



# IIGDT Training Level 3

## “GD&T - Advanced Applications and Analysis”

### Objective:

To provide advanced information in applications and analysis (per ASME Y14.5 and ASME Y14.5.1) involving optimization strategies for given design applications, manufacturing methodologies and measurement implications.

### Course Length:

2 days

### Course Content:

#### In-Depth Analysis & Implications of Advanced Y14.5 Principles

- Multiple feature patterns used to define a single datum, and negative implications of using “non-functional” surfaces as datum features.
- 3D analysis of composite position callouts, in relationship to multiple hole patterns defined as a single datum.
- Calculations for determining allowable position tolerance for floating and fixed fastener designs.
- Positioning holes and patterns of holes at “zero tolerance” for optimizing manufacturability and critical cost reductions.
- Positioning functional coaxial cylinders from independent datum features -vs- to each other and defined as compound datum features.
- Boundary principles used with profile for non-cylindrical shapes.
- Contoured surfaces as datum features.
- Mathematical definitions and implications of ASME Y14.5.1M-1994.
- Surface roughness implications to features of size and form constraints.

#### Optimization Strategies in Applications & Analysis of Design, Manufacturing and Measurement

- Analysis and discussion of common error implications of dimensioning and tolerancing of tooling and functional gaging, based on product designs.
- Evaluate negative implications of common incorrect measurement procedures on coordinate measuring machines (CMMs) and discuss procedures to resolve / minimize problems.
- Profile definitions and boundary implications in corner transition areas.
- Uncertainty implications from ASME Y14.5 and critical transformation / development efforts which impact / benefit all technical areas.
- Characterization of physical to functional hierarchies and criticality of this analysis to achieve optimum functional intent.
- Review and analyze “your” engineering drawings and identify areas of negative financial implications, address questions to provide clarification/direction and make recommendations to optimize design intent and achieve maximum ROI.

#### Advanced Tolerancing Development within Y14.5

- Extension Principles for Datums used in Non-Standard Designs
- 3D Complex Profile Geometry and Tolerance Boundaries
- Critical Simplification of Y14.5
- Statistical Tolerancing

#### GD&T Implications to Corporate Six-Sigma Initiatives and Product Reliability

### Prerequisites:

GD&T Introduction & Fundamental Principles or equivalent knowledge. It is critical that each individual reviews this course content to ensure a positive level of proficiency in all areas. If not proficient, it is suggested to take this course prior to the advanced course to ensure an optimum level of understanding.

### Who should attend?

This advanced course is for those who require a greater understanding of the Y14.5 Standard from an advanced applications and analysis perspective. Specifiers of engineering requirements as well as specifiers of manufacturing processes and measurement applications will greatly benefit. Machinists, toolmakers, designers, senior inspectors, senior technicians and engineers (all levels).