

KARL FISCHER QUICK REFERENCE

KF Method Parameters Glossary

I(pol) – Polarization voltage applied to the platinum double-pin electrode during measurement.

Start drift – Consumption of KF reagent during conditioning. Since the cell is not absolutely impervious, we need to establish a baseline water content of the cell. This value sets the acceptable drift value for the start of the determination (i.e. cond OK). Drift accounts for water entering the system and is labeled as μL of KF reagent needed per minute.

Drift Correction – A value obtained by taking the time of the titration multiplied by the drift value. That amount is subtracted from the added volume. Default is off. Parameter might be helpful if water content is very low or if a long titration time is necessary.

Stabilizing time – Time requirement for the conditioned cell to be stable before “cond OK”

Dynamics – The control range before the specified endpoint. Within the control range, dosing is slowed until the minimum volume increment has been reached. Outside the control range, dosing is continuously carried out at the maximum rate.

Stop Criterion – Required as drift because EP alone is not sufficient for determining endpoint since some fluctuation in water will always be detected.

Drift – Considered an absolute drift value. The titration will stop once the EP and this drift value have been reached.

Rel. Drift – The stop drift is calculated as the sum of the drift value at the titration start and the value entered here.

Extraction time – The titration will not stop until the extraction time has elapsed, even if the EP has already been reached. This parameter is helpful when analyzing samples with solubility challenges or also when working with the KF oven. Setting an extraction time will keep the titration from ending prematurely.

Default KF Titration Parameters

	Volumetric KF	Coulometric KF
EP at U	250 mV	50 mV
Dynamics	100 mV	70 mV
Start drift	20 $\mu\text{L}/\text{min}$	20 $\mu\text{g}/\text{min}$
Stop criteria	drift / time	drift / relative drift
Stop drift	20 $\mu\text{L}/\text{min}$	5 $\mu\text{g}/\text{min}$
I(pol)	50 μA	10 μA

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Volumetric KF Calculations

$$\text{titer} = \text{sample size} / \text{EP} \times \text{standard concentration}$$

$$\% \text{ water} = \text{EP} \times \text{titer} \times 0.1 / \text{sample size}$$

$$\text{ppm water} = \text{EP} \times \text{titer} \times 1000 / \text{sample size}$$

titer: mg/mL

sample size: g

EP: mL

Standard concentration: mg/g

Coulometric KF Calculations

$$\% \text{ water} = \text{EP} / \text{sample size} / 10000$$

$$\text{ppm water} = \text{EP} / \text{sample size}$$

EP: ug

sample size: g

Conversion Chart

$$1\% = 10 \text{ mg/g} = 10,000 \text{ ppm}$$

$$0.1\% = 1.0 \text{ mg/g} = 1,000 \text{ ppm}$$

$$0.01\% = 0.1 \text{ mg/g} = 100 \text{ ppm}$$