

Geometric Tolerancing Applications and Tolerance Stacks

CEUs: 1.5

PDHs: 15

Number of Days: 2

After taking the introductory GD&T course, students will grasp the fundamentals of GD&T, such as datums, position with MMC and RFS modifiers, parallelism, profile etc. However, they may still lack the intimate knowledge of how to apply geometric tolerancing expertly and perform tolerance stacks to define and optimize their product design.

The Applications and Tolerance Stacks course teaches one how to apply GD&T and perform tolerance stacks using a series of case study problems including sheet metal, machinings, plastic parts, castings etc. The case studies require students to establish datum reference frames and apply geometric tolerancing based on defined functional requirements. Afterwards, they must perform tolerance stacks to ensure design requirements are met. This process links the concept that the proper selection of the datums, as well as position and profile values on individual parts, have a great effect on the accumulation in the overall assembly. The exercises are interactive and discussed in student groups and as a class to support an engaging class environment.

All participants receive a copy of the *GeoTol Applications and Tolerance Stacks*, along with an Excel Tolerance Stack Spreadsheet, both of which will serve as valuable resources long after the training is complete

By participating in this course, you will learn how to successfully:

- Employ the proper application of geometric tolerancing on parts and assemblies.
- Perform linear and axial tolerance stacks.
- Reallocate tolerances to meet manufacturing capabilities.

Who Should Attend?

Engineers, designers and drafters, as well as quality, tooling and manufacturing personnel. As a prerequisite, it is recommended that learners attend the Geometric Tolerancing Fundamentals class or have a strong foundation in geometric tolerancing fundamentals.

Course Materials (included in purchase of course)

- All participants receive a copy of *GeoTol Applications and Tolerance Stacks*
- *Downloads job aid:* Tolerance Stack Spreadsheet, both of which will serve as valuable resources long after the training is complete

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Day One

- **Fixed and Floating Fastener Formulas: Calculating Position Tolerances**
- **Linear Stacks, Vector Method with Plus Minus Tolerances**
- **Linear Stacks, Vector Method with Profile Tolerances**
 - Assemblies with a datum reference frame and profile tolerances
 - When to include flatness, perpendicularity in tolerance stacks
- **Practical Problem (2 parts): Grommet Assembly**
 - Selecting Datum Features, Calculating Position and Profile Tolerances
 - 3D Model Tolerancing Example
 - Linear Stack with Profile
- **Practical Problem (2 parts): Powder Case**
 - Selecting Datum Features, Calculating Position and Profile Tolerances
 - Intro to Axial Boundary Stacks
- **Practical Problem (3 parts, sheet metal): Step Bracket Assembly**
 - Selecting Datum features, Calculating Position and Profile Tolerances
 - Coaxial Holes as Datum Features
 - Complex Surfaces
 - 3D Model Tolerancing Example

Day Two

- **Detail Axial Boundary Stacks**
 - Maximum Material Boundary (MMB) and Least Material Boundary (LMB)
 - Wall Thickness Calculations
- **Assembly Axial Boundary Stacks**
 - 2-part Assemblies RFS (regardless of feature size) datum modifiers
 - 2-part Assemblies MMC (maximum material condition) datum modifiers
 - 4-part Assemblies
 - Stack Exercises utilizing Spreadsheet job-aid
- **Practical Problem (2 parts): Optic Connector**
 - Complex Alignment Requirements
 - Selecting Datum Features, Calculating Position and Profile Tolerances
 - Linear Stack
 - Axial Boundary Stack