

Roof pitch chart: 1:12 to 24:12, degrees and pitch factor

Multiply the flat (plan) area by the pitch factor to get the sloped roof area.

Pitch, angle, factor and percent slope

Computed: factor = $\sqrt{\text{rise}^2 + 144} / 12$; angle = $\text{atan}(\text{rise} / 12)$; percent = $\text{rise} / 12 \times 100$. Rounded to 3 dp / 0.1.

PITCH	ANGLE	FACTOR	SLOPE	PITCH	ANGLE	FACTOR	SLOPE
1:12	4.8°	1.003	8.3%	13:12	47.3°	1.474	108.3%
2:12	9.5°	1.014	16.7%	14:12	49.4°	1.537	116.7%
3:12	14.0°	1.031	25.0%	15:12	51.3°	1.601	125.0%
4:12	18.4°	1.054	33.3%	16:12	53.1°	1.667	133.3%
5:12	22.6°	1.083	41.7%	17:12	54.8°	1.734	141.7%
6:12	26.6°	1.118	50.0%	18:12	56.3°	1.803	150.0%
7:12	30.3°	1.158	58.3%	19:12	57.7°	1.873	158.3%
8:12	33.7°	1.202	66.7%	20:12	59.0°	1.944	166.7%
9:12	36.9°	1.250	75.0%	21:12	60.3°	2.016	175.0%
10:12	39.8°	1.302	83.3%	22:12	61.4°	2.088	183.3%
11:12	42.5°	1.357	91.7%	23:12	62.4°	2.162	191.7%
12:12	45.0°	1.414	100.0%	24:12	63.4°	2.236	200.0%

Rows not printed in the source table are computed with the same formula.

- US roof slope is stated as inches of rise per 12 in (1 ft) of horizontal run, e.g. 4:12.
- ARMA: measure slope with a 12 in level held level on the roof, measuring down to the roof surface.
- OSHA defines a low-slope roof as 4 in 12 or less and a steep roof as steeper than 4 in 12.
- Under IRC R905.2.2 asphalt shingles may only be used on slopes of 2:12 (17%) or steeper.
- From 2:12 up to 4:12 the IRC requires double underlayment under shingles (R905.2.2 / R905.1.1).
- Above about 21:12 (60 degrees, mansard) manufacturers require 6 nails plus hand-sealing.
- UK roof tile data sheets state minimum pitch in degrees (e.g. 17.5 deg, 35 deg), not x:12.
- Example: 1,500 sq ft of plan area at 6:12 is $1,500 \times 1.118 = 1,677$ sq ft of roof.

Sources (checked 2026-10-23): **Asphalt Roofing Manufacturers Association (ARMA)**: Residential Asphalt Roofing Manual - Design and Application Methods, 2014 edition (Ch. 5 Estimating; Ch. 6 Safety); **BMI Redland (UK)**: Redland 49 concrete roof tile technical data sheet (BS EN 490 / BS 5534:2014+A2:2018); **City of Des Moines Permit & Development Center**: Residential Asphalt Shingle Requirements (2021 IRC Chapter 9, R905.2 and R908.3.1.1); **GAF**: Installation Instructions: Timberline HDZ, UHDZ, AS II, CS, HDZ RS (©2023, 4/23); **LSU AgCenter (Louisiana Cooperative Extension Service)**: Pub. 3104 Consumer's Guide to Code-Compliant Roofing Installations, IRC 2006 Section R905 (03/09); **Marley (UK)**: Modern concrete interlocking roof tile - technical data; **Owens Corning**: Install Instructions: Supreme Shingles (May 2026); **Town of Firestone, Colorado**: Reroof Requirements, 2018 IRC (rev 8.11.23); **US OSHA (29 CFR via Cornell LII)**: 29 CFR 1926.500 Scope, application and definitions (Subpart M).

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