IIGDT Training
"Introduction to Dimensional Metrology"

Objective:

To provide hands applications on how to use shop level measurement equipment and to understand fundamental error sources and limitations applied to each. To provide insight on how to test the calibration on instruments using precision artifacts to ensure gages do not drift from their original calibration and induce an undesirable bias. Students will be introduced to how to repeatability and reproducibility (GR&R) of measurement instruments.

Course Length:

2 days (16-hours)

Course Content:

Precision Hand Tools and Hard Gaging
- Micrometers, calipers, indicators, pin & ring gages and thread gages

Bench Top Measurement Instruments
- Height gages, bore gages, fixed gages and laser micrometers

Surface and form instruments
- Profilometers, contour measurement, roundness and cylindricity systems

Optical measurement systems
- Optical comparators, and toolmakers microscopes

Introduction to coordinate measuring machines
- Manual & automatic CMMs, single point touch sensors & scanning sensors

Methods for analyzing and interpreting data results
- Introduction to Gage Repeatability & Reproducibility (GR&R)
- Introduction to measurement error sources (variability & bias)

Each session will include an overview of the tools followed by a demonstration of best application practices and a discussion of calibration issues and measurement variability & bias factors. Each session includes hands-on lab activity.

Targeted Audience:

Anyone requiring a foundational understanding of measurement systems used for measuring mechanical components and assemblies for proof of compliance versus process feedback. Specifiers and decision makers of engineering requirements and specifications as well as specifiers of manufacturing processes and measurement applications and anyone doing statistical analysis of design, manufacturing or measurement data. Engineers, designers, metrologists, technicians, machinists, toolmakers, designers, senior inspectors, senior technicians, statisticians and mechanical engineers at all levels.

Prerequisites:

GD&T - Intermediate Principles! An interpretation level knowledge of GD&T is required to allow all participants to be successful in this class. If students do not have this level of understanding, they will not understand "why" measurements are to be taken a particular way.