IIGDT Training

"Introduction to Dimensional Metrology"

Objective:

To provide hands on insight to fundamental measurement error sources and to learn how to use shop level measurement equipment. 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 also be introduced to how to analyze the repeatability and reproducibility of measurement instruments (GR&R).

Course Length:

2 days (16-hours) – 1.6 CEU's

Course Content:

Introduction to Measurement

- Measurement error sources

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

Methods for analyzing and interpreting data results

- Introduction to Gage Repeatability & Reproducibility (GR&R)

In each subject group an overview of the tools is followed by a demonstration of best application practices and a discussion of calibration issues and measurement uncertainty factors. Each subject session is concluded with a hands-on lab activity. When practical, customer parts will be utilized during this seminar to provide the greatest understanding of measurement technology applicable to customer parts.

Targeted Audience:

Anyone requiring a foundational understanding of measurement systems used for measuring mechanical components and assemblies. 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 competency they will not understand "why" measurements are being taken a particular way.