

# ADVANCED GEOMETRIC DIMENSIONING & TOLERANCING (ADV GD&T)



## Objectives

Translating Designer's thought into proper GD&T drawings, including tolerance allocations. You will learn the advanced concepts in GD&T, including:-

- Tolerancing Mating Parts - learn-while-during training session
- Direct Versus Indirect Datum Structures
- Allowed versus Actual Deviation from True Position - Bonus Tolerancing and Virtual Condition Boundaries
- Profile, Flexible Parts and Datum Targets
- Tolerancing Complex Assemblies with Multi-Level Functional Controls and Varying Datum Structures
- Measuring and gauging GD&T, first article inspection, applying CMM to GD&T, and tabulation of results

## Duration

3 days | 9am – 5pm | 21 hours

## Who should attend

This course is designed for designed for engineers who need to qualify parts with GD&T specifications. You will learn effective ways to measure and gauge geometric tolerances. You will also learn to select the most appropriate measurement techniques for particular GD&T specifications, whether it is prototype or production, batch production or mass production. Enhance understanding by using videos, with step by step explanations, using open setup, gauges or specialised equipment. Course Pre-requisites Participants must possess basic knowledge of GD&T and Tolerance Analysis concepts

## Methodology

Participants will learn final details in advanced GD&T. Case studies and hands-on exercises using specially selected drawings allow participants to use and apply the information learnt in the course. Participants may also bring company drawings for interpretation during live case studies.

## Course Fees

Member: S\$1,296.00  
Non-Member: S\$1,452.60  
*Registration Fee of S\$17.28 apply*  
*All fees stated are inclusive of 8% GST*

## Award of Certificate

Certificate of Completion will be issued to participants who have attended at least 75% of the course.



Please refer to this URL  
<https://www.sqi.org.sg/courses/>  
or QR Code for soft copy  
and updated training schedule



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## Course Contents

### Recap of Essential Concepts in GD&T

- Datum concepts and applications
- Form control concepts and applications
- Orientation control concepts and applications
- Location control concepts and applications
- Runout control concepts and applications
- Profile control concepts and applications

### The Major Principles in Geometric Dimensioning and Tolerancing

- Conventional Dimensioning Versus Profile and Position Tolerancing
- Converting to Positional Tolerancing to Avoid Ambiguities
- Selecting Datum Features
- Tolerancing Datum Features
- Calculating Geometric Tolerances
- Worst Case Least Material Conditions
- Virtual and Resultant Conditions
- Basic Dimensions and Where Their Tolerances Come From

### Tolerancing Mating Parts in a Rotating Assembly - learn-while-doing training session

- Read and Understand a Crank Shaft and Coupling Assembly
- Apply Criteria for Optimal Datum Feature Selection to the Assembly
- Form Controls for Assembly and Inspection Repeatability
- Orientation Control for Datum Feature Bonus Tolerance and Pattern Shift

### Direct Versus Indirect Datum Structures

- Datum Structures and Their Effect on Tolerance
- Direct and Indirect Functional Relationships
- Tolerancing for Producibility and Functionality
- The Goal of Datums in Inspection and Assembly
- How to Choose Between Datum Structures
- How to Calculate the Feasibility of Various Datum Schemes
- Weighing the Suitability of One Control against Another
- How to Spot Similarities in Dissimilar Part Configurations
- How to Lower Cost without Compromising Function

### Allowed versus Actual Deviation from True Position - Bonus Tolerancing and Virtual Condition Boundaries

- Logic behind the Maximum Material Condition concept
- Logic behind the Functional Worst Case Boundaries
- Calculating Actual Departure from True Position
- How to Read a Feature Control Frame to Determine Part Function
- Protecting Virtual Condition Boundaries
- How Additional Positional Tolerances Derived from Feature Size Limits Relate to Worst Mating Condition Boundaries

### Profile, Flexible Parts and Datum Targets

- How to Choose Datums and Tolerancing Schemes for complex Sheet Metal and Plastic Parts
- Dealing with Parts with Multiple Curvatures and Angles
- Free State and Restrained versus Free State Inspection Requirements
- Varying Tolerances from Segment to Segment on Surfaces
- Tolerancing Curved Mating Features for Fit
- Measuring Parts as They Function
- Simultaneous versus Separate Gauging Requirements
- Pattern Shift with Simultaneous Requirements
- Fixturing and Stabilising Parts in Presses
- Compound Pattern Datums
- Casting and Draft Angles
- Sheet Metal and Complex Flexible Parts
- Plastic Parts

### Tolerancing Complex Assemblies with Multi-Level Functional Controls and Varying Datum Structures

- Detail Analysis of Optimal use of Datums and Functional Controls that escalates in Sophistication
- Determining the Most Functional and Producible Approach to Form, Orientation and Location Control
- Calculating and Distribution of Tolerances in Assembly
- Multi-Level, Two Single-segment Controls for Cost Reduction
- Changing of Datum Structures for Direct Tolerancing Relationships to Produce Greatest Yield

### Membership Application

Register membership online at [www.sqi.org.sg/membership-join/](http://www.sqi.org.sg/membership-join/) or contact us to get the membership application form.

Membership Categories:

- ~ Organisation membership
- ~ Individual membership

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