Alloying gold: turning gold into 21K or 18K

I have gold of a given karat: how much alloy do I add to make it 21K or 18K?

1 Use it in 4 steps

1. Type the weight of the gold going into the melt and its karat (or its purity per thousand if a lab tested it).
2. Choose the karat you want: 21 or 18 (or 24).
3. The sheet gives the final weight and the alloy to add if you are lowering the karat, or the 24K to add if you are raising it.
4. The kind of alloy and its mix are your workshop's decision. Delete the "Example" rows before you start.

2 The calculation

1. Pure gold = weight × purity (24K = 0.999, 21K = 0.875, 18K = 0.75, or the lab purity ÷ 1000).
2. Final weight = pure gold ÷ purity of the target karat. Alloy = final weight − weight in.
3. To raise the karat: 24K to add = (target purity × weight − pure gold) ÷ (0.999 − target purity).

3 Worked example Example

Note	Weight in (g)	Current karat	Target karat	Pure gold (g)	Final weight at the target karat	Alloy to add (g)	24K to add to raise the karat (g)
Example 24K bar to 21K	100.000	24	21	99.900	114.171	14.171	0.000
Example 24K bar to 18K	50.000	24	18	49.950	66.600	16.600	0.000
Example 18K scrap to 21K	40.000	18	21	30.000	34.286	0.000	40.323

Result	Value
Total pure gold	179.850
Total alloy	30.771
Total 24K added	**40.323**

4 The table: fill it in by hand

Note	Weight in (g)	Current karat	Target karat	Pure gold (g)	Final weight at the target karat	Alloy to add (g)

Prices and calculations are for information only. They are not financial advice, an offer to buy or sell, or a religious ruling. Check tax matters with your accountant.

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