Eurachem guidance for Measurement Uncertainty

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Measurement uncertainty and the measurement cycle

Decide
Control
Measure
Sample
Specify requirement
Choose method and validate
Eurachem measurement uncertainty guides

Quantifying Uncertainty in Analytical Measurement

- First published 1995
- Close implementation of the GUM
- Error propagation basis
- Examples from chemical measurement
- Extensive list of typical uncertainties included
Quantifying Uncertainty in Analytical Measurement

- Second edition 2000
  - Introduced use of validation data
  - Used ‘cause and effect analysis’ to identify uncertainty sources
  - Included simple spreadsheet approach

- Third edition 2011 (current)
  - Added improved consideration near detection limits
  - Includes Monte Carlo simulation
  - Referred to compliance guide for detail on conformity

Asymmetric interval: $0 < x < x + t.u$
**Measurement uncertainty arising from sampling**

- First published 2007
  - First guide to include sampling as a source of uncertainty
  - Included Guy particulate theory and a practical “duplicate method”
- Updated 2019
  - Improved handling of skewed distributions
  - Added ‘uncertainty factor’

**Use of uncertainty information in compliance assessment**

- Published in 2007
  - Extended guidance on conformity assessment
Use of uncertainty information in compliance assessment

- Published in 2007
  - Extended guidance on conformity assessment
  - Introduced “decision rules”
  - Introduced guard-bands
  - Considered variable uncertainty
Setting and using target measurement uncertainty

- Published 2015
  - Introduces and discusses target measurement uncertainty
  - Provides options for setting target uncertainty
  - Shows how target uncertainty is relevant to validation

Additional information - Information leaflets

Information and additional guidance on technical issues
Measurement uncertainty and the measurement cycle

Specify

Sample

Measure

Decide

Summary

• Measurement uncertainty matters
  – from specification to decision

• Four Eurachem guides
  – Setting target measurement uncertainty
  – Quantifying uncertainty
  – Uncertainty from sampling
  – Uncertainty in conformity assessment

• Additional information in leaflets

All Guides are available free of charge from www.eurachem.org and several translations are available at national Eurachem websites.