

### January/February 1995

Accurate Traceable Power Calibration at High Frequencies  
Guest Editorial: Certifying the Certifier  
Streamlining the Documentation Process for ISO 9000

### March/April 1995

The Josephson Primary Voltage Standard: A New Voltage Calibration System with 5 ppb Uncertainty  
EMI Calibration Requirements  
ANSI/NCSL Z540-1: A New National Standard for Calibration Laboratories and Equipment

### May/June 1995

The NIST Frequency Measurement Service  
Temperature Measurement with AC and DC Bridges  
Sandia's New Primary Standards Laboratory  
Determining Mass Measurement Uncertainty

### July/August 1995

Producing the Highest Level of Accuracy from Standard Platinum Resistance Thermometers  
Performance of a Multilayer Thin-Film Multijunction Thermal Converter  
Gas Flowrate Calibration Using a Piston Prover and A Laser Doppler Displacement Meter  
Automatic Calibration of Height Setting Micrometers Using A Laser Interferometer  
An Update on Worldwide Cleanroom Standards

### September/October 1995

Soldiers Into Farmers: The Future of Calibration Services (Survey)  
Preparing for NVLAP Accreditation: One Company's Story  
Precision Temperature Calibration On Platinum Resistance Thermometers Using AC Thermometry Bridges  
Cryogenic Flow Calibration at NIST  
A Private Sector Role in the Accreditation of Calibration Laboratories

### November/December 1995

The Making of a Low Gauss Solenoid: The Legacy of 1936  
Phase Standards: Design, Construction, Traceability and Verification  
Magnetic Calibration at the U.S. Navy Primary Standards Laboratory  
Eliminating A Source of Stepping Noise in Josephson Voltage Standards  
Design of a Calibration Platform for Scanning Probe Microscopes and Other Probing Systems  
Accurate Calibration of Vibration Transducers from 0.25 Hz to 1,5000 Hz

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### January/February 1996

Maintaining the Primary Standard of Resistance Using a Cryogenic Current Comparator  
An Introduction to Frequency Calibration  
EMC Calibration: European EN Standards are Driving a New Service  
A Measurement Technique to Improve Automatic Accelerometer Calibration  
Notes from the British Electromagnetic Measurements Conference  
Notes from the Metrology of the Americas Symposium

### March/April 1996

ANSI/NCSL Z540 Update  
One Company Has It All: NAMAS and NVLAP Accreditation  
ISO 9000 Versus ISO Guide 25 for Laboratories  
Adopting Calibration Adjustment Philosophy to Microprocessor Based Instruments  
An Introduction to Frequency Calibration Part II  
Notes from the Measurement Science Conference

### May/June 1996

New Techniques in Automated, High Performance Oscilloscope Calibration  
Metrology Education: Opening the Door to the Next Century of Competitiveness  
Recent Advances in Oscilloscope Capabilities  
Performance Verification of Small Volume Mechanical Action Pipettes  
Measuring Screw Threads: When New Technology Meets Old Practices  
Understanding Low and Medium Frequency Impedance

### July/August 1996

The Josephson Primary Voltage Standard: Towards a Mobile Turnkey System  
The Trident Exchange Pool: Calibrated Test Equipment - To Go  
Current Developments in the Chilean Metrology Situation

Development of A Resistance Thermometer for Use Up to 1600°C  
The Elusive Properties of Magnetism in Mass Standards  
Tolerance Calculator: A Freeware Metrology Tool

#### September/October 1996

Recent Developments in Software-Controlled Automated Resistance Bridges  
Non Traditional Applications of Field Calibrators  
Combination Valve Enables In-Situ Zeroing and Calibration of Capacitance Manometers  
The Design Aspects of a Documenting Process Calibrator  
A Universal Length Measuring Device to Measure and Calibrate Gauges  
The New Uncertainty Estimates and How They Affect Pressure Measurement

#### November/December 1996

Laboratory Accreditation: The Need for a National Infrastructure  
The Single Process Initiative: Fast Road to Commercial Practices  
The New Approach: Present and Forthcoming Situation for the European Directives  
A Third True Hamon Ratio  
The Advantages of Portable Coordinate Measuring Machines  
Answers to Commonly Asked Questions About Mass Standards  
Four Terminal-Pair Concepts

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#### January/February 1997

Developing A Process Measurement Assurance Program  
Improving Accuracy in Low Pressure Measurements  
Inspection Moves from Post to Pre for Machine Tools  
The Single Process Initiative: Fast Road to Commercial Practices  
A Third True Hamon Ratio

#### March/April 1997

Notes from the Measurement Science Conference  
Uncertainty Calculator: A Freeware Tool for Expressing Measurement Uncertainty  
A Statistical Approach to Calibrate High End Digital Multimeters  
Simple Tests for Evaluating Digital Storage Oscilloscopes  
Calibration of Multifunctional and Multirange Measuring Instruments Using Functional Blocks  
Calibration and Maintenance of Deadweight Testers

#### May/June 1997

A New NIST-Certified Small Scale Pitch Standard  
Highly Accurate Direct Mass Measurements Without the Use of External Mass Standards  
An Evaluation of Commercial Solid State Zener Voltage Standards  
Tips on Handling and Maintenance of Precision Weights

#### July/August 1997

A Generic DMM Test and Calibration Strategy  
Evaluations of Water Triple Point Cells: A Summary Report of Recent International Intercomparisons  
Resistance Measurement Systems with Sub-ppm Accuracies

#### Sep/Oct 1997

Analytical Chemistry Measurement Assurance Programs: More Than Just Measurement Control  
Type A/Type B Uncertainty Calculations Demystified  
Laboratory Makeover: Plan for Equipment Storage  
How to Choose the Appropriate Pipets and Pipet Tips for Your Applications

#### Nov/Dec 1997

Guildline Instruments Celebrates 40 Years of Achievements  
Changes Proposed by the Draft ISO/IEC Guide 25  
Using the ISO "Guide to the Expression of Uncertainty in Measurements to Determine Calibration Requirements"  
Advances in Environmental Parameter Measurements: The EMDAS  
The Application of Decentralized Computer Systems for Environmental Monitoring

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#### January/February 1998

End-to-End Temperature Calibration - A Matter of Degree  
Improving the Laboratory Management Process  
A New Generation of Fixed Points  
Implementing Automated Oscilloscope Calibration Systems

### March/April 1998

Freeware: Mismatch Uncertainty Calculator  
Privatization: The Future of Government Laboratories  
A Simple Resistance Bridge Calibrator  
Selecting a Commercial Calibration Service

### May/June 1998

Isotech's New ITS-90 Primary Thermometry Laboratory  
Statistical Analysis of Network Analyzer Measurements  
A New Gauge Management Software  
Temperature Measurements With Pure Element Thermocouples

### July/August 1998

Secondary Calibration of Tube Mass Flow Meters  
Sources of Error in Mass Determinations  
A Custom Shop Floor CMM  
Setting Up a Pressure Calibration Laboratory

### September/October 1998

A Successor to the Wheatstone Bridge: NASA's Anderson Loop  
NVLAP Calibration Laboratory Accreditation: A Working Example  
Setting Zero on an Absolute Pressure Transducer  
Calibration of Total Harmonic Distortion Meters

### November/December 1998

Profile: International Society of Antique Scale Collectors  
The Development of An Oceanographic Water Triple Point Cell  
Difficulties in Achieving Well Characterized Accuracy and Reproducibility in Micropipettes  
Reference Material Standardization Guidelines for Quality Control and Validation of UV/VIS Absorption Spectrophotometers  
The Case for Functional Fit Philosophy

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### January/February 1999

U.S. Metrology Training for the 21st Century  
Improved Uncertainty in 10 Volt Standard Cells Using an Ensemble and Modified Uncertainty Predictions  
Using Data Normalization to Get the Most From Your Equipment Database  
Combustible Gas Monitoring: Technology Choices and Metrology Issues

### March/April 1999

A Mutual Recognition Agreement for National Measurement Standards  
Are Your Magnetic Measurements Really Traceable: An Introduction to NPLs Capabilities  
Tele-Calibration of Gas Flow Meters  
Maintenance and Calibration of Highway Automated Remote Transducer Field Instrumentation  
Verifying a Short (Zero) Connection with Kelvin Clips

### July/August 1999

Development of a 100A Transconductance Amplifier  
A Modular, Portable Quantized Hall Resistance Standard  
The Effect of Vacuum Exposure on Mass Standards  
Measurement Accreditation of Electrical Calibration Laboratories

### September/October 1999

Verification Methods for Microwave Network Analyzers  
A New DC Voltage Maintenance System  
Traceability in Time and Frequency Metrology  
Telecom Metrology

### November/December 1999

Intrinsic and Derived Standards: Rebuttal to Are They Really What They Claim  
Intrinsic and Derived Standards: Are They Really What They Claim  
Diode Lasers in Length Metrology: Application to Absolute Distance Interferometry  
Buying Instruments on the Internet: Introducing www.testmart.com

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### January/February 2000

Fluke's Acquisition of Wavetek-Datron  
Challenges in Developing the Space Clock  
Controlling Pipette Performance  
Advantages of Commercial Calibration Software

### **March/April 2000**

The How's and Why's of Proficiency Testing  
Profile: National Association for Proficiency Testing  
The Current Status of U.S. Gear Measurement Traceability and Uncertainty  
A Proposal for the Establishment of Measurement Uncertainty for Pressure Dial Gauges and Transducers

### **May/June 2000**

ISO/IEC 17025: Highlights of the New Requirements for Calibration Laboratories  
The Practical Significance of Electrical Harmonics  
Standard Resistors: Their Use and Maintenance, an Overview  
Precise Measurement of Complex Voltage Ratios at Power Frequencies  
Measurement of Relative Magnetic Permeability

### **July/August 2000**

Thermal Conductivity Standards at Britain's NPL  
The BIPM/IGS High Accuracy Time Project  
A Revealing Study of Low Conductivity Solution Standards  
Quality Audit Standards for Particle Sizers

### **Sep/Oct 2000**

How to Ensure Timebase Accuracy: Prepping the Techs in the Trenches  
Metrology Education in the New Millennium  
Sources of Uncertainty in Standard Resistors  
The Advantages of Customized Software

### **Nov/Dec 2000**

A Certification Program for Calibration Technicians: An Initiative in the Works  
Internet-Based Calibrations of Electrical Quantities at the United Kingdom's National Physical Laboratory  
Issues in Purchasing and Maintaining Intrinsic Standards  
The Business of Calibration: The Role of Marketing and Customer Service

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### **January/February/March 2001**

Future Voltage Metrology at NIST  
A Century of Impedance  
Methods for Estimating Uncertainty of Electronic Balance Measurements  
Practical Humidity Calibration Experience

### **April/May/June 2001**

not published

### **July/August/September 2001**

A History of U.S. Accreditation  
Time and Frequency Using GPS  
A Platinum Resistance Thermometer for -200 deg C to 661 deg C

### **October/November/December 2001**

Automating Pressure Sensor Manufacturing  
Temperature, Scales and Isothermal Volumes: A Primer  
Developing a Metrology Program Without a Laboratory

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### **January/February/March 2002**

Strategic Measurement Services: Increasing the Corporate Value of Your Cal Lab  
Recommended Practices for Flowmeter Use and Calibration  
Determining Uncertainty in Accredited CMM Field Service Calibrations  
The QA Managers Guide to Selecting A Calibration Service Provider  
2002 Directory Consultants and Training Services

### **April/May/June 2002**

2002 Directory of Calibration Service Providers  
Profile: International Measurement Confederation (IMEKO)  
Magnetic Measurements  
The Development of A New Software Standard (Fluke's MetCal Plus 7.0)

### **July/August/September 2002**

2002 Directory of Calibration Products and Services: Instrument and Software Manufacturers  
Update on the ASQ Certified Calibration Technician Program  
The Theory and Operation of Optical Chilled Mirror Hygrometers for Humidity Calibration  
MUDCATS: A Comprehensive New Software Program

### **October/November/December 2002**

Meeting ISO 17025 for Complex Electronic Equipment  
The Value of Proficiency Testing  
Hidden Challenges of Relative Humidity Calibration  
DeVry University's Engineering Program

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### **January/February/March 2003**

Torque and Its Impact on the Bottom Line  
Characterization of NPL India's Hydraulic Pressure Standards  
Gravimetric vs. Spectrophotometric Errors in Pipette Calibration

### **April/May/June 2003**

Radio Signals for Time and Frequency Measurements  
Improving Power Quality Measurements  
Buying Reconditioned Test Equipment  
Innovations in Proficiency Testing

### **July/August/September 2003**

2003 Directory of Calibration Products and Services  
Calibration of SPRTs in a Primary Laboratory  
A New Low Current Measurement System  
When Equipment Rental Makes Sense

### **October/November/December 2003**

Calibration Certificates: Look Closer Before Filing  
Gas Detectors and Occupational Safety  
A Statistical Procedure to Maintain Point Value

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### **January/February/March 2004**

Hart Scientific's New UK Primary Standards Lab  
Promoting the Calibration Agenda  
Evaluation of Outliers in Metrological Data  
Switching from Chart Recorders to Data Loggers

### **April/May/June 2004**

Integration of ISO 10012 Into US Measurement Processes  
Statistical Control of Flow Calibration  
A Primer on Vibration & Shock Calibration  
Radiation Thermometer Facilities at NIS, Egypt

### **July/August/September 2004**

Agilent Technologies' New Measuring Receiver  
Bridging the Gap Between Documentary Standards  
A Primer on Vibration & Shock Calibration, Part II  
Using the Government Purchasing Website

### **October/November/December 2004**

A Direct Comparison Calibrator for RF Power Sensors  
Mass vs. the Ampere: Evolution in SI Units  
Determining the Right Software for Your Business  
A New Polydisperse Particle Size Reference Standard

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### **January/February/March 2005**

Metrology Training Grants  
Stable Low Level Conductivity Standards  
Selecting the Right Balance  
Calibrating Precision Multimeters Using a Characterized Multifunction Calibrator

### **April/May/June 2005**

Calibrating Frequency Sources  
Considerations in Determining Calibration Status  
Effects of Different Surroundings on the Stability of SPRTs from 650° through 1000°C  
Making Accurate DC Voltage Measurements in the Presence of Series Mode AC Signals

### **July/August/September 2005**

Using Metrology As a Competitive Weapon  
Single Instrument Calibration of Signal Generators to 50 GHz

Uncertainty Analysis When Using Multifunction Calibrators to Calibrate DMMs  
The Effect of Air Laden Soluble Salts on Dew Point Measurement

**October/November/December 2005**

A Measurement Assurance Program for Flow Calibration by the Transfer Method  
Measurements of a Hydraulic Valve System Using New NDT Techniques  
A Calibration Software With Advanced Uncertainty and Prediction Capabilities  
The Acropolis Width and Ancient Geodesy

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**January/February/March 2006**

Using a Mini Triple Point of Water System to Improve Reliability  
Preparing for Tomorrow: Trends in Metrology  
Evaluation of Associated Uncertainties in Direct Pressure Electromechanical Devices  
Adding Measurement Functions to Multi-Product Calibrators to Improve Functionality

**April/May/June 2006**

Not published

**July/August/September 2006**

Outsourcing Metrology Services  
Recent Improvements in AC-DC Difference Calibration Service for Thermal Transfer Standards at NIS, Egypt  
The New National Measurement Institute Australia  
A 1kg Prototype Balance for High Precision Mass Determination and Research Applications

**October/November/December 2006**

Variation of the Isotopic Ratio  $^{15}\text{N}/^{14}\text{N}$  in Nitric Oxide Calibration Gases May Bias Analytical Results  
Better Accuracy in Temperature Calibration and Measurement Through a New Type of Analog-to-Digital Converter  
Implementation of a Commercial Quantum Hall Resistance System  
Going Paperless and Wireless

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**January/February/March 2007**

The Design, Development and Commissioning of a 2 kNm Torque Standard Machine  
GPS Receiver Calibration: Why Is It Necessary  
A Portable Accredited Humidity Calibration System

**April/May/June 2007**

Methods for Evaluating the Condition of PRTs  
Error Propagation in Laser Scanning for Dimensional Inspection  
Building the Mahr Federal Precision Measurement Center  
Calibrating Pressure Sensors for Critical Environments

**July/August/September 2007**

Measuring the Netherlands Meter by Atomic Clock  
A Calibration Software and Metrology Analysis Tool  
Multi-Channel Converters for Electrical Capacitance Standards  
Influence of the Accuracy of the DC Source on the AC-DC Differences of Micropotentiometers

**October/November/December 2007**

Metrology Education and Training — NCSLI Taking the Initiative  
Managing Change in an ISO/IEC 17025:2005 Environment  
Use of SPC in Maintenance and Quality Verification of a DC Voltage Reference Standard  
A New Solution for Shock and Vibration Calibration of Accelerometers  
Building a Better Cal Lab Workstation for the Naval Surface Warfare Center

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**January/February/March 2008**

Fluke Precision Measurement: Organic Growth + Acquisition = Innovation  
So Your Laboratory is Accredited — Now What?  
High Aspect Ratio Sensors in Microscale Metrology  
What the Specifications of Your Humidity Measurement System Might Be Missing

**April/May/June 2008**

Selecting a Primary Frequency Standard for a Calibration Laboratory  
Maintaining In-Situ Traceability on the Factory Floor  
Volumetric Positioning Error Measurement at Various Thermal Conditions  
On-Line Training for Metrology

### **July/August/September 2008**

Comparison Between Melting and Freezing Points of Aluminum and Silver  
Designing Performance Measures for Calibration and Technical Laboratories  
RF/Microwave Coaxial Connector Care

### **October/November/December 2008**

Not Published

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### **January/February/March 2009**

The Basics in Temperature Measurement  
Towards the Improvement of Metrology in Africa: The Role of CAFMET  
Metrology Impact in Technological Universities, Mexico

### **April/May/June 2009**

Fieldbus Calibration With Intrinsically Safe Calibrators  
Predominant Errors in Calibration of Precision Diameter Measurement Equipment  
Performance of the Single Junction Thermal Voltage Converter at 1 MHz via Equivalent Circuit Simulation

### **July/August/September 2009**

The Electronic Deadweight Tester — A Modern Replacement for the Conventional Deadweight Tester  
The Basics of Measurement, Traceability and ISO/IEC 17025  
The Benefits of Automated RF & Microwave Testing for Calibration, Compliance, and Customer Satisfaction  
A Day at the BIPM

### **October/November/December 2009**

Fabrication of A New Decade Resistance Using Parallel Port Technique  
Source Based Discrepancies in UV Meter Calibrations  
Assessment of Compliance with Specifications  
NPSL National Interlaboratory Comparison: Length of Short Gauge Blocks

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### **January/February/March 2010**

Practical Aspects of High Resistance Measurements  
Some Factors That May Affect the Calibration Accuracy of Universal Testing Machines  
Pressure-Indicating Film Characterization of Wafer-to-Wafer Bonding  
Test Sieve Weaving Uncertainty

### **April/May/June 2010**

Uncertainty Considerations for Gas Flow Rate Reference Measurement Systems  
Manual/ Automated Decade Resistance Using Microcontroller Technique  
Metrology for a Competitive Advantage

### **July/August/September 2010**

Micro-Feature Dimensional and Form Measurements with the NIST Fiber Probe on a CMM  
A Programmable Calibration System for Accurate AC Current Measurements at NIS, Egypt  
Calibration Management in the ISO/IEC 17025 Accredited Facility

### **October/November/December 2010**

Evaluating and Documenting Substitution Inspection, Measuring & Test Equipment  
A New Compact Low-Cost 1kN Force Standard at NIS, Egypt  
Ready to Assemble Ruler Calibrator