
Applied Geometric Dimensioning & Tolerancing (AGDT)

1.0 Introduction

Geometric Dimensioning and Tolerancing (GD&T) is a powerful engineering language used to define product requirements based on function, fit, and performance. When properly applied, GD&T improves communication between Design, Manufacturing, and Quality teams while reducing variation, rework, and inspection disputes.

This practical training course focuses on the real-world application of GD&T rather than theory alone. Participants will learn how to interpret engineering drawings, establish functional datums, apply geometric controls, understand material condition modifiers, and develop effective inspection methods. Through industry-based examples, case studies, and hands-on exercises, participants will gain the skills required to confidently apply GD&T principles in daily engineering and quality activities.

2.0 Course Objective

At the end of this course, participants will be able to:

1. Understand GD&T fundamentals and terminology.
2. Interpret GD&T drawings and symbols.
3. Apply GD&T controls based on functional requirements.
4. Select appropriate datums and tolerance schemes.
5. Develop practical inspection strategies for GD&T features.
6. Utilize GD&T to improve product quality and manufacturability.

3.0 Training Outcome

Upon completion of this training, participants will be able to:

- Interpret GD&T drawings and symbols correctly.
- Apply GD&T principles in practical engineering applications.
- Establish functional datums and tolerance requirements.
- Develop effective inspection strategies for GD&T features.
- Improve product quality, manufacturability, and communication across functions.

4.0 Target Audience

This course is designed for design, product, manufacturing, process, tooling, and quality engineers, as well as quality inspectors, supervisors, and technical personnel involved in product design, manufacturing, assembly, inspection, and quality assurance activities.

5.0 Prerequisites

Participants should possess basic knowledge of engineering drawings, manufacturing processes, or quality control practices. Prior experience with GD&T is not required, making this course suitable for both beginners and professionals seeking practical application skills.

6.0 Methodology

This course adopts a practical and interactive learning approach through instructor-led lectures, group discussions, drawing interpretation exercises, case studies, hands-on workshops, and real-world application examples. Participants will actively engage in problem-solving activities to reinforce learning and enhance their ability to apply GD&T concepts in workplace situations.

7.0 Course Agenda

Day 1:	
9.00am – 10.00am	Introduction to GD&T • <i>Why GD&T?</i> • <i>Limitations of Conventional Tolerancing</i> • <i>Design Intent Concept</i> • <i>Benefits of GD&T</i> Activity: • <i>Comparison of Conventional Drawing vs GD&T Drawing</i>
10.00am – 10.15am	Morning Break
10.15am – 12.30pm	Datum Systems and Functional Datums • <i>Datum Features</i> • <i>Datum Reference Frame (DRF)</i> • <i>3-2-1 Principle</i> • <i>Datum Selection Strategy</i> Workshop: • <i>Selecting Datums from Actual Parts</i>
12.30pm – 1.30pm	Lunch Break

1.30pm – 3.15pm

Form Tolerances

- *Straightness*
- *Flatness*
- *Circularity*
- *Cylindricity*

Workshop:

- *Interpretation of Form Controls*
- *Inspection Methods*

3.15pm – 3.30pm

Afternoon Break

3.30pm – 5.00pm

Orientation Tolerances

- *Parallelism*
- *Perpendicularity*
- *Angularity*

Case Study:

- *Machined Block Analysis*

Day 2

9.00am – 10.30am

Position Tolerance

- *True Position Concept*
- *Positional Tolerance Zones*
- *Hole and Slot Applications*
- *Functional Assembly Requirements*

Workshop:

- *Hole Pattern Interpretation*
- *Slot Position Analysis*

10.30am – 10.45am

Morning Break

10.45am – 12.30pm

Material Condition Modifiers

- *MMC*
- *LMC*
- *RFS*
- *Bonus Tolerance*
- *Virtual Condition*

Workshop:

- *Calculation Exercises*
- *Functional Gaging Concepts*

12.30pm – 1.30pm

Lunch Break

1.30pm – 3.30pm	Profile Tolerancing • <i>Profile of Line</i> • <i>Profile of Surface</i> • <i>Composite Control Concepts</i> • <i>Simplifying Complex Drawings</i> Workshop: • <i>Converting Conventional Dimensions into Profile Controls</i>
3.30pm – 3.45pm	Afternoon Break
3.45pm – 5.00pm	GD&T Inspection & Measurement Strategy • <i>Inspection Planning</i> • <i>Measurement Equipment Selection</i> • <i>Height Gauge Techniques</i> • <i>Functional Gages</i> • <i>CMM Considerations</i> Integrated Applied GD&T Workshop • <i>Review a complete engineering drawing.</i> • <i>Identify critical functional features.</i> • <i>Establish datums.</i> • <i>Interpret GD&T callouts.</i> • <i>Determine manufacturing considerations.</i> • <i>Develop inspection methods.</i> • <i>Present findings.</i>

8.0 Duration

2 days

9.00am – 5.00pm
