

Measurement uncertainty, Basics

Basic course in measurement uncertainty for those who work with measurements and measuring.

Who can benefit from attending the course?

Everyone involved in measuring can benefit from having an understanding of the measurement uncertainty as a concept and term. The person measuring in the production environment, or designing routines for measuring. It is also the person who determines whether a product can be manufactured or not, as well as the quality manager at a company.

Why you should attend this course!

The training will provide you with the basic knowledge necessary to understand the importance of using measuring equipment correctly and efficiently, as well as the limitations of accuracy and precision.

What you'll learn

The standard for quality systems, SS-EN ISO 9001:2015, places requirements on all its levels for a measuring instrument and calibration system to be included in a company's total quality system. There are also requirements that the personnel who carry out checks and calibrations must have suitable training for the task.

Knowing which uncertainty components are involved in measurement and how these can be processed statistically is necessary in order to be able to draw conclusions from the collected measurement data. Without knowledge of which measurement uncertainty occurs in a measurement, it is not possible to verify a part's compliance with the drawing documentation.

The course provides an overview of the statistical models used in the measurement uncertainty calculation. In addition, various standards and governing documents relating to the concept of measurement uncertainty are briefly discussed. The course also gives the participant the opportunity to practice simple calculations. The participant will also have the opportunity to discuss different ways of reporting measurement uncertainty, choice of measurement instrument, choice of measurement method and calibration of measurement instruments, and what consequences this may have for their own operations.

Course duration

The course lasts one day.

Course material

A detailed course book and exercise tasks are included.

Locations

The course is conducted by remote learning via Teams. A number of course sessions are planned at fixed times during the year. Each course has space for ten participants.



Quick Facts

Target Group

Persons who work with control activities in production environments or near production. Calibrator and measuring room manager. Designers, processors, buyers, quality technicians.

Course Objectives

To provide basic knowledge of measurement uncertainty as a phenomenon and tools to carry out simpler measurement uncertainty calculations.

Previous knowledge

Practical experience from inspection work in production or experience from measuring rooms or measuring instrument equipment stores, as well as basic knowledge of workshop measurement techniques or theoretical knowledge of measurement.

Price:

SEK 4,900 for one day.

The price includes course material. Prices are excl. VAT.

More information:

Contact us on +46 16 16 08 05 or by email: training.se@hexagon.com

Measurement uncertainty, Basics

Course content

- What is measurement uncertainty?
- Statistics and formulas
- Uncertainty components
- How much measurement uncertainty can be permitted?
- Standards and governing documents
- Calculations – examples and exercises

Course content Measurement uncertainty, basics:

- What is measurement uncertainty? - 1 hour
- History
- Application
- Comparisons between the measurement error concept and the measurement uncertainty concept

Statistics and formulas – 0.75 hours

- Average
- Normal distribution
- Triangular and rectangular distribution
- Square total

Uncertainty components – 1 hour

- Sources
- Type A/Type B, Calculation/Scoring
- Sensitivity factor
- How they are put together
- Relationship to Extended Measurement Uncertainty

How much measurement uncertainty can be permitted? - 1 hour

- Strategies that can form the basis for the decision
- Consequences of the decision

Standards and governing documents – 0.75 hours

- Examples of which standards may be applicable
- Examples of which documents may be suitable to start with if you want to start work with measurement uncertainty

Calculations – examples and exercises in groups – 3.5 hours

- Calculating an uncertainty component – three strategies
- Calculating uncertainty budget when calibrating analogue calliper
- Calculating fault propagation when using calliper in workshop environment
- Calculating uncertainty budget for measurement with calliper in workshop environment

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Hexagon is a global leader in sensor, software and autonomous technologies. We are putting data to work to boost efficiency, productivity, quality and safety across the industry, manufacturing, public sector, and mobility applications.

Our technologies are shaping production and people-related ecosystems to become more connected and autonomous, ensuring a scalable, sustainable future.

Hexagon's Manufacturing Intelligence division provides solutions that use data from design, engineering, production and metrology to make manufacturing smarter.

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