

Training will be delivered according to these ISO GPS Standards

- ISO 8015:2011
- ISO 1101:2017
- ISO 5458:2018
- ISO 5459:2011
- ISO 2692:2014
- ISO 1660:2017
- ISO 2768-1: 1989
- ISO 22081: 2021
- ISO 14405-1: 2016
- ISO 14405-2: 2018
- and related ISO GPS standards

Quick Recap: Basics of GD&T (~ 1 hour)

- Revision of GD&T fundamentals, rules
- Feature of size and non-size features
- 14 GD&T Symbols
- Applications of Material Condition Modifier
- Basic Datums

Maximum Material Virtual Condition (MMVC)

- Importance of MMVC in product designs and functional gauge designs
- MMVC calculations
- Use MMVC for mating parts as well to design fixed gauges
- 100% interchangeability and MMVC
- Classroom exercise for MMVC

Auxiliary Feature Indicators

- Intersection plane indicator
- Orientation plane indicator
- Direction feature indicator
- Collection plane indicator

Datums

- 4 criteria to select datums
- Partial Datum
- Common datums: Two parallel cylinders
- Common datums: Pattern of cylinders
- Common datums: Two coaxial cylinders
- Common datums: Two coplanar planes
- Datum feature simulators
- Temporary Datums
- Datum Targets: Points, Line, Area
- Fixture designs using datum targets
- Datum feature shift: Datum on MMR basis
- Datum MMR calculations
- Proper Sequence in applying datums & GD&T

Form Specifications

- Flatness specification
- Flatness specification for multiple indicator pattern
- Simultaneous requirement: multiple indicator pattern specification
- Flatness on restrictive specifications basis
- Straightness specification for line elements
- Straightness specification with MMC modifier
- Roundness specification
- Cylindricity specification
- CZ Modifier on flatness
- Relationship between Envelope principle and form specifications
- Inspection methods to verify form specifications

Overview of ISO 2768 – 1 & ISO 22081 standards

- General Linear and Angular tolerances
- Envelope requirement
- Geometrical Linear and Angular tolerances
- Rule regarding automatic rejection

Understand the fundamental differences between

- Parallelism Vs Flatness
- Total run-out Vs Cylindricity
- Circular run-out Vs Roundness

Gauges to verify Geometrical Specifications

- Functional / Fixed Gauges:
 - Go-Gauges / No Go-Gauges
 - Attribute / Fixed gauges
 - Gauge size calculations and gauge-makers tolerances
 - Gauge design exercises
- Variable Gauges
- Various geometrical specifications inspection tools
- Hand calculation for position specification using Pythagoras theorem

Orientation Specifications

- Perpendicularity specification with multiple datums
- Perpendicularity specification of a median line: Two parallel planes tolerance zone
- Perpendicularity specification of a median line: Cylindrical tolerance zone
- Parallelism specification of a median line: Two parallel planes tolerance zone
- Parallelism specification of a median line: Cylindrical tolerance zone
- Parallelism: restricted area tolerance feature
- Parallelism: a set of lines in a surface
- Angularity specification applied to a feature of size
- How to make 3D orientation specifications to 2D
- Orientation specifications in multiple segment (combined) tolerance indicator
- Inspection methods to verify orientation specifications



Location Specifications

A) Position Specification

- Projected toleranced feature
- Position specification on reciprocity requirement (RPR)
- Position specification of a planar surface
- Position specification of a median plane
- Simultaneous Vs Separate requirements
- Bi-Directional Tolerancing for pattern of features
- Multi-level Single Indicator Pattern Specification
- Stacked tolerance indications
- Use position to control co-axial features
- Datums for Position specification
- Inspection methods to verify position specification

B) Run-out Specifications

- Circular run-out specification – Axial
- Circular run-out in any direction
- Total run-out for flat surfaces: Axial
- Total run-out applied on partial length
- Total run-out specification – Radial with common datums (A-B)

C) Profile Specifications

- Profile of a plane or tapered surface
- Offset tolerance zone with specified offset
- Multi-segment or combined profile specification
- Multi-level Single Indicator Pattern specification
- Profile on a restrictive specification
- Surface profile specification for a united feature
- Unequally disposed surface profile specification for a united feature
- Unequally disposed surface profile specification with variable displacement
- How to control co-planarity using profile specification
- Datums for Profile Controls
- Inspection methods to verify Profile specifications

D) Coaxiality, Concentricity & Symmetry Specifications

- Coaxiality specification on MMR basis
- Coaxiality specification MMVC calculations
- Coaxiality specification on MMR basis: functional gauge design
- Concentricity specification
- Symmetry specification
- How to use position specification instead of coaxiality / symmetry

Contact

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Thank You !