

Machine Hour Rate

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

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Machine Hour Rate

Build a defensible hourly rate for every machine from ownership, space, energy, upkeep and productive hours, and see which machines are charged below their full cost.

For: Cost engineers, estimators, plant controllers and owners of machine shops, fabricators and moulders who set or audit shop rates.

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Quick start

1. On Setup, type your currency, loaded operator rate, overhead uplift, energy price, area unit and space cost.
2. On Rates, give each machine a column: purchase cost, residual value, life, floor area, power and its annual upkeep costs.
3. Type each machine's shifts, hours, working days and utilisation; productive hours are the divisor of every rate.
4. Type the rate you charge today; read the full cost rate, the gap, the status word and the Check row.
5. On the Dashboard, pick a machine to see how its rate moves with utilisation.

What is in the workbook

Start Here	Read this first: what the workbook does and how to use it.
Setup	Currency, operator rate, overhead uplift, energy price and space cost used by every machine.
Rates	One column per machine: ownership, space, energy, upkeep and productive hours, the hourly rates and the rate you charge.
Dashboard	Annual machine cost, full cost rates against the rates charged, and how utilisation moves a rate.
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
Depreciation	$(\text{Purchase cost} - \text{residual value}) / \text{useful life (straight line)}$.	currency/yr
Interest on average capital	$(\text{Purchase cost} + \text{residual value}) / 2 \times \text{interest rate}$.	currency/yr
Space	Floor area x space cost per area unit per year (Setup).	currency/yr

Quantity	How it is calculated	Units
Scheduled, productive hours	Shifts x hours per shift x working days; productive = scheduled x utilisation.	h/yr
Energy	Rated kW x average load x productive hours x electricity price (Setup).	currency/yr
Annual machine cost	Depreciation + interest + space + energy + maintenance + tooling and consumables + insurance, lease and other.	currency/yr
Machine-only rate	Annual machine cost / productive hours.	currency/h
Operator cost per machine hour	Operators per machine x loaded operator rate (Setup).	currency/h
Loaded rate, labour share	Machine-only rate + operator cost; labour share = operator cost / loaded rate.	currency/h, %
Full cost rate	Loaded rate x (1 + overhead uplift on Setup).	currency/h
Gap, status, recovery	Rate charged - full cost rate; On target when the rate charged covers it, Near target within 5% below, Below target otherwise; recovery = gap x productive hours per year (estimate).	currency/h
Dashboard tiles	Sum of annual machine cost; full cost rate weighted by productive hours; count of Below target; under-recovery = minus the sum of the negative recoveries.	-
Rate by utilisation	$((\text{Annual cost} - \text{energy}) / (\text{scheduled hours} \times \text{utilisation}) + \text{kW} \times \text{load} \times \text{energy price} + \text{operator cost}) \times (1 + \text{overhead})$.	currency/h

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 Ashworth Precision, 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.

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Annual machine cost, full cost rates against the rates charged, and how utilisation moves a rate.

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Machine shown

Curve shows: CNC lathe, now 72% utilised, full cost rate 36.19 GBP/h. Pick another machine in the yellow cell.

ANNUAL MACHINE COST (GBP)	AVERAGE FULL COST RATE (GBP/H)	MACHINES CHARGED BELOW FULL COST	UNDER-RECOVERY PER YEAR (GBP, EST.)
470,126	53.63	4	66,383
All machines, operators excluded	Weighted by productive hours	Rate status Below target on Rates	Shortfall x productive hours

