

Applied Geometrical Tolerancing for PC-DMIS – Course Synopsis

Aims & Objectives

The course is delivered as an intensive, two-day programme **for users of PC-DMIS metrology software** and applies GD&T from a measurement/ inspection perspective. The aim of this course is to teach how to properly implement geometrical tolerance specifications with PC-DMIS.

Participants will be guided to “connect the dots” between their GD&T knowledge and its application on PC-DMIS metrology tasks, will discover how the different types of geometrical specifications are “translated” in PC-DMIS measurement programs and will understand the advanced inspection techniques offered by the latest versions of the software.

The focus of the course is utilizing Geometric Tolerance commands that were introduced in the 2020R2 PC-DMIS version, however, some references to Legacy and Xact Measure GD&T commands are considered.

The course includes extensive classroom discussions, team exercises and problem-solving sessions. Examples of drawings or components from the client, where available, are used in order to illustrate the course material. CMM hands-on mini workshops can be included, on sites where the necessary equipment is available (CMM+PC-DMIS). Suggestions to customize the course to specific participant needs can be discussed. To maximize the effectiveness of the training, an upper limit to the class size of 10 delegates is recommended.

Who it may concern

This course specifically designed is for PC-DMIS PRO, CAD and CAD++ users with both Manual and DCC coordinate measuring machines.

Prior GDF&T knowledge of fundamental concepts, such as Level-1 GD&T course is strongly recommended.

Course topics

- Standards in context

the ISO system and the GPS (*Geometrical Product Specification*) Method vs ASME (GD&T), relevant national standards, future development

- Introduction to PC-DMIS Geometric Tolerance commands and Feature Control Frames

structuring PC-DMIS measurement routines for Geometric Tolerances
dialog box usage and command syntax

- Feature Types

features-of-Size
deriving the Toleranced Feature

- Defining and Using Datums: controlling 6 degrees of freedom

how PC-DMIS solves and uses Datums
single Datums, common Datums, Datum targets, Datum patterns

- Geometric Tolerance Types

location, orientation, form and runout tolerances (*ISO 1101:2017*)
profile tolerances (*ISO 1660:2017*)

- Tolerance frame modifiers

Maximum Material Requirement and Bonus Tolerance (*as per ISO 2692:2021*)

- Evaluating Linear size tolerances with the Geometric Tolerance Command

dimension a feature using the SIZE Option, the Envelope Requirement
using the Size command supported ISO 14405-1 modifiers

- Outputting Results from Geometric Tolerances
- Migration from XactMeasure
 - options to Control Migration Math Types and Standards
 - migration to Constructed Input Features
 - migration to Legacy Dimensions
- Using GD&T Selection Modes to Create FCFs
 - 3D-CAD Model Based Annotation (MBD) (*as per ISO 16792:2021*) and 3D-PMI using GD&T Selection Mode (from CAD and from File)
 - optical Character Recognition (OCR) to Create FCFs, OCR Widget
 - GD&T from capture window
- Troubleshooting Error Messages and Warnings
- Major coordinate metrology pitfalls and how to overcome them

The Trainer



Georgios Kaisarlis, Ph.D., M. Eng., has more than 20 years of teaching and working experience in Geometrical Dimensioning and Tolerancing (GD&T), precision manufacturing and industrial dimensional metrology. His industrial experience comes from his career as a field engineer for the Hexagon MI group and his involvement as lead engineer in numerous specialized technical projects for the manufacturing industry (*reverse engineering, dimensional metrology, product design and development*). He has delivered hundreds of GD&T and dimensional metrology classes for a variety of manufacturing clients throughout Europe and the Middle East.

Dr Kaisarlis is serving as appointed Technical Expert (WG2/WG10/WG17/WG18) and as accredited national delegate (ELOT/NQIS) in ISO TC/213 “*Dimensional and geometrical product specifications and verification*”. ISO TC/213 is responsible for the international ISO standards relating to Geometrical Product Specification and Geometrical Tolerancing. He currently holds a research and teaching assistant’s position in the School of Mechanical Engineering of the National Technical University of Athens (NTUA), Greece. Dr Kaisarlis holds a M. Eng. Degree in Mechanical Engineering from TU Athens (NTUA) since 1997 and a Ph.D. degree from the same University since 2007.

