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Measurement uncertainty

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Measurement uncertainty - what is it?

The expanded measurement uncertainty is a concept used in measurement technology to represent the uncertainty of a measurement more comprehensively. It is often used in scientific and technical contexts to ensure that the results of a measurement are reliable and reproducible.

Measurement uncertainty

Every experimentally determined measured value is subject to uncertainties that can be caused by various factors such as instrument accuracy, environmental influences or operating variability. These uncertainties are combined to calculate the combined measurement uncertainty. The uncertainties for determining the measurement uncertainty can be determined using various methods, such as validation data, interlaboratory test results or the Horwitz equation.

Expanded measurement uncertainty

To provide a higher degree of confidence in the measurement, the combined measurement uncertainty is multiplied by a so-called coverage factor (usually $k = 2$). This factor corresponds to a confidence interval of 95 %. With $k = 2$, the interval covers about 95 % of the distribution, which means that there is a 95 % probability that the true value lies within this interval, or that there is only a 5 % probability that the true value lies outside it.

Representation:

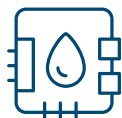
The expanded measurement uncertainty is often specified in the form of an interval, for example as:
Measured value: $\pm$ expanded measurement uncertainty

How is the measurement uncertainty presented in our test reports?

In our test reports, the expanded measurement uncertainty is expressed as an absolute value in the unit of the result for each parameter on the right-hand side of the report.

Additives

Parameter Method (location)	Result	Units	value /Legal Basis of assessment	
Natamycine (Pimaricine) (curd) CAS 7681-93-8 LCBMETP04 (na) LC-W (Dietikon)	100	$\mu\text{g}/\text{dm}^2$	1000 max. value CH (ZuV)	LOQ:10 LOD:2.5 MU: $\pm$ XX



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Measurement uncertainty

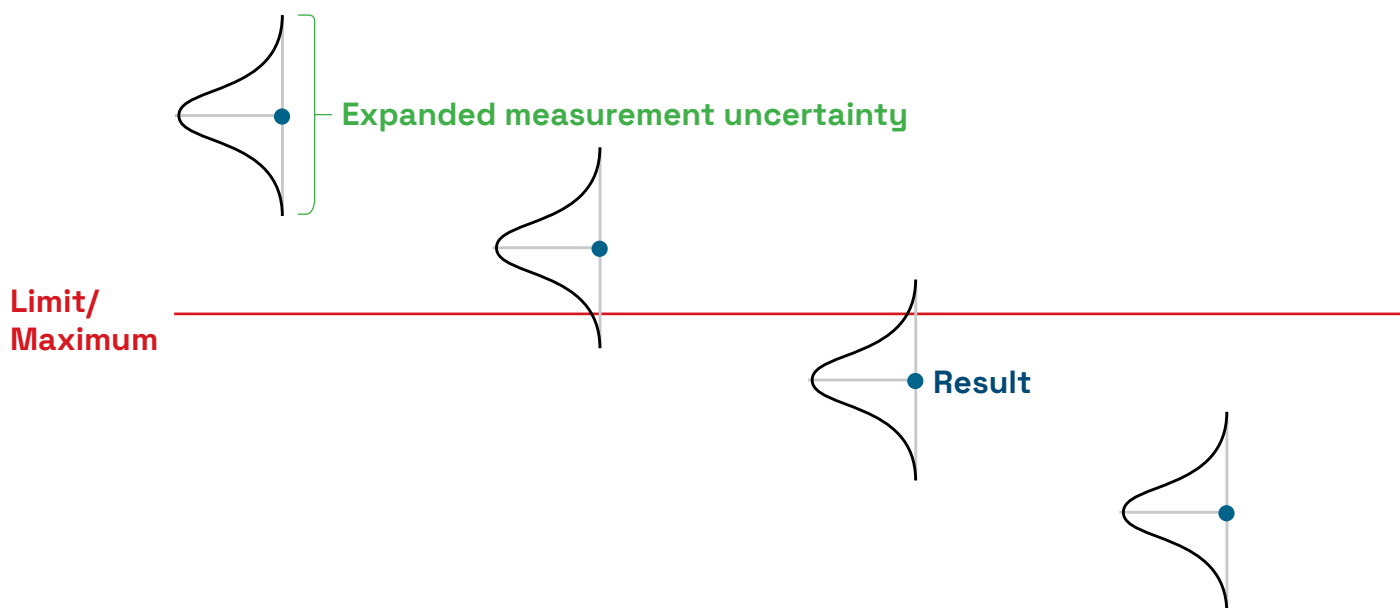
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When is measurement uncertainty used?

The expanded measurement uncertainty is used when deciding whether a product is to be classified as compliant or non-compliant. The cases **D** and **A** are marked in our test reports as **fulfilled requirements** or **unfulfilled requirements**. The cases **B** and **C** (colored yellow) are assessed differently depending on the area of application (food / FCM). Further clarifications (risk assessment / scope of sampling etc.) are required by the distributor / client.

In the field of trace analysis, particularly at concentrations in the mg/kg or µg/kg range, expanded measurement uncertainties of 30-50% are quite common and not unusual.

According to the Federal Food Safety and Veterinary Office, the measurement uncertainty is included in the legally prescribed microbiological criteria for the assessment of microbiological measured values in accordance with Swiss food legislation (e.g. HyV).



A
Result minus
expanded
measurement
uncertainty
above the limit

B
Result above
the limit.
Limit within the
extended
uncertainty
interval

C
Result below
the limit.
Limit within the
extended
uncertainty
interval

D
Result plus
expanded
measurement
uncertainty
below the limit