

# ROOFING CALCULATION REFERENCE

Standard pitch, surface area, material coverage, and estimation formulas for asphalt shingle roofing projects.

## Roof Pitch Formula

### Pitch Multiplier Formula

$$= \sqrt{(\text{rise}^2 + \text{run}^2)} \div \text{run}$$

For pitch expressed as X/12:

Pitch Factor

$$= \sqrt{(\text{X}^2 + 12^2)} \div 12$$

### Roof Surface Area

$$= \text{Building Footprint Area} \times \text{Pitch Factor}$$

## Waste Factor Allowances (Typical)

Complexity	Waste	Description
Simple	10%	Basic gable roof with few penetrations or valleys
Moderate	15%	Multiple slopes, some valleys, dormers or skylights
Complex	20%	Steep pitch, many hips/valleys, turrets or irregular shapes

Squares with Waste = Squares  $\times$  (1 + Waste%  $\div$  100)

Waste varies based on roof geometry, valley count, and cutting layout.

## Pitch Multiplier Table

Pitch	Angle	Factor	1000 sq ft
2/12	9.5	1.014	1014
3/12	14	1.031	1031
4/12	18.4	1.054	1054
5/12	22.6	1.083	1083
6/12	26.6	1.118	1118
7/12	30.3	1.158	1158
8/12	33.7	1.202	1202
9/12	36.9	1.250	1250
10/12	39.8	1.302	1302
12/12	45	1.414	1414

## Shingle Coverage Defaults

Bundles Per Square	
3-Tab Shingles	3 bundles per square
Architectural Shingles	3 bundles per square
<b>Field Bundles</b> = Squares with Waste $\times$ Bundles per Square (Round up to whole bundles)	
Accessory Coverage (Typical)	
Ridge Cap	25 linear ft per bundle
Starter Strip	105 linear ft per bundle
Underlayment	400 sq ft per roll (standard synthetic)
<b>Ridge Cap Bundles</b> = (Ridge Length + Hip Length) $\div$ 25 (Round up)	
<b>Starter Bundles</b> = (Eave Length + Rake Length) $\div$ 105 (Round up)	
<b>Underlayment Rolls</b> = Roof Area $\div$ Roll Coverage (Round up)	

## Quick Reference Formulas

Footprint Area = Length  $\times$  Width

Roof Area = Footprint  $\times$  Pitch Factor

Roofing Squares = Roof Area  $\div$  100

1 roofing square = 100 sq ft of roof surface area

Squares with Waste = Squares  $\times$  (1 + Waste%  $\div$  100)

Field Bundles = Squares with Waste  $\times$  Bundles per Square

Ridge Cap = (Ridge + Hip)  $\div$  25

Starter = (Eave + Rake)  $\div$  105

Underlayment = Roof Area  $\div$  Roll Coverage

## Example Calculation

**Footprint:** 50 ft  $\times$  40 ft **Pitch:** 6/12

**Footprint Area:** 50  $\times$  40 = 2,000 sq ft

**Roof Area:** 2,000  $\times$  1.118 = 2,236 sq ft

**Squares:** 2,236  $\div$  100 = 22.36

**With 15% Waste:** 22.36  $\times$  1.15 = 25.71

**Field Bundles (Architectural):** 25.71  $\times$  3 = 77.13  $\rightarrow$  78 bundles

## Measurement Notes

- Roof area is measured along roof surface
- Pitch multiplier converts horizontal to sloped area
- Valleys and dormers increase waste
- Round bundles and rolls up
- Coverage varies by manufacturer
- Roofing materials sold by square or bundle
- Pallet quantities and delivery minimums may apply