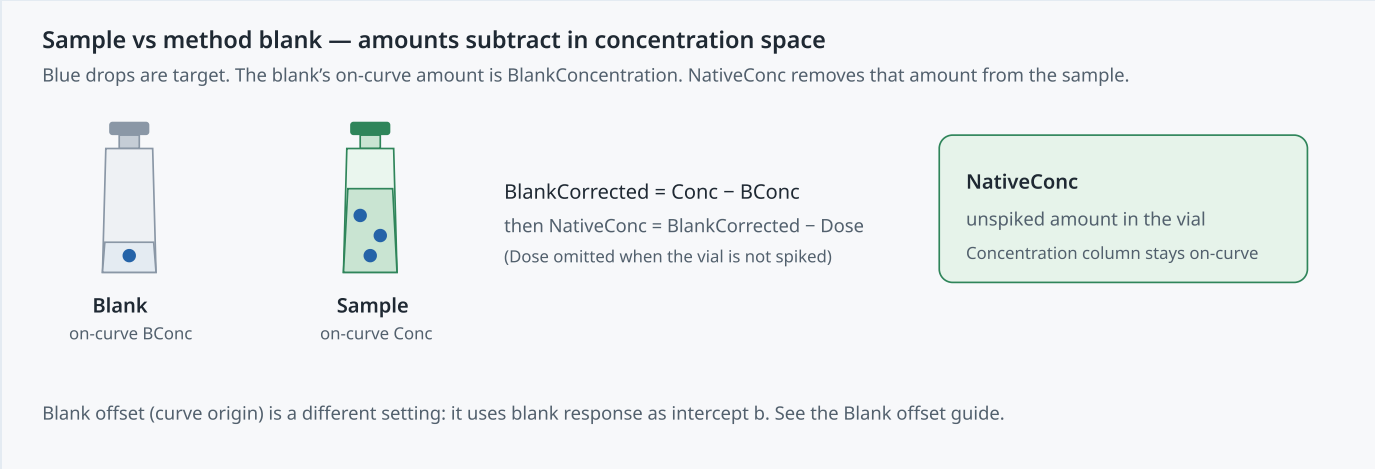
QUANTO USER GUIDE

Blank concentration

Subtract blank concentration toward NativeConc; Blank use; vs Blank offset; Solvent notes.

Blank concentration correction (**Blank corr** on the Quants grid) subtracts the method-blank *concentration* **after** the curve has been read. The corrected amount goes into **NativeConc**.

It is **not** Blank offset. Blank offset is a **Curve origin**: it uses blank *response* as intercept `b`. Blank corr never changes the fit and never changes on-curve **Concentration**.



Method blank vs sample — amounts subtract in concentration space

What it is vs Blank offset

Setting	Space	What it changes
Origin = Blank offset	Response / intercept	Uses blank response on the curve (`y = m·x + b`). On-curve **Concentration** already follows that curve.
Blank corr	Concentration	After quantitation: sample concentration minus blank concentration → **NativeConc** (then minus Dose when a dose is present). **Concentration** and **FConc** stay on-curve.

If both are on, Blank offset wins. Blank offset already removes blank background on the curve. Subtracting blank concentration as well would correct twice. Analyze **still runs**: it keeps Blank offset and **skips** concentration subtraction. The Quants grid shows **Blank warn**, and every result of that Quant gets a **Warnings** entry. Turn off Blank corr if you only want the offset, or turn off Origin = Blank offset if you want concentration subtraction.

A Type **Blank** bottle is still not a calibration level. Blank corr reads its on-curve **Concentration** like any other vial, then uses that amount as the blank concentration to subtract.

When Blank corr is on or off

Blank corr defaults to off.

Blank corr	What Analyze writes
Off	No blank concentration is stored. NativeConc is the usual path: **Concentration**, or **Concentration − Dose** when a dose is present. Standard-addition groups still set NativeConc from the addition line.
On	Same **Blank use** rules as Blank offset pick the bottles. Blank concentration = average of those blanks' on-curve **Concentration** (`0` if none, or Blank use = **None**). NativeConc uses the formulas below. A **Warnings** entry is written when Blank use is **None** or no usable blanks were found.
On, no eligible blanks	Blank concentration = `0`. NativeConc matches the uncorrected path. Warning on the result.
On + Origin = Blank offset	Analyze still runs. Blank offset is applied. Concentration subtraction is **skipped**. Blank concentration stays empty. NativeConc stays on the Blank-offset curve. Warning on the Quant and on every result.

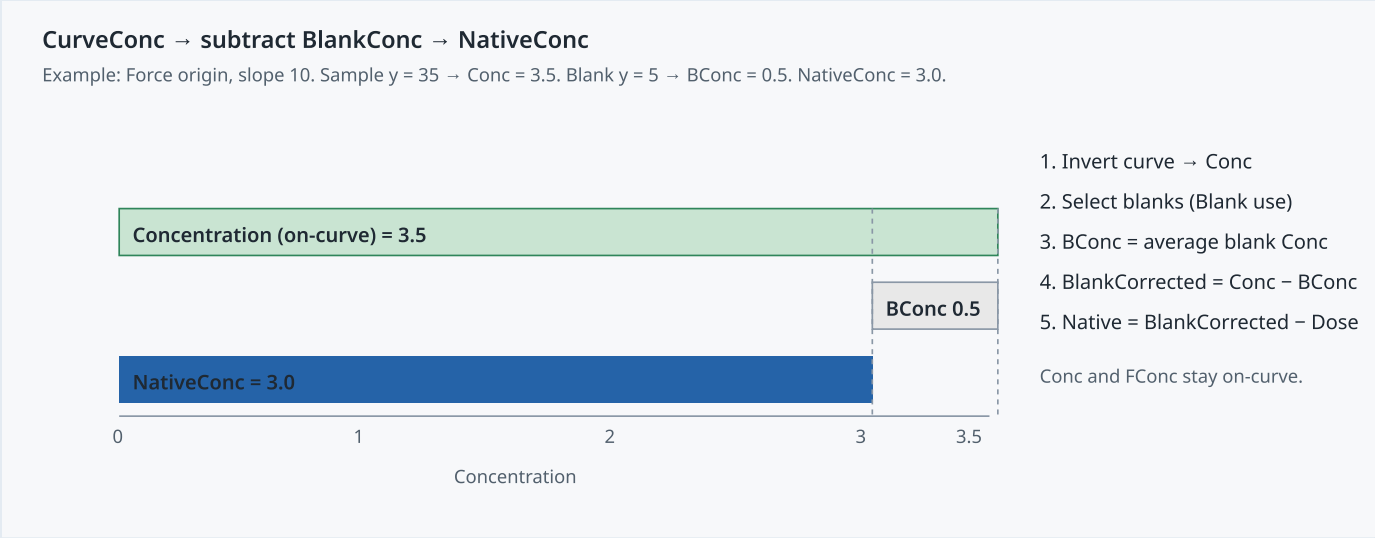
Turning Blank corr off and re-Analyze clears the stored blank-concentration list. Origin = Blank offset does **not** turn Blank corr on by itself.

Formula (what happens after Analyze)

Analyze first reads the curve to get on-curve **Concentration**. Then:

1. Collect **non-rejected** blanks with the Quant's **Blank use** (see Blank use).
2. Blank concentration = average of those blanks' on-curve **Concentration**. None (or Blank use = **None**) → `0`.
3. Blank-corrected = Concentration − blank concentration.
4. Normal path: **NativeConc** = blank-corrected when there is no dose; blank-corrected − Dose when a dose is present.
5. Standard-addition CalGroups: keep the shared native from the addition line, then subtract blank concentration. Recovery % still uses the spike increment.

Negative NativeConc is allowed (same as dose subtraction). **FinalConcentration** stays on-curve (`Concentration × dilution`) — it is **not** blank-corrected.



On-curve concentration minus blank concentration to NativeConc

How NativeConc is filled

NativeConc is the unspiked amount in the vial. Blank corr changes *how* that number is derived; it does not replace on-curve **Concentration**.

Path	NativeConc when Blank corr is on
No dose	Concentration − blank concentration
Dose present (not standard addition)	(Concentration − blank concentration) − Dose
Standard-addition CalGroup	Shared standard-addition native − blank concentration

On the result grid you see:

- **BConc** — blank concentration that was subtracted
- **NConc** — NativeConc after the subtract
- **Blanks used** — which bottles supplied BConc
- **Conc** — still the on-curve reading

Why subtract in concentration space

Detector response is often **not** a straight line with amount (especially with electrospray / electron multiplier). Subtracting responses and then reading the curve is only exact when sensitivity is constant.

A method blank is an *amount* of analyte (process or reagent contamination). Amounts add and subtract in **concentration** space.

So:

- use Blank offset when you want the **curve** to sit on a measured blank *response*;
- use **Blank corr** when you want to remove a measured blank *concentration* from NativeConc after the curve is read.

Do not do both at once. When both settings are on, Analyze prefers Blank offset, skips concentration subtraction, and writes a warning.

Blank use (which blanks)

The same **Blank use** column on the Quants grid picks bottles for Blank offset *and* Blank corr. Only **non-rejected** Type **Blank** bottles contribute.

Type Solvent is different:

- Solvent is read from the curve like Sample.
- Solvent is **not** a blank source for Blank use.
- Even when Blank corr is on, blank-concentration subtraction is **not** applied to Solvent results.
- Blank offset may still apply through the shared curve.

A bottle is skipped when the sample is rejected, that Quant's result is rejected, or the blank has no usable response. After the curve is read, those bottles' on-curve **Concentration** values are averaged.

Blank use	Selection
None	No blanks. Blank concentration = `0`. NativeConc is unchanged.
Average (CalGroup)	Average of eligible blanks in the **same CalGroup** as the curve. Unlabeled samples share the default group.
Average (overall)	Average of eligible blanks in the **whole batch**, all CalGroups.
Previous, else closest	The blank before the bracket span in run order; if none, the closest blank. Stays inside the CalGroup.
Bracket (previous + next)	Average of the blank before and after the span. One side is enough if the other is missing; if both are missing, same fallback as Previous, else closest. Stays inside the CalGroup.

The **span** is the same run-time range Blank offset uses.

Use **Average (CalGroup)** or a sequence mode when groups should keep their own blanks. Use **Average (overall)** when one set of blanks should serve every group.

Rejected blanks never enter blank concentration. Type **Solvent** never enters it either.

After Analyze: what you see

Each result (and its calibration bracket) stores:

- **BConc / BlankConcentration** — the on-curve blank concentration subtracted toward NativeConc
- **Blank use** — how the blanks were picked
- **Blanks used** — sample names (or file names) that contributed

One blank-concentration value is computed per bracket, then copied onto every result that used that curve.

Each result also stores:

- **Warnings** — Analyze warnings for that result (both options on, missing blanks / Blank use = None, Blank offset fallback `b = 0`, standard-addition failure, and similar)
- **Outliers** — which flags fired (a consolidated list, not the individual flag columns). Both lists are cleared and rebuilt on Analyze.

Method editor

On the **Quants** grid:

1. **Blank corr** → checked
2. **Blank use** → how to pick blanks (shared with Blank offset)
3. **Blank warn** → filled when Origin is also Blank offset (Analyze still runs; offset is applied and subtract is skipped)

ISTD Quants can use Blank corr the same way; ISTD still does not use Blank offset.

What this is not

- Not a curve-origin option. Origin = Blank offset does not turn Blank corr on. If both are on, Analyze still runs, prefers Blank offset, and skips concentration subtraction with a warning.
- Not a change to on-curve **Concentration** / **FConc**.
- Not subtraction of blank *response* from the sample before reading the curve.
- Not a zero-concentration calibration level.
- Not applied to Type **Solvent** results (those stay on the normal NativeConc path). Solvent is also not a Blank use source.

Next: Blank offset, ESTD, ISTD, bracketing, method design.