

Break-Even Analysis

How-to guide: what the workbook does, how to use it and what every number means.

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Break-Even Analysis

Find the volume where a job or product starts to make money, compare up to three tooling or sourcing options, and see how price changes move break-even.

For: Estimators, plant and product managers, sales engineers and owners deciding on a job, a price or a tooling investment.

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Quick start

1. On Setup, type your company name, currency and the margin of safety you require.
2. On Break-Even, name up to three options and type each one's price per unit and planned volume.
3. List the one-off fixed costs (tooling, fixtures, approval) and the variable cost per unit, with an amount in each option's column.
4. Read contribution, break-even volume, profit and margin of safety per option; the Check row says when a price or plan does not work.
5. On the Dashboard, pick the option to show: break-even chart, profit by volume for every option, crossover volumes and price sensitivity.

What is in the workbook

Start Here	Read this first: what the workbook does and how to use it.
Setup	Company, currency and the margin of safety you require.
Break-Even	Options, prices and volumes, the fixed and variable costs of each option, and the break-even results.
Dashboard	Break-even, profit and margin of safety for the option you pick, and every option compared.
Method	How every number is calculated, with assumptions, limits and sources.
Verify	Self-check: the workbook's formulas recomputed on fixed inputs against an independent reference.

What each number means

Quantity	How it is calculated	Units
Fixed costs	Sum of the option's column in the Fixed costs table.	currency
Variable cost per unit	Sum of the option's column in the Variable cost table.	currency/unit
Contribution per unit	Price per unit - variable cost per unit.	currency/unit
Contribution ratio	Contribution per unit / price per unit.	%

Quantity	How it is calculated	Units
Break-even volume	Fixed costs / contribution per unit, unrounded (as the live calculator shows it). Blank when the price does not cover the variable cost: that option never breaks even.	units
Break-even, whole units	CEILING(break-even volume, 1): the first whole unit at which profit is zero or better.	units
Break-even revenue	Break-even volume x price per unit (= fixed costs / contribution ratio).	currency
Profit at planned volume	Contribution per unit x planned volume - fixed costs. Negative is a loss.	currency
Margin of safety	(Planned volume - break-even volume) / planned volume: how far the plan may fall before the option loses money.	%
Status	On target when the margin of safety is at least your requirement on Setup, Near target within 5% of it, Below target otherwise or when the price does not cover the variable cost.	-
Crossover volume	(Fixed costs of one option - fixed costs of the other) / (contribution of one - contribution of the other): the volume where both make the same profit. Above it the option with the higher contribution per unit makes more.	units
Price sensitivity	The option's price x (1 + price change), then contribution, break-even (whole units), profit and margin of safety at the planned volume, recomputed.	-
Break-even chart	Revenue = price x volume; total cost = fixed costs + variable cost x volume; at 11 volumes from zero in steps of 1, 2 or 5 x 10 ⁿ chosen to cover 120% of the largest plan or break-even.	currency

Assumptions, limitations, sources and the self-check (the Verify sheet, which recomputes the workbook's formulas on fixed test inputs) are in the workbook. The last page shows the Dashboard with the example data for Halvorsen Plastics, a fictional business.

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Engineering estimates for planning and improvement work. Verify the results against your own process, data and standards before you rely on them.

Break-Even Analysis

Break-even, profit and margin of safety for the option you pick, and every option compared.

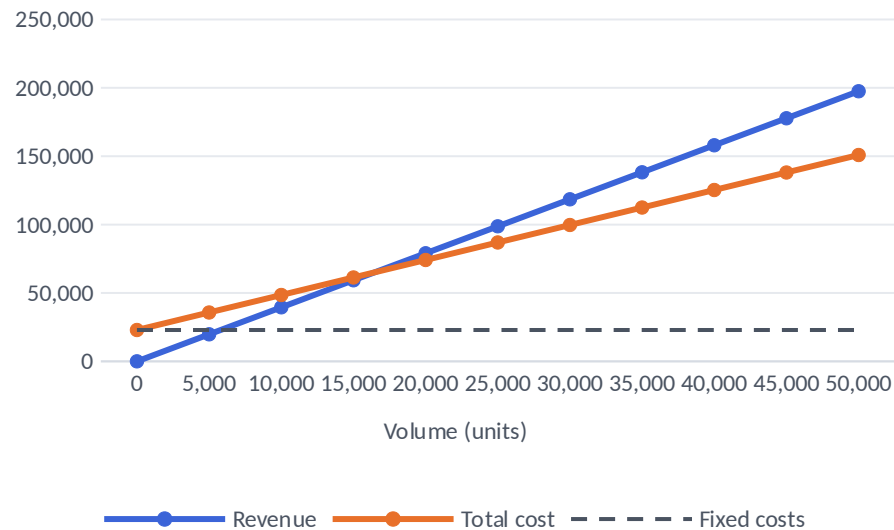
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Option shown

Showing: Aluminium mould (price 3.95 EUR per unit, planned volume 30,000 units). Pick another option in the yellow cell.

BREAK-EVEN VOLUME (UNITS)	MARGIN OF SAFETY	PROFIT AT PLANNED VOLUME (EUR)	HIGHEST PROFIT AT PLANNED VOLUME
16,475	45.1%	18,800	Steel 4-cavity mould
Whole units, rounded up	Target 40.0%	Contribution x volume - fixed costs	Of the options compared
	On target		

Break-even chart: option shown



Profit by volume, every option

