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# On the practical experiences of MU-trainings for laboratory and industry partners

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# AGENDA



- ▶ COMPANY PRESENTATION
- ▶ TARGET AUDIENCE
- ▶ WHAT ARE THE EXPECTATIONS
- ▶ EXPERIENCE

TESTO INDUSTRIAL SERVICES  
**KIRCHZARTEN**

Founded in **1999**

**1.100** employees

**5** Subsidiaries



WHO WE ARE

**More assurance, better service.**



## Calibration



**Precise and accurate  
measurement results  
in industries with high  
metrological  
requirements**

## Test equipment management



**Holistic service  
for industries with high  
metrological  
requirements**

## Qualification



**Reliable systems  
in Pharma, Medical and  
Life Science**

## Validation



**Safe processes in  
pharmaceuticals,  
medical and life  
sciences**

WHO WE ARE

**More assurance, better service.**



### Calibration



### Test equipment management



### Qualification



### Validation



**+ Trainings for customers, laboratories, industry partners**

## Target Audience



### ► Calibration laboratories

*The measurement uncertainty*

- is part of the calibration result
  - proof of traceability
  - is part of the results report and the CMCs
  - is determined accordance to GUM
  - is relevant when stating compliance to a specification
- 
- Calibration laboratories are normally trained users with a good basic understanding



## Target Audience



### ► Calibration laboratories – Expectations

- Practice-oriented evaluation of measurement uncertainty
- Selecting, modeling and describing sources of influences correctly
- Training on how to establish the basic model equation and transferring it to the measurement model equation
- Covariance and MC
- Decision rules



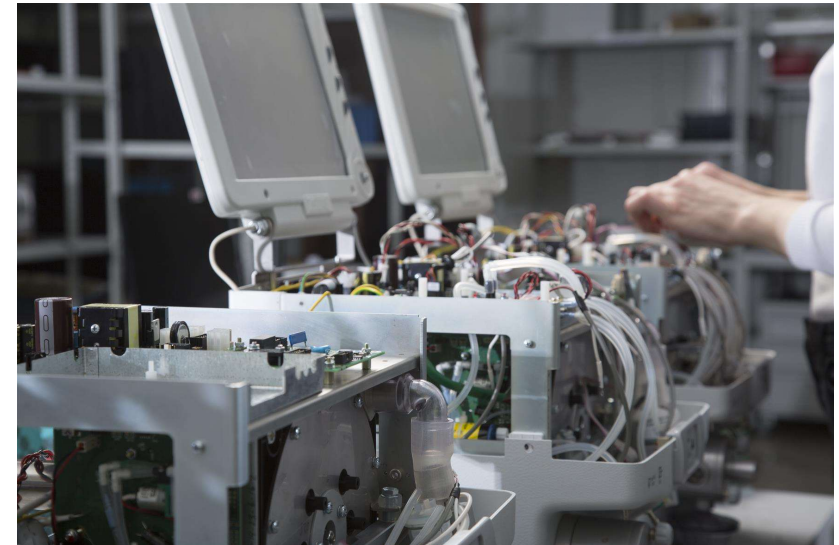
## Target Audience



### ► Test laboratories

*The measurement uncertainty*

- shall be evaluate or estimate if applicable
- shall be stated on reports
- Is not required, if the documented test-method limiting the major sources of uncertainty
- However, there is effectively no consideration of measurement uncertainty during the laboratory activities
- Majority of test labs are currently starting to deal with the topic

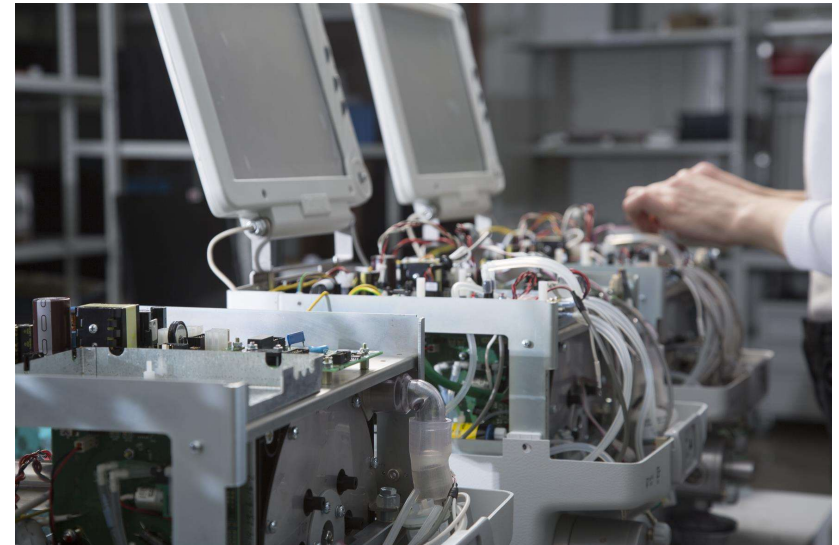


# Target Audience



## ► Test laboratories - Expectations

- Introduction to the concept of uncertainty
- Explanation of terms such as conformity, specification, accuracy, deviation, etc.
- Criteria for selecting influences for measurement uncertainty? → Focus on significant influences
- Teaching of relevant mathematical methods
- Simple templates for uncertainty calculation
- Decision rules



## Target Audience



### ► Industrial companies

*The measurement uncertainty*

- is the basis of the metrological confirmation of test equipment suitability → minimize risk for incorrect measurements
- is relevant for evaluating and stating specification intervals for products
- Very heterogenic competence in measurement uncertainty analysis



## Target Audience



### ► Industrial companies - Expectations

- Depends on the level of competence
- Starting from an introduction to the concept of uncertainty to very specific questions and topics
- Practical examples (different levels of difficulty, different measurement tasks)
- Practical guidelines for equipment suitability and test equipment management



## Training types



### Standard Measurement Uncertainty Training 2 days

- ▶ At our own premises
- ▶ Heterogenous state of knowledge of participants
- ▶ Broad range of topics, with a renunciation of details
- ▶ Well-structured lecture-style presentation
- ▶ General and simple practical examples
- ▶ Exchange of experiences, networking
- ▶ Evening Event



## Training types



### In-house seminar at the client's site

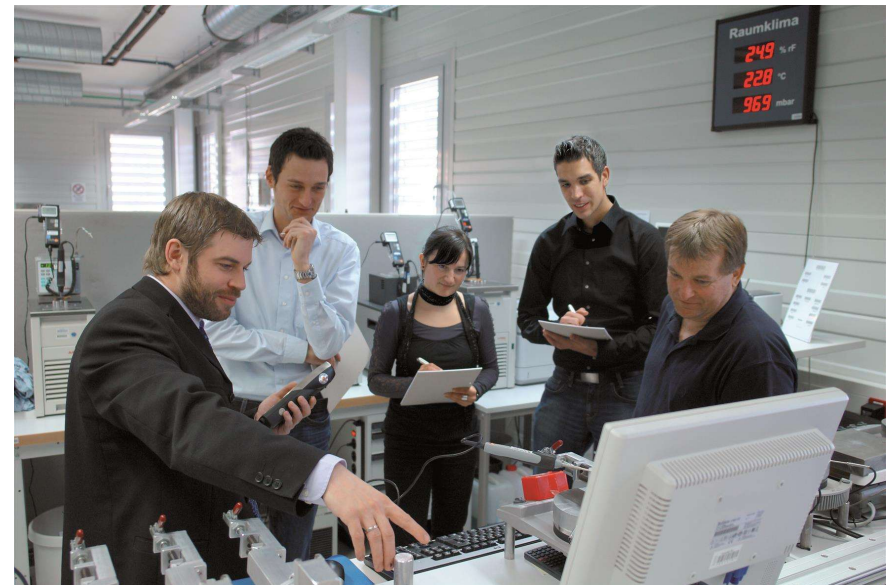
- ▶ Topics and trainings are tailored to the customer needs and activities
- ▶ Homogenous state of knowledge of all participants
- ▶ Topics can be selected more specifically and the level of detail can be adapted
- ▶ Interactive presentation with process-related examples
- ▶ Teaching of theoretical content and its practical implementation run coherently



## Training types

### Consulting

- ▶ Face-to-face up to small groups
- ▶ Complete uptake of the customer's requirements
- ▶ Individual evaluation of measurement uncertainty budgets of the customers measurement task with the responsible persons



## Our Experience



- ▶ Measurement uncertainty seminars need to be tailored according to target groups and focus areas:
- ▶ Basic uncertainty seminars
  - End-user community is not very interested in the underlying mathematical methods of statistics
  - Practice-oriented evaluation and reasonable estimates are required
  - Awareness of a balanced effort and benefit of the uncertainty evaluation
  - → for “beginners” who want to create budgets according to the standard method; illustrated with several calculation examples.
- ▶ Advanced uncertainty seminars
  - Focus on customers activity
  - Optimize budgets and apply alternative methods
  - When do I use which alternative to the GUM standard method?
- ▶ Combining theory and practices improves uptake of knowledge



Thank you for your attention

## Training types

- ▶ Tailoring of the event to your specific customer needs and company-specific content
- ▶ Individual appointment arrangement
- ▶ Online seminars
  - Less effort for preparation and participation
  - Requires a significant higher level of concentration
  - non-verbal communication is more difficult.
- ▶ Calibration, qualification and test equipment capability trainings

