



Roofing Square

Instructions

INTRODUCTION

The Faithfull Quick Roofing Square, also known as a layout or angle square, is designed to provide carpenters with a quick and accurate way to mark out for many building projects. This square is also widely used when constructing roof rafters.

The square is manufactured from aluminium and has imperial graduations marked with degree measurements, which helps to simplify material layout and timber cutting.

Quick, accurate and able to calculate hips, valleys and angles on roofs making it a truly flexible square.

DIAGRAM

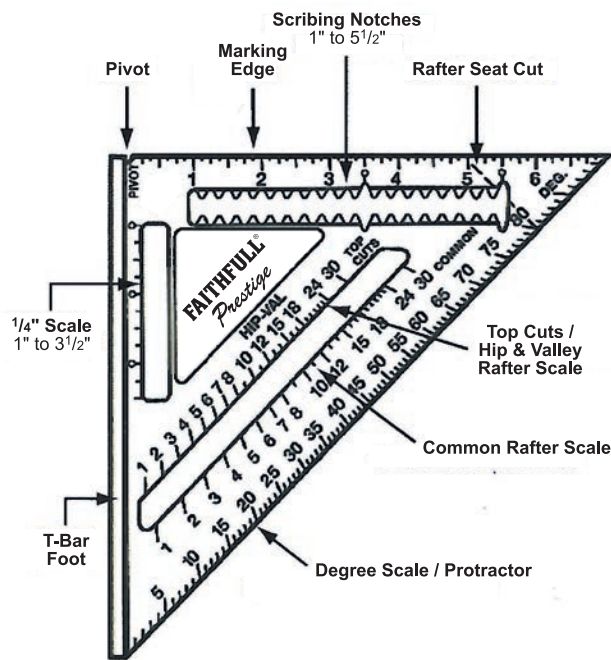
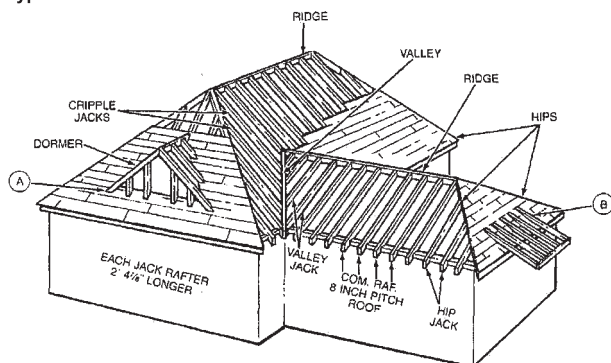


FIGURE 1
Types of Rafters



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PRODUCTS IN THIS RANGE

CODE	PRODUCT	SIZE
FAI CSQUICK	Quick Square	7in (180mm)
FAI CSQUICK12	Quick Square	12in (300mm)
FAI CSQ7CNC	Prestige Quick Square	7in (180mm)
FAI CSQ12CNC	Prestige Quick Square	12in (300mm)
FAI CSQA7CNC	Prestige Adjustable Quick Square	7in (180mm)
FAI CSQA12CNC	Prestige Adjustable Quick Square	12in (300mm)

TYPES OF RAFTERS

Common Rafter

A rafter that runs perpendicular (90°) from the wall plate to the roof ridge when looking straight down at the roof. When looking from the side, its length forms the diagonal leg (or hypotenuse) of a right triangle that has its vertical leg equal to the rise and its horizontal leg equal to the run. (Figures 1, 3 and 8).

Valley Rafter

A rafter that runs from the wall plate to the roof ridge at the intersection of the gable extension with the main roof. (Figures 1, 8, 12 and 13).

Valley Jack Rafter

A rafter that runs from a valley rafter to the roof ridge, 90° from the roof ridge. (Figures 1, 8 and 15).

Hip Rafter

A rafter that runs diagonally from the top of the wall plate to the roof ridge, so as to form an outside corner of the roof. (Figures 1, 8, 9 and 10).

Hip Jack Rafter

A rafter that runs from the top of the wall plate to a hip rafter at 90° to the wall plate. (Figures 1, 8 and 14).

Cripple Jack Rafter

A rafter that runs from a hip rafter to a valley rafter, perpendicular to the roof ridge. (Figures 1 and 8).

Dormer Rafter

A rafter which sets on top of the main roof without cutting into it, causing the main roof not to weaken. (Figure 1).

RAFTER MEASUREMENTS

The use of our square for rafter layout is based on two simple and common building measurements: (1) the rafter run, and (2) the rafter rise. These are available from either the building blueprints, drawings, or actual measurements. The tables included in the back of this manual are also based on these two simple measurements. (Figures 2 and 3, and also the tables at the end of this manual).

Rafter Run

Run is the horizontal or level distance the rafter will span. It is measured in feet.

Rafter Rise

Rise is the vertical distance of a rafter between its highest and lowest points. It is also measured in feet.

Inch Rise

The rise measured in inches per foot run. It is also called Inch Rise Per Foot Run. It can be calculated with the following formula:

$$\frac{\text{INCH RISE}}{\text{OR SCALE NUMBER}} = \frac{\text{RAFTER RISE (ft) x 12}}{\text{RAFTER RUN (ft)}}$$

The Inch Rise gives you the corresponding scale number to use on the square (for the common and hip-val scales).

BASIC ROOF CONSTRUCTION

Step 1: Obtain Rafter Run

Measure or calculate the horizontal distance the rafter will span, starting at the outside of the wall on which it will rest. Include any boarding on the wall if it extends to the wall top plate. (Figure 3).

When measuring building width to obtain rafter run, use a steel tape if possible so that you can measure the full width of the building. Measure from outside to outside of the wall or the top plate on which the rafter will rest. If boarding extends up to the top plate, measurement is to be taken from outside the boarding.

Then the run is found by dividing in half the building width. When a ridge board is being used, deduct half its thickness from the run.

FIGURE 2

Rafter Runs and Rises for Different Style Roofs

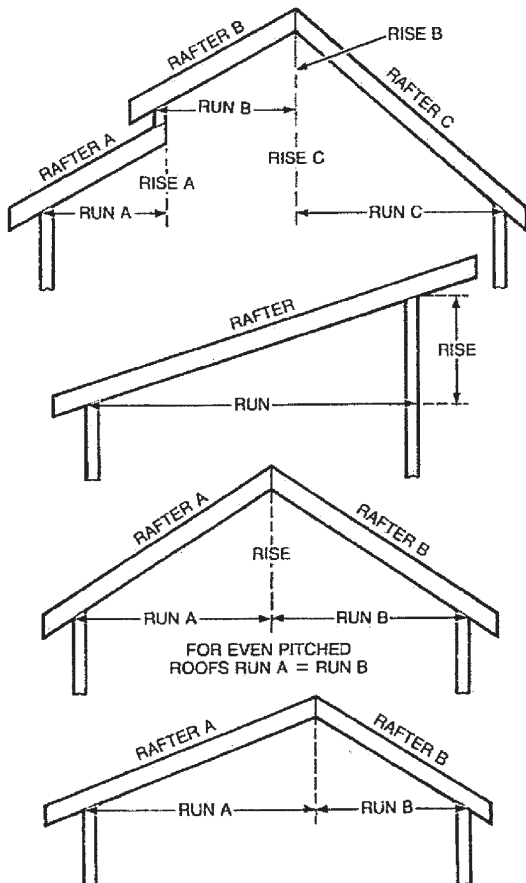
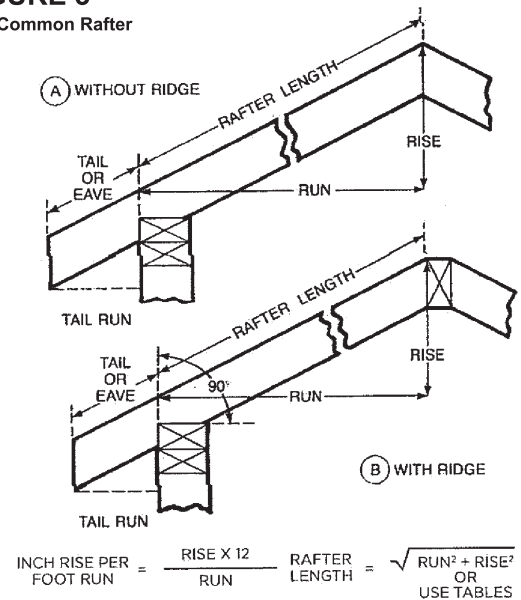


FIGURE 3

The Common Rafter



Step 2: Obtain Roof Rise

Find the distance you wish the roof ridge to be above the wall (in feet) by measuring, calculating or obtaining it from the blueprints (Figure 2).

Table A: Inches to Feet Conversion

INCHES	FEET
1	.08
2	.16
3	.25
4	.33
5	.42
6	.50
7	.58
8	.67
9	.75
10	.83
11	.92

Step 3: Calculate Inch Rise

First convert the rise to feet in decimal form, using Table A. Then use the formula for calculating the Inch Rise. Round off the Inch Rise to the nearest inch. Since rounding off won't make much difference in most cases. It will make the actual roof rise slightly higher or lower. Rounding off has more of an effect on buildings with longer rafter runs or higher roof rises.

NOTE:

If the Inch Rise is given on a blueprint, this calculation is not required.

COMMON RAFTERS

Common Rafter Length:

After the Inch Rise and Run are found, use the tables at the back of this manual to find the common rafter length. If an 8 Inch Rise is used, use the tables to find the 8 Inch Rise table and go down the left hand column headed Run Ft. and locate 13'. To the right, read the column headed Common Rafter Length for the rafter length. For our rafter we get 15' 7 1/2". This is the rafter length from the top cut to the seat plumb mark (Figure 4).

NOTE:

For a run greater than that given in the tables, simply add any two runs that will equal the run desired. Then find the lengths for those two rafters and add them together. For example, if your run is 38', add the length for an 18' run and the length for a 20' run together. Or add a 15' run's length and a 23' runs length together.

Tail or Eave Length:

The tail or eave overhang now must be added to the rafter length (Figure 5) With our example, a tail run of 1' 9". In the same common table as used above, for an 8" rise, we find:

1' Run	=	1' 2 1/2"
9" Run	=	10 7/8"
1' 9" Tail	=	2' 13/8"

FIGURE 4
Common Rafter Layout

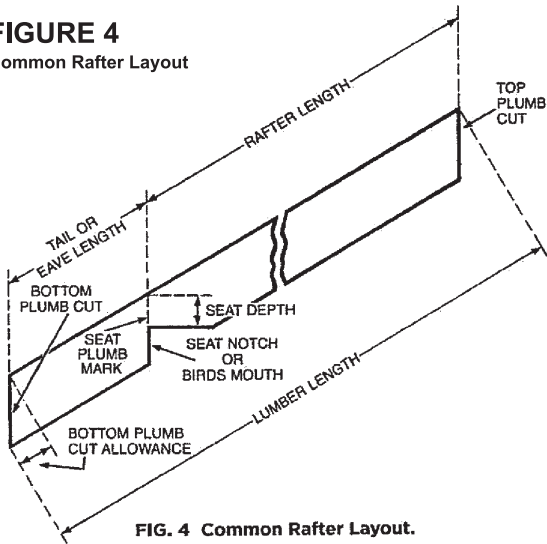
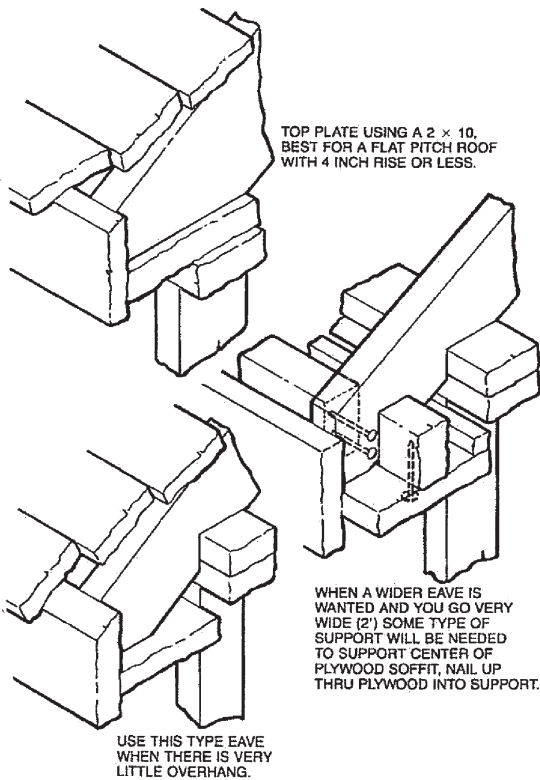


FIG. 4 Common Rafter Layout.

FIGURE 5
Suggested Eave Construction



COMMON RAFTER LAYOUT

Step 1: Top Plumb Cut

In choosing the side of your rafter to use, put the crown (high side) up if the rafter is not straight. Starting at the top of the rafter, lay the square on the face of the rafter so that the T Bar is draped over the top edge of the rafter (Figure 6). While holding the pivot point firmly against the edge of the rafter, pivot the square so that the number 8 on the common scale lines up with the edge of the rafter. Starting from the pivot point, mark the top plumb cut line along the top edge of the square.

Step 2: Seat Notch or Bird's Mouth

With your rafter length, measure down along the top edge of the rafter and mark another plumb line as required in step 1. This line represents the outside wall of your building. Now line up the dashed line (above the 80° increment on the square) with the plumb mark (Figure 7A & 7B). Draw the horizontal seat mark, a perpendicular line, along the bottom of the square. Never notch more than halfway through the rafter and make all seat notches the same depth.

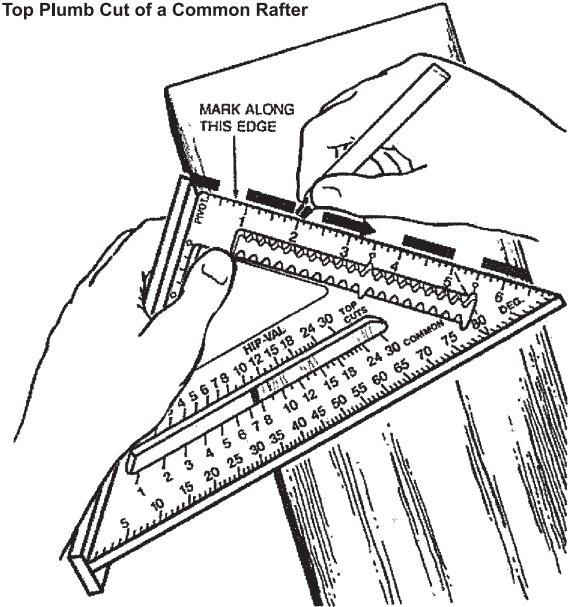
Step 3: Tail or Bottom Plumb Cut

Using your tail length, measure down the rafter from the seat plumb line and mark the bottom plumb line as required in step 1. You may wish to leave the tails long until all the rafters are in place, so that you can mark the ends to a line and then cut.

NOTE:

The top and bottom cuts on the rake board are also done in the same way as a common rafter, but the distance from the top cut to the bottom cut is the rake board length.

FIGURE 6
Top Plumb Cut of a Common Rafter



DRAWING SHOWS SQUARE IN POSITION FOR MARKING TOP PLUMB CUT OF A COMMON RAFTER WITH AN 8° RISE. ALSO SHOWING A 33 1/4° ANGLE.

FIGURE 7A
Seat Notch or Bird's Mouth Layout

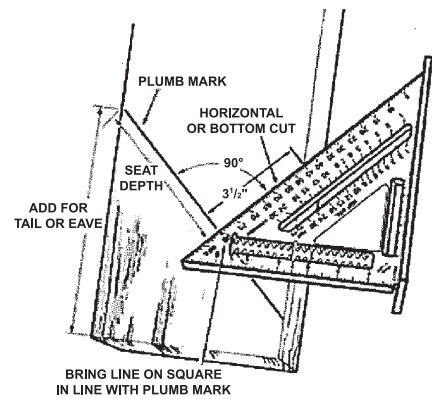
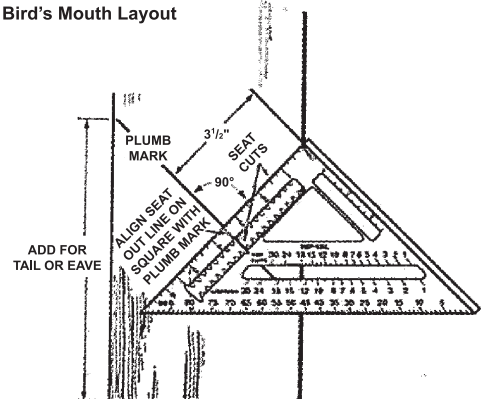


FIGURE 7B
Seat Notch or Bird's Mouth Layout

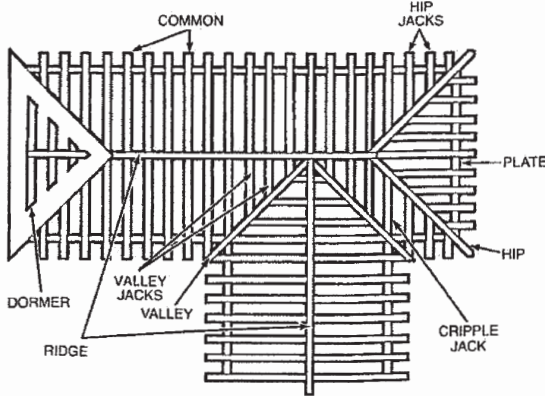


HIP AND VALLEY RAFTERS

The hip and valley rafters are treated very similarly because both run at a 45° angle to the common rafter, and they both form the diagonal or hypotenuse of a right triangle (Figure 8). The three sides being the hip, plate and common rafter, or the valley, ridge and common rafter. Therefore the cuts and length apply equally to hip and valley rafters.

FIGURE 8

Top View Rafter Definition



Hip-Val Length

Use the table at the back of this manual to obtain the hip or valley rafter length. If an 8 Inch Rise is used, find the column headed Run Ft and locate 13'. To the right read the column headed Hip or Val. Rafter Length and find a length of 20' 3⁷/₈". (Figures 8, 9, 10, 12 and 13).

FIGURE 9

View of Hip Rafter Layout

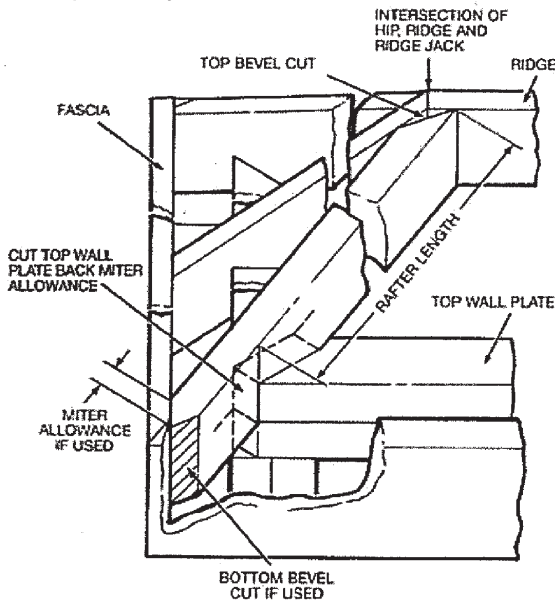


FIGURE 10

Hip Rafter Layout

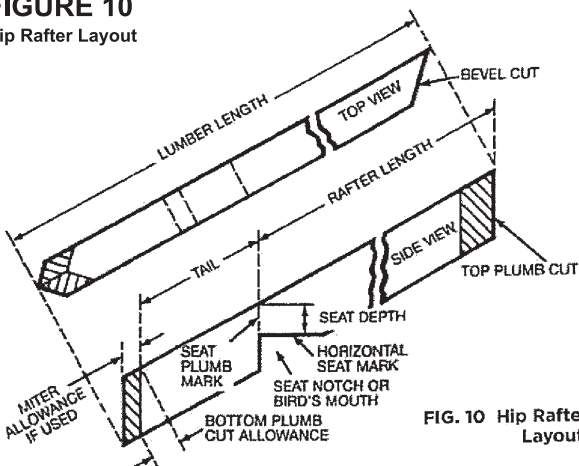


FIG. 10 Hip Rafter Layout.

Tail or Eave Length

Use the same procedure as you did for the common rafter but remember to use the Hip Val column. For example, a tail 1' 9" long would give us:

$$\begin{aligned} 1' \text{ Run} &= 1' 6\frac{3}{4}'' \\ 9'' \text{ Run} &= 14\frac{1}{8}'' \\ \hline 1' 9'' \text{ Tail} &= 2' 8\frac{7}{8}'' \end{aligned}$$

NOTE:

If a mitre is desired, add for hip or val mitre allowance from the tables. (Figures 10 and 13).

Hip Val Lumber Length

Add an allowance for a bottom plumb cut and, if used, a mitre. Obtaining from the table the allowance for the bottom plumb cut (using a 2 x 6) and a mitre allowance (using a 1¹/₂" actual rafter thickness, we get:

Rafter Length	=	20' 3 ⁷ / ₈ "
Tail Length	=	2' 8 ⁷ / ₈ "
Bottom Plumb Allow	=	3 ¹¹ / ₁₆ "
Mitre Allowance	=	7 ₈ "
Lumber Length		= 23' 5⁵/₁₆"

NOTE:

Only add mitre allowances if they are used.

HIP RAFTER LAYOUT

Step 1: Top Plumb Cut

The square is used in the same manner as in step 1 of the common rafter top plumb cut. But now, read the Inch Rise on the Hip Val scale instead. Remember that the top plumb cut is a bevel cut and that opposite rafters will have opposite bevel cuts (Figures 9 and 10). Therefore when placing the square on the rafter, place it on the long side of the bevel (The bevel cut will be explained in step 4).

Step 2: Seat Notch

Measure the rafter length down along the top of the rafter and make the seat plumb mark in the same manner as done for the common rafter. Next, measure along the seat plumb mark and the seat depth and using the dashed line on the square, draw a perpendicular line for the horizontal seat mark (Figure 10). Be sure all horizontal cuts for all rafters are the same distance from the top edge of the rafter at the wall line. For the proper fit of the hip rafter, cut the top wall plate corner off (Figure 9). This allows hip seat notch to set in against a full flat corner, rather than against an outside point.

Step 3: Tail or Bottom Plumb Cut

Measure down the top of the hip rafter from the seat plumb mark and mark the distance for the tail. Using our square, make the bottom plumb mark. If a tail mitre is used, make another plumb mark on the other side of the rafter just opposite of the bottom plumb mark (Figure 10).

Step 4: Cutting Hip Rafter Pattern

With your saw set at 45°, cut the top plumb cut, making sure the top bevels are opposite for opposite rafters. Setting the saw at 45° automatically gives the plumb cut and the side cut bevel. Make the bottom plumb cut on a 45° angle if mitre is used. If a bevel is not needed, set saw at 90°. The seat notch is made with the saw at 90° (Figures 9 and 10).

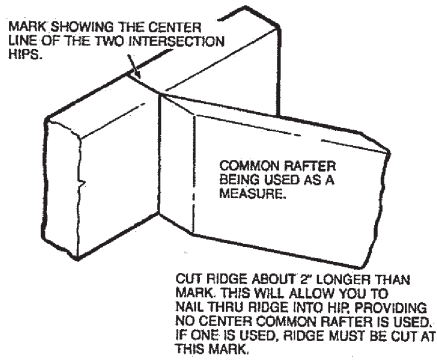
INTERSECTION OF HIP ON RIDGE

To find the intersection points of the hip on the ridge rafter, cut ridge on foot longer at the point where the hips intersect the ridge. With a regular length common rafter, set the seat notch cut over the edge of the top plate, in line with the ridge (Figure 11). Making sure your walls are straight, place top end of common rafter even with top of ridge.

Now mark across top of ridge (as shown). This mark will be the centre of the two intersecting hips. If a common rafter is to be used, the ridge will be cut off at this mark and the common rafter butted up against it (Figure 9). If no common rafter will be used, cut the ridge about 2" longer. This will allow you to nail through the ridge into the hip.

FIGURE 11

Intersection of Hips on Ridge



VALLEY RAFTER LAYOUT

Step 1: Top Plumb Cut

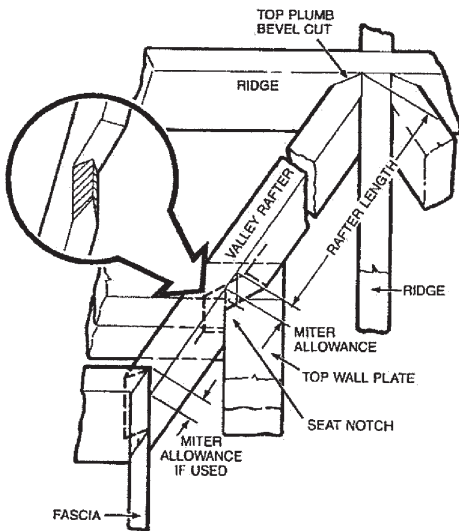
Using the Hip Val scale, make the top plumb mark in the usual way. Now measure down the top of the rafter from this mark for a mitre allowance, if used (Figures 12 and 13). Look up the allowance in the Tables under the rise and the rafter thickness that you are using. Then make two plumb marks on both sides of the rafter for the top plumb bevel cuts.

Step 2: Seat Notch

From the first top plumb mark, measure down the rafter length and make the seat plumb mark (Figure 13). Now go down the rafter from the seat plumb mark the mitre allowance distance and make a plumb line for the mitre allowance. Draw the same mitre plumb line on the other side of the rafter for making the bevel cut. This mitred seat cut will allow the valley rafter to fit down over the crotch formed by the joining wall plates (Figure 12). Next, to make the horizontal seat mark, measure down to the seat depth on the seat plumb mark (not the mitre plumb line). Aligning the dashed line on our square with the seat plumb mark, draw a perpendicular line using the bottom edge of our square to the edge of the rafter. Also extend the horizontal seat mark to the added mitre allowance plumb line (Figures 7 and 13). Double check to see that all seat notches are the same depth.

FIGURE 12

View of Valley Rafter Layout



Step 3: Bottom or Tail Plumb Cut

Measure down the top of the valley rafter from the Seat Plumb Mark and mark the tail length. Be sure to add the mitre allowance in the measurement, if used (Figure 13). Make the bottom plumb mark with the square in the normal manner.

Step 4: Rafter Pattern Cuts

To make the top and bottom cuts, tilt the saw at 45° (Figure 13). Also make the seat mitre cuts. Now change the saw tilt to 90° for the horizontal seat cut. You may want to check for proper fit and use this rafter as a pattern for the other valley rafters.

JACK RAFTERS

Jack Rafter Length

The Jack Rafter tables are different than those for the other rafters. The table lists, in the first column, the varying centre-to-centre spacing of the jack rafters. Then in the second column is the difference in length from one jack to the next (Figures 14 and 15). This difference in length is to be added to or subtracted from the rafter length as you progress from jack to jack (using the spacing selected). Using the example of an 8" rise, lets assume a 24" spacing; we have a 2' 4⁷/₈" difference in length. Therefore, to obtain the length of the first or longest jack rafter, measure the distance from the edge of the last common rafter to the intersection of the hip and ridge, or the valley and top plate (for a valley jack). This measurement is called (P) in Figures 14 and 15. Now subtract the measurement (P) from the spacing you are using (W). The result is the distance from the intersection of the hip and ridge to the first hip jack or the plate corner to the first valley jack. Look in the table for this distance and find the length to deduct from the common rafter length. For example, if a measurement of 12" is taken from the common rafter far side edge to where the hip intersects the ridge (W-P=24 -12=12). Therefore:

Common Rafter Length	=	15' 7 ¹ / ₂ "
Subtract (W-P) From Table	=	1' 2 ³ / ₈ "
<hr/>		
First Hip Jack Rafter Length	=	14' 5 ¹ / ₈ "

The tail length must now be added to this length. For all remaining jacks, subtract the full spacing (W). Example: finding in the tables the amount to subtract for a spacing of 24", we get:

First Hip Jack Rafter Length	=	14' 5 ¹ / ₈ "
Subtract (W) From Table	=	2' 4 ⁷ / ₈ "
<hr/>		
Second Hip Jack Rafter Length	=	12' 0 ¹ / ₄ "

Continue with this process until you get to the last jack rafter (the process is identical for valley rafters). Always remember to measure the jack rafter length on the long side of the rafter because of the bevel. Cripple jacks (Figure 8) use the same method as above, but must be beveled at both ends. Therefore, the subtraction for both ends must be made from a common rafter length as if it went from the plate to the ridge. The crippled jack rafters are actually being measured from long point to long point diagonally along the top edge. By measuring diagonally, you will compensate for half of the hip thickness and half of the valley thickness.

Tail or Eave Length

The tail or eave length for all hip jack rafters is the same as for common rafters. If desired, use a common rafter for a pattern. Cripple and valley jacks have no tail (Figures 14 and 15).

Lumber Length

The lumber length is found by using the same procedure outlined for common rafters, but subtracting for the rafters' position (see above).

FIGURE 13

Valley Rafter Layout

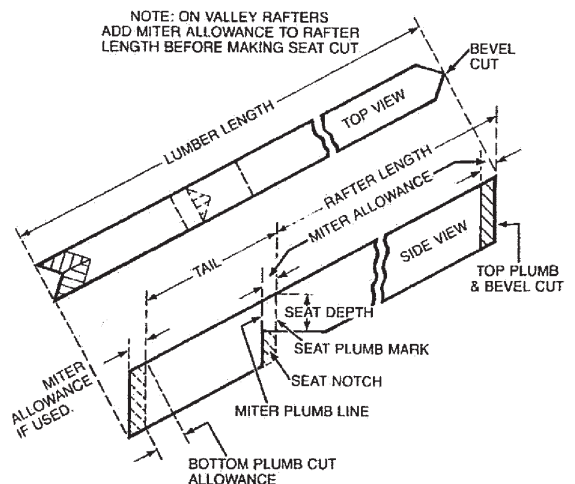


FIGURE 14
Top View of Hip Jack Rafter Spacing

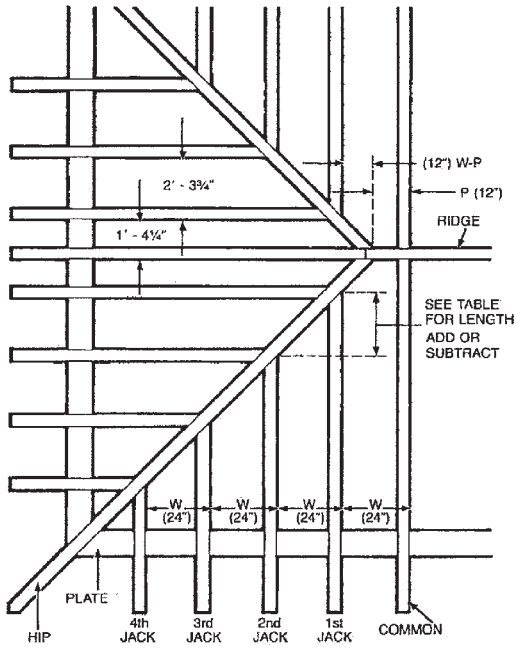


FIGURE 15
Top View of Valley Jack Rafter Spacing

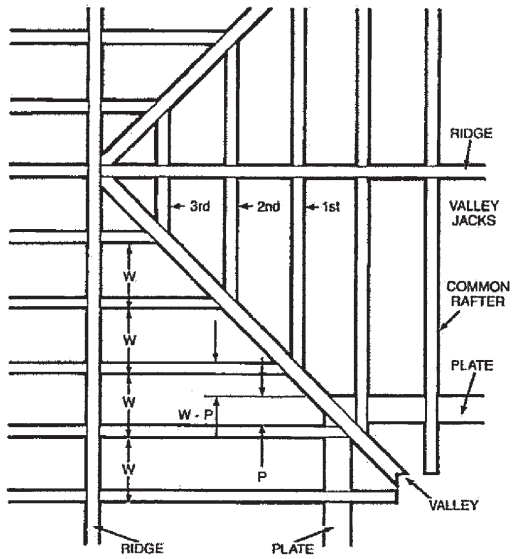
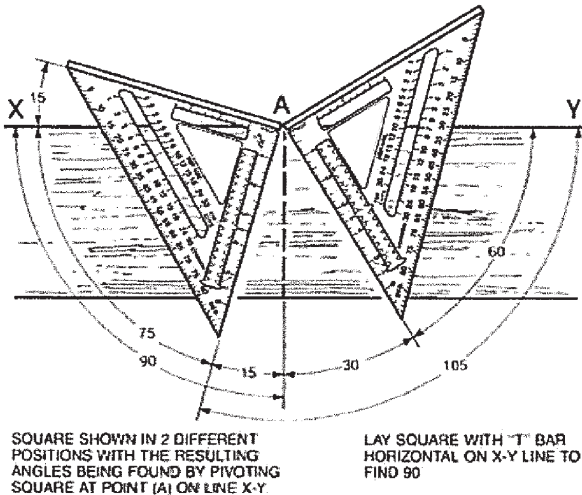


FIGURE 16
Resulting Angles Using the Degree Scale on a Board



JACK RAFTER LAYOUT

Jack Rafter Layout Cuts

Seat notches and bottom plumb cuts for hip jack rafters are the same as for common rafters. The common scale on the square is used for all jack rafters. Whenever a jack rafter rests against a hip or valley rafter, mark a plumb cut, and then cut at a 45° along the mark. This will give both the side cut and the plumb cut. Angles should be checked for direction before cuts are made. See figures 11 and 14 for the centre common rafter at the end of the ridge.

DORMER RAFTERS

Sometimes when adding a room or remodeling, it is easier to build a valley on top of the main roof. This saves cutting into the main roof that could cause weakening.

Step 1:

Referring to Figure 1, mark location of valley on roof at 45° to common rafters. Then set long point of bottom end of rafter even with the mark just made at line "A".

Step 2: Plumb Cuts on the Dormer Rafter

Using whichever inch rise has been determined, make them the same as the common rafter.

Step 3: Rafter Length

Once the shortest rafter is measured, the rafter length may be determined using the same method as with jack rafters.

Step 4: Bottom Cut

The heel or bottom cut is the same as the horizontal cut of the seat notch (Figure 7). But cut all the way across the rafter (and without making a seat plumb cut). The saw should be tilted at the same angle as the rise of the roof. Thus allowing your horizontal cut to lay flat against the roof. For example, using the common scale with an 8" rise, you will notice that the number 8 lines up at 33 1/2° before making the bottom cut.

DOOR OVERHANG

In Figure 1 is pictured a roof extension that may be found over a doorway. To find the end cut at point "B", hold the square so that the T Bar is flat against the rafter. Then using the common rafter scale, make a mark next to the inch rise that was used for the main roof. Now draw a line from the mark just made to the pivot point. This is then the cut required for a flat roof. For a pitched roof, use the angle scale and make our mark next to the angle that is the result of the roof inch rise angle minus the overhang inch rise angle.

DEGREE SCALE

With the degree scale on our square, any angle can be found on board. Figure 16 shows a couple of examples. To find an obtuse angle, for example 105°, put the pivot point on the mark where the cut is to be made. Lay the square so that the T Bar is held tight against the board and draw a perpendicular line across the board. Now flip the square on its opposite side (making sure you're using the same pivot point) and pivot the square so the degree scale reads 15° (105° - 90°). Scribing a line along the bottom edge of the square now gives you a 105° angle (and also a 75° angle and 15° angle).

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STAIR LAYOUT EXAMPLE

With our square, stair layout can be completed simple and efficiently. The layout can be done without hours of calculations. Basic math and the use of a calculator with a square root function are all that is needed.

Step 1: Find Step Measurements

Starting with the total rise (Figure 17) to find the number of steps required. If the rise is not known, measure the vertical distance between the lower finished floor and the upper one. Whenever a quantity is known, use it instead of calculating it.

FIGURE 17

Stair Layout

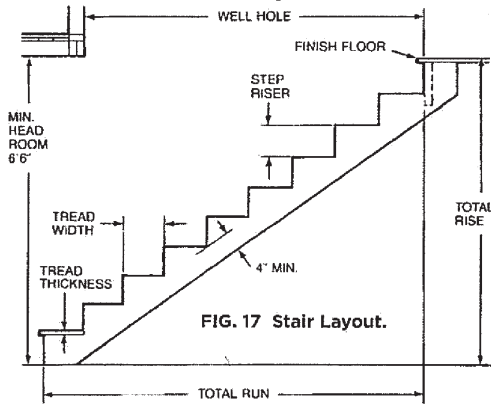


FIG. 17 Stair Layout.

NOTE:

Before starting your layout, check local building codes for tread width, length and step rise requirements.

Find the approximate number of steps with the following formula:

$$\text{Approximate No. of Steps} = \frac{\text{Total Rise (Inches)}}{7''}$$

For example, let's assume an 8' 6" rise = 102"

$$\begin{aligned} \text{Approximate No. of Steps} &= \frac{102''}{7''} \\ &= 14.57'' \end{aligned}$$

The actual number of steps would be the whole number, ignoring any fraction. In this example, that number would be 14.

Next, find the actual step rise by using the following equation:

$$\begin{aligned} \text{Actual Step Rise} &= \frac{\text{Total Rise (Inches)}}{\text{No. of Steps}} \\ \text{In our Example} &= \frac{102''}{14} \\ \text{Actual Step Rise} &= 7.29'' \end{aligned}$$

Now find the step run (or tread width) by subtracting the step rise from 17 1/2":

$$\begin{aligned} \text{Step Run} &= 17.5'' - \text{Actual Step Rise} \\ &= 17.5'' - 7.29'' \\ &= 10.21'' \end{aligned}$$

Thus the total run is:

$$\begin{aligned} \text{Total Run} &= \text{Step Run} \times (\text{No. of Steps} - 1) \\ &= 10.21'' \times (14 - 1) \\ &= 10.21'' \times (13) \\ &= 132.73'' \end{aligned}$$

Finally we calculate the inch rise (similar to the rafter inch rise):

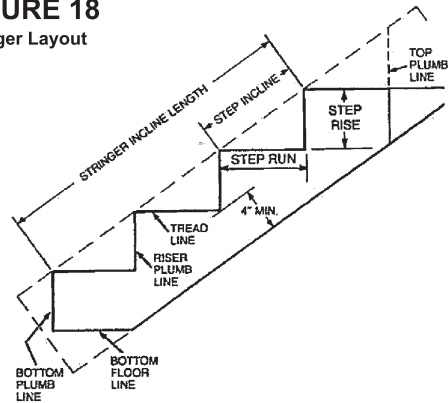
$$\begin{aligned} \text{Inch Rise} &= \frac{\text{Actual Step Rise (Inches)} \times 12}{\text{Actual Step Run (Inches)} \times 12} \\ &= \frac{7.29'' \times 12}{10.21'' \times 12} \\ &= \frac{87.48}{122.52} \\ &= 8.57'' \end{aligned}$$

The ideal inch rise is 7 or 8 (or 30° to 35°) but may be from a 5 inch rise to a 14 inch rise depending on the circumstances. The step rise or run may be modified if the run becomes impractical or if the minimum head room is under 6 1/2 ft. Check the head room by measuring down along a plumb line dropped from the lowest ceiling point to where the tread beneath would be. To find the tread height, count the number of steps necessary to get under the plumb line and then multiply by the step rise. Another consideration is to have a minimum of 4" from the inside corner of the step to the bottom edge of the stringer (Figure 18). A quick test is to use the square as you did for the common rafter top plumb cut (using the step inch rise) and make a plumb line the distance of the step rise, then measuring from the end of the plumb line directly to the edge of the stringer.

The tread length depends on available room and intended use. For instance, for two-way traffic a length of 36 to 42 inches is needed, whereas one-way traffic doesn't require over a 24 inch length. Also, the calculated tread width does not include a nosing width (1 3/4" being maximum).

FIGURE 18

Stringer Layout



Step 2: Layout Stringer

First find the step incline length (Figure 18) by using the following formula:

$$\text{Step Incline} = \sqrt{(\text{Step Rise})^2 + (\text{Step Run})^2}$$

In our example: Step Rise = 7.29
Step Run = 10.21

Using the following formula:

$$\begin{aligned} \text{Step Incline} &= \sqrt{(7.29)^2 + (10.21)^2} \\ &= \sqrt{(53.14) + (104.24)} \\ &= \sqrt{157.38} \\ &= 12.545 \end{aligned}$$

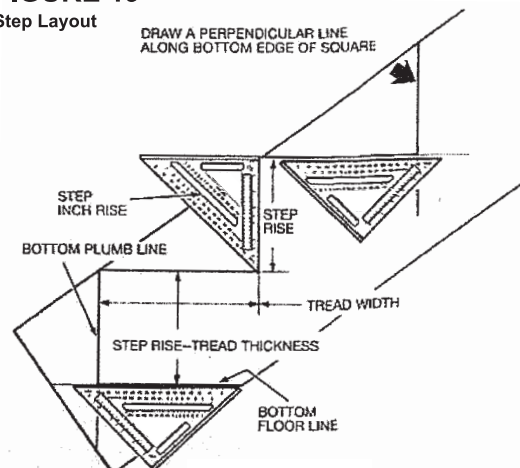
Second, find the stringer incline length by using the following formula:

$$\text{Stringer Incline Length} = \text{Step Incline Length} \times (\text{number of steps} - 1)$$

$$\begin{aligned} \text{In our example: Stringer Incline Length} &= 12.545 \times (14 - 1) \\ &= 12.545 \times (13) \\ &= 163.085 \text{ Inches} \\ &= 13\text{ft. } 7\frac{1}{16} \text{ Inches} \end{aligned}$$

FIGURE 19

Step Layout



Draw the bottom plumb line using your inch rise on the common scale of the square, exactly as you did for the common rafter (Figures 18 and 19). If you wish to conserve wood, adjust the bottom plumb line so that its length is equal to the step rise. Next, draw the bottom floor line by measuring down the bottom plumb line the distance of the step rise minus the tread thickness. In our example, with a 1" tread; 7.29" minus 1.00" giving you 6.29" or 6⁵/₁₆". Use the square the same way as you did for the bird's mouth horizontal seat mark (Figures 7A, 7B and 19).

The outside step corners should now be marked off (again see Figure 18). Starting from the bottom plumb line, measure up along the top edge of the stringer, the distance of a step incline. Repeat this for each step corner, until you have reached the stringer incline length. Make another step incline mark for a top plumb line.

Draw the riser plumb lines for all the steps, using the square as you did for the bottom plumb line. Using the same procedure as you did for the bottom floor line, draw all the step tread lines (Figure 19). Be sure to measure down the riser plumb line the distance of the step rise only. Make the last tread line which will be the top floor line. If the stringer is to go below the top floor boards, add the floor board thickness to the step rise when measuring down the top plumb line to draw the top floor line (this is to be done when the bottom floor line was found by not taking into account the tread thickness). If the tread thickness was used, add the difference between the floor board thickness and the tread thickness.

Step 3: Cutting Stringer Pattern

The stringer pattern should be ready to cut, except for any special allowances for anchoring the top of the stringer. Once that is laid out, you may want to clamp both stringers together before cutting to be sure the stringers are identical.

Table B: Change Decimals to Fractions

DECIMAL	FRACTION	DECIMAL	FRACTION
.06"	.08	.56"	.08
.13"	.16	.63"	.16
.19"	.25	.69"	.25
.25"	.33	.75"	.33
.31"	.42	.81"	.42
.38"	.50	.88"	.50
.44"	.58	.94"	.58
.50"	.67		

SOLAR PANEL SUPPORT EXAMPLE

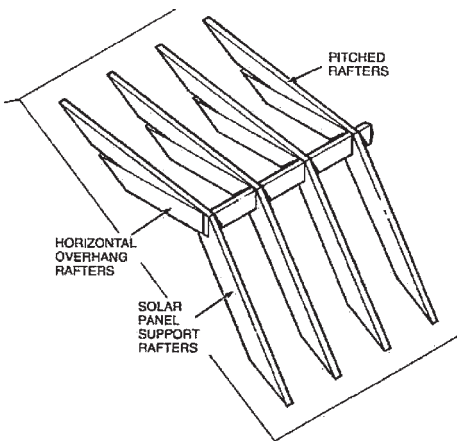
Example: A rafter support for a series of flat plate collectors on a south facing 8-inch rise roof.

Step 1: Rafter Calculations

The pitch for the support rafters, which is the desired tilt angle for the solar panels, will be required. If known in degrees, convert it to the nearest inch rise so that the tables may be used. This pitch is found by added 10 to 15 degrees to your latitude (since this is theoretically the best for heating). In our example, we need a 58° pitch for a 19 inch rise because the latitude of the location is 43°. The angle of tilt is not critical, since the efficiency is not appreciably reduced by a small difference in tilt angle from optimum, thus the closest inch rise can be used (Figures 20 and 21).

FIGURE 20

A Rafter Support Structure for Solar Panels



Find the support rafter rise and run by using the tables somewhat in reverse from the way you have done so far. First, find the proper table for your support rafter inch rise and locate your length under the common rafter length column (Note: You may have to refer to both the Run (ft.) column plus the Run (Inch) column in referring to the correct length). In our example we need a 50" or 4' 2" support rafter length. To begin with, we find a 2' run having a 3' 9" length. This then leaves a 5" length which results in an approximation of a 2¹¹/₁₆" run. If needed, approximating can be done with the following equation, if desired:

$$Rm = \frac{(Rh \times (\frac{Lm - Ll}{Lh - Lm})) + Rl}{1.00 + (\frac{Lm - Ll}{Lh - Lm})}$$

R = Run
L = Length
l = Low
h = High

In our example:

$$Rm = \frac{(3.00 \times (\frac{5.00 - 4.63}{5.63 - 5.00})) + 2.50}{1.00 + (\frac{5.00 - 4.63}{5.63 - 5.00})} = \frac{2.69}{2^{11/16}}$$

Thus we have for the support rafter run, 2' plus 2¹¹/₁₆" equalling 2' 2¹¹/₁₆" or 26.69". Now to find the support rafter rise:

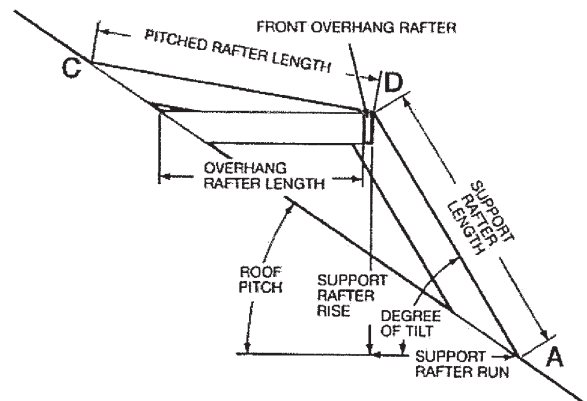
$$\begin{aligned} \text{Support Rafter Rise (in.)} &= \frac{\text{Inch Rise} \times \text{Run (in.)}}{12} \\ &= \frac{19 \text{ Inch Rise} \times 26.69''}{12} \\ &= 42.25'' \\ \text{Converted to feet:} &= 3' 6\frac{1}{4}'' \end{aligned}$$

Next we need to find the horizontal overhang length (Figure 21). It is found by finding the roof run between points A and B and then subtracting the support rafter run and the front overhang rafter thickness. The roof run between points A and B is found by:

$$\begin{aligned} \text{Roof Run (in.)} &= \frac{\text{Roof Rise (in.)} \times 12}{\text{Inch Rise}} \\ &= \frac{42.25'' \times 12}{8 \text{ Inch Rise}} \\ &= 63.37'' \\ \text{Converted to feet:} &= 5' 3\frac{3}{8}'' \end{aligned}$$

FIGURE 21

Rafter Layout for a Solar Panel



From this we can get the overhang rafter length, noting that we are using 2 x 6 rafters giving a thickness of 1 1/2":

Roof Run Between A & B	63.37"
- Support Rafter Run	- 26.69"
- Front Overhang Thickness	- 1.50"
= Overhang Rafter Length	= 35.18"
	Or in feet: = 2' 11 ³ / ₁₆ "

Lastly we need to find the pitched rafter length, the rafter above the horizontal overhang rafter. In our example, the pitched rafter length will equal the support rafter length (i.e 50").

Step 2: Rafter Layouts

The support rafter bottom cut layout (at point A on Figure 21) will be made similar to a pitched door overhang. Drape the square T over the top (or outside) edge of the support rafter and hold the square firmly against the rafter. Then make a mark, using the angle scale, next to the angle that is found by subtracting the roof pitch angle (the roof inch rise in degrees) from the support rafter inch rise angle. In our example, we have 57³/₄° (for the 19 inch rise support) minus 33³/₄° (for the 8 inch rise roof) or 24°. From this mark, draw a line to the pivot point and you will then have the bottom cut layout. The support rafter top cut layout (at point D in Figure 21) is similar to the bird's mouth layout. First measure up the outside of the rafter the rafter length from the bottom cut and then draw a plumb line using the support rafter inch rise. Now, instead of measuring down the seat depth, measure down the overhang rafter width and make a horizontal line going to the roof edge of the rafter.

The horizontal overhang rafter layout is identical to the layout for a flat roof extension (hence its name). The pitched rafter top cut layout (at point C in Figure 21) is the same as the support rafter bottom cut layout (at point A). For the pitched rafter bottom cut layout (at point D) the following equation is used:

$$\text{Bottom Angle} = \text{Support Angle} + (2 \times \text{Roof Angle}) - 90^\circ$$

$$\begin{aligned} \text{In our example:} &= 57\frac{3}{4}^\circ + (2 \times 33\frac{3}{4}^\circ) - 90^\circ \\ &= 35\frac{1}{4}^\circ \end{aligned}$$

Use this equation when the pitched rafter length equals the support rafter length. We then hold the square tight against the top edge of the rafter as we did for the top cut and make a mark at the bottom cut angle (e.g at 35¹/₄°). A line from this mark to the pivot point gives us the necessary bottom cut pattern.

Step 3: Rafter Pattern Cuts

If Figures 20 and 21 are carefully studied, the rafter pattern cuts can be easily made following the patterns that were laid out. Set your saw at 90° for all the cuts.

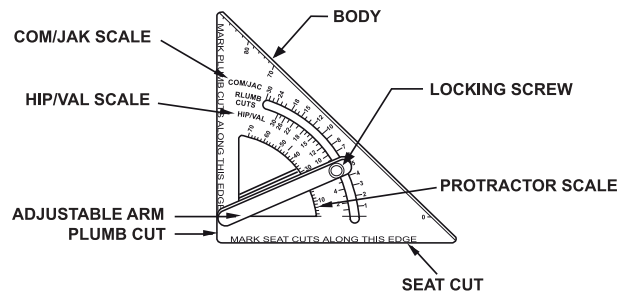
ADJUSTABLE QUICK SQUARE FEATURES

Two adjustable quick squares are also available in our quick square range. This heavy-duty version is manufactured from aluminium using computer numerical controlled (CNC) machines.

The black anodised finish offers enhanced corrosion protection and the laser engraved scales give outstanding measurement accuracy. It combines the functions of a combination, try and framing square and can be used to make basic measurements and as a saw guide for 45° and 90° cuts.

It can be utilised as a protractor allowing the measurement of angles and pitches. This makes light and fast work of cutting wall shoulders (bird beaks) or rafter ends. The adjustable protractor arm can be locked in place with the brass screw - a useful feature when making repetitive cuts.

DIAGRAM



Plumb Cut using Adjustable Quick Square

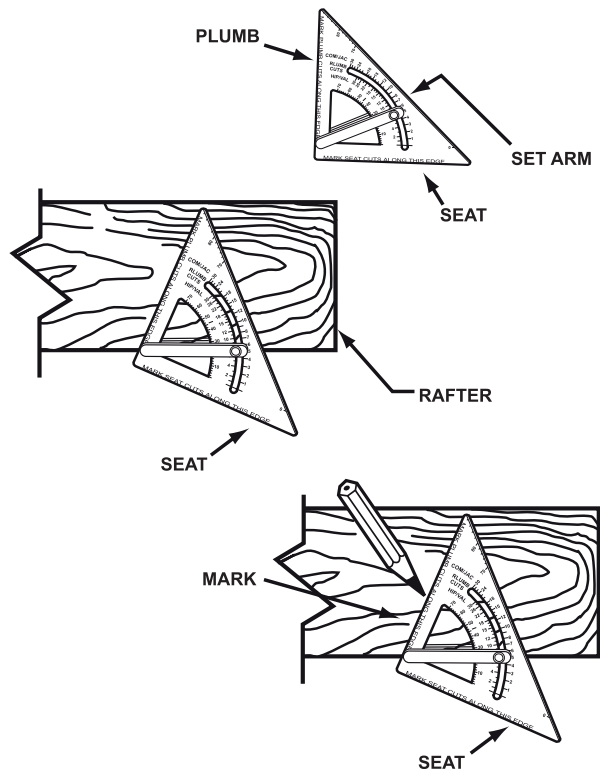
Loosen the locking screw and set the adjustable arm so that its top edge coincides with the desired inch rise per foot of run (slope) for the desired type of rafter. Tighten the locking screw to lock the arms in position.

At one end of the rafter, lay the quick square on the side of the rafter with the top at the adjustable arm placed against the bottom edge at the rafter.

Along the edge marked for plumb cuts, mark the rafter (Figure 22).

FIGURE 22

Plumb Cut using Adjustable Quick Square



1 INCH RISE 1-12 PITCH 4 1/4 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 0 1/8"	1' 5"
2	2' 0 1/8"	2' 10"
3	3' 0 1/8"	4' 3"
4	4' 0 1/4"	5' 8"
5	5' 0 1/4"	7' 1"
6	6' 0 1/4"	8' 6"
7	7' 0 3/8"	9' 11"
8	8' 0 3/8"	11' 4"
9	9' 0 3/8"	12' 9"
10	10' 0 1/2"	14' 2"
11	11' 0 1/2"	15' 7"
12	12' 0 1/2"	17' 0"
13	13' 0 5/8"	18' 5"
14	14' 0 5/8"	19' 10"
15	15' 0 5/8"	21' 3"
16	16' 0 5/8"	22' 8"
17	17' 0 5/8"	24' 1"
18	18' 0 3/4"	25' 6"
19	19' 0 3/4"	26' 11"
20	20' 0 7/8"	28' 4"
21	21' 0 7/8"	29' 9"
22	22' 0 7/8"	31' 2"
23	23' 1"	32' 7"
24	24' 1"	34' 0"
25	25' 1"	35' 5"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	1/2"	3/4"
1	1"	1 3/8"
1 1/2	1 1/2"	2 1/8"
2	2"	2 7/8"
2 1/2	2 1/2"	3 1/2"
3	3"	4 1/4"
3 1/2	3 1/2"	5"
4	4"	5 5/8"
4 1/2	4 1/2"	6 3/8"
5	5"	7 1/8"
5 1/2	5 1/2"	7 3/4"
6	6"	8 1/2"
6 1/2	6 1/2"	9 1/4"
7	7"	9 7/8"
7 1/2	7 1/2"	10 5/8"
8	8"	11 3/8"
8 1/2	8 1/2"	12"
9	9"	12 3/4"
9 1/2	9 1/2"	13 1/2"
10	10"	14 1/8"
10 1/2	10 1/2"	14 7/8"
11	11"	15 5/8"
11 1/2	11 1/2"	16 1/4"

Spacing In.	Jack Rafter Length
1	1"
2	2"
3	3"
4	4"
5	5"
6	6"
7	7"
8	8"
9	9"
10	10"
11	11"
12	1' 0"
13	1' 1"
14	1' 2"
15	1' 3"
16	1' 4"
17	1' 5"
18	1' 6 1/8"
19	1' 7 1/8"
20	1' 8 1/8"
21	1' 9 1/8"
22	1' 10 1/8"
23	1' 11 1/8"
24	2' 0 1/8"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	3/4"	3 1/2"	5/16"
1 5/8"	3/4"	5 1/2"	5/16"
1 3/4"	7/8"	7 1/4"	5/8"
1 7/8"	15/16"	9 1/4"	3/4"

2 INCH RISE 2-12 PITCH 9 1/2 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 0 5/8"	1' 5 1/8"
2	2' 0 5/8"	2' 10 1/4"
3	3' 0 1/2"	4' 3 1/4"
4	4' 0 5/8"	5' 8 3/8"
5	5' 0 5/8"	7' 1 1/2"
6	6' 1"	8' 6 1/2"
7	7' 1 1/8"	9' 11 5/8"
8	8' 1 3/8"	11' 4 3/4"
9	9' 1 1/2"	12' 9 3/4"
10	10' 1 1/8"	14' 2 7/8"
11	11' 1 1/8"	15' 8"
12	12' 2"	17' 1 1/8"
13	13' 2 1/2"	18' 6 1/8"
14	14' 2 3/8"	19' 11 1/4"
15	15' 2 1/2"	21' 4 3/8"
16	16' 2 5/8"	22' 9 3/8"
17	17' 2 7/8"	24' 2 1/2"
18	18' 3"	25' 7 5/8"
19	19' 3 1/8"	27' 0 3/4"
20	20' 3 3/8"	28' 5 3/4"
21	21' 3 1/2"	29' 10 7/8"
22	22' 3 5/8"	31' 4"
23	23' 3 7/8"	32' 9"
24	24' 4"	34' 2 1/8"
25	25' 4 1/8"	35' 7 1/4"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	1/2"	3/4"
1	1"	1 3/8"
1 1/2	1 1/2"	2 1/8"
2	2"	2 7/8"
2 1/2	2 1/2"	3 1/2"
3	3"	4 1/4"
3 1/2	3 1/2"	5"
4	4"	5 5/8"
4 1/2	4 1/2"	6 3/8"
5	5"	7 1/8"
5 1/2	5 1/2"	7 3/4"
6	6"	8 1/2"
6 1/2	6 1/2"	9 1/4"
7	7"	10"
7 1/2	7 1/2"	10 5/8"
8	8"	11 3/8"
8 1/2	8 1/2"	12 1/8"
9	9"	12 7/8"
9 1/2	9 1/2"	13 1/2"
10	10"	14 1/4"
10 1/2	10 1/2"	15"
11	11"	15 5/8"
11 1/2	11 1/2"	16 3/8"

Spacing In.	Jack Rafter Length
1	1"
2	2"
3	3"
4	4"
5	5 1/8"
6	6 1/8"
7	7 1/8"
8	8 1/8"
9	9 1/8"
10	10 1/8"
11	11 1/8"
12	1' 0 1/8"
13	1' 1 1/8"
14	1' 2 1/8"
15	1' 3 1/8"
16	1' 4 1/8"
17	1' 5 1/8"
18	1' 6 1/8"
19	1' 7 1/8"
20	1' 8 1/8"
21	1' 9 1/8"
22	1' 10 1/8"
23	1' 11 1/8"
24	2' 0 3/8"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	3/4"	3 1/2"	5/16"
1 5/8"	3/4"	5 1/2"	5/16"
1 3/4"	7/8"	7 1/4"	5/8"
1 7/8"	15/16"	9 1/4"	3/4"

3 INCH RISE 3-12 PITCH 14 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 0 ³ / ₈ "	1' 5 ¹ / ₄ "
2	2' 0 ³ / ₄ "	2' 10 ¹ / ₄ "
3	3' 1 ¹ / ₈ "	4' 3 ³ / ₄ "
4	4' 1 ¹ / ₂ "	5' 9"
5	5' 1 ¹ / ₈ "	7' 2 ¹ / ₈ "
6	6' 2 ¹ / ₄ "	8' 7 ³ / ₈ "
7	7' 2 ⁵ / ₈ "	10' 0 ⁵ / ₈ "
8	8' 3"	11' 5 ⁵ / ₈ "
9	9' 3 ³ / ₈ "	12' 11 ¹ / ₈ "
10	10' 3 ³ / ₄ "	14' 4 ³ / ₈ "
11	11' 4 ¹ / ₈ "	15' 9 ⁵ / ₈ "
12	12' 4 ¹ / ₂ "	17' 2 ⁷ / ₈ "
13	13' 4 ⁷ / ₈ "	18' 8"
14	14' 5 ¹ / ₄ "	20' 1 ¹ / ₄ "
15	15' 5 ¹ / ₂ "	21' 6 ¹ / ₂ "
16	16' 5 ⁵ / ₈ "	22' 11 ³ / ₄ "
17	17' 6 ¹ / ₄ "	24' 5"
18	18' 6 ³ / ₈ "	25' 10 ¹ / ₄ "
19	19' 7"	27' 3 ¹ / ₂ "
20	20' 7 ¹ / ₂ "	28' 8 ³ / ₄ "
21	21' 7 ³ / ₄ "	30' 1 ⁷ / ₈ "
22	22' 8 ¹ / ₈ "	31' 7 ¹ / ₈ "
23	23' 8 ¹ / ₂ "	33' 0 ³ / ₈ "
24	24' 8 ³ / ₈ "	34' 5 ⁵ / ₈ "
25	25' 9 ¹ / ₄ "	35' 10 ⁵ / ₈ "

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	1/2"	3/4"
1	1"	1 1/8"
1 1/2	1 1/2"	2 1/8"
2	2"	2 7/8"
2 1/2	2 1/2"	3 5/8"
3	3 1/8"	4 1/4"
3 1/2	3 3/8"	5"
4	4 1/8"	5 3/4"
4 1/2	4 5/8"	6 1/2"
5	5 1/8"	7 1/8"
5 1/2	5 5/8"	7 7/8"
6	6 1/8"	8 3/8"
6 1/2	6 3/4"	9 3/8"
7	7 1/4"	10"
7 1/2	7 3/4"	10 3/4"
8	8 1/4"	11 1/2"
8 1/2	8 3/4"	12 1/2"
9	9 1/4"	12 7/8"
9 1/2	9 3/4"	13 3/8"
10	10 1/4"	14 3/8"
10 1/2	10 7/8"	15 1/8"
11	11 3/8"	15 3/4"
11 1/2	11 7/8"	16 1/2"

Spacing In.	Jack Rafter Length
1	1"
2	2"
3	3 1/8"
4	4 1/8"
5	5 1/8"
6	6 1/8"
7	7 1/4"
8	8 1/4"
9	9 1/4"
10	10 1/4"
11	11 1/8"
12	1' 0 3/8"
13	1' 1 1/8"
14	1' 2 3/8"
15	1' 3 1/2"
16	1' 4 1/2"
17	1' 5 1/2"
18	1' 6 1/2"
19	1' 7 3/8"
20	1' 8 3/8"
21	1' 9 3/8"
22	1' 10 3/8"
23	1' 11 3/8"
24	2' 0 3/4"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	3/4"	3 1/2"	1/8"
1 5/8"	3/4"	5 1/2"	1 3/8"
1 3/4"	7/8"	7 1/4"	1 13/16"
1 7/8"	1 1/16"	9 1/4"	2 5/16"

4 INCH RISE 4-12 PITCH 18 1/2 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 0 ⁵ / ₈ "	1' 5 ¹ / ₂ "
2	2' 1 ³ / ₈ "	2' 10 ⁵ / ₈ "
3	3' 2"	4' 4 ³ / ₈ "
4	4' 2 ⁵ / ₈ "	5' 9 ³ / ₄ "
5	5' 3 ¹ / ₄ "	7' 3 ¹ / ₄ "
6	6' 3 ³ / ₈ "	8' 8 ⁵ / ₈ "
7	7' 4 ⁵ / ₈ "	10' 2 ¹ / ₈ "
8	8' 5 ¹ / ₄ "	11' 7 ¹ / ₂ "
9	9' 5 ⁵ / ₈ "	13' 1"
10	10' 6 ¹ / ₂ "	14' 6 ³ / ₈ "
11	11' 7 ¹ / ₈ "	15' 11 ³ / ₄ "
12	12' 7 ³ / ₄ "	17' 5 ¹ / ₄ "
13	13' 8 ¹ / ₂ "	18' 10 ⁵ / ₈ "
14	14' 9 ¹ / ₈ "	20' 4 ¹ / ₈ "
15	15' 9 ³ / ₈ "	21' 9 ¹ / ₂ "
16	16' 10 ³ / ₈ "	23' 3"
17	17' 11"	24' 8 ³ / ₈ "
18	18' 11 ³ / ₄ "	26' 1 ⁷ / ₈ "
19	20' 0 ³ / ₈ "	27' 7 ¹ / ₄ "
20	21' 1"	29' 0 ³ / ₄ "
21	22' 1 ⁵ / ₈ "	30' 6 ¹ / ₈ "
22	23' 2 ¹ / ₄ "	31' 11 ⁵ / ₈ "
23	24' 3"	33' 5"
24	25' 3 ⁵ / ₈ "	34' 10 ¹ / ₂ "
25	26' 4 ¹ / ₄ "	36' 3 ⁷ / ₈ "

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	1/2"	3/4"
1	1"	1 1/2"
1 1/2	1 1/8"	2 1/8"
2	2 1/8"	2 7/8"
2 1/2	2 5/8"	3 5/8"
3	3 3/8"	4 3/8"
3 1/2	3 5/8"	5 1/8"
4	4 1/4"	5 3/4"
4 1/2	4 3/4"	6 1/2"
5	5 1/4"	7 1/4"
5 1/2	5 3/4"	8"
6	6 3/8"	8 3/4"
6 1/2	6 5/8"	9 1/2"
7	7 3/8"	10 1/4"
7 1/2	8"	10 7/8"
8	8 1/2"	11 5/8"
8 1/2	9"	12 3/8"
9	9 1/2"	13 1/8"
9 1/2	10 1/8"	13 7/8"
10	10 5/8"	14 1/2"
10 1/2	11 1/8"	15 1/4"
11	11 5/8"	16"
11 1/2	12 1/8"	16 3/4"

Spacing In.	Jack Rafter Length
1	1"
2	2 1/8"
3	3 1/8"
4	4 1/4"
5	5 1/4"
6	6 3/8"
7	7 3/8"
8	8 3/8"
9	9 1/2"
10	10 1/2"
11	11 5/8"
12	1' 0 5/8"
13	1' 1 3/4"
14	1' 2 3/4"
15	1' 3 3/4"
16	1' 4 3/8"
17	1' 5 3/8"
18	1' 7"
19	1' 8"
20	1' 9 1/8"
21	1' 10 1/8"
22	1' 11 1/4"
23	2' 0 1/4"
24	2' 1 1/4"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	13/16"	3 1/2"	1 3/16"
1 5/8"	7/8"	5 1/2"	1 3/8"
1 3/4"	15/16"	7 1/4"	2 1/16"
1 7/8"	1"	9 1/4"	3 1/16"

5 INCH RISE 5-12 PITCH 22½ DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 1"	1' 5½"
2	2' 2"	2' 11⅝"
3	3' 3"	4' 5⅝"
4	4' 4"	5' 10¾"
5	5' 5"	7' 4½"
6	6' 6"	8' 10⅝"
7	7' 7"	10' 3⅝"
8	8' 8"	11' 9⅝"
9	9' 9"	13' 3¼"
10	10' 10"	14' 8⅞"
11	11' 11"	16' 2⅝"
12	13' 0"	17' 8⅜"
13	14' 1"	19' 2"
14	15' 2"	20' 7⅝"
15	16' 3"	22' 1⅝"
16	17' 4"	23' 7⅝"
17	18' 5"	25' 0¾"
18	19' 6"	26' 6½"
19	20' 7"	28' 0⅝"
20	21' 8"	29' 5⅝"
21	22' 9"	30' 11½"
22	23' 10"	32' 5¼"
23	24' 11"	33' 10⅝"
24	26' 0"	35' 4⅝"
25	27' 1"	36' 10⅜"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
½	½"	¾"
1	1⅛"	1½"
1½	1⅝"	2¼"
2	2¼"	3"
2½	2⅞"	3⅝"
3	3¼"	4⅝"
3½	3⅞"	5⅝"
4	4⅜"	5⅞"
4½	4⅞"	6⅝"
5	5⅝"	7⅝"
5½	6"	8⅝"
6	6½"	8⅞"
6½	7"	9⅝"
7	7⅝"	10⅝"
7½	8⅝"	11⅝"
8	8⅝"	11⅞"
8½	9¼"	12½"
9	9¾"	13¼"
9½	10¼"	14"
10	10⅞"	14¾"
10½	11⅝"	15½"
11	11⅞"	16¼"
11½	12½"	17"

Spacing In.	Jack Rafter Length
1	1⅛"
2	2⅛"
3	3¼"
4	4⅜"
5	5⅝"
6	6½"
7	7⅞"
8	8⅝"
9	9¾"
10	10⅞"
11	11⅞"
12	1' 1"
13	1' 2⅝"
14	1' 3⅝"
15	1' 4¼"
16	1' 5⅝"
17	1' 6⅝"
18	1' 7½"
19	1' 8⅝"
20	1' 9⅝"
21	1' 10¾"
22	1' 11⅞"
23	2' 0⅞"
24	2' 2"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1½"	13/16"	3½"	1⅛"
1⅝"	7/8"	5½"	2⅝"
1¾"	15/16"	7¼"	3"
1⅞"	1"	9¼"	3⅞"

6 INCH RISE 6-12 PITCH 26½ DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 1⅜"	1' 6"
2	2' 2⅞"	3' 0"
3	3' 4¼"	4' 6"
4	4' 5⅝"	6' 0"
5	5' 7⅝"	7' 6"
6	6' 8⅞"	9' 0"
7	7' 9⅞"	10' 6"
8	8' 11⅜"	12' 0"
9	10' 0¾"	13' 6"
10	11' 2⅞"	15' 0"
11	12' 3⅝"	16' 6"
12	13' 5"	18' 0"
13	14' 6⅝"	19' 6"
14	15' 7⅞"	21' 0"
15	16' 9¼"	22' 6"
16	17' 10⅝"	24' 0"
17	19' 0⅞"	25' 6"
18	20' 1½"	27' 0"
19	21' 2⅞"	28' 6"
20	22' 4⅝"	30' 0"
21	23' 5⅝"	31' 6"
22	24' 7⅞"	33' 0"
23	25' 8⅝"	34' 6"
24	26' 10"	36' 0"
25	27' 11⅝"	37' 6"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
½	½"	¾"
1	1⅛"	1½"
1½	1⅝"	2¼"
2	2¼"	3"
2½	2⅞"	3⅝"
3	3⅜"	4½"
3½	3⅞"	5¼"
4	4½"	6"
4½	5"	6¾"
5	5⅝"	7½"
5½	6⅝"	8¼"
6	6¾"	9"
6½	7¼"	9¾"
7	7⅞"	10½"
7½	8⅝"	11¼"
8	9"	12"
8½	9½"	12¾"
9	10⅝"	13½"
9½	10⅝"	14¼"
10	11¼"	15"
10½	11¾"	15¾"
11	12⅝"	16½"
11½	12⅝"	17¼"

Spacing In.	Jack Rafter Length
1	1⅛"
2	2¼"
3	3⅝"
4	4½"
5	5⅝"
6	6¾"
7	7⅞"
8	9"
9	10⅞"
10	11⅞"
11	1' 0¼"
12	1' 1⅝"
13	1' 2½"
14	1' 3⅝"
15	1' 4¼"
16	1' 5⅝"
17	1' 7"
18	1' 8⅝"
19	1' 9¼"
20	1' 10⅝"
21	1' 11½"
22	2' 0⅞"
23	2' 1¼"
24	2' 2⅞"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1½"	13/16"	3½"	1⅛"
1⅝"	7/8"	5½"	2⅝"
1¾"	15/16"	7¼"	3"
1⅞"	1"	9¼"	3⅞"

7 INCH RISE 7-12 PITCH 30% DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 1 1/8"	1' 6 3/8"
2	2' 3 3/4"	3' 0 3/4"
3	3' 5 3/4"	4' 7 1/8"
4	4' 7 3/8"	6' 1 1/2"
5	5' 9 1/2"	7' 7 3/4"
6	6' 11 3/8"	9' 2 1/8"
7	8' 1 1/4"	10' 8 1/2"
8	9' 3 1/8"	12' 2 1/8"
9	10' 5"	13' 9 1/4"
10	11' 7"	15' 3 5/8"
11	12' 8 3/8"	16' 10"
12	13' 10 3/4"	18' 4 1/4"
13	15' 0 5/8"	19' 10 5/8"
14	16' 2 1/2"	21' 5"
15	17' 4 3/8"	22' 11 3/8"
16	18' 6 1/4"	24' 5 3/4"
17	19' 8 1/4"	26' 0 1/8"
18	20' 10 1/8"	27' 6 1/2"
19	22' 0"	29' 0 3/4"
20	23' 1 1/8"	30' 7 1/8"
21	24' 3 3/4"	32' 1 1/2"
22	25' 5 5/8"	33' 7 3/8"
23	26' 7 1/2"	35' 2 1/4"
24	27' 9 3/8"	36' 8 3/8"
25	28' 11 3/8"	38' 3"

Run in.	Common Rafter Length	Hip or Val. Rafter Length
1/2	5/8"	3/4"
1	1 1/8"	1 1/2"
1 1/2	1 3/4"	2 1/4"
2	2 3/8"	3"
2 1/2	2 5/8"	3 3/8"
3	3 1/2"	4 5/8"
3 1/2	4"	5 3/8"
4	4 5/8"	6 1/8"
4 1/2	5 1/4"	6 5/8"
5	5 3/4"	7 5/8"
5 1/2	6 3/8"	8 3/8"
6	6 5/8"	9 1/8"
6 1/2	7 1/2"	10"
7	8 1/8"	10 3/4"
7 1/2	8 3/8"	11 1/2"
8	9 1/4"	12 1/4"
8 1/2	9 5/8"	13"
9	10 3/8"	13 3/4"
9 1/2	11"	14 1/2"
10	11 5/8"	15 1/4"
10 1/2	12 1/8"	16 1/8"
11	12 3/4"	16 5/8"
11 1/2	13 3/8"	17 5/8"

Spacing in.	Jack Rafter Length
1	1 1/8"
2	2 3/8"
3	3 1/2"
4	4 5/8"
5	5 3/4"
6	7"
7	8 3/8"
8	9 1/4"
9	10 3/8"
10	11 5/8"
11	1' 0 3/4"
12	1' 1 7/8"
13	1' 3"
14	1' 4 1/4"
15	1' 5 3/8"
16	1' 6 1/2"
17	1' 7 5/8"
18	1' 8 3/8"
19	1' 10"
20	1' 11 1/8"
21	2' 0 1/4"
22	2' 1 1/2"
23	2' 2 5/8"
24	2' 3 3/4"

Rafter Thickness	Miller Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	7/8"	3 1/2"	2 1/8"
1 5/8"	15/16"	5 1/2"	3 3/16"
1 3/4"	1"	7 1/4"	4 1/4"
1 7/8"	1 1/16"	9 1/4"	5 3/8"

8 INCH RISE 8-12 PITCH 33 1/3% DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 2 1/2"	1' 6 3/4"
2	2' 4 3/8"	3' 1 1/2"
3	3' 7 1/4"	4' 8 1/4"
4	4' 9 3/4"	6' 3 1/8"
5	6' 0 5/8"	7' 9 5/8"
6	7' 2 1/2"	9' 4 3/8"
7	8' 5"	10' 11 3/8"
8	9' 7 3/8"	12' 6 1/8"
9	10' 9 7/8"	14' 0 3/8"
10	12' 0 1/4"	15' 7 5/8"
11	13' 2 5/8"	17' 2 3/8"
12	14' 5 1/8"	18' 9 1/8"
13	15' 7 1/2"	20' 3 3/8"
14	16' 9 3/8"	21' 10 3/8"
15	18' 0 3/8"	23' 5 1/2"
16	19' 2 1/4"	25' 0 1/4"
17	20' 5 1/4"	26' 7"
18	21' 7 3/8"	28' 1 3/4"
19	22' 10"	29' 8 1/2"
20	24' 0 1/2"	31' 3 3/4"
21	25' 2 3/8"	32' 10"
22	26' 5 1/4"	34' 4 3/4"
23	27' 7 3/4"	35' 11 1/2"
24	28' 10 1/8"	37' 6 1/4"
25	30' 0 5/8"	39' 1"

Run in.	Common Rafter Length	Hip or Val. Rafter Length
1/2	5/8"	3/4"
1	1 1/4"	1 5/8"
1 1/2	1 3/4"	2 3/8"
2	2 3/8"	3 3/8"
2 1/2	3"	3 5/8"
3	3 5/8"	4 3/4"
3 1/2	4 1/4"	5 1/2"
4	4 3/4"	6 1/4"
4 1/2	5 3/8"	7"
5	6"	7 7/8"
5 1/2	6 5/8"	8 3/8"
6	7 1/4"	9 3/8"
6 1/2	7 5/8"	10 3/8"
7	8 1/2"	11"
7 1/2	9"	11 3/4"
8	9 5/8"	12 1/2"
8 1/2	10 1/4"	13 1/4"
9	10 3/8"	14 1/8"
9 1/2	11 1/2"	14 3/8"
10	12"	15 5/8"
10 1/2	12 5/8"	16 3/8"
11	13 1/4"	17 1/4"
11 1/2	13 3/8"	18"

Spacing in.	Jack Rafter Length
1	1 1/4"
2	2 3/8"
3	3 3/8"
4	4 3/4"
5	6"
6	7 1/4"
7	8 3/8"
8	9 3/8"
9	10 3/8"
10	1' 0"
11	1' 1 1/4"
12	1' 2 3/8"
13	1' 3 3/8"
14	1' 4 3/8"
15	1' 6"
16	1' 7 1/4"
17	1' 8 3/8"
18	1' 9 3/8"
19	1' 10 3/8"
20	2' 0"
21	2' 1 1/4"
22	2' 2 3/8"
23	2' 3 3/8"
24	2' 4 3/8"

Rafter Thickness	Miller Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	7/8"	3 1/2"	2 5/16"
1 5/8"	1"	5 1/2"	3 1/16"
1 3/4"	1 1/16"	7 1/4"	4 13/16"
1 7/8"	1 1/8"	9 1/4"	6 3/16"

9 INCH RISE 9-12 PITCH 37 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 3"	1' 7 $\frac{1}{4}$ "
2	2' 6"	3' 2 $\frac{3}{8}$ "
3	3' 9"	4' 9 $\frac{5}{8}$ "
4	5' 0"	6' 4 $\frac{7}{8}$ "
5	6' 3"	8' 0 $\frac{1}{8}$ "
6	7' 6"	9' 7 $\frac{1}{4}$ "
7	8' 9"	11' 2 $\frac{1}{2}$ "
8	10' 0"	12' 9 $\frac{3}{4}$ "
9	11' 3"	14' 4 $\frac{7}{8}$ "
10	12' 6"	16' 0 $\frac{1}{8}$ "
11	13' 9"	17' 7 $\frac{3}{8}$ "
12	15' 0"	19' 2 $\frac{1}{2}$ "
13	16' 3"	20' 9 $\frac{3}{4}$ "
14	17' 6"	22' 5"
15	18' 9"	24' 0 $\frac{1}{8}$ "
16	20' 0"	25' 7 $\frac{3}{8}$ "
17	21' 3"	27' 2 $\frac{5}{8}$ "
18	22' 6"	28' 9 $\frac{3}{4}$ "
19	23' 9"	30' 5"
20	25' 0"	32' 0 $\frac{1}{4}$ "
21	26' 3"	33' 7 $\frac{3}{8}$ "
22	27' 6"	35' 2 $\frac{5}{8}$ "
23	28' 9"	36' 9 $\frac{7}{8}$ "
24	30' 0"	38' 5"
25	31' 3"	40' 0 $\frac{1}{4}$ "

Run In.	Common Rafter Length	Hip or Val. Rafter Length
$\frac{1}{2}$	$\frac{5}{8}$ "	$\frac{3}{4}$ "
1	1 $\frac{1}{4}$ "	1 $\frac{5}{8}$ "
1 $\frac{1}{2}$	1 $\frac{7}{8}$ "	2 $\frac{3}{8}$ "
2	2 $\frac{1}{2}$ "	3 $\frac{1}{4}$ "
2 $\frac{1}{2}$	3 $\frac{1}{8}$ "	4"
3	3 $\frac{3}{4}$ "	4 $\frac{3}{4}$ "
3 $\frac{1}{2}$	4 $\frac{3}{8}$ "	5 $\frac{5}{8}$ "
4	5"	6 $\frac{3}{8}$ "
4 $\frac{1}{2}$	5 $\frac{5}{8}$ "	7 $\frac{1}{4}$ "
5	6 $\frac{1}{4}$ "	8"
5 $\frac{1}{2}$	6 $\frac{7}{8}$ "	8 $\frac{3}{4}$ "
6	7 $\frac{1}{2}$ "	9 $\frac{5}{8}$ "
6 $\frac{1}{2}$	8 $\frac{1}{8}$ "	10 $\frac{3}{8}$ "
7	8 $\frac{3}{4}$ "	11 $\frac{1}{4}$ "
7 $\frac{1}{2}$	9 $\frac{3}{8}$ "	12"
8	10"	12 $\frac{7}{8}$ "
8 $\frac{1}{2}$	10 $\frac{5}{8}$ "	13 $\frac{5}{8}$ "
9	11 $\frac{1}{4}$ "	14 $\frac{3}{8}$ "
9 $\frac{1}{2}$	11 $\frac{7}{8}$ "	15 $\frac{1}{4}$ "
10	12 $\frac{1}{2}$ "	16"
10 $\frac{1}{2}$	13 $\frac{1}{8}$ "	16 $\frac{7}{8}$ "
11	13 $\frac{3}{8}$ "	17 $\frac{5}{8}$ "
11 $\frac{1}{2}$	14 $\frac{3}{8}$ "	18 $\frac{3}{8}$ "

Spacing In.	Jack Rafter Length
1	1 $\frac{1}{4}$ "
2	2 $\frac{1}{2}$ "
3	3 $\frac{3}{4}$ "
4	5"
5	6 $\frac{1}{4}$ "
6	7 $\frac{1}{2}$ "
7	8 $\frac{3}{4}$ "
8	10"
9	11 $\frac{1}{4}$ "
10	1' 0 $\frac{1}{2}$ "
11	1' 1 $\frac{3}{4}$ "
12	1' 3"
13	1' 4 $\frac{1}{4}$ "
14	1' 5 $\frac{1}{2}$ "
15	1' 6 $\frac{3}{4}$ "
16	1' 8"
17	1' 9 $\frac{1}{4}$ "
18	1' 10 $\frac{1}{2}$ "
19	1' 11 $\frac{3}{4}$ "
20	2' 1"
21	2' 2 $\frac{1}{4}$ "
22	2' 3 $\frac{1}{2}$ "
23	2' 4 $\frac{3}{4}$ "
24	2' 6"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 $\frac{1}{2}$ "	1"	3 $\frac{1}{2}$ "	2 $\frac{5}{8}$ "
1 $\frac{5}{8}$ "	1 $\frac{1}{8}$ "	5 $\frac{1}{2}$ "	4 $\frac{1}{8}$ "
1 $\frac{3}{4}$ "	1 $\frac{1}{8}$ "	7 $\frac{1}{4}$ "	5 $\frac{7}{8}$ "
1 $\frac{7}{8}$ "	1 $\frac{3}{16}$ "	9 $\frac{1}{4}$ "	6 $\frac{5}{8}$ "

10 INCH RISE 10-12 PITCH 40 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 3 $\frac{3}{8}$ "	1' 7 $\frac{3}{4}$ "
2	2' 7 $\frac{1}{2}$ "	3' 3 $\frac{3}{8}$ "
3	3' 10 $\frac{1}{2}$ "	4' 11 $\frac{1}{8}$ "
4	5' 2 $\frac{1}{2}$ "	6' 6 $\frac{3}{4}$ "
5	6' 6 $\frac{1}{2}$ "	8' 2 $\frac{1}{2}$ "
6	7' 9 $\frac{3}{4}$ "	9' 10 $\frac{1}{4}$ "
7	9' 1 $\frac{3}{8}$ "	11' 5 $\frac{7}{8}$ "
8	10' 5"	13' 1 $\frac{5}{8}$ "
9	11' 8 $\frac{5}{8}$ "	14' 9 $\frac{1}{4}$ "
10	13' 0 $\frac{1}{4}$ "	16' 5"
11	14' 3 $\frac{3}{8}$ "	18' 0 $\frac{3}{4}$ "
12	15' 7 $\frac{1}{2}$ "	19' 8 $\frac{3}{8}$ "
13	16' 11 $\frac{1}{8}$ "	21' 4 $\frac{1}{8}$ "
14	18' 2 $\frac{3}{4}$ "	22' 11 $\frac{3}{4}$ "
15	19' 6 $\frac{3}{8}$ "	24' 7 $\frac{1}{2}$ "
16	20' 10"	26' 3 $\frac{1}{8}$ "
17	22' 1 $\frac{5}{8}$ "	27' 10 $\frac{7}{8}$ "
18	23' 5 $\frac{1}{4}$ "	29' 6 $\frac{5}{8}$ "
19	24' 8 $\frac{3}{4}$ "	31' 2 $\frac{1}{4}$ "
20	26' 0 $\frac{3}{8}$ "	32' 10"
21	27' 4"	34' 5 $\frac{5}{8}$ "
22	28' 7 $\frac{5}{8}$ "	36' 1 $\frac{3}{8}$ "
23	29' 11 $\frac{1}{4}$ "	37' 9 $\frac{1}{8}$ "
24	31' 2 $\frac{7}{8}$ "	39' 4 $\frac{3}{4}$ "
25	32' 6 $\frac{1}{2}$ "	41' 0 $\frac{1}{2}$ "

Run In.	Common Rafter Length	Hip or Val. Rafter Length
$\frac{1}{2}$	$\frac{5}{8}$ "	$\frac{7}{8}$ "
1	1 $\frac{1}{4}$ "	1 $\frac{5}{8}$ "
1 $\frac{1}{2}$	2"	2 $\frac{1}{2}$ "
2	2 $\frac{5}{8}$ "	3 $\frac{1}{4}$ "
2 $\frac{1}{2}$	3 $\frac{1}{4}$ "	4 $\frac{1}{8}$ "
3	3 $\frac{7}{8}$ "	4 $\frac{7}{8}$ "
3 $\frac{1}{2}$	4 $\frac{1}{2}$ "	5 $\frac{3}{4}$ "
4	5 $\frac{1}{4}$ "	6 $\frac{5}{8}$ "
4 $\frac{1}{2}$	5 $\frac{7}{8}$ "	7 $\frac{3}{8}$ "
5	6 $\frac{1}{2}$ "	8 $\frac{1}{2}$ "
5 $\frac{1}{2}$	7 $\frac{1}{8}$ "	9"
6	7 $\frac{3}{4}$ "	9 $\frac{7}{8}$ "
6 $\frac{1}{2}$	8 $\frac{1}{2}$ "	10 $\frac{3}{4}$ "
7	9 $\frac{1}{8}$ "	11 $\frac{1}{2}$ "
7 $\frac{1}{2}$	9 $\frac{3}{4}$ "	12 $\frac{3}{8}$ "
8	10 $\frac{3}{8}$ "	13 $\frac{1}{8}$ "
8 $\frac{1}{2}$	11 $\frac{1}{8}$ "	14"
9	11 $\frac{3}{4}$ "	14 $\frac{3}{4}$ "
9 $\frac{1}{2}$	12 $\frac{3}{8}$ "	15 $\frac{5}{8}$ "
10	13"	16 $\frac{1}{2}$ "
10 $\frac{1}{2}$	13 $\frac{5}{8}$ "	17 $\frac{1}{4}$ "
11	14 $\frac{3}{8}$ "	18 $\frac{1}{8}$ "
11 $\frac{1}{2}$	15"	18 $\frac{3}{8}$ "

Spacing In.	Jack Rafter Length
1	1 $\frac{1}{4}$ "
2	2 $\frac{5}{8}$ "
3	3 $\frac{3}{8}$ "
4	5 $\frac{1}{4}$ "
5	6 $\frac{1}{2}$ "
6	7 $\frac{3}{4}$ "
7	9 $\frac{1}{8}$ "
8	10 $\frac{3}{8}$ "
9	11 $\frac{3}{4}$ "
10	1' 1"
11	1' 2 $\frac{3}{8}$ "
12	1' 3 $\frac{5}{8}$ "
13	1' 4 $\frac{7}{8}$ "
14	1' 6 $\frac{1}{4}$ "
15	1' 7 $\frac{1}{2}$ "
16	1' 8 $\frac{3}{8}$ "
17	1' 10 $\frac{1}{8}$ "
18	1' 11 $\frac{3}{8}$ "
19	2' 0 $\frac{3}{4}$ "
20	2' 2"
21	2' 3 $\frac{3}{8}$ "
22	2' 4 $\frac{5}{8}$ "
23	2' 6"
24	2' 7 $\frac{1}{4}$ "

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 $\frac{1}{2}$ "	1"	3 $\frac{1}{2}$ "	2 $\frac{5}{8}$ "
1 $\frac{5}{8}$ "	1 $\frac{1}{8}$ "	5 $\frac{1}{2}$ "	4 $\frac{9}{8}$ "
1 $\frac{3}{4}$ "	1 $\frac{1}{8}$ "	7 $\frac{1}{4}$ "	6 $\frac{1}{8}$ "
1 $\frac{7}{8}$ "	1 $\frac{1}{4}$ "	9 $\frac{1}{4}$ "	7 $\frac{1}{4}$ "

11 INCH RISE 11-12 PITCH 42½ DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 4 1/4"	1' 8 1/4"
2	2' 8 5/8"	3' 4 1/2"
3	4' 0 7/8"	5' 0 3/4"
4	5' 5 1/8"	6' 8 7/8"
5	6' 9 3/8"	8' 5 1/8"
6	8' 1 3/4"	10' 1 1/8"
7	9' 6"	11' 9 5/8"
8	10' 10 1/4"	13' 5 3/4"
9	12' 2 1/2"	15' 2"
10	13' 6 3/4"	16' 10 1/4"
11	14' 11 1/8"	18' 6 1/2"
12	16' 3 3/8"	20' 2 3/4"
13	17' 7 5/8"	21' 10 7/8"
14	18' 11 7/8"	23' 7 7/8"
15	20' 4 1/8"	25' 3 3/8"
16	21' 8 1/2"	26' 11 5/8"
17	23' 0 3/4"	28' 7 7/8"
18	24' 5"	30' 4"
19	25' 9 5/8"	32' 0 1/4"
20	27' 1 5/8"	33' 8 1/2"
21	28' 5 7/8"	35' 4 3/4"
22	29' 10 1/8"	37' 1"
23	31' 2 3/8"	38' 9 1/8"
24	32' 6 3/4"	40' 5 3/8"
25	33' 11"	42' 1 5/8"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	5/8"	7/8"
1	1 3/8"	1 5/8"
1 1/2	2"	2 1/2"
2	2 3/4"	3 3/8"
2 1/2	3 3/8"	4 1/4"
3	4 1/8"	5"
3 1/2	4 3/4"	5 5/8"
4	5 3/8"	6 3/4"
4 1/2	6 1/8"	7 5/8"
5	6 3/4"	8 3/8"
5 1/2	7 1/2"	9 1/4"
6	8 1/8"	10 1/8"
6 1/2	8 7/8"	11"
7	9 1/2"	11 3/4"
7 1/2	10 1/8"	12 5/8"
8	10 3/8"	13 1/2"
8 1/2	11 1/2"	14 3/8"
9	12 1/4"	15 1/8"
9 1/2	12 5/8"	16"
10	13 3/8"	16 5/8"
10 1/2	14 1/4"	17 3/8"
11	14 5/8"	18 1/2"
11 1/2	15 3/8"	19 1/8"

Spacing In.	Jack Rafter Length
1	1 3/8"
2	2 3/4"
3	4 1/8"
4	5 3/8"
5	6 3/4"
6	8 1/8"
7	9 1/2"
8	10 5/8"
9	1' 0 1/4"
10	1' 1 5/8"
11	1' 2 3/8"
12	1' 4 1/4"
13	1' 5 5/8"
14	1' 7"
15	1' 8 3/8"
16	1' 9 3/4"
17	1' 11"
18	2' 0 3/8"
19	2' 1 3/4"
20	2' 3 3/8"
21	2' 4 1/2"
22	2' 5 5/8"
23	2' 7 1/4"
24	2' 8 1/2"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	1"	3 1/2"	3 1/8"
1 5/8"	1 1/8"	5 1/2"	5 1/8"
1 3/4"	1 3/8"	7 1/4"	6 5/8"
1 7/8"	1 1/4"	9 1/4"	8 1/2"

12 INCH RISE 12-12 PITCH 45 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 5"	1' 8 3/4"
2	2' 10"	3' 5 5/8"
3	4' 2 1/8"	5' 2 3/8"
4	5' 7 1/8"	6' 11 1/8"
5	7' 0 5/8"	8' 8"
6	8' 5 5/8"	10' 4 3/4"
7	9' 10 7/8"	12' 1 1/2"
8	11' 3 3/4"	13' 10 1/4"
9	12' 8 3/4"	15' 7 1/8"
10	14' 1 1/4"	17' 3 3/8"
11	15' 6 3/4"	19' 0 5/8"
12	16' 11 5/8"	20' 9 3/8"
13	18' 4 3/8"	22' 6 1/4"
14	19' 9 3/8"	24' 3"
15	21' 2 5/8"	25' 11 3/4"
16	22' 7 1/2"	27' 8 5/8"
17	24' 0 1/2"	29' 5 3/4"
18	25' 5 1/2"	31' 2 1/2"
19	26' 10 3/8"	32' 10 7/8"
20	28' 3 3/8"	34' 7 3/4"
21	29' 8 3/8"	36' 4 1/2"
22	31' 1 3/8"	38' 1 1/4"
23	32' 6 3/8"	39' 10"
24	33' 11 1/4"	41' 6 7/8"
25	35' 4 1/4"	43' 3 3/8"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	3/4"	7/8"
1	1 3/8"	1 3/4"
1 1/2	2 1/8"	2 5/8"
2	2 5/8"	3 1/2"
2 1/2	3 1/2"	4 3/8"
3	4 1/4"	5 1/4"
3 1/2	5"	6"
4	5 5/8"	6 5/8"
4 1/2	6 3/8"	7 3/4"
5	7 1/8"	8 3/8"
5 1/2	7 3/4"	9 1/2"
6	8 1/2"	10 3/8"
6 1/2	9 1/4"	11 1/4"
7	9 5/8"	12 1/8"
7 1/2	10 5/8"	13"
8	11 3/8"	13 7/8"
8 1/2	12"	14 3/4"
9	12 3/4"	15 5/8"
9 1/2	13 1/2"	16 1/2"
10	14 1/8"	17 3/8"
10 1/2	14 3/8"	18 1/8"
11	15 3/8"	19"
11 1/2	16 1/4"	19 7/8"

Spacing In.	Jack Rafter Length
1	1 3/8"
2	2 1/8"
3	4 1/4"
4	5 5/8"
5	7 1/8"
6	8 1/2"
7	9 5/8"
8	11 3/8"
9	1' 0 1/4"
10	1' 2 1/8"
11	1' 3 1/2"
12	1' 5"
13	1' 6 3/8"
14	1' 7 3/4"
15	1' 9 1/4"
16	1' 10 5/8"
17	2' 0"
18	2' 1 1/2"
19	2' 2 7/8"
20	2' 4 1/4"
21	2' 5 3/4"
22	2' 7 1/8"
23	2' 8 1/2"
24	2' 10"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	1 1/8"	3 1/2"	3 1/2"
1 5/8"	1 1/4"	5 1/2"	5 1/2"
1 3/4"	1 1/2"	7 1/4"	7 1/4"
1 7/8"	1 5/8"	9 1/4"	9 1/4"

13 INCH RISE 13-12 PITCH 47 1/4 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 5 3/4"	1' 9 3/8"
2	2' 11 3/8"	3' 6 3/4"
3	4' 5 5/8"	5' 4 1/8"
4	5' 10 3/4"	7' 1 1/2"
5	7' 4 1/2"	8' 10 5/8"
6	8' 10 1/8"	10' 8 1/4"
7	10' 3 3/8"	12' 5 5/8"
8	11' 9 1/2"	14' 3"
9	13' 3 3/4"	16' 0 5/8"
10	14' 9"	17' 9 3/4"
11	16' 2 5/8"	19' 7 7/8"
12	17' 8 5/8"	21' 4 1/2"
13	19' 2"	23' 1 5/8"
14	20' 7 3/4"	24' 11 1/4"
15	22' 1 3/8"	26' 8 5/8"
16	23' 7 7/8"	28' 6"
17	25' 0 3/4"	30' 3 3/8"
18	26' 6 1/2"	32' 0 7/8"
19	28' 0 5/8"	33' 10 1/4"
20	29' 5 5/8"	35' 7 5/8"
21	30' 11 1/2"	37' 5"
22	32' 5 1/4"	39' 2 3/8"
23	33' 10 7/8"	40' 11 3/4"
24	35' 4 5/8"	42' 9 1/8"
25	36' 10 3/8"	44' 6 1/2"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	3/4"	7/8"
1	1 1/2"	1 3/4"
1 1/2	2 1/4"	2 5/8"
2	3"	3 5/8"
2 1/2	3 5/8"	4 1/2"
3	4 3/8"	5 5/8"
3 1/2	5 1/8"	6 1/4"
4	5 5/8"	7 1/8"
4 1/2	6 5/8"	8"
5	7 3/8"	8 5/8"
5 1/2	8 1/8"	9 1/4"
6	8 5/8"	10 3/4"
6 1/2	9 5/8"	11 5/8"
7	10 3/8"	12 1/2"
7 1/2	11"	13 3/8"
8	11 3/4"	14 1/4"
8 1/2	12 1/2"	15 1/8"
9	13 1/4"	16"
9 1/2	14"	16 7/8"
10	14 3/4"	17 7/8"
10 1/2	15 1/2"	18 3/4"
11	16 1/4"	19 5/8"
11 1/2	17"	20 1/2"

Spacing In.	Jack Rafter Length
1	1 1/2"
2	3"
3	4 3/8"
4	5 5/8"
5	7 3/8"
6	8 5/8"
7	10 3/8"
8	11 3/4"
9	1' 1 1/4"
10	1' 2 3/4"
11	1' 4 1/4"
12	1' 5 3/4"
13	1' 7 1/8"
14	1' 8 5/8"
15	1' 10 5/8"
16	1' 11 5/8"
17	2' 1 1/8"
18	2' 2 1/2"
19	2' 4"
20	2' 5 1/2"
21	2' 7"
22	2' 8 3/8"
23	2' 9 5/8"
24	2' 11 3/8"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	1 1/8"	3 1/2"	3 1/2"
1 5/8"	1 3/16"	5 1/2"	5 1/16"
1 3/4"	1 5/16"	7 1/4"	7 7/8"
1 7/8"	1 3/8"	9 1/4"	10"

14 INCH RISE 14-12 PITCH 49 1/2 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 6 1/2"	1' 10"
2	3' 0 7/8"	3' 8"
3	4' 7 3/8"	5' 6"
4	6' 1 3/4"	7' 4"
5	7' 8 1/4"	9' 2"
6	9' 2 5/8"	11' 0"
7	10' 9 1/4"	12' 10"
8	12' 3 1/2"	14' 8"
9	13' 10"	16' 6"
10	15' 4 3/8"	18' 4"
11	16' 10 5/8"	20' 2"
12	18' 5 1/4"	22' 0"
13	19' 11 3/4"	23' 10"
14	21' 6 5/8"	25' 8"
15	23' 0 5/8"	27' 6"
16	24' 7"	29' 4"
17	26' 1 1/2"	31' 2"
18	27' 7 5/8"	33' 0"
19	29' 2 3/8"	34' 10"
20	30' 8 3/4"	36' 8"
21	32' 3 1/4"	38' 6"
22	33' 9 5/8"	40' 4"
23	35' 4 5/8"	42' 2"
24	36' 10 1/2"	44' 0"
25	38' 5"	45' 10"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	3/4"	7/8"
1	1 1/2"	1 7/8"
1 1/2	2 1/4"	2 3/4"
2	3 1/8"	3 5/8"
2 1/2	3 5/8"	4 5/8"
3	4 5/8"	5 1/2"
3 1/2	5 3/8"	6 3/8"
4	6 1/8"	7 3/8"
4 1/2	6 5/8"	8 1/4"
5	7 5/8"	9 1/8"
5 1/2	8 1/2"	10 5/8"
6	9 1/4"	11"
6 1/2	10"	11 7/8"
7	10 3/4"	12 5/8"
7 1/2	11 1/2"	13 3/4"
8	12 3/8"	14 5/8"
8 1/2	13 3/8"	15 5/8"
9	13 5/8"	16 1/2"
9 1/2	14 5/8"	17 3/8"
10	15 5/8"	18 3/8"
10 1/2	16 5/8"	19 1/4"
11	16 5/8"	20 5/8"
11 1/2	17 3/4"	21 1/8"

Spacing In.	Jack Rafter Length
1	1 1/2"
2	3 5/8"
3	4 5/8"
4	6 1/8"
5	7 5/8"
6	9 1/4"
7	10 3/4"
8	1' 0 1/4"
9	1' 1 7/8"
10	1' 3 3/8"
11	1' 4 7/8"
12	1' 6 1/2"
13	1' 8"
14	1' 9 1/2"
15	1' 11"
16	2' 0 5/8"
17	2' 2 1/8"
18	2' 3 5/8"
19	2' 5 1/4"
20	2' 6 3/4"
21	2' 8 1/4"
22	2' 9 5/8"
23	2' 11 3/8"
24	3' 0 7/8"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	1 1/8"	3 1/2"	4 1/16"
1 5/8"	1 1/4"	5 1/2"	6 7/16"
1 3/4"	1 3/8"	7 1/4"	8 7/16"
1 7/8"	1 7/16"	9 1/4"	10 3/16"

15 INCH RISE 15-12 PITCH 51½ DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 7¼"	1' 10½"
2	3' 2¾"	3' 9¾"
3	4' 9½"	5' 8"
4	6' 4¾"	7' 6½"
5	8' 0½"	9' 5¼"
6	9' 7¼"	11' 3¾"
7	11' 2½"	13' 2½"
8	12' 9¾"	15' 1¼"
9	14' 4¾"	16' 11½"
10	16' 0½"	18' 10½"
11	17' 7½"	20' 9½"
12	19' 2½"	22' 7½"
13	20' 9¾"	24' 6½"
14	22' 5"	26' 5½"
15	24' 0½"	28' 3¾"
16	25' 7½"	30' 2¾"
17	27' 2½"	32' 1"
18	28' 9¾"	33' 11¼"
19	30' 5"	35' 10¾"
20	32' 0½"	37' 9"
21	33' 7½"	39' 7½"
22	35' 2½"	41' 6¼"
23	36' 9½"	43' 5"
24	38' 5"	45' 3¾"
25	40' 0½"	47' 2¼"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
½	¾"	1"
1	1½"	1¾"
1½	2¾"	2¾"
2	3¾"	3¾"
2½	4"	4¾"
3	4¾"	5½"
3½	5½"	6½"
4	6¾"	7½"
4½	7¼"	8½"
5	8"	9½"
5½	8¾"	10¾"
6	9½"	11¾"
6½	10¾"	12¾"
7	11¼"	13¼"
7½	12"	14¼"
8	12¾"	15½"
8½	13¾"	16½"
9	14¾"	17"
9½	15¼"	18"
10	16"	18¾"
10½	16¾"	19¾"
11	17¾"	20¾"
11½	18¾"	21¾"

Spacing In.	Jack Rafter Length
1	1½"
2	3¼"
3	4¾"
4	6¾"
5	8"
6	9½"
7	11¼"
8	1' 0¾"
9	1' 2¾"
10	1' 4"
11	1' 5½"
12	1' 7¼"
13	1' 8¾"
14	1' 10¾"
15	2' 0"
16	2' 1½"
17	2' 3¼"
18	2' 4¾"
19	2' 6¾"
20	2' 8"
21	2' 9½"
22	2' 11¼"
23	3' 0¾"
24	3' 2¾"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1½"	1¾"	3½"	4¾"
1¾"	1¾"	5½"	6¾"
1¾"	1¾"	7¼"	9¼"
1¾"	1¾"	9¼"	11¾"

16 INCH RISE 16-12 PITCH 53¼ DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 8"	1' 11¾"
2	3' 4"	3' 10½"
3	5' 0"	5' 10"
4	6' 8"	7' 9¾"
5	8' 4"	9' 8½"
6	10' 0"	11' 8"
7	11' 8"	13' 7¼"
8	13' 4"	15' 6½"
9	15' 0"	17' 5½"
10	16' 8"	19' 5¼"
11	18' 4"	21' 4¾"
12	20' 0"	23' 3¾"
13	21' 8"	25' 3¼"
14	23' 4"	27' 2½"
15	25' 0"	29' 1½"
16	26' 8"	31' 1¼"
17	28' 4"	33' 0½"
18	30' 0"	34' 11½"
19	31' 8"	36' 11½"
20	33' 4"	38' 10½"
21	35' 0"	40' 9¾"
22	36' 8"	42' 9½"
23	38' 4"	44' 8½"
24	40' 0"	46' 7¾"
25	41' 8"	48' 7½"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
½	⅞"	1"
1	1½"	2"
1½	2½"	2¾"
2	3¾"	3¾"
2½	4½"	4¾"
3	5"	5½"
3½	5¾"	6¾"
4	6½"	7¾"
4½	7½"	8¾"
5	8¾"	9¾"
5½	9½"	10¾"
6	10"	11½"
6½	10¾"	12¾"
7	11½"	13¾"
7½	12½"	14¾"
8	13¾"	15½"
8½	14¾"	16½"
9	15"	17½"
9½	15¾"	18½"
10	16½"	19¾"
10½	17½"	20¾"
11	18¾"	21¾"
11½	19½"	22¾"

Spacing In.	Jack Rafter Length
1	1½"
2	3¾"
3	5"
4	6¾"
5	8¾"
6	10"
7	11½"
8	1' 1¾"
9	1' 3"
10	1' 4½"
11	1' 6¾"
12	1' 8"
13	1' 9½"
14	1' 11¾"
15	2' 1"
16	2' 2½"
17	2' 4¾"
18	2' 6"
19	2' 7½"
20	2' 9½"
21	2' 11"
22	3' 0¾"
23	3' 2¾"
24	3' 4"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1½"	1¾"	3½"	4¾"
1¾"	1¾"	5½"	6¾"
1¾"	1¾"	7¼"	9¼"
1¾"	1¾"	9¼"	11¾"

17 INCH RISE 17-12 PITCH 54 3/4 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 8 7/8"	2' 0"
2	3' 5 5/8"	4' 0"
3	5' 2 1/2"	6' 0 1/8"
4	6' 11 1/4"	8' 0 1/8"
5	8' 8"	10' 0 1/8"
6	10' 4 7/8"	12' 0 1/8"
7	12' 1 1/8"	14' 0 1/8"
8	13' 10 1/2"	16' 0 1/8"
9	15' 7 1/4"	18' 0 1/8"
10	17' 4 1/8"	20' 0 1/8"
11	19' 0 5/8"	22' 0 1/8"
12	20' 9 3/8"	24' 0 1/8"
13	22' 6 1/2"	26' 0 1/8"
14	24' 3 3/8"	28' 0 1/8"
15	26' 0 5/8"	30' 0 3/8"
16	27' 9"	32' 0 3/8"
17	29' 5 3/4"	34' 0 3/8"
18	31' 2 5/8"	36' 0 3/8"
19	32' 11 3/8"	38' 0 3/8"
20	34' 8 1/4"	40' 0 1/2"
21	36' 5"	42' 0 1/2"
22	38' 1 3/4"	44' 0 1/2"
23	39' 10 5/8"	46' 0 1/2"
24	41' 7 3/8"	48' 0 1/2"
25	43' 4 1/4"	50' 0 1/2"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	7/8"	1"
1	1 3/4"	2"
1 1/2	2 5/8"	3"
2	3 1/2"	4"
2 1/2	4 3/8"	5"
3	5 1/4"	6"
3 1/2	6 1/8"	7"
4	7"	8"
4 1/2	7 3/4"	9"
5	8 5/8"	10"
5 1/2	9 1/2"	11"
6	10 3/8"	12"
6 1/2	11 1/4"	13"
7	12 1/8"	14"
7 1/2	13"	15"
8	13 7/8"	16"
8 1/2	14 3/4"	17"
9	15 5/8"	18"
9 1/2	16 1/2"	19"
10	17 3/8"	20"
10 1/2	18 1/4"	21"
11	19 1/8"	22"
11 1/2	20"	23"

Spacing In.	Jack Rafter Length
1	1 3/4"
2	3 1/2"
3	5 1/4"
4	6 5/8"
5	8 3/8"
6	10 3/8"
7	1' 0 1/8"
8	1' 1 1/8"
9	1' 3 3/8"
10	1' 5 3/8"
11	1' 7 3/8"
12	1' 8 3/4"
13	1' 10 1/2"
14	2' 0 1/4"
15	2' 2"
16	2' 3 3/4"
17	2' 5 1/2"
18	2' 7 1/4"
19	2' 9"
20	2' 10 5/8"
21	3' 0 3/8"
22	3' 2 1/8"
23	3' 3 3/8"
24	3' 5 5/8"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	1 5/16"	3 1/2"	4 13/16"
1 5/8"	1 7/16"	5 1/2"	7 13/16"
1 3/4"	1 1/2"	7 1/4"	10 1/4"
1 7/8"	1 5/8"	9 1/4"	13 1/8"

18 INCH RISE 18-12 PITCH 56 1/4 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 9 5/8"	2' 0 3/4"
2	3' 7 1/4"	4' 1 1/2"
3	5' 4 3/8"	6' 2 1/4"
4	7' 2 1/2"	8' 3"
5	9' 0 1/8"	10' 3 3/4"
6	10' 9 7/8"	12' 4 3/8"
7	12' 7 1/2"	14' 5 1/4"
8	14' 5 1/8"	16' 5 5/8"
9	16' 2 3/4"	18' 6 5/8"
10	18' 0 3/8"	20' 7 3/8"
11	19' 10"	22' 8 1/8"
12	21' 7 5/8"	24' 8 3/8"
13	23' 5 1/4"	26' 9 5/8"
14	25' 2 1/8"	28' 10 3/8"
15	27' 0 1/2"	30' 11 1/8"
16	28' 10 5/8"	32' 11 1/8"
17	30' 7 3/4"	35' 0 5/8"
18	32' 5 3/8"	37' 1 3/8"
19	34' 3"	39' 2"
20	36' 0 5/8"	41' 2 3/4"
21	37' 10 3/8"	43' 3 1/2"
22	39' 7 7/8"	45' 4 1/4"
23	41' 5 3/8"	47' 5"
24	43' 3 3/4"	49' 5 3/4"
25	45' 0 5/8"	51' 6 1/2"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	7/8"	1"
1	1 3/4"	2"
1 1/2	2 3/4"	3 1/8"
2	3 5/8"	4 1/8"
2 1/2	4 1/2"	5 1/8"
3	5 3/8"	6 1/8"
3 1/2	6 1/4"	7 1/4"
4	7 1/4"	8 1/4"
4 1/2	8 1/8"	9 1/4"
5	9"	10 1/4"
5 1/2	9 5/8"	11 3/8"
6	10 3/8"	12 3/8"
6 1/2	11 1/4"	13 3/8"
7	12 3/8"	14 3/8"
7 1/2	13 3/8"	15 1/2"
8	14 1/2"	16 1/2"
8 1/2	15 3/8"	17 1/2"
9	16 1/4"	18 1/2"
9 1/2	17 3/8"	19 5/8"
10	18 3/8"	20 5/8"
10 1/2	19"	21 5/8"
11	19 5/8"	22 5/8"
11 1/2	20 3/4"	23 3/4"

Spacing In.	Jack Rafter Length
1	1 3/4"
2	3 5/8"
3	5 3/8"
4	7 1/4"
5	9"
6	10 7/8"
7	1' 0 5/8"
8	1' 2 3/8"
9	1' 4 1/4"
10	1' 6"
11	1' 7 7/8"
12	1' 9 5/8"
13	1' 11 1/2"
14	2' 1 1/4"
15	2' 3"
16	2' 4 7/8"
17	2' 6 5/8"
18	2' 8 1/2"
19	2' 10 1/4"
20	3' 0"
21	3' 1 1/8"
22	3' 3 3/8"
23	3' 5 1/2"
24	3' 7 1/4"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	1 3/8"	3 1/2"	5 1/4"
1 5/8"	1 5/8"	5 1/2"	8 1/4"
1 3/4"	1 7/8"	7 1/4"	10 7/8"
1 7/8"	1 11/16"	9 1/4"	13 7/8"

19 INCH RISE 19-12 PITCH 57 3/4 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 10 1/2"	2' 1 1/2"
2	3' 9"	4' 3"
3	5' 7 3/8"	6' 4 1/2"
4	7' 5 5/8"	8' 5 5/8"
5	9' 4 3/8"	10' 7 3/8"
6	11' 2 3/8"	12' 8 3/8"
7	13' 1 3/8"	14' 10 3/8"
8	14' 11 3/4"	16' 11 7/8"
9	16' 10 1/4"	19' 1 1/4"
10	18' 8 3/4"	21' 2 3/4"
11	20' 7 1/4"	23' 4 1/4"
12	22' 5 5/8"	25' 5 3/4"
13	24' 4 1/8"	27' 7 1/4"
14	26' 2 3/8"	29' 8 3/8"
15	28' 1 1/8"	31' 10 1/8"
16	29' 11 5/8"	33' 11 5/8"
17	31' 10"	36' 1 1/8"
18	33' 8 1/2"	38' 2 5/8"
19	35' 7"	40' 4"
20	37' 5 1/2"	42' 5 1/2"
21	39' 3 3/8"	44' 7"
22	41' 2 3/8"	46' 8 1/2"
23	43' 0 3/8"	48' 10"
24	44' 11 3/8"	50' 11 3/8"
25	46' 9 7/8"	53' 0 3/8"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	7/8"	1"
1	1 1/8"	2 1/8"
1 1/2	2 3/4"	3 3/8"
2	3 3/4"	4 1/4"
2 1/2	4 5/8"	5 1/4"
3	5 5/8"	6 3/8"
3 1/2	6 1/2"	7 3/8"
4	7 1/2"	8 1/2"
4 1/2	8 3/8"	9 1/2"
5	9 3/8"	10 3/8"
5 1/2	10 1/4"	11 3/8"
6	11 1/4"	12 3/4"
6 1/2	12 3/8"	13 3/4"
7	13 3/8"	14 3/8"
7 1/2	14"	15 3/8"
8	15"	17"
8 1/2	15 3/8"	18"
9	16 3/8"	19 1/4"
9 1/2	17 3/4"	20 1/2"
10	18 3/4"	21 1/2"
10 1/2	19 3/8"	22 1/2"
11	20 3/8"	23 3/8"
11 1/2	21 1/2"	24 3/8"

Spacing In.	Jack Rafter Length
1	1 7/8"
2	3 3/4"
3	5 5/8"
4	7 1/2"
5	9 3/8"
6	11 1/4"
7	1' 1 1/8"
8	1' 3"
9	1' 4 7/8"
10	1' 6 3/4"
11	1' 8 5/8"
12	1' 10 1/2"
13	2' 0 3/8"
14	2' 2 1/4"
15	2' 4 1/8"
16	2' 6"
17	2' 7 7/8"
18	2' 9 3/4"
19	2' 11 3/8"
20	3' 1 1/2"
21	3' 3 3/8"
22	3' 5 1/4"
23	3' 7 1/8"
24	3' 9"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	1 3/8"	3 1/2"	5 9/16"
1 5/8"	1 1/2"	5 1/2"	8 1/16"
1 3/4"	1 5/8"	7 1/4"	11 1/2"
1 7/8"	1 3/4"	9 1/4"	14 5/8"

20 INCH RISE 20-12 PITCH 59 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	1' 11 3/8"	2' 2 1/4"
2	3' 10 5/8"	4' 4 1/2"
3	5' 10"	6' 6 3/4"
4	7' 9 3/8"	8' 8 7/8"
5	9' 8 5/8"	10' 11 1/8"
6	11' 8"	13' 1 3/8"
7	13' 7 1/4"	15' 3 5/8"
8	15' 6 3/8"	17' 5 5/8"
9	17' 5 3/8"	19' 8 3/8"
10	19' 5 1/4"	21' 10 3/8"
11	21' 4 5/8"	24' 0 1/2"
12	23' 3 3/8"	26' 2 3/4"
13	25' 3 3/4"	28' 5"
14	27' 2 1/2"	30' 7 1/4"
15	29' 1 1/8"	32' 9 1/2"
16	31' 1 1/4"	34' 11 3/4"
17	33' 0 1/2"	37' 1 1/8"
18	34' 11 1/8"	39' 4 1/8"
19	36' 11 1/8"	41' 6 3/8"
20	38' 10 1/2"	43' 8 5/8"
21	40' 9 7/8"	45' 10 7/8"
22	42' 9 1/8"	48' 1 1/8"
23	44' 8 1/2"	50' 3 1/4"
24	46' 7 3/4"	52' 5 1/2"
25	48' 7 1/8"	54' 7 3/4"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	1"	1 1/8"
1	2"	2 1/8"
1 1/2	2 7/8"	3 1/4"
2	3 7/8"	4 3/8"
2 1/2	4 7/8"	5 1/2"
3	5 7/8"	6 1/2"
3 1/2	6 3/4"	7 5/8"
4	7 3/4"	8 3/4"
4 1/2	8 3/4"	9 7/8"
5	9 3/4"	10 7/8"
5 1/2	10 3/4"	12"
6	11 5/8"	13 3/8"
6 1/2	12 5/8"	14 1/4"
7	13 5/8"	15 1/4"
7 1/2	14 5/8"	16 3/8"
8	15 1/2"	17 1/2"
8 1/2	16 1/2"	18 5/8"
9	17 1/2"	19 5/8"
9 1/2	18 1/2"	20 3/4"
10	19 3/8"	21 7/8"
10 1/2	20 3/8"	23"
11	21 3/8"	24"
11 1/2	22 3/8"	25 1/8"

Spacing In.	Jack Rafter Length
1	2"
2	3 7/8"
3	5 5/8"
4	7 3/4"
5	9 3/4"
6	11 5/8"
7	1' 1 5/8"
8	1' 3 1/2"
9	1' 5 1/2"
10	1' 7 3/8"
11	1' 9 3/8"
12	1' 11 3/8"
13	2' 1 1/4"
14	2' 3 1/4"
15	2' 5 1/8"
16	2' 7 1/8"
17	2' 9"
18	2' 11"
19	3' 0 3/8"
20	3' 2 3/8"
21	3' 4 3/8"
22	3' 6 3/4"
23	3' 8 3/4"
24	3' 10 3/8"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	1 7/16"	3 1/2"	5 3/16"
1 5/8"	1 9/16"	5 1/2"	9 3/16"
1 3/4"	1 11/16"	7 1/4"	12 1/16"
1 7/8"	1 13/16"	9 1/4"	15 7/16"

21 INCH RISE 21-12 PITCH 60 1/4 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	2' 0 1/4"	2' 3"
2	4' 0 3/8"	4' 6"
3	6' 0 5/8"	6' 9"
4	8' 0 3/4"	9' 0"
5	10' 1"	11' 3"
6	12' 1 1/8"	13' 6"
7	14' 1 3/8"	15' 9"
8	16' 1 1/2"	18' 0"
9	18' 1 3/4"	20' 3"
10	20' 1 7/8"	22' 6"
11	22' 2 1/8"	24' 9"
12	24' 2 1/4"	27' 0"
13	26' 2 1/2"	29' 3"
14	28' 2 5/8"	31' 6"
15	30' 2 3/4"	33' 9"
16	32' 3"	36' 0"
17	34' 3 1/4"	38' 3"
18	36' 3 3/8"	40' 6"
19	38' 3 5/8"	42' 9"
20	40' 3 3/4"	45' 0"
21	42' 4"	47' 3"
22	44' 4 1/8"	49' 6"
23	46' 4 3/8"	51' 9"
24	48' 4 1/2"	54' 0"
25	50' 4 5/8"	56' 3"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	1"	1 1/8"
1	2"	2 1/4"
1 1/2	3"	3 3/8"
2	4"	4 1/2"
2 1/2	5"	5 5/8"
3	6"	6 3/4"
3 1/2	7"	7 7/8"
4	8 1/8"	9"
4 1/2	9 1/8"	10 1/8"
5	10 1/8"	11 1/4"
5 1/2	11 1/8"	12 3/8"
6	12 1/8"	13 1/2"
6 1/2	13 1/8"	14 5/8"
7	14 1/8"	15 3/4"
7 1/2	15 1/8"	16 7/8"
8	16 1/8"	18"
8 1/2	17 1/8"	19 1/8"
9	18 1/8"	20 1/4"
9 1/2	19 1/8"	21 3/8"
10	20 1/8"	22 1/2"
10 1/2	21 1/8"	23 5/8"
11	22 1/8"	24 3/4"
11 1/2	23 1/8"	25 7/8"

Spacing In.	Jack Rafter Length
1	2"
2	4"
3	6"
4	8 1/8"
5	10 1/8"
6	1' 0 1/8"
7	1' 2 1/8"
8	1' 4 1/8"
9	1' 6 1/8"
10	1' 8 1/8"
11	1' 10 1/8"
12	2' 0 1/4"
13	2' 2 1/4"
14	2' 4 1/4"
15	2' 6 1/4"
16	2' 8 1/4"
17	2' 10 1/4"
18	3' 0 1/2"
19	3' 2 1/2"
20	3' 4 3/8"
21	3' 6 3/8"
22	3' 8 3/8"
23	3' 10 3/8"
24	4' 0 3/8"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	1 1/2"	3 1/2"	6 1/8"
1 5/8"	1 5/8"	5 1/2"	9 5/8"
1 3/4"	1 3/4"	7 1/4"	12 1 1/8"
1 7/8"	1 7/8"	9 1/4"	16 3 1/8"

22 INCH RISE 22-12 PITCH 61 1/2 DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	2' 1 1/8"	2' 3 3/4"
2	4' 2 1/8"	4' 7 5/8"
3	6' 3 1/4"	6' 11 3/8"
4	8' 4 1/4"	9' 3 3/8"
5	10' 5 3/8"	11' 7"
6	12' 6 3/8"	13' 10 3/4"
7	14' 7 1/2"	16' 2 1/2"
8	16' 8 1/2"	18' 6 1/4"
9	18' 9 1/2"	20' 10 1/8"
10	20' 10 5/8"	23' 1 1/8"
11	22' 11 5/8"	25' 5 1/8"
12	25' 0 3/4"	27' 9 1/2"
13	27' 1 3/4"	30' 1 1/4"
14	29' 2 3/8"	32' 5"
15	31' 3 3/8"	34' 8 3/4"
16	33' 5"	37' 0 5/8"
17	35' 6"	39' 4 3/8"
18	37' 7 1/8"	41' 8 1/8"
19	39' 8 1/8"	43' 11 1/8"
20	41' 9 1/4"	46' 3 3/4"
21	43' 10 1/4"	48' 7 1/2"
22	45' 11 3/8"	50' 11 1/4"
23	48' 0 3/8"	53' 3 1/8"
24	50' 1 1/2"	55' 6 7/8"
25	52' 2 1/2"	57' 10 5/8"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
1/2	1"	1 1/8"
1	2 1/8"	2 3/8"
1 1/2	3 3/8"	3 1/2"
2	4 5/8"	4 5/8"
2 1/2	5 7/8"	5 7/8"
3	6 7/8"	7"
3 1/2	7 7/8"	8 1/8"
4	8 3/8"	9 1/4"
4 1/2	9 3/8"	10 3/8"
5	10 3/8"	11 3/8"
5 1/2	11 3/8"	12 3/8"
6	12 3/8"	13 3/8"
6 1/2	13 3/8"	15"
7	14 3/8"	16 1/4"
7 1/2	15 3/8"	17 3/8"
8	16 3/4"	18 1/2"
8 1/2	17 3/4"	19 5/8"
9	18 3/4"	20 7/8"
9 1/2	19 7/8"	22"
10	20 7/8"	23 3/8"
10 1/2	21 7/8"	24 1/4"
11	23"	25 1/2"
11 1/2	24"	26 5/8"

Spacing In.	Jack Rafter Length
1	2 1/8"
2	4 1/8"
3	6 1/4"
4	8 1/8"
5	10 1/2"
6	1' 0 1/2"
7	1' 2 1/2"
8	1' 4 1/4"
9	1' 6 1/4"
10	1' 8 1/8"
11	1' 11"
12	2' 1"
13	2' 3 1/8"
14	2' 5 1/4"
15	2' 7 3/8"
16	2' 9 3/8"
17	2' 11 1/2"
18	3' 1 1/8"
19	3' 3 3/8"
20	3' 5 3/8"
21	3' 7 3/8"
22	3' 10"
23	4' 0"
24	4' 2 1/8"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1 1/2"	1 1/2"	3 1/2"	6 7/8"
1 5/8"	1 5/8"	5 1/2"	10 1/8"
1 3/4"	1 3/4"	7 1/4"	13 5/8"
1 7/8"	1 7/8"	9 1/4"	16 3 1/8"

23 INCH RISE 23-12 PITCH 62½ DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	2' 2"	2' 4½"
2	4' 3¾"	4' 9½"
3	6' 5½"	7' 1¾"
4	8' 7¾"	9' 6¾"
5	10' 9¾"	11' 10¾"
6	12' 11½"	14' 3½"
7	15' 1½"	16' 8½"
8	17' 3½"	19' 0½"
9	19' 5½"	21' 5¼"
10	21' 7½"	23' 9¾"
11	23' 9¾"	26' 2¾"
12	25' 11¾"	28' 7"
13	28' 1¼"	30' 11½"
14	30' 3¼"	33' 4½"
15	32' 5½"	35' 8¾"
16	34' 7½"	38' 1¾"
17	36' 9"	40' 5¾"
18	38' 11"	42' 10½"
19	41' 0¾"	45' 3¾"
20	43' 2¾"	47' 7¾"
21	45' 4¾"	50' 0¼"
22	47' 6¾"	52' 4¾"
23	49' 8¾"	54' 9¾"
24	51' 10¾"	57' 2"
25	54' 0¾"	59' 6¾"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
½	1⅞"	1¼"
1	2⅞"	2¾"
1½	3¾"	3¾"
2	4¾"	4¾"
2½	5¾"	6"
3	6½"	7⅞"
3½	7¾"	8¾"
4	8¾"	9½"
4½	9¾"	10¾"
5	10¾"	12"
5½	11¾"	13¾"
6	13"	14¼"
6½	14¾"	15½"
7	15¾"	16¾"
7½	16¾"	17¾"
8	17¾"	19"
8½	18¾"	20¼"
9	19½"	21¾"
9½	20¾"	22¾"
10	21¾"	23¾"
10½	22¾"	25"
11	23¾"	26¼"
11½	24¾"	27¾"

Spacing In.	Jack Rafter Length
1	2¼"
2	4¾"
3	6½"
4	8¾"
5	10¾"
6	1' 1"
7	1' 3⅞"
8	1' 5¼"
9	1' 7½"
10	1' 9¾"
11	1' 11¾"
12	2' 2"
13	2' 4½"
14	2' 6¼"
15	2' 8¾"
16	2' 10¾"
17	3' 0¾"
18	3' 2¾"
19	3' 5¾"
20	3' 7¼"
21	3' 9¾"
22	3' 11½"
23	4' 1¾"
24	4' 3¾"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1½"	1½"	3½"	6⅛"
1⅝"	1¾"	5½"	10⅞"
1¾"	1⅞"	7¼"	13⅞"
1⅞"	2"	9¼"	17¾"

24 INCH RISE 24-12 PITCH 63½ DEGREES

Run Ft.	Common Rafter Length	Hip or Val. Rafter Length
1	2' 2⅞"	2' 5¾"
2	4' 5½"	4' 10¾"
3	6' 8½"	7' 4¼"
4	8' 11¾"	9' 9¾"
5	11' 2½"	12' 3"
6	13' 5"	14' 8¾"
7	15' 7½"	17' 1¾"
8	17' 10½"	19' 7½"
9	20' 1½"	22' 0¾"
10	22' 4¾"	24' 6"
11	24' 7¾"	26' 11¾"
12	26' 10"	29' 4¾"
13	29' 0¾"	31' 10½"
14	31' 3¾"	34' 3½"
15	33' 6¾"	36' 8¾"
16	35' 9¾"	39' 2¾"
17	38' 0¾"	41' 7¾"
18	40' 3"	44' 1½"
19	42' 5½"	46' 6½"
20	44' 8¾"	48' 11¾"
21	46' 11½"	51' 5¼"
22	49' 2¾"	53' 10¾"
23	51' 5¾"	56' 4½"
24	53' 8"	58' 9½"
25	55' 10¾"	61' 2¾"

Run In.	Common Rafter Length	Hip or Val. Rafter Length
½	1⅞"	1¼"
1	2¼"	2½"
1½	3¾"	3¾"
2	4½"	4¾"
2½	5¾"	6½"
3	6¾"	7¾"
3½	7¾"	8¾"
4	9"	9¾"
4½	10"	11"
5	11½"	12¼"
5½	12¼"	13½"
6	13¾"	14¾"
6½	14¾"	15¾"
7	15¾"	17½"
7½	16¾"	18¾"
8	17¾"	19¾"
8½	19"	20¾"
9	20½"	22"
9½	21¼"	23¼"
10	22¾"	24½"
10½	23½"	25¾"
11	24¾"	27"
11½	25¾"	28¼"

Spacing In.	Jack Rafter Length
1	2¼"
2	4½"
3	6¾"
4	9"
5	11½"
6	1' 1¾"
7	1' 3¾"
8	1' 5¾"
9	1' 8"
10	1' 10¾"
11	2' 0¾"
12	2' 2¾"
13	2' 5½"
14	2' 7¼"
15	2' 9½"
16	2' 11¾"
17	3' 2"
18	3' 4¼"
19	3' 6½"
20	3' 8¾"
21	3' 11"
22	4' 1¼"
23	4' 3¾"
24	4' 5¾"

Rafter Thickness	Miter Allowance for Hip and Valley Rafters	Rafter Depth	Bottom Allowance
1½"	1½"	3½"	7"
1⅝"	1¾"	5½"	11"
1¾"	1⅞"	7¼"	14½"
1⅞"	2"	9¼"	18½"



IMPORTANT SAFETY INFORMATION

It is essential that you read and understand the instructions contained in this manual before using the product for the first time. Failure to follow these instructions could result in personal injury or possible damage to the equipment.
This manual should be stored safely for future reference.



DISPOSAL OF THIS PRODUCT

If you at some point intend to dispose of this product, then please keep in mind that many of its components consist of valuable materials, which can be recycled. Please do not dispose of this product in the household waste bin, but check with your local council for recycling facilities in your area.



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