



UTM
UNIVERSITI TEKNOLOGI MALAYSIA

Faculty of
Mechanical
Engineering

QBASE
ENGINEERING

Geometric Dimensional & Tolerancing (GD&T)

Training Date:

27th – 29th SEPTEMBER, 2016

Training Venues:

Faculty of Mechanical
Engineering,
Universiti Teknologi Malaysia
Johor Bahru, Johor, Malaysia

Course Fee

RM 2,400 per pax.

Discount Available for:

- Early Birds
- Multiple Attendees

Jointly Organised By

Faculty of Mechanical
Engineering,
Universiti Teknologi Malaysia
&
Q-Base Engineering Sdn Bhd

Phone: 603-77264377

6011-32492001(preffered)

Fax : 603-77264211

E-mail: bizunit@mail.fkm.utm.my

GD&T, because of its extensive use in automotive industries, has been identified as a required skill in the Quality System Requirement section of Automotive Industry Action Group's (AIAG) new quality standard, TS16949:2002 *"Suppliers who design the activity should be qualified in the skill of Geometric Dimensioning and Tolerancing as appropriate."*

GD&T can save considerable time, money and resources by having clear, concise and consistent communications throughout the entire product life-cycle cycle processes, by getting every personnel involve from product and process designs, prototyping, production, inspector, gage and tool make to *"read from the same page"*. GD&T ensures that there is only one interpretation to any drawing as intended by the designer.

Today, the major problem not only faced by designers who have little of no experience with GD&T, but also those who are responsible for the final product inspection and gage-making. Most of the training and information on the GD&T are from the draftsman's, designer's, or manufacturing engineer's point of view. There are very limited training for the people who have to design inspection gage and to inspect the final product with respect to these tolerances. Many who understand the GD&T and inspection methods have learnt the hard way through mistakes and experience. This training will close these deficiencies.

This two and half day training and workshop presents all the fundamental GD&T concepts adopted by the **American National Standard Institute (ANSI)**; from specifying, interpreting, to measuring, gaging, and verifying the applicable tolerances. This training will enable a smooth transition from the conventional dimensioning to Geometric Tolerancing. The transition can be accomplished through an easy-to-learn sequence which ensures complete understanding of all major aspects of GD&T and respective measurement methods.

Even though, the main focus of this training is on GD&T from final product inspector's, measurement and tool controller's, draftsman's, part and gage designer's, or manufacturing engineer's points of views, it will also discuss the Application of GD&T from designer point of view.

In this training the participants will learn how to read and understand the ANSI Y14.5M -1998 standard requirements, read, interpret and communicate the GD&T symbols, define the function of GD&T symbols, discuss the methods of measuring and gaging of major GD&T tolerances, stacking up the tolerances and relate GD&T concepts directly to their jobs.



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Geometric Dimensional & Tolerancing -Course Objectives

Contact for pre-Registration
or enquiry :
bizunit@mail.fkm.utm.my

or Call/Whatsapp
6011-32492001

At the conclusion of this training, the participants will have the knowledge to be able to:

- Understand and explain the ANSI Y14.5M standard requirements, philosophies, concepts, design and tolerance rules, convention, symbols, and interpretation guidelines;
- Appreciate the benefit of GD&T as opposed to conventional tolerance rules;
- Be able to read and interpret and implement GD&T symbols, rules, and requirements;
- Understanding common mistakes and misconception in specifying and verifying GD&T requirements;
- Explain the concept of functional design and concurrent engineering philosophy as advocated by GD&T;
- Explain the concept of bonus tolerance, part tolerances, datum shift that become available under certain design circumstances

At the conclusion of this training the participants will have the skills to be able to:

- Specify GD&T requirement based on parts functional requirements;
- Read, interpret, and verify GD&T requirements as intended by design engineers in the drawings;
- Apply GD&T rules, tolerances, symbols, modifiers in part and gage drawings to communicate precisely the part and function design requirements/intents, consistently throughout the product life-cycle;
- Define the function of GD&T symbols, modifiers, frames, rules, datum system, and tolerances where appropriate depending on the functional requirements and intents of the parts;
- Validate/verify/measure and the Geometric & Tolerance requirements of the parts as stated in the part's drawings;
- Define the methods and techniques of verifying/measure/accept the major GD&T tolerances, specifying and contacting the datum system as intended by the designer and part functionality requirements;
- Apply the concept of “**functional design**” and concurrent engineering philosophy in the future product tolerance design;
- Calculate the tolerance availability, worst case boundary conditions, worst case mating condition of part(s) based on GD&T specifications, symbols datum system as stated on the drawing;
- Tolerance Management by calculating tolerance stack-ups for part design using the GD&T system ;



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Geometric Dimensional & Tolerancing—GD&T

Target Audience

- Manufacturing/Process Engineers and Managers
- Design Engineers and Managers
- Integration Engineers and Managers
- Product Engineers and Managers
- Quality Engineers and Managers
- TQM Managers
- Technical Staff
- Quality Professionals
- Suppliers Quality Assurance

Training Methodology

- Classroom lecture on concepts, methodologies and techniques
- Workshop and simulation exercises
- Case studies , case discussion and best practices
- Learning from actual examples and/or drawings
- Comprehension Test at end of each module

Prerequisite

- Knowledge and skills in technical drawings – able to read & interpret
- Knowledge and skills in Gaging techniques (Go-No Go or No-Go gages) and basic measurement techniques;
- Scientific calculators
- Bring own drawing to class (if available)

Course Duration

- Two and half (2 & 1/2) days 9:00 – 5:00 pm

Training Delivery

- English and /or Bahasa Malaysia



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Geometric Dimensional & Tolerancing—GD&T

Training Grant:

This training is 100% claimable under SBL training grant scheme

For details contact:

www.brdp.com.my

Fees per Session

RM 2,400.00* per participant
(inclusive of lecture notes, other course materials, lunches and refreshments).

Special discount for:

- Early bird registration, before 31th August 2016 (RM 2,200.00)
- Group registration comprises of at least 3 participants (RM 2,000.00)
***Certificate of Attendance will be awarded to participants who have successfully completed the course.*
- ***Dateline of Registration : 20 SEPTEMBER 2016 (TUESDAY) - 4.30 p.m.**

Accommodation

Participants are required to make their own arrangements for accommodation. There are several hotels near UTM that participants can choose to stay in. Participants are advised to make early booking to ensure availability of rooms

List of hotels :

Scholar's Inn, UTM (2 minutes drive)

Tel : +6075535197

Email : scholarsinn@utm.my

Other nearest Hotels

(Rose Cottage, U hotel, Pulau Spring, Good Hope Hotel)

Payment

Bank Transfer

CIMB : 80-0281289-6 (Q-BASE ENGINEERING SDN BHD)

*please send proof of transaction by email at bizunit@mail.fkm.utm.my or whatsapp to +601132492001

Banker Cheque

*we only accept banker cheque in order to avoid any payment problems

Paybill to :

Q-BASE ENGINEERING SDN BHD

Cheque can either be send to :

Q-BASE ENGINEERING SDN BHD

2-8C jalan PJU 8/3A

Perdana Business Centre

Bandar Damansara Perdana

47820 Petaling Jaya, Selangor

*please make a copy of your cheque and send it by email at

bizunit@mail.fkm.utm.my or whatsapp to +601132492001 as a proof



Geometric Dimensional & Tolerancing - Course Outlines

Module	Module Title
1	• Overview of GD&T
2	• Introduction & Understanding of GD&T Symbols, Requirements and Terms
3	• GDT Concepts and Rules
4	• Understanding, Tolerancing, Specifying & Measuring of Form Controls 4a. Flatness Controls 4b. Straightness Control 4c. Circularity (roundness) Control 4d. Cylindricity Control
5	• Understanding and Defining Datum • Types of Datum • F.O.S as Datum & Datum Controls • Datum Systems
6	• Understanding, Tolerancing, Specifying & Verifying of Orientation Controls 6a. Perpendicularity Controls 6b. Angularity Controls 6c. Parallelism Controls
7	• Understanding, Tolerancing, Specifying & Verifying of Tolerance of Position (TOP)
8 (optional)	• Tolerance of Position - Applications
9	• Understanding and Measuring of Concentricity and Symmetry Controls
10	• Understanding, Tolerancing , Specifying and Measuring of Runout Controls 10a. Circular Runout 10b. Total Runout
11	• Understanding, Tolerancing & Measuring of Profile Controls 11a. Profile of Surface 11b. Profile of Line
12	• Other GDT Related Topics 12a. Designing and Tolerancing the Functional Gages (fixed gages) 12b. Tolerance Stack-up Calculations & wall thickness 12c. Tolerance for Fasteners (Floating and Fixed)



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Geometric Dimensional & Tolerancing—Schedule

27th SEPTEMBER 2016 (Tuesday)

- 8.30 am : Registration
- 9.00 am : Opening Remarks by Prof Dr. Noordin Bin Mohd Yusof (Dean, Faculty of Mechanical Engineering, UTM)
- 9.10 am : **Module 1:** Introduction and ASMEY14.5-2009 Overview
Module 2: General Tolerancing, Theories, Principles and Related Rules
- 10.30 am: **MORNING BREAK**
- 10.45 pm: **Module 3:** Dimensioning, Definitions, terms, and Tolerancing Symbology
Module 4: Understanding and Verifying **FORM** Controls
Test and Workshop
- 1.00 pm : **LUNCH BREAK**
- 2.00 pm : Module 4 continuation
- 3.00 pm : **AFTERNOON BREAK**
- 3.15 pm : **Module 4:** Understanding Datum, Datum system and types of Datum
Test and Workshop
- 5.00 pm : Tea Break & Adjourn

28th SEPTEMBER 2016 (Wednesday)

- 9.00 am : **RECAP DAY 1**
Module 6: Understanding and verifying Orientation Controls
- 10.30 am: **MORNING BREAK**
- 10.45 am: **Test and Workshop**
- 1.00 pm : **LUNCH BREAK**
- 2.00 pm : **Module 7-8:** Tolerance of Position and advanced application of T.O.P controls, verification methods of **T.O.P** ... continuation
Test and Workshop
- 3.00 pm : **AFTERNOON BREAK**
- 3.15 pm : **Discussion & Wrap-up**
Real-Life Examples
- 5.00 pm : Tea Break & Adjourn

29th SEPTEMBER 2016 (Thursday)

- 9.00 am : **RECAP DAY 2**
Module 9-11: Understanding and Measurement Method for Various Geometric **Concentricity** and **Symmetry** Controls, **Runout** controls and profile controls
- 10.30 am: **MORNING BREAK**
- 10.45 am: - Continuation of **Profile** Controls
- GDT Related Topics - Designing and Tolerancing of **Functional Gages**, other advanced control such as Statistical Control
- 1.00 pm : **LUNCH BREAK**
- 2.00 pm : • GDT metrology workshops and hands-on in metrology lab.
• Discussion and Wrap-up
- 3.00 pm : **END**



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Geometric Dimensional & Tolerancing -Facilitator

Shaibudin Daud

Six Sigma Master Blackbelt

Q-BASE Engineering Sdn.Bhd

2-8C Jalan PJU 8/3A, Perdana Business Centre

Bandar Damansara Perdana,

47820 Petaling Jaya, Selangor

Tel : 0377264377 Fax: 0377264211 H/P: 012-238-1212

Tertiary Education & Professional Membership

- California State & Oregon State University , U.S.A
- (B.Sc & M.Sc. in Applied Physics)
- Six Sigma Master BlackBelt (Motorola University 1993)
- Member of Worldwide Motorola University's 6σ Black Belt Society
- Member of ASQC (US Chapter) and SME (society of Manufacturing Engineers – USA)
- Certificated ISO Lead Auditors (IQA-IRCA)
- Certified PSMB Train-the-Trainer

WORKING EXPERIENCE

- Texas Instrument Malaysia Sdn. Bhd (1982- 1996)
- East Asia Quality Consultant Sdn. Bhd (1996- 1997)
- QBASE Engineering Sdn. Bhd (1998 - present)

PROFESSIONAL EXPERIENCE

Shaibudin's professional career started in 1983 as Process Engineer in one of the largest multinational semiconductor company in Malaysia. Out of 14 years working experience, 8 years in technical and engineering field involving in process design and development, and 6 years were involved in the Quality Organization.

He is well versed in Total Quality Management (TQM), SixSigma and Lean Sigma methodologies, and Total Quality Engineering and has been a consultant in the field of Business Excellence Assessment, Policy Deployment implementation, World Class Manufacturing Strategies, People and Team Development, Statistical Method of Process Control & Variation Reduction, Design of Experiments, product and process tolerance design and management, and Small Group Activities (QCC/ICC activities) for manufacturing, properties management, oil and gas, automotive industries, service industries, constructions and public sectors.



Geometric Dimensional & Tolerancing -Facilitator

Shaibudin was a certificated corporate trainer, member of Group Technical Staff and member of the Worldwide Motorola University's Six Sigma Quality Practitioner. He is an experienced coach/trainer, implementers and consultant. To-date he has effectively trained more than 3000 Engineers, Managers and Production workers from Malaysia, Philippines, Singapore, Taiwan and India. He has written several technical papers in the above areas which have been presented in several International Technical Symposiums and Forums. He is also a certificated ISO9000 Lead Auditor (IQA- IRCA) and Certificated Internal Malcolm Baldrige Award (MBA) Assessor. He is also a member of ASQC (US Chapter) and Motorola University 6s Black Belt Society.

Training Experience

- Texas Instruments (Malaysia, Singapore, Taiwan, Philippines and India)
- Texas Instruments DLOG5 -(Dallas Wafer Fab)
- Muda Holding (Malaysia and Philippines)
- Tanaka (Singapore)
- American Fine Wire (Singapore)
- Royal Malaysian Navy
- RFS (Electronic Components Company)
- PKNP
- Sime Darby Holdings
- Unilever Holdings
- Epson Precision
- TEAC
- Nippon Electric Glass (NEGM)
- UEM World Berhad
- Globetronics
- Johor Land Berhad
- SIRIM Manufacturing (Equipment Design)
- BESI-Apac
- FMC WellHead (oil and Gas)
- Plexus Manufacturing (penang)
- DYSON Manufacturing
- Automotive Lighting
- Globetronics (Penang & Melaka)
- Global Facility Management Sdn Bhd
- Oriental Summit (Automotive)
- AAC (automotive)
- Kualiti Alam Sdn Bhd
- PROTON Berhad/PROTON Holdings
- DRB-HICOM
- Hicom Engineering
- Hicom DieCasting
- PLUS Berhad & Rangkaian Segar
- M.A.C Technologies (Injection Molding)
- KL International Airport
- Sunway Premix Industries
- Kenneison Brothers (Quarry, Premix and Readymix)
- Yano Electronic (OEM)
- Johor Tenggara Oil Palm
- Matsushita Industrial Corp. Sdn. Bhd
- Matsushita Group of Companies
- Matsushita Human Resource Development Center
- UEM Academy & UEM Builders Berhad
- National semiconductor
- Radicare
- Faber Mediserve
- Healthronics
- Pantai Medical



Geometric Dimensional & Tolerancing

TRAINING & CONSULTATION CORE COMPETENCIES

- Total Quality Control & Management
- SPC Control-Intermediate & Advanced Level
- Design of Experiment – Classical, Shainin and Taguchi Methods
- Six Sigma Green and BlackBelt Training
- Lean Sigma
- Six Sigma Breakthrough Strategy
- Six Sigma Awareness
- 7 QC/QM Tools and Variation Reduction Techniques
- ISO9000 & Business Excellence Assessment (Malcolm Baldrige)
- Statistical Technique in a Non- Manufacturing environment
- Failure Mode and Effect Analysis (FMEA & FTA)
- Design for Manufacturability (DFM)
- Reliability Engineering
- Geometric Dimensional and Tolerancing – GD&T
- Tolerance Stack-up Analysis
- SPC Implementation Assessment
- Quality Planning Tools (Hoshin and Policy Deployment)
- Variation Reduction Techniques
- Manufacturing Technologies
- TS16949 Quality System and “Core Tools”

Training Terms and Conditions

- Course fee quoted is for each participants, discounts are available for early birds (as stated in Fee’s column) , multiple participants from single organization. The discount amount will be deducted from the total course fee once the participant has pre-register for the training.
- No refund for late withdrawal (1 day before training) or No show of any confirmed training program, but the fee can be used for other or future QBASE Organized public training programs.
- 10% levy will be imposed on late cancellation of confirmed training (within one week prior to training date). QBASE will refund the balance of the paid amount or invoice the participant if payment has not been made.
- All PSMB claims will be processed by each participants, QBASE is not responsible for training grant claim process.
- QBASE reserve the right to cancel the training due to poor response, all registered participants will be informed at least one week prior to training and any payment made will be returned in full.
- Payment can be made in check payable to QBASE Engineering Sdn Bhd or direct transfer to QBASE’s bank account. Proof of payment is required.
- **Intellectual Property Rights**—All intellectual property rights vested in the training manual, materials, workbook, forms, checklist used in this training or part thereof made from these documents shall remain with QBASE. The participant agrees to retain all legends and marks reflecting QBASE’s intellectual property rights on such materials. In the event the participants requires extra copies for use within the Client’s company, the Client shall seek QBASE’s prior written agreement subject to prevailing terms and conditions. All audio and video recordings of the training sessions shall require prior written consent from QBASE. Additional material for in-house use can be purchased from QBASE Engineering Sdn. Bhd.
- Copy right of any software use in this training is owned by their respective owner, QBASE will not be liable for any breach of these third party copyright.
- The fee quoted is inclusive of training delivery, training related material such as manuals, forms, workbook and charts, any meals during the duration of training (morning and afternoon breaks and lunch), excluded are participant’s lodging, transportation and other subsistence.