8	2.4	8'-0"						
		8'-6"				12.0	10.5	6.0
		9'-0"						
		9'-6"	8.0	9.0	9.0			
2x10	2.8	10'-0"						10.5
		10'-6"				10.0	9.0	
		11'-0"						
		11'-6"	9.0	10.0	10.0			
2x12	3.3	12'-0"				12.5	11.0	6.5
		12'-6"				7.0	6.0	
		13'-0"						
		13'-6"	8.5	9.0	8.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-19.2-50-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	3'-6"	46.5	48.5	48.0	39.5	38.0	32.5
		4'-0"	26.5	27.5	27.5	20.0	19.5	16.5
		4'-6"	12.0	13.5	13.5	6.5	7.0	5.0
		5'-0"	2.0	3.0	3.0			
2x6	1.0	5'-6"	36.5	37.5	37.5	29.0	28.0	24.0
		6'-0"	24.0	25.0	25.0	17.5	17.0	14.0
		6'-6"	14.5	15.5	15.5	8.0	8.5	6.5
		7'-0"	7.0	7.5	7.5	1.0	1.5	0.5
2x8	1.3	7'-0"	36.0	37.0	36.5	28.5	27.0	23.5
		7'-6"	26.0	27.0	26.5	19.0	18.5	15.5
		8'-0"	18.0	19.0	18.5	11.5	11.5	9.0
		8'-6"	11.5	12.0	12.0	5.0	5.5	4.0
2x10	1.7	9'-0"	28.5	29.5	29.0	21.5	20.5	17.5
		9'-6"	21.5	22.5	22.0	14.5	14.5	12.0
		10'-0"	15.5	16.5	16.0	9.0	9.0	7.0
		10'-6"	10.5	11.0	11.0	4.0	4.0	3.0
2x12	2.1	11'-0"	22.0	23.0	22.5	14.5	14.5	12.0
		11'-6"	17.0	17.5	17.0	9.5	9.5	7.5
		12'-0"	12.0	12.5	12.5	5.0	5.5	4.0
		12'-6"	8.0	8.5	8.0	1.0	2.0	0.5

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	3'-6"						
		4'-0"						
		4'-6"						37.5
		5'-0"	29.5	33.0	34.5	28.0	27.0	22.5
2x6	1.7	5'-6"						
		6'-0"						
		6'-6"						
		7'-0"				10.0	10.0	8.0
2x8	2.0	7'-0"						
		7'-6"						
		8'-0"						
		8'-6"				12.0		10.0
2x10	2.4	9'-0"						
		9'-6"						
		10'-0"						
		10'-6"				11.0	11.0	8.5
2x12	2.7	11'-0"						
		11'-6"						
		12'-0"				12.5		10.0
		12'-6"				8.0	8.0	6.0

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-19.2-50-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	3'-6"	43.5	45.0	45.0	34.0	31.5	25.5
		4'-0"	23.0	24.5	24.0	14.0	13.0	9.5
		4'-6"	9.0	10.0	10.0	0.5	0.5	
		5'-0"						
2x6	1.0	5'-6"	33.0	34.0	34.0	23.5	21.5	17.0
		6'-0"	21.0	22.0	21.5	11.5	10.5	7.0
		6'-6"	11.5	12.0	12.0	2.5	2.0	
		7'-0"	3.5	4.5	4.0			
2x8	1.3	7'-0"	32.5	33.5	33.0	22.5	21.0	16.0
		7'-6"	23.0	23.5	23.5	13.0	12.0	8.5
		8'-0"	15.0	15.5	15.0	5.5	5.0	2.0
		8'-6"	8.0	8.5	8.5			
2x10	1.7	9'-0"	25.5	26.5	26.0	15.5	14.5	10.5
		9'-6"	18.5	19.0	18.5	9.0	8.0	4.5
		10'-0"	12.5	13.0	12.5	3.0	2.5	
		10'-6"	7.0	7.5	7.5			
2x12	2.1	11'-0"	19.0	19.5	19.0	9.0	8.0	5.0
		11'-6"	13.5	14.0	13.5	4.0	3.5	0.5
		12'-0"	9.0	9.5	9.0			
		12'-6"	4.5	5.0	5.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	3'-6"						
		4'-0"						
		4'-6"				40.0	38.0	30.5
		5'-0"	26.0	30.0	31.0	22.0	21.0	15.5
2x6	1.7	5'-6"						
		6'-0"						
		6'-6"				13.0	12.0	8.0
		7'-0"	12.5	13.5	13.5			
2x8	2.0	7'-0"						
		7'-6"						
		8'-0"					13.0	9.0
		8'-6"				6.5	6.0	
2x10	2.4	9'-0"						
		9'-6"						12.0
		10'-0"				11.0	10.0	6.0
		10'-6"				5.0		
2x12	2.7	11'-0"						12.0
		11'-6"				12.0	11.0	7.5
		12'-0"				7.0	6.0	
		12'-6"	11.5	12.0	12.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-19.2-50-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	3'-6"	44.0	45.5	45.0	32.5	29.5	22.0
		4'-0"	23.5	24.5	24.5	12.5	11.0	6.0
		4'-6"	9.5	10.5	10.0			
		5'-0"						
2x6	1.0	5'-6"	33.5	34.5	34.0	22.0	19.5	13.5
		6'-0"	21.5	22.0	21.5	10.0	8.5	3.5
		6'-6"	12.0	12.5	12.0	1.0		
		7'-0"	4.0	4.5	4.5			
2x8	1.3	7'-0"	33.0	34.0	33.5	21.0	19.0	13.0
		7'-6"	23.5	24.0	23.5	12.0	10.0	5.0
		8'-0"	15.0	16.0	15.5	4.0	3.0	
		8'-6"	8.5	9.0	8.5			
2x10	1.7	9'-0"	26.0	26.5	26.0	14.0	12.0	7.0
		9'-6"	19.0	19.5	19.0	7.5	6.0	1.5
		10'-0"	13.0	13.5	13.0	1.5	0.5	
		10'-6"	7.5	8.0	7.5			
2x12	2.1	11'-0"	19.5	20.0	19.5	7.5	6.0	1.5
		11'-6"	14.0	14.5	14.0	2.5	1.0	
		12'-0"	9.5	9.5	9.0			
		12'-6"	5.0	5.5	5.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	3'-6"						
		4'-0"						
		4'-6"				38.5	35.5	27.0
		5'-0"	26.5	30.5	31.5	21.0	18.5	12.0
2x6	1.7	5'-6"						
		6'-0"						14.0
		6'-6"				11.5	10.0	5.0
		7'-0"	12.5	14.0	14.0			
2x8	2.0	7'-0"						
		7'-6"						13.0
		8'-0"				12.5	10.5	5.5
		8'-6"				5.0		
2x10	2.4	9'-0"						
		9'-6"						8.5
		10'-0"				9.5	7.5	
		10'-6"						
2x12	2.7	11'-0"						9.0
		11'-6"				10.5	9.0	
		12'-0"				5.5		
		12'-6"	12.0		12.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-19.2-60-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	3'-6"	41.5	43.5	43.5	35.0	34.5	30.5
		4'-0"	21.0	22.5	22.5	15.5	16.0	14.0
		4'-6"	7.0	8.5	8.5	2.0	3.5	3.0
		5'-0"						
2x6	1.0	5'-6"	31.0	32.5	32.5	24.5	24.5	21.5
		6'-0"	19.0	20.0	20.0	13.0	13.5	12.0
		6'-6"	9.5	10.5	10.5	3.5	5.0	4.0
		7'-0"	2.0	2.5	3.0			
2x8	1.3	7'-0"	31.0	32.0	32.0	24.0	23.5	21.0
		7'-6"	21.0	22.0	22.0	14.5	15.0	13.0
		8'-0"	13.0	14.0	14.0	6.5	7.5	7.0
		8'-6"	6.0	7.0	7.0	0.5	2.0	1.5
2x10	1.7	9'-0"	23.5	24.5	24.5	17.0	17.0	15.0
		9'-6"	16.5	17.5	17.0	10.0	11.0	9.5
		10'-0"	10.5	11.5	11.0	4.0	5.5	4.5
		10'-6"	5.0	6.0	6.0		0.5	0.5
2x12	2.1	11'-0"	17.0	18.0	17.5	10.0	11.0	9.5
		11'-6"	12.0	12.5	12.0	5.0	6.0	5.5
		12'-0"	7.0	7.5	7.5	0.5	2.0	1.5
		12'-6"	3.0	3.5	3.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	3'-6"						
		4'-0"						
		4'-6"				41.5	40.5	35.0
		5'-0"	24.5	28.5	29.5	23.5	23.5	20.5
2x6	1.7	5'-6"						
		6'-0"						
		6'-6"				14.5	15.0	13.0
		7'-0"	10.5	12.0	12.0	5.5	6.5	5.5
2x8	2.0	7'-0"						
		7'-6"						
		8'-0"						
		8'-6"				7.5	8.5	7.5
2x10	2.4	9'-0"						
		9'-6"						
		10'-0"				12.0		11.0
		10'-6"	12.0			6.5	7.5	6.0
2x12	2.7	11'-0"						
		11'-6"				13.5		
		12'-0"				8.0	9.0	7.5
		12'-6"	9.5	10.5	10.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-19.2-60-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	3'-6"	38.5	40.0	40.0	29.5	28.0	23.5
		4'-0"	18.0	19.5	19.5	9.5	9.5	7.0
		4'-6"	4.0	5.0	5.0			
		5'-0"						
2x6	1.0	5'-6"	28.0	29.0	29.0	19.0	18.0	14.5
		6'-0"	16.0	17.0	16.5	7.0	7.0	4.5
		6'-6"	6.0	7.0	7.0			
		7'-0"						
2x8	1.3	7'-0"	27.5	28.5	28.5	18.0	17.5	14.0
		7'-6"	17.5	18.5	18.5	8.5	8.5	6.0
		8'-0"	9.5	10.5	10.5	1.0	1.5	
		8'-6"	3.0	4.0	3.5			
2x10	1.7	9'-0"	20.5	21.5	21.0	11.0	11.0	8.0
		9'-6"	13.5	14.0	14.0	4.0	4.5	2.5
		10'-0"	7.0	8.0	7.5			
		10'-6"	2.0	2.5	2.5			
2x12	2.1	11'-0"	14.0	14.5	14.0	4.5	4.5	2.5
		11'-6"	8.5	9.0	9.0			
		12'-0"	4.0	4.5	4.0			
		12'-6"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	3'-6"						
		4'-0"						
		4'-6"	38.0	43.0	44.5	35.5	34.0	28.0
		5'-0"	21.0	25.0	26.5	17.5	17.5	13.0
2x6	1.7	5'-6"						
		6'-0"						15.0
		6'-6"				8.5	8.5	6.0
		7'-0"	7.0	8.5	8.5			
2x8	2.0	7'-0"						
		7'-6"						
		8'-0"				9.5	9.5	6.5
		8'-6"	10.0	11.0	11.0			
2x10	2.4	9'-0"						
		9'-6"				13.0	12.5	9.5
		10'-0"				6.0	6.5	
		10'-6"	8.5	10.0	9.5			
2x12	2.7	11'-0"				13.5	13.0	10.0
		11'-6"				7.5	7.5	5.0
		12'-0"	11.0	12.0	12.0			
		12'-6"	6.5	7.0	7.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-19.2-60-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	19.2 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.6	3'-6"	39.0	41.0	40.5	28.5	26.0	20.0
		4'-0"	19.0	20.0	20.0	8.5	8.0	4.0
		4'-6"	5.0	6.0	6.0			
		5'-0"						
2x6	1.0	5'-6"	29.0	30.0	29.5	18.0	16.0	11.5
		6'-0"	16.5	17.5	17.5	6.0	5.5	1.5
		6'-6"	7.0	8.0	7.5			
		7'-0"						
2x8	1.3	7'-0"	28.5	29.5	29.0	17.0	15.5	10.5
		7'-6"	18.5	19.5	19.0	7.5	7.0	3.0
		8'-0"	10.5	11.5	11.0			
		8'-6"	4.0	4.5	4.5			
2x10	1.7	9'-0"	21.5	22.0	21.5	10.0	9.0	5.0
		9'-6"	14.0	15.0	14.5	3.0	2.5	
		10'-0"	8.0	9.0	8.5			
		10'-6"	3.0	3.5	3.0			
2x12	2.1	11'-0"	15.0	15.5	15.0	3.5	3.0	
		11'-6"	9.5	10.0	9.5			
		12'-0"	5.0	5.0	5.0			
		12'-6"	0.5	1.0	0.5			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.3	3'-6"						
		4'-0"						46.0
		4'-6"	39.0			34.5	32.5	25.0
		5'-0"	22.0	26.0	27.0	16.5	15.5	10.0
2x6	1.7	5'-6"						
		6'-0"						12.0
		6'-6"				7.5	6.5	
		7'-0"	8.0	9.5	9.5			
2x8	2.0	7'-0"						
		7'-6"						11.0
		8'-0"				8.5	7.5	
		8'-6"	11.0	12.0	12.0			
2x10	2.4	9'-0"						13.0
		9'-6"				12.0	11.0	6.5
		10'-0"				5.0		
		10'-6"	9.5	10.5	10.5			
2x12	2.7	11'-0"				12.5	11.0	6.5
		11'-6"				6.5	5.5	
		12'-0"	12.0	13.0	12.5			
		12'-6"	7.5	8.0	8.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-24-50-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	3'-0"	54.0	56.5	56.0	47.5	45.5	39.5
		3'-6"	29.5	31.0	31.0	23.5	22.5	19.0
		4'-0"	13.5	14.5	14.5	7.5	8.0	6.0
		4'-6"	2.0	3.0	3.0			
2x6	0.8	5'-0"	34.0	35.5	35.0	27.0	26.0	22.5
		5'-6"	21.0	22.5	22.0	15.0	14.5	12.0
		6'-0"	11.5	12.5	12.5	5.5	6.0	4.5
		6'-6"	4.0	4.5	4.5			
2x8	1.1	6'-6"	30.5	31.5	31.5	23.5	23.0	19.5
		7'-0"	21.0	22.0	21.5	14.0	14.0	11.5
		7'-6"	13.0	14.0	14.0	6.5	7.0	5.5
		8'-0"	6.5	7.5	7.5	0.5	1.5	0.5
2x10	1.4	8'-0"	29.5	30.5	30.5	22.5	22.0	18.5
		8'-6"	22.0	22.5	22.5	15.0	14.5	12.0
		9'-0"	15.0	16.0	15.5	8.5	9.0	7.0
		9'-6"	9.5	10.0	10.0	3.0	3.5	2.5
2x12	1.7	10'-6"	15.0	15.5	15.0	8.0	8.0	6.5
		11'-0"	10.0	10.5	10.5	3.5	4.0	2.5
		11'-6"	5.5	6.0	6.0			
		12'-0"	2.0	2.5	2.0			

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	3'-0"						
		3'-6"						
		4'-0"						
		4'-6"	29.5	33.5	34.5	28.5	27.5	23.0
2x6	1.3	5'-0"						
		5'-6"						
		6'-0"						12.5
		6'-6"	12.0	13.5	13.5	6.5	7.0	5.5
2x8	1.6	6'-6"						
		7'-0"						
		7'-6"						
		8'-0"				7.5	7.5	6.0
2x10	1.9	8'-0"						
		8'-6"						
		9'-0"						
		9'-6"				10.0	10.0	8.0
2x12	2.2	10'-6"						
		11'-0"				10.5	10.5	8.5
		11'-6"				6.0	6.0	
		12'-0"	8.0	8.5	8.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-24-50-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	3'-0"	51.0	53.0	53.0	42.0	39.0	32.5
		3'-6"	26.5	27.5	27.5	17.5	16.5	12.0
		4'-0"	10.0	11.0	11.0	1.5	1.5	
		4'-6"						
2x6	0.8	5'-0"	30.5	32.0	31.5	21.5	20.0	15.5
		5'-6"	18.0	19.0	19.0	9.0	8.5	5.0
		6'-0"	8.0	9.0	9.0			
		6'-6"	0.5	1.5	1.0			
2x8	1.1	6'-6"	27.5	28.5	28.0	18.0	16.5	12.5
		7'-0"	17.5	18.5	18.5	8.5	8.0	4.5
		7'-6"	10.0	10.5	10.5	1.0	1.0	
		8'-0"	3.5	4.0	4.0			
2x10	1.4	8'-0"	26.5	27.5	27.0	17.0	15.5	11.5
		8'-6"	18.5	19.5	19.0	9.0	8.5	5.0
		9'-0"	12.0	12.5	12.5	3.0	2.5	
		9'-6"	6.5	7.0	6.5			
2x12	1.7	10'-6"	11.5	12.0	12.0	2.0	2.0	
		11'-0"	7.0	7.5	7.0			
		11'-6"	2.5	3.0	2.5			
		12'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	3'-0"						
		3'-6"						
		4'-0"				42.5	40.0	33.0
		4'-6"	26.0	30.0	31.5	22.5	21.0	16.0
2x6	1.3	5'-0"						
		5'-6"						15.0
		6'-0"				10.0	9.0	5.5
		6'-6"	8.5	10.0	10.0			
2x8	1.6	6'-6"						
		7'-0"						12.0
		7'-6"				8.5	8.0	
		8'-0"	10.0	11.0	11.0			
2x10	1.9	8'-0"						
		8'-6"						12.5
		9'-0"				10.5	10.0	6.5
		9'-6"						
2x12	2.2	10'-6"				10.0	9.5	6.0
		11'-0"				5.0		
		11'-6"	9.0	9.5	9.5			
		12'-0"		5.5	5.0			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-24-50-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	50 psf
Flat Roof Snow Load =	35 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	3'-0"	51.0	53.5	53.0	40.5	37.0	29.0
		3'-6"	26.5	28.0	28.0	16.0	14.0	9.0
		4'-0"	10.5	11.5	11.0	0.5		
		4'-6"						
2x6	0.8	5'-0"	31.0	32.5	32.0	20.0	17.5	12.0
		5'-6"	18.5	19.5	19.0	7.5	6.0	1.5
		6'-0"	8.5	9.5	9.0			
		6'-6"	1.0	1.5	1.5			
2x8	1.1	6'-6"	27.5	28.5	28.5	16.5	14.5	9.0
		7'-0"	18.0	19.0	18.5	7.0	5.5	1.0
		7'-6"	10.5	11.0	10.5			
		8'-0"	4.0	4.5	4.0			
2x10	1.4	8'-0"	27.0	28.0	27.5	15.5	13.5	8.0
		8'-6"	19.0	20.0	19.5	7.5	6.0	2.0
		9'-0"	12.5	13.0	12.5	1.5	0.5	
		9'-6"	6.5	7.5	7.0			
2x12	1.7	10'-6"	12.0	12.5	12.0	0.5		
		11'-0"	7.0	7.5	7.0			
		11'-6"	3.0	3.5	3.0			
		12'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	3'-0"						
		3'-6"						
		4'-0"				41.0	38.0	29.5
		4'-6"	26.5	30.5	31.5	21.0	19.0	12.5
2x6	1.3	5'-0"						
		5'-6"						12.0
		6'-0"				8.5	7.0	
		6'-6"	9.0	10.5	10.0			
2x8	1.6	6'-6"						
		7'-0"						8.5
		7'-6"				7.0	6.0	
		8'-0"	10.5	11.5	11.0			
2x10	1.9	8'-0"						
		8'-6"						9.0
		9'-0"				9.0	7.5	
		9'-6"						
2x12	2.2	10'-6"				9.0	7.0	
		11'-0"						
		11'-6"	9.5	10.0	9.5			
		12'-0"	5.0	5.5	5.5			

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-24-60-B

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure B	Wind Load =	90 mph, Exposure B
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	3'-0"	49.0	51.5	51.5	43.0	42.0	37.0
		3'-6"	24.5	26.0	26.0	19.0	19.0	17.0
		4'-0"	8.0	9.5	9.5	3.0	4.5	4.0
		4'-6"						
2x6	0.8	5'-0"	29.0	30.5	30.0	22.5	22.5	20.0
		5'-6"	16.0	17.5	17.5	10.0	11.0	10.0
		6'-0"	6.5	7.5	7.5	1.0	2.5	2.0
		6'-6"						
2x8	1.1	6'-6"	25.5	26.5	26.5	19.0	19.5	17.0
		7'-0"	16.0	17.0	17.0	9.5	10.5	9.5
		7'-6"	8.0	9.0	9.0	2.0	3.5	3.0
		8'-0"	1.5	2.5	2.5			
2x10	1.4	8'-0"	24.5	26.0	25.5	18.0	18.5	16.0
		8'-6"	16.5	17.5	17.5	10.5	11.0	10.0
		9'-0"	10.0	11.0	11.0	4.0	5.5	4.5
		9'-6"	4.5	5.0	5.0			
2x12	1.7	10'-6"	10.0	10.5	10.5	3.5	4.5	4.0
		11'-0"	5.0	5.5	5.5		0.5	
		11'-6"	0.5	1.5	1.0			
		12'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	3'-0"						
		3'-6"						
		4'-0"				43.5	43.0	37.5
		4'-6"	24.5	28.5	30.0	23.5	24.0	21.0
2x6	1.3	5'-0"						
		5'-6"						
		6'-0"				11.0	12.0	10.5
		6'-6"	7.0	8.5	8.5			
2x8	1.6	6'-6"						
		7'-0"						
		7'-6"				10.0	11.0	9.5
		8'-0"	8.0	9.0	9.5			
2x10	1.9	8'-0"						
		8'-6"						
		9'-0"				12.0		11.0
		9'-6"	11.0	12.5	12.5	5.5	6.5	6.0
2x12	2.2	10'-6"				11.5	12.0	10.5
		11'-0"	12.0			6.0	7.0	6.0
		11'-6"	7.0	8.0	8.0			
		12'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-24-60-C

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure C	Wind Load =	90 mph, Exposure C
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	3'-0"	45.5	48.0	48.0	37.5	35.5	30.0
		3'-6"	21.0	22.5	22.5	13.0	13.0	10.0
		4'-0"	5.0	6.0	6.0			
		4'-6"						
2x6	0.8	5'-0"	25.5	27.0	27.0	17.0	16.5	13.0
		5'-6"	13.0	14.0	14.0	4.5	5.0	2.5
		6'-0"	3.0	4.0	4.0			
		6'-6"						
2x8	1.1	6'-6"	22.0	23.5	23.0	13.5	13.0	10.0
		7'-0"	12.5	13.5	13.5	4.0	4.5	2.5
		7'-6"	4.5	5.5	5.5			
		8'-0"						
2x10	1.4	8'-0"	21.5	22.5	22.0	12.5	12.0	9.0
		8'-6"	13.5	14.5	14.0	4.5	5.0	3.0
		9'-0"	7.0	7.5	7.5			
		9'-6"	1.0	2.0	2.0			
2x12	1.7	10'-6"	6.5	7.0	7.0			
		11'-0"	1.5	2.5	2.0			
		11'-6"						
		12'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	3'-0"						
		3'-6"						
		4'-0"	39.5			38.0	36.5	30.5
		4'-6"	21.0	25.0	26.5	18.0	17.5	13.5
2x6	1.3	5'-0"						
		5'-6"				17.0	16.5	13.0
		6'-0"	12.5	14.5	14.5	5.0	5.5	
		6'-6"		5.0	5.0			
2x8	1.6	6'-6"						
		7'-0"				13.0	12.5	9.5
		7'-6"	12.0					
		8'-0"		6.0	6.0			
2x10	1.9	8'-0"						
		8'-6"				13.5	13.5	10.0
		9'-0"				6.0	6.5	
		9'-6"	8.0	9.0	9.0			
2x12	2.2	10'-6"				5.5	6.0	
		11'-0"	8.5	9.5	9.5			
		11'-6"						
		12'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end

Table SPF-3-24-60-D

Design Assumptions

Wood Species =	Spruce-Pine-Fir	Wood Grade =	No.3
Rafter Spacing =	24 in. O.C.	Ground Snow Load =	60 psf
Flat Roof Snow Load =	42 psf, Exposure D	Wind Load =	90 mph, Exposure D
Sheathing & Shingles DL =	5.13 psf	Assumed Wood Density =	28.5 pcf

Allowable Additional Dead Load (psf)								
Member Size	Member DL* (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	0.5	3'-0"	46.5	49.0	48.5	36.5	33.5	27.0
		3'-6"	22.0	23.5	23.5	12.0	11.0	6.5
		4'-0"	6.0	7.0	7.0			
		4'-6"						
2x6	0.8	5'-0"	26.5	28.0	27.5	16.0	14.5	10.0
		5'-6"	14.0	15.0	14.5	3.5	3.0	
		6'-0"	4.0	5.0	5.0			
		6'-6"						
2x8	1.1	6'-6"	23.0	24.5	24.0	12.5	11.0	7.0
		7'-0"	13.5	14.5	14.0	3.0	2.5	
		7'-6"	5.5	6.5	6.0			
		8'-0"						
2x10	1.4	8'-0"	22.5	23.5	23.0	11.5	10.0	6.0
		8'-6"	14.5	15.5	15.0	3.5	3.0	
		9'-0"	8.0	8.5	8.0			
		9'-6"	2.0	3.0	2.5			
2x12	1.7	10'-6"	7.5	8.0	7.5			
		11'-0"	2.5	3.0	3.0			
		11'-6"						
		12'-0"						

* Member DL is the self weight of the member in terms of psf based upon the spacing of the rafters

Allowable Additional Dead Load w/ Sistered 2x4 (psf)*								
Member Size	Member DL (psf)	Projected Span (ft)	Roof Pitch					
			3:12	*4:12*	*5:12*	*7:12*	*9:12*	*12:12*
2x4	1.0	3'-0"						
		3'-6"						
		4'-0"				37.0	34.5	27.5
		4'-6"	22.0	26.0	27.0	17.0	16.0	10.5
2x6	1.3	5'-0"						
		5'-6"				16.0	14.5	9.5
		6'-0"	13.5	15.0	15.0			
		6'-6"		6.0	6.0			
2x8	1.6	6'-6"						
		7'-0"				12.0	11.0	6.5
		7'-6"						
		8'-0"	5.5	7.0	6.5			
2x10	1.9	8'-0"						
		8'-6"				12.5	11.5	7.0
		9'-0"				5.0		
		9'-6"	9.0	10.0	9.5			
2x12	2.2	10'-6"						
		11'-0"	9.5	10.5	10.5			
		11'-6"	5.0	5.5	5.5			
		12'-0"						

* Sistered member shall be equal or better grade of lumber than the existing rafter member and attached over the length to within 12" of each bearing end