

Dilutions and dilution factors

Parts, volumes, serial steps, and the reported result

Adding diluent lowers concentration. The **dilution factor (DF)** is final volume divided by specimen volume; DF = 5 gives one fifth of the original concentration.

One specimen part in five final parts

Here, **1:5 means specimen:final volume**: one specimen part plus four diluent parts. A written **1 + 5** makes six parts, DF = 6. If a method uses specimen:diluent notation, follow its stated volumes.

Specimen 100 µL	Diluent 100 µL	Diluent 100 µL	Diluent 100 µL	Diluent 100 µL
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500 µL final volume = 100 µL specimen + 400 µL diluent
Equal-volume schematic. µL = microliter.

Volumes and factor

Dilution factor

DF = final volume ÷ specimen volume

Specimen volume = final volume ÷ DF

Diluent volume = final – specimen volume

Prepare 1:10, final 1.0 mL.

Specimen = $1.0 \div 10 = 0.10$ mL.

Diluent = $1.0 - 0.10 = 0.90$ mL.

mL = milliliter; 1 mL = 1000 µL.

Concentration and result

Diluted concentration

Original concentration ÷ DF

Original concentration

Diluted concentration × DF

A 1:5 aliquot measures 84 U/L.

$84 \times 5 = 420$ U/L in the original specimen. U/L = units per liter.

The method must recover the expected result after dilution; the choice of diluent can affect that recovery.

Serial dilutions multiply

Original specimen → 1:5 step
Total DF = 5 → 1:4 step from that mixture
Total DF = $5 \times 4 = 20$

Each step uses the well-mixed preceding tube. A result of 12 mg/dL in the second tube gives $12 \times 20 = 240$ mg/dL originally. mg/dL = milligrams per deciliter. Each step dilutes the preceding mixture, so the factors multiply.

Before reporting: apply each factor once. Check whether the analyzer or laboratory information system has already applied the factor. An automatically corrected 420 U/L stays 420 U/L. The measured aliquot must fall within the method's analytical measuring interval, the range it can measure directly. The calculated result must also fit the verified extended interval. Use the approved diluent and ratios; an extra dilution cannot extend reporting beyond those limits or reliably remove interference.