



FORCE METROLOGY

Aim of Course

This course will benefit anybody who performs force measurements either for the purpose of calibrating Force Transducers or calibrating Force machines. It aims to provide an understanding of the needs for, and methods of, calibrating, operating and maintaining force measurement systems. It will improve their understanding of force measurement principles, the selection of appropriate instrumentation and the estimation of uncertainty of their force measurements.

Pre-Requisites for attending this course

The satisfactory completion of the following courses is preferred:

- Introduction to Measurement course
- Method Validation (Calibration) course
- Uncertainty of Measurement – GUM (Physical) course

Course Overview

Introduction

- Force Fundamental's: Newton laws of motion
- Theory: Stress, Strain, Young's Modulus

Force measurement

- Electrical Circuit (Wheatstone bridge)
- Types of Force Transducers
- Strain Gauge Selection
- Readout Units
- Choosing the correct Force Transducer for the application

Generic Calibration of Force Transducers

- Preliminary measures
- Overloading test
- Verification relating to application of forces
- Variable voltage test
- Resolution of the indicator
- Analogue scale
- Digital scale
- Variation of readings
- Units
- Minimum force

Calibration Methods

Calibration of Force Transducers by deadweight

- ISO 376: Calibration of force proving instruments

Calibration of Force Transducers by comparison

- ISO 7500: Metallic materials — Verification of static uniaxial testing machines

Analysis of the calibration data

Measurement error and uncertainty

Practical Demonstrations

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FORCE METROLOGY (CONT.)



Who should attend

Metrologists and quality practitioners wishing to learn the fundamentals of force measuring principles, and how to perform calibrations of various instruments and devices. Attendees of this course should preferably have previous experience of metrology work and inspection procedures.

Course Duration

4 Days

Evaluation

Daily tests and the passing of a final examination are required to successfully complete this course.

The examination will be written approximately two weeks after the completion of the course.

