Components of a Shingled Roof System

1. **Metal Roof Edging**

   - Metal roof edging is typically the first item that is applied during a roofing project and its use has many benefits. The drip portion on the vertical leg of roof edge helps get water in the gutter or away from the house. It also helps tie the soffit color into the roof system. Roof edge is commonly integrated with the ice and water shield which helps protect the edge of the roof sheathing from rot or decay. Metal roof edge is available in 12ft aluminum or 10ft steel lengths.

2. **Ice and Water Shield**

   - Ice and water shield is a self-adhered roofing membrane made from a combination of rubberized asphalt for leak protection and a strong inorganic fiberglass mat for reinforcement. Its main application purpose is to prevent leaks and damage to a roof system. Ice and water shield is required to be installed one foot inside a building's vertical wall line. Most Minnesota homes have a 2 foot eave side overhang which requires two rows of ice and water shield after calculating for the roof's slope. Oslin Lumber Company carries ice and water shield in 100 sq ft rolls.

3. **Underlayment**

   - Underlayment (tar paper, roofing felt) is a heavy-duty paper, fiberglass or polyester fleece material that is impregnated with a bituminous material (tar) for waterproofing purposes. It is used, along with ice and water, under shingles as a second line of defense against water infiltration into a building's roof system. Underlayment typically covers the entire roof deck system (some will hold out at ice and water location). Oslin Lumber carries 400 sq ft rolls of 15lb and 200 sq ft rolls of 30lb tar paper. We also have quick access to multiple synthetic shingle underlayment options.

4. **Architectural Shingles**

   - Architectural (laminated) shingles are made with a base layer of a fiberglass reinforcing mat that are laminated for appearance and strength. The mat is made from wet, random-laid fiberglass that is bonded with a resin. The mat is then coated with asphalt which contains mineral fillers and makes the fiberglass shingle waterproof. Granules are added to the top for color and additional weather protection. Layers are laminated to give the architectural shingle its characteristic shake like look. Architectural shingles are figured by square (100 sq ft) and are the most widely used product for roof coverings. Oslin Lumber stocks many colors of Tamko Heritage 30 year and GAF / Elk Timberline Prestique HD 30 year shingles. We have quick access to many other brands, however, so don't be afraid to request a non-stock option.

5. **Ridge Cap Shingles**

- Ridge cap shingles are similar in composition to architectural shingles. They are used to cover the area where two roof planes meet at peak (ridge) or hip locations. They are typically perforated for ease of application and come in single or multiple layer pieces (multiple layers provide more definition at the roof peak). The amount of ridge coverage varies by manufacturer, but they usually cover between 20 and 33 lf per bundle.

6. **Starter Shingles**

- Starter shingles are a narrow, single layer shingle that are similar in composition to ridge cap shingles. Starter shingles are applied at a roof's eave side edge and occasionally along the rake portion. Starter shingles have a tar strip that helps bond the architectural shingle to the edge of the roof to prevent blow-off in high wind situations. The amount of starter coverage varies by manufacturer, but they typically cover between 75 and 125 lf per bundle.

7. **W-Valley**

- W-Valley is a 20" X 10ft piece of aluminum or steel that is shaped like a "W." W-Valley helps protect against water backing up in the valley portion of a roof. The rib portion in the center of the "W" helps to slow and change the direction of water as it moves down the roof plane. W-Valley comes standard as a mill finish, but can be ordered to match the shingle color. W-Valley is not used in all applications. Shingles can be weaved in the valley with ice and water shield or a valley pan below.

8. **Venting**

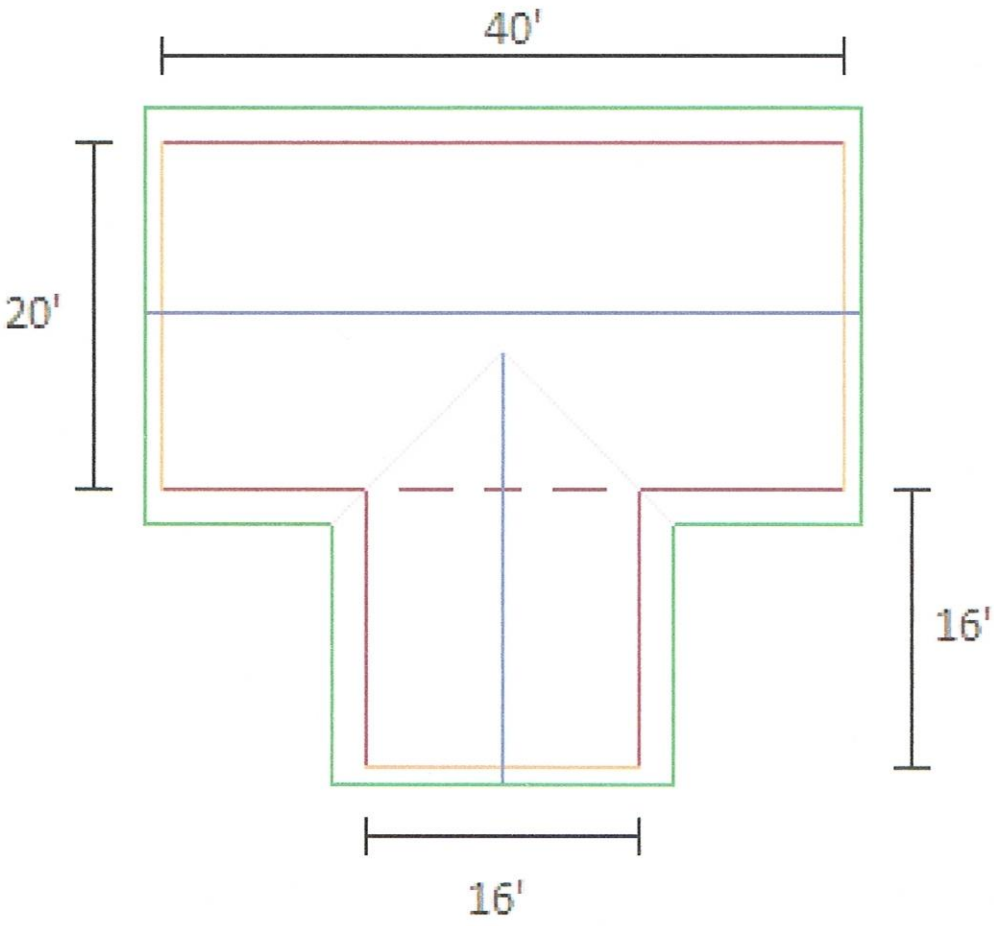
- Oslin lumber handles multiple types of roof vents. The two most common forms are ridge and box vents. Ridge vents have become the preferred form as they are discreet in appearance and don't require flashing in the roof's main plane. Ridge vents come in both 20 - 30 ft rolls and 4ft pieces. Many ridge vents can be applied with a pneumatic roofing nails. Box (turtle) vents are also a common venting option. They are available in plastic, aluminum and steel and are available in many colors. A typical box vent will vent 250 - 300 sq ft of an attic's footprint.

9. **Miscellaneous**

- Step Flashing
- Endwall / Sidewall Flashing
- Kick-out Flashing
- Nails
- Staples
- Pipe Boots

- Bath / Kitchen Vents
- Roof Jacks
- Adhesive Caulk

Green Line - Perimeter of Roof
Brown Line - Building Eave Side Wall Line
Orange Line - Building Gable (Rake) End Wall Line
Blue Line - Roof Ridge
Pink Line - Roof Valley



Sample Estimate 6 in 12 Slope

Sample Figures
Roof Slope 6 in 12
Eave Overhang Width (standard) 2ft
Gable Overhang Width (standard) 1ft

1. Determine Roof Slope

- Roof slope can be determined by using the roof slope gauge that may be found on the laminated shingle page of our website. Print out a copy, then stand back and hold the gauge up to determine the slope of your building's roof. After the slope is figured look at the table below to find the roof slope factor. We will use a 6 in 12 slope for this example.

Roof Factor Table

Roof Slope	Slope Factor	Hip / Valley Factor
2 in 12	1.014	1.424
3 in 12	1.031	1.436
4 in 12	1.054	1.453
5 in 12	1.083	1.474
6 in 12	1.118	1.5
7 in 12	1.158	1.53
8 in 12	1.202	1.563
9 in 12	1.25	1.601
10 in 12	1.302	1.641
11 in 12	1.357	1.685
12 in 12	1.413	1.732

2. Figuring Total Length of Gable Ends

- The drawing above shows the gable ends of the house as orange lines (2 - 20ft, 1 - 16ft). There are six gable (rake) lengths on the sample house. We are looking for the gable end lengths for the edge of the roof, so the roof overhang (2ft) must be added to half the width of the wall.

20 ft wall example

(½ width of wall + eave overhang width) x slope factor = gable end length

(10 + 2) x 6 in 12 slope factor = gable end length

12 x 1.118 = 13.416

Round up to nearest two foot increment for a gable end length of 14ft

16ft wall example

(½ width of wall + eave overhang width) x slope factor = gable end length

(8 + 2) x 6 in 12 slope factor = gable end length
10 x 1.118 = 11.18
Round up to nearest two foot increment for a gable end length of 12ft

Total Gable Length
We have six gable lengths that need to be added to find the total gable length. There are 4 lengths from the 20ft wall and 2 lengths from the 16ft wall.
14 + 14 + 14 + 14 + 12 + 12 = Total Gable Length
Total Gable Length = 80ft

3. Figuring Total Lengths of Eaves
   - The drawing above shows the eave sides of the house as brown lines (1 - 40ft, 2 - 16ft, 2 - 12ft). There are five eave lengths on the sample house. We are looking for the eave lengths for the edge of the roof, so the roof overhangs (1ft) must be added.

40ft wall example
length of wall + overhangs = eave side length
(40 + 1 + 1) = eave side length
eave side length = 42ft

16ft wall example
The 16ft wall is a little different than the 40ft wall. The eave starting point is out 2ft from the wall line.
length of wall - eave width + overhang = eave side length
(16 - 2 + 1) = eave side length
eave side length = 15ft

12ft wall example
The 12ft wall is similar to the 16ft wall. The eave starting point is out 2ft from the wall line.
length of wall - eave width + overhang = eave side length
(12 - 2 + 1) = eave side length
eave side length = 11ft

Total Eave Length
We have five eave lengths that need to be added to find the total eave length. There is 1 length from the 40ft wall and 2 lengths each from the 16ft and 12ft walls.
42 + 15 + 15 + 11 + 11 = Total Eave Length
Total Eave Length = 94ft

4. Figuring Total Roof Perimeter
   - The total roof perimeter is equal to the sum of the total gable and eave

lengths.

Total Roof Perimeter

total gable length + total eave length = total roof perimeter
80 + 94 = total roof perimeter
Total Roof Perimeter = 174ft

5. Figuring Total Sloped Roof Area

- To figure the sloped roof area we first need to figure the roof's footprint. The roof footprint print is the area inside the edge of the roof (green lines).

Main Roof Footprint

Figuring the footprint of a roof is a simple area calculation. We need to take the roof width (including overhangs) and multiply it by the roof length (including overhangs).

main roof width x main roof length = main roof footprint
(20 + 2 + 2) x (40 + 1 +1) = main roof footprint
24 x 42 = main roof footprint
main roof footprint = 1008 sq ft

Small Roof Footprint

Figuring the small roof footprint is similar to the main roof, but we do need to deduct for the main roof's eave that was figured with the main roof footprint.

small roof width x small roof length (minus eave) = small roof footprint
(16 + 2 + 2) x (16 + 1 - 2) = small roof footprint
20 x 15 = small roof footprint
small roof footprint = 300 sq ft

Total Roof Footprint

Finding the total roof footprint involves adding the main and small roof footprints.

main roof footprint + small roof footprint = total roof footprint
1008 sq ft + 300 sq ft = total roof footprint
Total Flat Roof Footprint = 1308 sq ft

Total Sloped Roof Area

Finding the total sloped roof area involves multiplying the total roof footprint by the roof slope factor.

total roof footprint x roof slope factor = total sloped roof area

1308 sq ft x 6 in 12 roof factor = total sloped roof area
1308 x 1.118 = total sloped roof area
Total Sloped Roof Area = 1462.344 sq ft
Round Up for a Total Sloped Roof Area of 1463 sq ft

6. Figuring Total Roof Ridge Length

- The drawing above shows the roof ridge as blue lines. There are two ridge lengths on the sample house. We are looking for the ridge lengths to the edge of the roof, so the roof overhangs (1ft) must be added.

Main Roof Ridge Length

Finding the main roof ridge length involves adding the length of the house to the overhangs.

length of house + overhangs = main roof ridge length
(40 + 1 + 1) = main roof ridge length
main roof ridge length = 42ft

Small Roof Ridge Length

Finding the small roof ridge length involves adding the length of the smaller house portion to the overhang.

length of house + overhang = small roof ridge length
(16 + 1) = small roof ridge length
small roof ridge length = 17ft

Common Roof Ridge Length

Finding the length of the ridge that extends from the small roof ridge to the main roof is simple. That length is equal to half the width of the small roof's gable end wall.

gable end wall width / 2 = common roof ridge length
16 / 2 = common roof ridge length
common roof ridge length = 8ft

Total Roof Ridge Length

The total roof ridge length is equal to the sum of the main, small and common roof ridge lines.

main + small + common = total roof ridge length
(42 + 17 + 8) = total roof ridge length
Total Roof Ridge Length = 67ft

7. Figuring Total Valley Length

- The drawing above shows the roof valley as pink lines. There are two valley lengths on the sample house. We are looking for the valley lengths to the edge of the roof, so the roof overhangs (2ft) must be added.

<u>Valley Length</u>

The valley length is calculated by multiplying half of the roof width (including overhangs) by the valley slope factor.

(½ building width + overhang) x valley slope factor = valley length
(8 + 2) x 6 in 12 valley slope factor = valley length
10 x 1.5 = valley length
valley length = 15ft

<u>Total Valley Length</u>

The total valley length is the sum of all roof valley lengths.

valley length + valley length = total roof valley length
(15 + 15) = total roof valley length
Total Roof Valley Length = 30ft

Using the Figures to Calculate Roofing Material

Total Gable Length = 80ft
Total Eave Length = 94ft
Total Roof Perimeter = 174ft
Total Flat Roof Footprint Area = 1308 sq ft
Total Sloped Roof Area = 1463 sq ft
Total Roof Ridge Length = 67ft
Total Roof Valley Length = 30ft

1. Roof Edge

- The amount of roof edge needed is based on the <u>total roof perimeter figure</u>. In the example estimate we came up with a total roof perimeter of 174ft. Most homes use a 12ft aluminum roof edge, so take the perimeter divided by the length of roof edge to determine how many pieces are needed (174 / 12 = 14.5 pieces). Round up to the nearest whole number to figure out how many pieces are needed (15). On large roofing projects it is wise to add a couple extra pieces to allow for waste.

2. Underlayment

- The amount of underlayment needed is based on the <u>total sloped roof area figure</u>. In the example estimate we came up with a total sloped roof area of 1463 sq ft. Most homes use 15lb tar paper which covers 400 sq ft per roll. Take the total sloped roof area divided by the coverage of the underlayment to figure out how many rolls are required (1463 / 400 = 3.66 rolls). Round up to the nearest whole number to figure out how many rolls are needed (4).

3. Ice and Water Shield
   - The amount of ice and water shield needed is based on the total eave length figure. In the example estimate we came up with a total eave length of 94ft. Most homes use two rows of ice and water at the eave which cover 33ft per roll (1 sq). Double the total eave length then divide by the coverage of the ice and water shield to figure out how many rolls are required (94 x 2 / 33 = 5.7 rolls). Round up to the nearest whole number to figure out how many rolls are needed (6).

4. Architectural Shingles
   - The amount of shingles needed is based on the total sloped roof area figure. In the example structure we came up with a total sloped roof area of 1463 sq ft. Architectural shingles are figured by the square (100 sq ft) and require a 5% waste factor to be added. Multiply the total sloped roof area by 1.05 to figure out how many square are required (1463 x 1.05 = 1537 sq ft or 15.37 square). Round up to the nearest whole number to figure out how many square are needed (16).

5. Ridge Cap Shingles
   - The amount of ridge shingles needed is based on the total roof ridge length figure. In the example structure we came up with a total roof ridge length of 67ft. Ridge shingles are figured per bundle and we'll assume that the brand selected covers 25ft. Divide the total roof ridge length by the amount of ridge cap coverage to figure out how many bundles are needed (67 / 25 = 2.68 bundles). Round up to the nearest whole number to figure out how many bundles are needed (3).

6. Starter Shingles
   - The amount of starter shingles needed is based on the total eave length figure for most applications or the total roof perimeter figure in situations needing additional wind protection. In the example structure we came up with a total eave length of 94ft. Starter shingles are figured per bundle and we'll assume that the brand selected covers 75ft. Divide the total length being covered by the amount of starter shingle coverage to figure out how many bundles are needed (94 / 75 = 1.26 bundles). Round up to the nearest whole number to figure out how many bundles are needed (2).

7. W-Valley
   - The amount of w-valley needed is based on the total roof valley length figure. In the example structure we came up with a total roof valley length of 30ft. W-valley comes in 10ft lengths. Divide the total valley length by the length

of the valley material to figure out how many pieces are needed (30 / 10 = 3 pieces). Round up to the nearest whole number to figure out how many pieces are needed (3). W-valley does need to be cut at an angle, so in this case 4 pieces would actually be required.

8. Roof Vents

- Depending on the type of venting being used, the amount of venting needed is based on either the total roof ridge length or total flat roof footprint.

- The amount of ridge vent needed is based on the total roof ridge length figure. In the example structure we came up with a total roof ridge length of 67ft. Ridge vent material comes in various forms but we'll assume that the brand selected covers 30ft per roll. Divide the total roof ridge length by the amount of ridge vent coverage to figure out how much is needed (67 / 30 = 2.24 rolls). Round up to the nearest whole number to figure out how many rolls are needed (3).

- The amount of box vents needed is based on the total flat roof footprint. In the example structure we came up with a total flat roof footprint of 1308 sq ft. Box vents typically vent 250 - 300 sq ft of flat roof footprint, but we'll assume that the brand selected vents 250 sq ft per vent. Divide the total flat roof footprint by the amount of ridge vent exhaust to figure out how many are needed (1308 / 250 = 5.24 vents). Round up to the nearest whole number to figure out how many vents are needed (6).

9. Miscellaneous

- Step Flashing
- Endwall / Sidewall Flashing
- Kick-out Flashing
- Pneumatic Nails (20 - 22 sq of coverage per box)
- Staples
- Pipe Boots
- Bath / Kitchen Vents
- Roof Jacks
- Adhesive Caulk

We hope that this has been a helpful guide in your shingle purchasing decision. Give us a call or send an email with any questions or to let us figure and price the material for you. Thanks.

Oslin Lumber Company
Phone 320 679 1181
Email sales@oslinlumber.com