ASME Geometric Dimensioning and Tolerancing Professional Certification

ASME GDTP (Y14.M)

Applicant Information

STATEMENT OF POLICY ON THE USE OF ASME GDTP SYMBOLS AND AUTHORIZATION IN ADVERTISING

ASME has established procedures to certify professionals who meet qualifications in accordance with the requirements of the ASME Y14.5.2–2000. It is the aim of the Society to provide recognition of those that are so authorized. Those that meet the qualifications of ASME Y14.5.2–2000 GDTP, are issued a certificate. An individual holding a GDTP certificate may state this credential in business cards, correspondence, and advertising literature. It is the aim of the Society to maintain the standing of the ASME Technologist and Senior Symbols for the benefit of those who meet the qualifications. Based on these objectives, the following policy has been established on the usage in advertising of facsimiles of the symbols. The American Society of Mechanical Engineers does not "approve," "certify," "rate," or "endorse" any item, construction, or activity that is manufactured, designed, or performed by an individual who holds a GDTP certificate. An organization with representatives holding GDTP certificates, and therefore authorized to use the respective symbol, must state in advertising literature that "the (instructor, editor, or author) is GDTP certified by ASME in accordance with the qualifications of ASME Y14.5.2–2000 in the (Senior or Technologist) level". The ASME GDTP Senior or Technologist Symbol shall be used only in media which distinctly designates that there is/are certified individual(s) within an organization. It is strictly prohibited to use the ASME GDTP Senior or Technologist symbol in media, where there is no individual, or individuals certified in GDTP by ASME. It is also strictly prohibited to present oneself, or an organization as employees, or an employee, of ASME. The ASME logo, which is the cloverleaf with the letters ASME within, shall not be used by any organization other than ASME.

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GDTP CERTIFICATION

WHAT IS ASME GDTP?
GDTP CERTIFICATION – OVERVIEW

The American Society of Mechanical Engineers (ASME), in recognition of the needs and benefits associated with standard qualifications for professionals using Geometric Dimensioning and Tolerancing and the ASME Y14.5M Standard, established the Geometric Dimensioning and Tolerancing Professional (GDTP) Certification Program. This program provides the means to recognize proficiency in the understanding and application of the geometric dimensioning and tolerancing principles expressed in Y14.5. Those principles form an essential element of the language of engineering.

There are two levels of certification. The first level, Technologist GDTP, provides a measure of an individual's ability to understand drawings that have been prepared using the language of Geometric Dimensioning and Tolerancing, as defined in the Y14.5 Standard. The second level, Senior GDTP, provides the additional objective measure of an individual's ability to select and apply geometric controls to drawings.

A GDTP might typically be employed as, but not limited to: design engineer; production or manufacturing engineer; process engineer; quality engineer; tool or gage engineer; engineering manager; user, programmer, or developer of CAD, CAM, CAE software, etc.; drafter, checker; engineering consultant; educator; inspector; contract engineer; project engineer; and technical specialist.

Certification will be based upon the current edition of the Y14.5 Dimensioning and Tolerancing Standard, its appendices and the application of its principles and practices.

WHY GET ASME GDTP CERTIFIED?
GDTP CERTIFICATION – BENEFITS

CORPORATIONS/ENGINEERING MANAGEMENT

- Verify the GD&T abilities of your design, manufacturing and inspection team.
- Reinforce uniform engineering drawing and documentation interpretation in your company, from design to manufacturing to inspection.
- Improve drawing and documentation interpretation and communication among your staff, your suppliers, and your customers.
- Cut manufacturing and inspection costs through proper application of tolerancing schemes.

DESIGN, DRAFTING, INSPECTION, QUALITY, CAD/CAM, AND ENGINEERING PROFESSIONALS

- Many design, drafting, inspection, quality and engineering related positions require knowledge of GD&T and the ASME Y14.5 standard. ASME GDTP Certification is the ONLY way to prove your knowldge and move yourself ahead of the rest of the pack.
- Enhance your credentials and get the respect from your peers that you deserve.
- Confirm your knowldge so you can work more confidently in an advisory capacity.
- Prove that you deserve that promotion.

CERTIFICATION LEVELS AND QUALIFICATIONS

CERTIFICATION LEVELS

Technologist Level

Certification indicates that the individual has demonstrated competencies in the understanding of the symbols, modifiers, and relationships of Geometric Dimensioning and Tolerancing (GD&T) as applied to engineering drawings and related documentation.

Senior Level

Certification indicates that the individual has demonstrated competencies in:

(a) Understanding the meaning of the symbols, modifiers, and relationships of GD&T as applied to engineering drawings and related documentation.

(b) Making the proper selection with consideration for the function and relationship of part features and of geometric controls, to document the product design intent.

(c) Performing calculations associated with GD&T.

(d) Applying the appropriate geometric control symbols, modifiers, and datum references to the engineering drawings and related documentation.

(e) Applying the principles of GD&T to the operations of manufacturing, quality control, and verification processes associated with engineering drawings and related documentation.

(f) Applying the principles of GD&T to the establishment of functional gaging activities.

QUALIFICATIONS

Technologist Level

In order to be certified as a Technologist GDTP, applicants must successfully pass the Technologist GDTP Examination. There is no experience requirement.

Senior Level

The qualifications for the Senior Level GDTP certification are two-fold: applicants must have five years of documented experience in the field of GD&T in the recognized use of the system in both application and understanding; and secondly, successfully pass the Senior GDTP Examination.

Note: It is not required to be a certified GDTP Technologist to qualify for Senior Level certification. ASME membership is not an exam requirement.

TEST REQUIREMENTS (EXAMINATION)

TECHNOLOGIST LEVEL EXAMINATION

The Technologist Level examination is a maximum of four hours in duration consisting of 100 to 150 questions. The examination is structured as a closed book, multiple choice, written examination, evaluating the applicant's knowledge of GD&T principles and practices in accordance with the current Y14.5 Standard.

The topics and approximate distribution of questions is as follows:

(a) 10% of the questions on Scope, Definitions, and General Dimensioning.

(b) 10% of the questions on General Tolerancing and Related Principles.; Knowledge of former practices included in Appendix D of Y14.5.

(c) 5% of the questions on Symbology.

(d) 15% of the questions on Datum Referencing.

(e) 30% of the questions on Tolerances of Location.

(f) 30% of the questions on Tolerances of Form, Profile, Orientation, and Runout.

A candidate must achieve at least a 75% grade overall and at least 50% in each of the above categories.

Body of Knowledge

The body of knowledge corresponding to these topics is shown in Appendix A.

SENIOR LEVEL EXAMINATION

The Senior Level examination is a maximum of six hours in duration consisting of 100 to 150 questions. The examination is structured as a closed book, multiple choice, written examination.
The Senior Level examination will emphasize knowledge, selection and application of the dimensioning and tolerancing principles, concepts and practices.

The topics and approximate distribution of questions will be as follows:

(a) 10% of the questions will cover topics from the Technologist's Level examination.

(b) 20% of the questions on Datum selection.

(c) 40% of the questions on General Tolerancing and Related Principles, Tolerance Calculation and Appendices.

(d) 15% application of modifiers in feature control frames.

(e) 15% Composite Positional Tolerancing.

A candidate must achieve at least an 80% grade overall and at least 50% in each of the above categories.

Body of Knowledge

The body of knowledge corresponding to these topics is shown in Appendix B.

CERTIFICATION PROCESS

APPLICATION PROCESS

1. You are required to fill out an application and return it to ASME with payment. It should be returned at least 30 days prior to the date you wish to take the test.

All information supplied on this application is subject to verification. Certification may be revoked by ASME for reasons of falsifying or providing inaccurate information in the certification process.

2. Upon receipt of the application and payment, ASME will provide the applicant (via mail) with an identification number. This identification number will serve as a confirmation of payment and acceptance of the application by ASME.

3. The test will be given at Prometric test centers with locations throughout the world. In order to find a location convenient to you, log on to www.prometric.com and click on “Locate a Test Site” or call 800-967-1100. Further information for registration will be provided to you upon acceptance of your application.

Note

GDTP exams are not offered at any specific time, date or location. Applicants may take the exam at a Prometric test center of their choice, and on the date of their choice, subect to availability at the given test center.

CERTIFICATION

An applicant who passes the GDTP exam will be issued a certificate. The certificate will identify the specific edition of Y14.5 on which the certification is based and the level of certification. The certificates will have an expiration date of 3 years from the date of issuance.

RECERTIFICATION

Certification for both levels (to the same edition of Y14.5) may be renewed without examination upon verification of involvement with GD&T for at least 24 of the previous 36 months. Certification by examination to a previous edition is not allowed.

A verifiable record must be provided to ASME such as a letter from the employer, a client, or other evidence of participation.

EXAMINATION RESULTS

Notification of the results of the examination, including the percentage of correct answers within each part, will be mailed to the applicant within 30 days after the exam. Grades will not be given over the telephone.

In the event that you do not pass the examination, you may take the exam two times in a period of six months.

APPENDIX A

TECHNOLOGIST LEVEL BODY OF KNOWLEDGE

These tables provide the body of knowledge upon which the examination for Technologist Level will be based.

A1 SCOPE, DEFINITIONS, AND GENERAL DIMENSIONING

Topic	Sub-Topics
(a) General	(1) what the Y14.5 Standard covers (2) reference to Y14.5 Standard (3) reference to gaging
(b) Definitions	(1) datum (2) datum feature (3) datum target (4) dimension (5) basic dimension (6) reference dimension (7) feature (8) feature of size (9) Full Indicator Movement (FIM) (10) Least Material Condition (LMC) (11) Maximum Material Condition (MMC) (12) Regardless of Feature Size (RFS) (13) actual size (14) limits of size (15) tolerance (16) bilateral tolerance (17) geometric tolerance (18) unilateral tolerance (19) true position (20) virtual condition
(c) Fundamental Rules	(1) dimensioning (2) implied 90 deg. angle (3) basic 90 deg. angle
(d) Units of Measurement	(1) identification of linear units (2) angular units
(e) Types of Dimensioning	(1) millimeter dimensioning (2) decimal inch dimensioning
(f) Application of Dimensions	(1) dimension lines (2) extension (projection) lines (3) limited length or area indication (4) leaders (leader lines) (5) reading direction (6) reference dimensions (7) overall dimensions (8) dimensioning within the outline of a view

A1 SCOPE, DEFINITIONS, AND GENERAL DIMENSIONING (continued)

Topic	Sub-Topics
(g) Dimensioning Features	(1) diameters (2) radii (3) chords, arcs, and angles (4) rounded ends (5) rounded corners (6) outlines consisting of arcs (7) irregular outlines (8) symmetrical outlines (9) round holes (10) slotted holes (11)counterbored holes (12) countersunk and counterdrilled holes (13) spotfaces (14) chamfers (15) keyseats (16) rods and tubing details
(h) Location of Features	(1) rectangular coordinate dimensioning (2) rectangular coordinate dimensioning without dimension lines (3) tabular dimensioning (4) polar coordinate dimensioning (5) repetitive features or dimensions (6) use of “X” to indicate “BY” or “NUMBER OF PLACES”

A2 GENERAL TOLERANCING AND RELATED PRINCIPLES AND FORMER

Topic	Sub-Topics
(a) Application of Tolerances	(1) directly applied tolerances (2) geometric tolerances (3) application by note (4) specified in reference documents (5) general tolerance block
(b) Tolerance Expression	(1) metric tolerances (2) inch tolerances (3) angle tolerances
(c) Interpretation of Limits	
(d) Plated and Coated Parts	
(e) Single Limits	
(f) Tolerance Accumulation	(1) chain dimensions (2) baseline dimensioning (3) direct dimensioning
(g) Limits of Size	(1) individual feature of size (Rule 1) (2) exceptions to Rule 1
(h) Relationship between Features	

A2 GENERAL TOLERANCING AND RELATED PRINCIPLES AND FORMER PRACTICES

Topic	Sub-Topics
(i) Applicability of RFS, MMC,LMC	(1) effect of RFS (2) effect of MMC (3) effect of LMC (4) effect of zero tolerance at MMC and LMC
(j) Geometric Tolerance Application to Screw Threads	(1) default feature (2) specified feature
(k) Geometric Tolerance Application to Gears and Splines	
(l) Virtual/resultant Condition	(1) LMC (2) MMC
(m) Datum Features at Virtual Condition	
(n) Angular Surfaces	(1) parallel planes (2) non-parallel planes
(o) Conical Tapers	
(p) Flat Tapers	
(q) Radii	(1) R (2) CR
(r) Statistical Tolerancing Identification	
(s) Former Practices (Appendix D of Y14.5)	(1) general (2) definition for feature of size (3) applicability of RFS, MMC and LMC (4) tangent radii (5) datum feature symbol (6) projected tolerance zone

A3 SYMBOLOGY

Topic	Sub-Topics
(a) Geometric Characteristic Symbols	(1) straightness (2) flatness (3) circularity (4) cylindricity (5) profile of line (6) profile of surface (7) angularity (8) perpendicularity (9) parallelism (10) position (11) concentricity (12) symmetry (13) circular runout (14) total runout

A3 SYMBOLOGY

Topic	Sub-Topics
(b) Datum Feature Symbol	(1) datum identifying letters (2) method of relating symbol frame to datum feature
(c) Datum Target Symbol	(1) indicating size of target area (2) indicating targets on hidden side of view
(d) Basic Dimension Symbols	
(e) Material Condition Symbols	(1) maximum material condition (2) least material condition (3) restrictions on use of symbols
(f) Projected Tolerance Zone Symbol; Use and Restrictions	
(g) Diameter and Radius	
(h) Reference Symbol	
(i) Arc Length Symbol	
(j) Statistical Tolerance Symbol	
(k) Between Symbol	
(l) Counterbore or Spotface Symbol	
(m) Countersink Symbol	
(n) Depth Symbol	
(o) Square Symbol	
(p) Dimension Origin Symbol	
(q) Taper and Slope Symbol	
(r) All Around Symbol	
(s) Free State Symbol	
(t) Tangent Plane Symbol	
(u) Geometric Tolerance Symbols	(1) feature control frame (2) feature control frame incorporating one datum reference (3) composite feature control frame (4) two single-segment feature control frames (5) combined feature control frame and datum feature symbol (6) feature control frame with a projected tolerance zone
(v) Tolerance Zone Identification	

A4 DATUM REFERENCING

Topic	Sub-Topics
(a) Definitions	(1) datum simulator (2) datum reference frame
(b) Immobilization of Part	(1) purpose — measurable relationships (2) true geometric counterparts (3) application (4) datum reference frame
(c) Datum Feature Identification	
(d) Datum Feature Controls	
(e) Datum Feature Order of Precedence	
(f) Establishing Datums from Datum Features	(1) datum features not subject to size variations (2) datum features subject to size variations (3) multiple datum features (4) pattern of features (5) screw threads, gears, and splines (6) partial surface as datum features (7) mathematically defined surface (8) multiple datum reference frames (9) simultaneous versus separate requirements (10) simultaneous requirements and composite feature control
(g) Datum Targets	(1) purpose/applications (2) datum target symbol (3) datum target points (4) datum target lines (5) datum target areas (6) datum target dimensions (7) datum planes established by datum targets (8) methods of establishing a primary datum axis (9) equalizing datums (10) datums established from complex or irregular surfaces

A5 TOLERANCES OF LOCATION

Topic	Sub-Topics
(a) General	(1) types of location tolerances (2) relationships controlled
(b) Position Tolerancing	(1) features applicable to (2) basic dimensions (3) use of feature control frame (4) application to base line and chain dimensioning (5) effect of material condition (a) RFS (implied) (b) MMC (c) LMC (6) zero positional tolerancing at MMC (7) multiple patterns of features located by basic dimensions relative to common datums (8) simultaneous requirements—RFS (9) simultaneous requirements—MMC
(c) Feature Pattern Location	(1) definitions (a) Feature—Relating Tolerance Zone Framework (FRTZF) (b) Pattern—Locating Tolerance Zone Framework (PLTZF) (2) composite positional tolerancing (3) projected tolerance zone (4) nonparallel holes (5) counterbored holes (6) closer control at one end of a feature
(d) Bi-directional Positional Tolerancing of Features	
(e) Noncircular Features	
(f) Coaxility Controls	(1) definition (2) position tolerance control
(g) Concentricity	(1) definition (2) differences between coaxiality controls and concentricity
(h) Positional Tolerancing for Symmetrical Relationships	
(i) Symmetry Tolerancing	(1) definition (2) material condition basis
(j) Spherical Features	

A6 TOLERANCES OF FORM, PROFILE, ORIENTATION AND RUNOUT

Topic	Sub-Topics
(a) Form Tolerance	(1) straightness (2) flatness (3) circularity (4) cylindricity
(b) Orientation	(1) angularity (2) parallelism (3) perpendicularity
(c) Profile	(1) profile of a line (2) profile of a surface
(d) Runout	(1) circular (2) total

APPENDIX B

SENIOR LEVEL BODY OF KNOWLEDGE

These tables provide the body of knowledge upon which the examination for Senior Level will be based.

B1 TOPICS FROM THE TECHNOLOGIST LEVEL BODY OF KNOWLEDGE (APPENDIX A)

B2 DATUM SELECTION

Topic	Sub-Topics
(a) Immobilization of Part	(1) purpose—measurable relationships (2) true geometric counterparts (a) a plane (b) maximum material condition boundary (c) least material condition boundary (d) virtual condition boundary (e) actual mating envelope (f) mathematically defined contour
(b) Application	(1) measurement origin (2) examples of simulated datums (3) surface extremities establish datums
(c) Datum Reference Frame	(1) purpose (a) relate features (b) restrict motion of part (2) multiple datum reference frames (a) functional requirements (b) requires different datum simulation methods
(d) Datum Feature Selection Criteria	
(e) Datum Feature Symbol Placement	
(f) Datum Feature Controls	(1) to account for datum feature variations (2) datum targets used alternatively
(g) Selection of Datum Feature Order of Precedence	(1) design requirements (2) functional requirements (3) process requirements (4) verification requirements/principles

B2 DATUM SELECTION

Topic	Sub-Topics
(h) Establishing Datums from Datum Features	(1) datum features not subject to size variations (a) unstable (b) restrained (2) datum features subject to size variations (a) diameters and widths (b) datum features RFS (1) primary datum feature — diameters or width RFS (2) secondary datum feature — diameter or width RFS (3) tertiary datum feature — diameter or width RFS (c) datum features at MMC (1) size of a primary or single datum feature (2) size of a secondary or tertiary datum feature (d) datum features at LMC (e) effects of datum precedence and material condition (1) cylindrical feature at RFS primary (2) cylindrical feature at MMC secondary (3) multiple datum features (a) simulation of a single datum plane (coplanar) (b) single axis of two coaxial features (4) pattern of features (5) screw threads, gears and splines (6) partial surface as datum features (7) mathematically defined surface (8) multiple datum reference frames (9) simultaneous versus separate requirements (10) simultaneous requirements and composite feature control
(i) Datum Targets	(1) purpose/applications (2) datum target area dimensions (3) datum planes established by datum targets (a) primary, secondary and tertiary datums (b) stepped surfaces (4) methods of establishing a primary datum axis (5) secondary datum axis (6) equalizing datums (7) datums established from complex or irregular surfaces

B3 GEOMETRIC TOLERANCING & RELATED PRINCIPLES, TOLERANCE CALCULATION AND APPENDICES

Topic	Sub-Topics
(a) General Need for Expressing Tolerances	
(b) Application	(1) means of expressing tolerances (2) controlling features of size (3) controlling other features
(c) Direct Tolerancing Methods	(1) general (a) limit dimensioning (b) plus and minus tolerancing (2) metric limits and fits (3) limits and tolerance symbols (4) tolerance symbols and limits (5) millimeter tolerancing (a) unilateral tolerancing (b) bilateral tolerancing (c) limit dimensioning (d) with basic dimensions (6) inch tolerances (a) unilateral tolerancing (b) bilateral tolerancing (c) limit dimensioning (d) with basic dimensions (7) angle tolerances (8) plated or coated parts (9) single limits (10) tolerance accumulation (a) chain dimensioning (b) base line dimensioning (c) direct dimensioning (11) dimensional limits related to an origin
(d) Limits of Size	(1) individual feature of size (Rule #1) (a) when form control does not apply (b) indicating that perfect form at MMC not required (2) relationship between individual features (a) no relationship unless otherwise specified (b) zero tolerance of orientation (c) zero tolerance of position (d) control with general note (e) relate dimensions to a datum reference framework with a general note
(e) Applicability of RFS, MMC and LMC	(1) appropriate applications (2) all applicable geometric tolerances (Rule #2) (3) alternate practice for position control (4) effect of RFS (5) effect of MMC (6) effect of zero tolerance at MMC (7) effect of LMC (8) effect of zero tolerance at LMC
(f) Screw Threads	(1) feature (2) modifier
(g) Gears and Splines	

B3 GEOMETRIC TOLERANCING & RELATED PRINCIPLES, TOLERANCE CALCULATION AND APPENDICES (continued)

Topic	Sub-Topics
(h) Virtual/Resultant Condition	(1) determining the appropriateness of MMC and LMC (2) virtual condition determination (3) resultant condition determination (4) datum features at virtual condition (5) calculating inner and outer locus
(i) Angular Surfaces	
(j) Conical Tapers	
(k) Flat Tapers	
(l) Radius	
(m) Statistical Tolerancing	(1) application to assemblies (2) identification
(n) Tolerances of Location	(1) utilization of modifiers (a) effects of RFS (implied) (b) effects of MMC (c) effects of LMC (2) displacement allowed by datum features at MMC (3) calculating positional tolerance (4) zero positional tolerance at MMC (5) simultaneous requirements (6) separate requirements (7) projected tolerance zone (8) nonparallel holes (9) counterbored holes (10) closer control at one end of a feature (11) bidirectional positional tolerancing (12) noncircular features (13) coaxial controls (14) concentricity (15) symmetry
(o) Form	(1) straightness (a) surface (b) axis (c) center plane (d) applied on a unit basis (2) flatness (a) surface (b) applied on a unit basis (3) circularity (4) cylindricity
(p) Profile	(1) profile of a line (2) profile of a surface (3) coplanarity (4) for plane surfaces (5) on conical features
(q) Orientation Tolerances	(1) angularity (a) of a surface (b) applied to features of size (2) parallelism (a) of a surface (b) applied to features of size (3) perpendicularity (a) of a surface (b) applied to features of size
(r) Runout Tolerances	(1) circular (2) total

B3 GEOMETRIC TOLERANCING & RELATED PRINCIPLES, TOLERANCE CALCULATION AND APPENDICES (continued)

Topic	Sub-Topics
(s) Y14.5 Appendices	(1) Appendix A - Principal Changes and Improvements (a) Figures (b) Scope, definitions and general dimensioning (c) General tolerancing and related principles (d) Symbology (e) Datum referencing (f) Tolerances of location (g) Tolerances of form, profile, orientation and runout (h) Principal changes and improvements (I) Formulas for positional tolerancing (j) Form, proportion and comparison of symbols (k) Former practices (l) Decision diagrams for geometric control (2) Appendix B - Formulas for Positional Tolerancing (a) General (b) Formula symbols (c) Floating fastener case (d) Fixed fastener case (e) Provision for out-of-squareness when projected tolerance zone is not used (f) Coaxial features (g) Limits and fits (3) Appendix C - Form, Proportion, and Comparison of Symbols (a) General (b) Form and proportion (c) Comparison (4) Appendix D - Former Practices (a) General (b) Definition for feature of size (c) Applicability of RFS, MMC, and LMC (d) Tangent Radii (e) Datum feature special (f) Projected tolerance zone (5) Appendix E - Decision Diagrams for Geometric Control (a) Purpose (b) Functional requirements (c) Reference to standard (d) Geometric controls (e) Choosing other controls (f) Use of modifiers (g) Datums (1) Datum modifiers (2) Multiple datums

B4 APPLICATION OF MODIFIERS IN FEATURE CONTROL FRAMES

Topic	Sub-Topics
(a) Types of Modifiers	(1) Regardless of Feature Size (RFS) (2) Maximum Material Condition (MMC) (3) Least Material Condition (LMC)
(b) Application	(1) to the toleranced feature (2) to datums (3) when applicable (a) to geometric tolerances (b) to datums (4) zero tolerance at MMC (5) results of datum features modified (a) RFS (implied) (b) MMC (c) LMC (6) results of pattern of features modified (a) RFS (implied) (b) MMC (c) LMC (7) simultaneous requirements

B5 COMPOSITE TOLERANCING

Topic	Sub-Topics
(a) Location of a Pattern of Features	(1) location of a pattern of features (2) interrelationship of individual features within a pattern (3) multiple patterns of features; separate requirements
(b) Composite profile tolerancing	
(c) Part Verification Methods	(1) functional gaging (2) graphical analysis (3) mathematical analysis
(d) Application of Composite Positional Tolerancing versus Two Single-Segment Tolerancing	