

# GD&T BASICS

## FUNDAMENTALS COURSE

Learn the Simplified Framework Behind the Tolerances on Your Prints

### **Section 1: Introduction to GD&T**

- Course Introduction
- Simple Example - What is GD&T?
- Terminology & Basic Rules
- The Feature Control Frame

### **Section 2: Size (S):**

- Intro to Features and Material Conditions
- Rule #1 of GD&T (Envelope Principle)

### **Section 2: Form (F):**

- Straightness (Surface)
- Straightness (Feature of Size)
- Flatness (Surface)
- Flatness (Feature of Size)
- Circularity
- Cylindricity

### **Section 4: Datums Control**

- Intro to Datums
- Datum Reference Frame
- Primary Datum Controls
- Basics of Datum Selection

### **Section 5: Location (L)**

- Position vs Coordinate Dimensions
- “True” Position – Basics
- The Position Calculation

### **Section 6: Orientation (O)**

- Parallelism (Surface & Axis)
- Perpendicularity (Surface & Axis)
- Angularity (Surface and Axis)

### **Section 7: Material Modifiers**

- Maximum Material Condition (M)
- Least Material Condition (L)
- Regardless of Feature’s Size & Rule #2

### **Section 8: Profile Tolerances**

- Profile of a Surface – Basics
- Profile In-Depth (Modifiers)
- Profile of a Line

### **Section 9: Runout Tolerances**

- Runout/Circular Runout
- Total Runout

### **Section 10 – Outcast Symbols to Avoid**

- Concentricity
- Symmetry

### **Section 11 – SLOF Exercises**

- SLOF Review for Drawings (Size, Location, Orientation & Form)
- GD&T Fundamentals Final Exam (online)
- Further Review: Drawing Examples of Interpretation / Application Bonus Recordings

**Online course access includes live weekly example webinars and our large library of real part examples where we show how to apply specific content from the course.**

We promise, once you take our training & understand our GD&T framework, you will drastically improve the way you work with your drawings. We want you to just understand more than just theory – we want you to apply what you learn!

GD&T Basics – Pareto Learning, LLC

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## The Advanced GD&T Tactics Used to Design for Manufacturability & Inspection

### Section 2: Advanced Datum Application

- Course Overview and Introduction
- Datum vs Datum Feature vs Datum Simulators
- Patterns as Datums
- Datum Targets
- Datum Translation & Movable Targets
- Irregular & Inclined Datums

### Section 2: Functional Gaging & Datum Modifiers

- Maximum Material Boundary (MMB)
- Simultaneous Requirements
- Gauge Building Exercise with Position
- Functional Gauge Design Considerations

### Section 3: Composite Tolerances

- Composite Tolerances – Single Datum
- Composite Tolerances – Multiple Datums
- Multiple Single Segment Tolerances
- Composite Profile Tolerances

### Section 4: Fastener Design for Assembly

- Projected Tolerances
- Fixed Fasteners
- Floating Fasteners
- Zero Tolerance at MMC
- Hole Process Designs (Counterbore, Spotface, etc.)

### Section 5: Geometric Tolerance Calculations

- RFS Envelopes and Boundary Calculations
- Practice Tolerance Calculation–RFS Example
- Virtual Condition Calculation Review
- Resultant Condition Calculation Overview
- MMC & LMC Positional Stack-Up Calculation
- Practice Tolerance Calculation–MMC Example
  
- Tolerance Impact of Datum Surfaces (Orientation & Form)
- Practice Application–Datum Surface Tolerance Calculation

### Section 6: Feature-Specific Rules and Symbols

- General Feature Definitions and Rules
- Taper and Slope
- Square & Tangent Plane Symbols
- Statistical Tolerance & Dimension Origin Symbols
- Knurling and Keyseats Rules
- Screw Thread & Gear/Spline Rules
- Individually Note & Continuous Feature
- Parts in Restrained Condition / Free State
- Non-Uniform Profile Segments

### Section 7: Feature-Specific Rules and Symbols

- GD&T Advanced Final Exam (available online)
- Further Review: Drawing Examples of Interpretation / Application Bonus Recordings

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