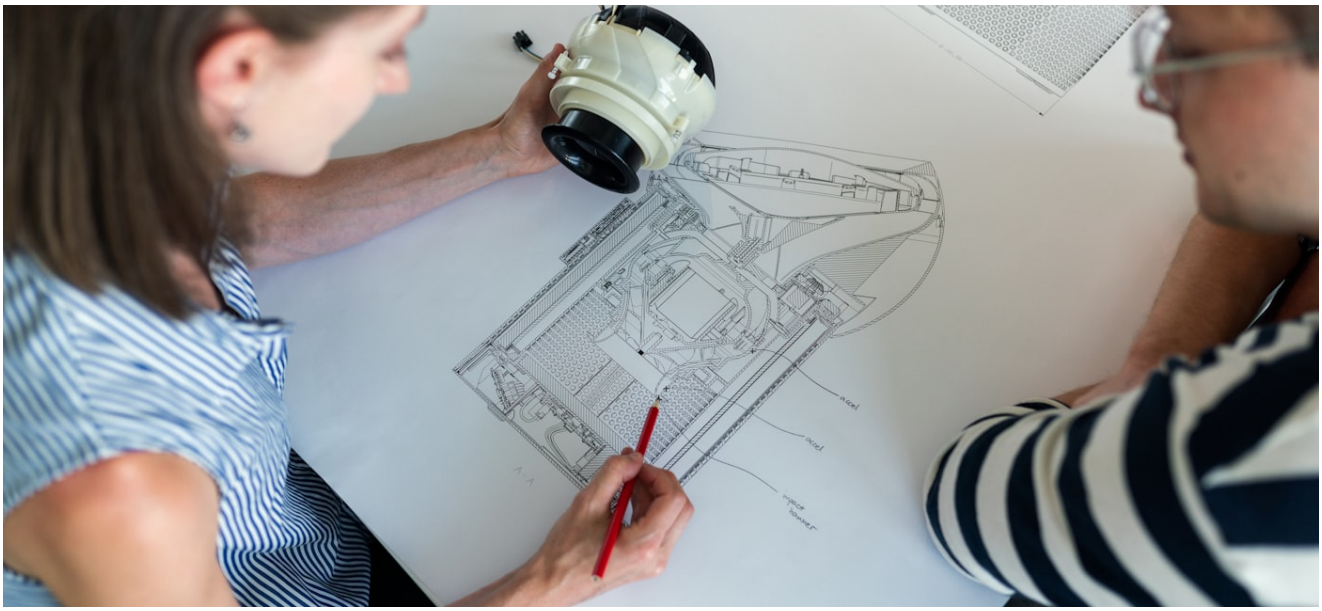
Degrees vs Percent Grade vs mm/m vs Ratio: Which Slope Unit Should You Use?

Degrees, percent grade, mm per meter, ratio — four ways to express the same slope. Learn which unit fits your trade and how to convert between them instantly.

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Online version: https://appstoryo.com/en/blog/degrees-vs-percent-grade-slope-units



Four Ways to Measure the Same Slope

A ramp, a roof, a drainage pipe, a ski run — they all have a slope, but the professionals who build and inspect them rarely agree on how to express it. A roofer talks about pitch in ratio form. A highway engineer quotes percent grade. A plumber demands millimeters per meter. A physicist defaults to degrees. All four describe the same physical reality, yet each unit exists because it solves a specific practical problem. Understanding when to use which one will save you time, prevent costly mistakes, and help you communicate clearly with every trade on site.

Degrees: The Universal Language of Angles

Degrees are the most intuitive unit for anyone who remembers basic geometry. A perfectly flat surface is 0°, a vertical wall is 90°, and everything in between scales linearly. Degrees shine when the angle is steep — above 45° the numbers remain manageable and easy to visualize, whereas percent grade shoots past 100% and becomes less intuitive. Carpenters cutting compound mitre joints, roofers laying steep pitches, and physics teachers all prefer degrees because the unit carries immediate spatial meaning. Most digital levels and smartphone apps display degrees by default for exactly this reason.

Percent Grade: The Language of Roads and Ramps

Percent grade is defined as the tangent of the angle multiplied by 100 — in plain terms, how many centimetres you rise for every metre you travel horizontally. A 5% grade means you climb 5 cm per 100 cm of horizontal run. Road engineers and urban planners standardised on percent grade because it maps directly onto vehicle performance calculations. The ADA (Americans with Disabilities Act) caps accessible ramps at 8.33%, which corresponds to roughly 4.76°. Ski resorts classify beginner runs below 25% and expert black-diamond terrain above 40%. Whenever you are dealing with anything wheeled — roads, car parks, loading docks, wheelchair ramps — percent grade is the expected unit.

mm per Meter: Precision for Drainage and Tiling

For gentle slopes where a fraction of a degree matters enormously, millimetres per metre is the unit of choice. Plumbers specify drainage falls as 10 mm/m (about 0.57°) to ensure waste flows without pooling. Tile layers use the same scale to guarantee water drains off shower floors without being visibly uneven underfoot. The beauty of mm/m is that it translates directly into a physical measurement you can check with a spirit level and a ruler: lay a one-metre straightedge on the surface and measure the gap at the low end in millimetres. No trigonometry required on the job site.

Ratio (1:X): Roof Pitch and Stair Standards

Ratio notation expresses slope as a relationship between rise and run — for example, 1:12 means you rise 1 unit for every 12 units of horizontal travel. Roof pitch in North America is often quoted as rise over a 12-inch run, so a 4:12 pitch rises 4 inches per foot of run (about 18.4°). Stair-building codes specify rise-to-run ratios to ensure safe, comfortable steps. Drainage engineers sometimes prefer 1:40 or 1:80 because it communicates the gradient as a simple fraction. Ratio notation is common wherever building codes are written in imperial units and wherever the slope is relatively gentle.

Quick Conversion Reference

Use this table to move between units at a glance:

- 1° = 1.75% = 17.5 mm/m = approx 1:57
- 5° = 8.75% = 87.5 mm/m = approx 1:11.4
- 10° = 17.6% = 176 mm/m = approx 1:5.7
- 45° = 100% = 1000 mm/m = 1:1

Which Unit Should You Use by Trade?

Here is a simple guide: **Roofing** — use ratio for code compliance, degrees for steep cuts. **Plumbing and drainage** — use mm/m for precise fall specification. **Roads, ramps, and accessibility** — use percent grade to match engineering standards. **General carpentry, metalwork, and physics** — use degrees for clear angular communication. When in doubt, degrees are universally understood and easy to verify with any level.

Switch Units Instantly with Bubble Level and Angle Gauge

Rather than carrying a conversion chart on site, the free app **Bubble Level & Angle Gauge** lets you tap a single button to cycle through degrees, percent grade, mm/m, and ratio in real time. With four measurement modes — surface level, camera angle, wall plumb, and manual entry — it covers every scenario described above. There are no ads and no in-app purchases. Available on App Store (iOS) and Google Play (Android), it is the one tool that speaks every slope language fluently.

Frequently Asked Questions

Is a 10% driveway slope steep?

Yes — 10 percent (about 5.7 degrees) is near the practical limit for a residential driveway. Many local codes cap driveways at 12 to 15 percent, and anything above 10 percent gets uncomfortable in ice or snow and risks scraping cars with long overhangs. For comparison, highway grades rarely exceed 6 percent.

Why is 100% grade only 45 degrees and not vertical?

Percent grade is rise divided by horizontal run, times 100. At 45 degrees the rise equals the run, so the ratio is exactly 1.0 — that is, 100 percent. A vertical wall would be infinite percent, not 100. This is also why percent sounds steeper than degrees at small angles: 100 percent sounds extreme but is only 45 degrees.

Download Bubble Level & Angle Gauge free for iOS or Android — no ads, no tracking, and it works fully offline.

Cite as: Lubor Šimůnek (2026). *Degrees vs Percent Grade vs mm/m vs Ratio: Which Slope Unit Should You Use?*. AppStoryo, lapnito.cz s.r.o.. https://appstoryo.com/en/blog/degrees-vs-percent-grade-slope-units
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