

Estimation of Measurement Uncertainty in Test and Calibration

1. Introduction

The purpose of measurement is to determine a value of quantity of interest or the measurand. However, when any measurement is made, the measurement process involves the use of standards, work piece, instruments, persons, procedure and environment.

For reliable measurement process, it is necessary to quantify this inherent variation, which is known as the uncertainty of measurement. It is, thus, necessary to not only to understand what measurement uncertainty is, but to learn how to estimate the same and consider its implication in decision based on measurement.

According to clause 5.4.6.2 of ISO/IEC 17025, "Testing laboratories shall have and shall apply procedures for estimating uncertainty of measurement". Further, as per cl. 5.5.1.4 of ISO 15189:2012 Standard on accreditation of medical laboratories, "The laboratory shall determine measurement uncertainty for each measurement procedure in the examination phase used to report measured quantity values on patients' samples. The laboratory shall define the performance requirements for the measurement uncertainty of each measurement procedure and regularly review estimates of measurement uncertainty".

2. Course Objectives

The main objective of this course is:

- ✓ To understand the concept of measurement uncertainty and its implication in measurement
- ✓ To learn how to estimate the uncertainty associated with measurement results of tests & calibration.
- ✓ To practice the estimation techniques through a workshop with live examples so that a participant can perform the calculation at his/her work station.

3. You should attend this course if,

- ✓ You want to understand the concept of measurement uncertainty.
- ✓ You want to implement concept of measurement uncertainty in measurement procedures exercise in your testing and calibration laboratories.
- ✓ You want to learn to estimate uncertainty associated with measurement results of test and calibration.
- ✓ You want to practice estimation techniques for improving efficiency of your laboratory processes
- ✓ You are looking to expand your skills in the area of good laboratory practices.

4. Course Material

Course kit comprising detailed course material with several worked out examples which will help participants in estimation of Measurement Uncertainty in their tests.

5. Methodology & Certification

A judicious mix of class room presentations, exercises, group discussion, case studies and hands-on practice will be used. Participants will be encouraged to relate the learning to live situations.

Participants who successfully complete the continuous assessment during the course and also the written examination conducted on 3rd day of the course will be issued a certificate by FICCI.

6. Course organisation, schedule & registration procedure

Date: Apr 22 – 24, 2015

Timing: 0930 hrs – 17:30 hrs

Nature: Non residential

Venue: Federation House, New Delhi

Participation Fee: Rs. 11,850 + 12.36% Service Tax (Total amount of Rs. 13,315/- includes cost of training, course kit, lunch, tea etc.)

Registration: Send registration form along with Cheque/DD in favour of "FICCI Quality Forum". The seats are limited to 20 and registration will be done on first come first serve basis

For further details & to reserve your seat, please contact:

Mritunjay Kumar

T: +91-11-2348 7356

M: +91 - 99111 64501

E: fgf@ficci.com; mritunjay.kumar@ficci.com

7. About our Lead Faculty

Our Lead faculty of this course Mr. Basudev Bhattacharya has rich experience of 43 years in the field of designing, functioning, & managing testing laboratories. He was one of the founder members of Pilot Test House of the Government of India, Ministry of Commerce, a premier test and calibration centre for testing export product from the country.

Mr Bhattacharya was trained on Laboratory Management in UK in 1988 under the Indo-EEC Co-operation. He has been an International consultant in the field of laboratory accreditation on behalf of International Trade Centre; a Geneva based UN Agency. He was Chairman of Technical Committee on Photometry of NABL and member of the NABL technical committees on Clinical & Food Testing Laboratories.

He has presented and published more than 30 papers on a variety of technical subjects in National and International Journals, seminars and conferences. He has conducted more than 150 in-house workshops and training programmes on LMS in India, Bangladesh, Mauritius, Dubai, Abu Dhabi & Kuwait, and has trained more than 2000 persons. He has been providing auditing services to accredited laboratories and certified organizations as per ISO/IEC 17025, ISO 15189 & ISO 9001 Standards. and has conducted more than 75 such audits. He has also provided LMS implementation support to 13 laboratories in different disciplines (viz. Chemical, Clinical, Mechanical, Electrical testing etc and Calibration of Mass-Dimension-Thermal-Pressure which have successfully achieved NABL accreditation.

8. About FICCI Quality Forum

FICCI Quality Forum (FQF) is a specialized division of Federation of Indian Chambers of Commerce and Industry (FICCI) set up with objective to sharpen the competitive edge of Indian Industry. FQF provides training, consultancy and research services focused on enhancing the quality quotient of clients and partner organization.

For the past 20 years, FQF is providing training on various ISO management systems and has a pool of highly competent & experienced trainers to conduct training courses.

FQF has collaboration arrangements with TUV NORD CERT GmbH for providing IRCA, UK approved Auditor/Lead Auditor training courses on ISO 9001 Quality Management System (QMS) ISO 14001 Environment Management System (EMS), ISO 22000 Food Safety Management System (FSMS) and Occupational Health and Safety Management System (OHSAS) 18001 standards. A summary of feedback given by past participants of these courses is included in this brochure.

In addition we also provide training on Six Sigma Green and Black belt certification, and Project Management. We also provide consultancy support on effective implementation of above management systems including LMS leading to certification/accreditation.

<p>9. Course Content</p>	<p><u>Some Comments from participants of previous Training Program conducted by FICCI</u></p>
<ul style="list-style-type: none"> • Fundamentals of Measurement • Concept of Measurement Uncertainty • Method of Estimation of Measurement Uncertainty as per ISO Guide of 1995 • Basics of Statistics as applicable to estimation of measurement uncertainty • <i>Syndicated Exercise on estimation of type-A & type-B evaluations</i> • Case Studies involving Test situations • Case Studies involving Calibration situations • Model for estimation of measurement uncertainty in testing • Model for estimation of measurement uncertainty in calibration • <i>Workshop on estimation of measurement uncertainty in physical and chemical measurements</i> • <i>Workshop on estimation of measurement uncertainty in Calibration of common parameters</i> • Method of estimation of Measurement Uncertainty in Microbiology as per ISO 19036 • <i>Syndicated Exercise on estimation uncertainty associated with quantitative microbiological measurements</i> • Application of Measurement Uncertainty in testing & calibration • Asia Pacific Laboratory Accreditation Cooperation (APLAC)'s interpretation of estimation of MU in calibration & testing • Development of a Standard Operating Procedure (SOP) for the estimation of measurement uncertainty • Workshop on estimation of medical examination 	<ul style="list-style-type: none"> ▪ The course and the manner in which it was delivered certainly deserve high grades on the scale. It has gone beyond what I had actually expected before being part of it • After training I am able to know the basic knowledge of uncertainty. More knowledge will be with the practice. Overall experience is good • An interesting and educative program. Got to know many parameters for the calculation of uncertainty. Would certainly try to implement in our measurement process • I came to understand concept of uncertainty and now, I am at a level where I can do uncertainty measurement <ul style="list-style-type: none"> ▪ Learned a lot during training program via training session, group exercises, group discussion etc. ▪ This is the best experience for me because measurement of uncertainty training is beneficiary for me and my company. That is the wonderful job and experience of my life ▪ The friendly and tension free environment created by the trainers ▪ The training program was very effective and now I have come to know about uncertainty measurement and how and where it can be used ▪ Very beneficial for me. Now I am able to understand all other things which are associated with the testing, equipment and reports as an analyst ▪ Calmness of trainers in answering all the queries. ▪ The learning that comes with each course is always good but the way it is given is really important. The Course material/learning were very well disseminated and the ease with which I could learn was good. I enjoyed learning. ▪ I had wonderful experience which is full of knowledge and information which will not only help in my professional life but also personal life. ▪ Programme was very good especially both faculties were extremely good having full knowledge about the concept

List of Participants of Previous Courses

<p>Ms. Parameshwari Gajendra Machha QA Officer Parle Products Pvt Ltd Mumbai Maharashtra T: 022 66916911, 022 67130451 M: 080820 11418 E: machhapg@parle.biz</p>	<p>Mr. Amol Patil Chemsit Reliable Transoil Testing Laboratory Mumbai Maharashtra T: 022-27707080 M: 9664034867, 9869223727 E: reliabletransoil@gmail.com; Amolp2107@gmail.com</p>
<p>Mr. Manjunarayanan N.S Biomedical Engineer HLL Lifecare Ltd Trivandrum Kerala T: 0471-2330447 M: 095398 54155 E: manjunarayanan@lifecarehll.com</p>	<p>Shri Prodip Kumar Sarkar JWM Rifle Factory Ishapore Ichapur-Nawabganj West Bengal M: 091432 00728</p>
<p>Ms. Chandana Borthakur, Dy. Manager (QC Lab) Numaligarh Refinery Ltd. Assam M: 094351 52791 E: chandana.borthakur@nrl.com</p>	<p>Mr. Dulal Phukan, Officer – QC lab NRL,Numaligarh Assam M: 094351 52937 E: dulal.phukan@nrl.co.in</p>
<p>Mr. Saurabh Chaudhari Sr. Executive Intertek India (P) Ltd. Mumbai Maharashtra M: 099871 77468 E: saurabh.chaudhari@intertek.com</p>	<p>Mr. Ajinkya Sawant Executive Intertek India (P) Ltd. Mumbai Maharashtra M: 098703 61292 E: ajinkya.sawant@intertek.com</p>
<p>Mr. Arvind Rudani Premier Colorscan Instruments Pvt Ltd Mumbai Maharashtra T: 022-27637906 E: pci@vsnl.com</p>	<p>Mr. Biju K. J Chemist Petronet LNG Ltd. Kochi Kerala M: 094950 07697 E: bijukj@petronetlng.com</p>
<p>Mr. R. Nagarajan Test Engineer Mesaurematic India Tirunelveli Tamil Nadu M: 077080 12502</p>	<p>Mr. Goutam Kumar Swain Manager – Operation (RSTS) SGS India (P) Ltd. Gurgaon Haryana M: 098717 94643</p>

E: measurematicindia@gmail.com	E: goutamkumar_swain@sgs.com
Mr. Moh ammed Rayees Chemist Petronet LNG Ltd. Kochi Kerala M: 099612 19879 E: rayeesva@petronetlng.com	Ms. Ajanta Sircar Scientist Grade-III National Institute of Biologicals Noida Uttar Pradesh M: 9312012890 E: ajantasircar@gmail.com
Mr. Venkata Suresh Pedasingu Chief Chemist Tribocare Hyderabad Andhra Pradesh M: 095815 31396 E: mail2pedasingu@gmail.com	Mr. Subhash Chand, Jr. Scientist National Institute of Biologicals Noida Uttar Pradesh E: subhash.608@gmail.com
Shri Pankaj Sharma, Jr. Scientist National Institute of Biologicals Noida Uttar Pradesh M: 9891386494 E: pankaj9191@gmail.com	Mr. S. G. Mahajan Head – QA Tata Steel – Wire Division Mumbai Maharashtra E: Suresh.Mahajan@wires.tatasteel.com
Mr. V B Ramteke CFSL New Delhi M: 099683 07782 E: vbramteke@rediffmail.com	Dr. Anita Ittoop Technical Manager Clinical Labs Mumbai Maharashtra M: 098202 31918 E: aittoop@its.inj.com
Mr. Padmanava Panda Manager –Laboratory Mineral Services , SGS India Private Limited Bhubaneswar Odhisia M: 078944 02743 E: Padmanava.Panda@sgs.com	Mr. Rajendra Kumar Kalra Chief Inspector Air India Ltd. New Delhi M: 095400 13555 E: kalra.rajinder@rediffmail.com

<p>Mr. Suhas Salunkhe Manager – QA Tata Steel – Wire Division Mumbai Maharashtra E: suhas.salunke@tatasteel.com</p>	<p>Mr. R. D. Vartak Chief Lab Analyst HPCL Mumbai Maharashtra T: 022 - 25076138</p>
<p>Mr. Vivek Sharma Chief Inspector Air India Ltd. New Delhi M: 093100 22240 E: vivek.sharma1@airindia.in</p>	<p>Mr. Saqib Kapadia Corporate QA Manager Allanasons Ltd. Mumbai Maharashtra M: 099308 11695</p>
<p>Mr. S. A. Salvi Lab Officer HPCL Mumbai Maharashtra T: 022 - 25076138</p>	<p>Mr. R. K. Gandhi Scientific Officer Gujarat Pollution Control Board Gandhinagar Gujarat M: 9879399501 E: rkgandhi88@rediffmail.com</p>
<p>Ms. Manisha Dhumne DiagnoSearch Life Sciences Pvt. Ltd Mumbai Maharashtra T: 022-67776300 E: manisha.ginde@diagnosearch.com</p>	<p>Mr. Swetesh John Sen. Scientist Gujarat Environment Management Institute Gandhinagar Gujarat M: 8000693533 E: swetesh1988@gmail.com</p>
<p>Dr. A.H. Sharma Scientific Officer Gujarat Pollution Control Board Gandhinagar Gujarat M: 9924388669 E: dr_avnesh@rediffmail.com</p>	<p>Mr. Ajay Kumar Garg Q.A.Deptt Minda Industries Ltd. Gurgaon Haryana - 122004 T: 0124-2290693 M: 09810665917 E: ajaygarg@mindagroup.com</p>
<p>Mr. Viral Brahmhatt Sen. Scientist Gujarat Environment Management Institute Gandhinagar Gujarat M: 090990 69897 E: viral_feb15@ymail.com</p>	<p>Mr. Vijay Kumar Bhalwal Technical Officer Isolloyd Engineering Technologies Ltd Solan -174101 Himachal Pradesh M: 094187 33897</p>

<p>Mr. P. N. Wasnik QA Officer Textile Committee Mumbai Maharashtra</p>	<p>Ms. Akanksha Srivastava Manager – Quality Assurance FICCI Research and Analysis Centre New Delhi-110077 T: 011 45333500 Ext. 510 E: akanksha.srivastava@fraclabs.org</p>
<p>Mr. Samresh Kumar Sr. Testing Engineer Atharva Laboratories Pvt. Ltd. Greater Noida Uttar Pradesh M:09990363651 E: samresh@live.com</p>	<p>Ms. Shalini Tyagi Quality Manager – Food Labs Intertek India Ltd. Gurgaon Haryana T: 0124 4840600 Ext. 611 M: 096506 01103 E: shalini.tyagi@intertek.com</p>
<p>Mr. Nek Mohammad Technical Officer Isolloyd Engineering Technologies Ltd Solan -174101 Himachal Pradesh M: 094592 97168</p>	<p>Mr. Anshul Sharma Food & Drug Lab Spectro Analytical labs Ltd. New Delhi M: 083759 50184 E: anshul1102@gmail.com</p>
<p>Mr. Prabhat Soni Section In charge (Microbiology) Advance Research & Analytical Services Ghaziabad Uttar Pradesh - 201009 M: 099905 20980 E: prabhatsoni29@yahoo.in</p>	<p>Ms. Aruna Singh Section In Charge – Wet Chemical Lab Intertek Pvt. Ltd. Gurgaon 122016 Haryana M: 099719 04389 E: aruna.singh@intertek.com</p>
<p>Ms. Rashmi Gupta FICCI Research and Analysis Centre New Delhi 110077 M: 098735 68817 E : rashmilaharia@gmail.com</p>	<p>Mr. Puneet Bhardwaj Head – BV Plus Services Bureau Veritas India Noida -201301 Uttar Pradesh M: 9999812138 E: puneet.bhardwaj@in.bureauveritas.com</p>
<p>Ms. Renu Singh Section In charge – Microbiology Lab Intertek Pvt. Ltd. Gurgaon 122016 Haryana M: 098916 56255 E: renu.singh@intertek.com</p>	<p>Mr. V. R. Anand Asst. Dir. (Ballistics) & DQM Forensic Science Laboratory Delhi-110085 M: 090133 00038 E: vijay1973anand@gmail.com</p>

<p>Mr. Abhimanyu Kumar Dy. Manager – Polymer & Rubber Lab Spectro Analytical labs Ltd. New Delhi M: 098717 12161 E: abhimanyu_sharma53@rediffmail.com</p>	<p>Dr. Sandeep Kumar Mourya SSA (Physics) Forensic Science Laboratory, Delhi-110085 M: 088008 23387 E: sandeepmourya07@rediffmail.com</p>
<p>Ms. Shipra Jain Head – QA & HSE Bureau Veritas India Noida -201301 Uttar Pradesh M: 088001 98061 E: shipra.jain@in.bureauveritas.com</p>	<p>Mr. Libin Kumar K.V. Section In charge – RSTS Lab SGS India (P) Ltd. Gurgaon- 122015 Haryana M: 099992 63650 E: itslibin@gmail.com</p>
<p>Mr. Anirban Ghosh Cairn India Ltd. Gurgaon Haryana - 122054 M: 088263 92072 E: anirban.ghosh@cairnindia.com</p>	<p>Mrs. Kavita Goyal SSO (Chemistry) Forensic Science Laboratory, Delhi-110085 M: 099680 93569 E: kavita_goyal74@yahoo.co.in</p>

FACULTY	For any query or reserving your seat for other programs, please contact
<p>Mr. B. Bhattacharya Consultant - FQF M : +91-9869354407 E: basudev44@gmail.com</p>	<p>Mr. Mritunjay Kumar Deputy Director – FICCI Quality Forum M: +91 – 9911164501 T: +91 11 2348 7356 E: Mritunjay.kumar@ficci.com</p>