PrintKinetic RESOURCE

The Real Cost of a Printed Part

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"How much filament did that use" is the easiest question to answer about a print's cost, and it is often the smallest number in the actual total. A defensible cost estimate has to include machine time, energy, labor, a realistic allowance for failed prints, and, for anyone selling printed parts, a minimum price floor and per-order overhead that a per-gram material cost never captures. This guide connects the four engines that build that fuller picture, one layer at a time.

The Print Cost Estimator is the foundation: it combines material cost, machine time valued at a realistic hourly rate, energy consumption, and labor for setup and post-processing into one number per part. The reason machine time matters as much as material is that a printer occupied for six hours has an opportunity cost, whether that cost is electricity and wear on a hobby machine or lost capacity on a machine that could be running a different paying job. Ignoring machine time systematically underprices anything with a long print time relative to its material usage.

The Quote Price Planner takes that cost estimate and turns it into a price, which is a separate decision from cost. A price needs to cover the estimated cost, a margin, and the risk that this specific job does not go as planned, and it needs to account for what the market or client will actually accept, not just what the math says the job costs to produce. Treating cost and price as the same number is one of the more common ways a print business underprices its own work without noticing.

The Minimum Order Price Planner addresses a specific failure mode: small jobs that take real setup time but produce little material cost can lose money even at a price that looks reasonable per gram, because the fixed cost of starting, monitoring, and finishing a job does not shrink with the job's size. A minimum order price protects against quoting a small job as if its only cost were the filament it used, when the actual time cost of running that job is nearly identical to a much larger one.

The Failure Allowance Planner addresses the cost that is easiest to leave out entirely: prints that fail partway through, use material and machine time, and produce nothing sellable. A

cost estimate that assumes every print succeeds understates the real cost of reliably delivering a finished part, especially for longer prints, less-tested designs, or materials known to be more failure-prone. Building in a realistic failure allowance, based on the specific part's print time and complexity, keeps the estimate honest instead of optimistic.

Consider a small order for a single custom bracket, quoted at $8 to cover roughly $2 of filament and a rough guess at "a little extra for time." The print itself takes ninety minutes of machine time, plus setup, monitoring, and packaging that add up to nearly the same again in labor, before accounting for the one failed attempt it took to get a clean print. Run through the Print Cost Estimator, Minimum Order Price Planner, and Failure Allowance Planner together, the honest cost is closer to $18, and the $8 quote was a loss on every dimension except the raw material line, exactly the trap a filament-only cost estimate walks into on small orders.

Cost estimates also need to distinguish between one-off jobs and repeat production, because the labor and failure-rate assumptions that belong in each differ. A first print of a new design carries higher failure risk and more hands-on setup time while settings get dialed in; a tenth repeat of an already-proven design should carry a lower failure allowance and less setup labor, since the process is already validated. Reusing a first-run cost estimate for every later repeat overstates the real cost of production runs, just as reusing a production-run estimate for a first attempt understates the risk that attempt actually carries.

A common mistake is estimating cost once at the start of a job and treating that number as final regardless of what actually happens during printing. A print that fails twice before succeeding, or needs unplanned post-processing to fix a defect, has a real cost that diverges from the original estimate. Track what actually happened against the estimate occasionally, and use that gap to correct the failure allowance and labor assumptions going forward, rather than re-guessing them from scratch on every job.

FAQ

Is filament cost the biggest line item in a print’s real cost?

Often not. Machine time, labor, and a realistic failure allowance frequently outweigh the raw material cost, especially on smaller or more failure-prone parts.

Should a quote assume every print succeeds?

No. A quote that ignores failed prints and re-runs understates the real cost of delivering a finished part, which is why a failure allowance belongs in the estimate up front.