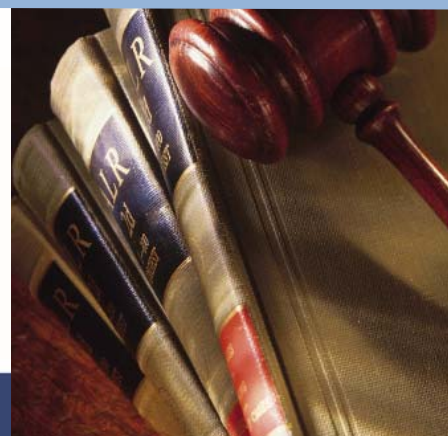
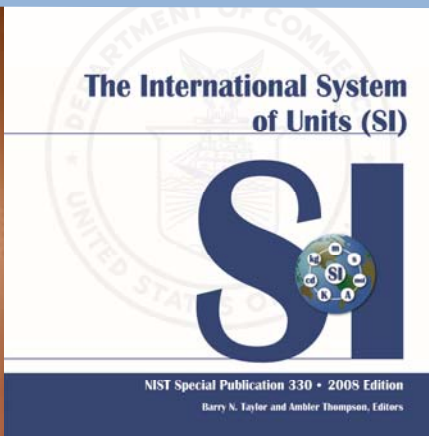


Office of Weights and Measures



Promoting uniformity in U.S. weights and measures laws, regulations, and standards to achieve equity between buyers and sellers in the marketplace.



Physical Measurement Laboratory

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TOP HIGHLIGHTS

Training Program

- Courses/Students: 41/750 (actual) vs. 40/450 (projected)
- Offered new seminars/webinars: 3/3 (actual) vs. 2/4 (projected)
 - **Seminars:** Liquefied Petroleum Gas (LPG) Liquid-Measuring Systems Training; Fundamentos de Metrologia; Advanced Mass Seminar (Rev 2015);
 - **Webinars:** Webinar - Draining 5-Gallon Test Measures and Provers; State Lab Annual Submission - Uncertainty Assessments; Webinar - State Laboratory Annual Submission Process (PT Follow-up and analysis)
- Conducted After Action Review: 73 % (actual) vs. 50 % (projected)
- 27 Trainers attended 3-day training

Publications

- Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices (HB44)
- Uniform Laws and Regulations in the Areas of Legal Metrology and Engine Fuel Quality (HB130)
- Checking the Net Content of Package Goods (HB133)
- Testing Packages of Animal Bedding with Compressed and Expanded Volume Declarations
- Selected Laboratory and Measurement Practices and Procedures for Length Calibrations (2014)— NISTIR 8028 (Oct., 2014)
- Unit Pricing Guide, “A Best Practice Approach to Unit Pricing”— SP 1181
- “Weights and Measures Connection” newsletter 11 Featured Articles:
 - Measurement and Marketing: Considerations when Determining the Method of Sale for CNG/LNG
 - Testing Compressed Natural Gas Retail Motor-Fuel Dispensers/ Arriving Prepared to Test —Web HB 133-2015 —Topic Areas
 - NCWM Affirms Method of Sale for “Products Sold in Pressurized Containers Using Bag on Valve Technology (Pub. 12/10/14)
 - Draft Procedure for Determining the Amount of Purge from Chitterlings (Pub. 10/14/14)
 - Changes to Product Labeling for Meats and Poultry with Added Solutions—Vol 6 #4

Laboratory Recognition/Accreditation

- NIST Mentoring/Training Results
 - 4 of labs regained recognition/1 new lab accredited
 - Expanded or restored scopes of labs
- Laboratory Recognition
 - 16 labs accredited/45 labs recognized
- Metrology Education Liaison and Outreach
 - NCSLI Education Liaison and Outreach Committee
 - American Society for Engineering Education

Laws Program

- Publication of Best Practices Guide on Unit Pricing in Retail Stores.
 - ISO to incorporate significant portion into an International Standard
- Developed new and revised test methods for animal bedding, mulch, firewood, chitterlings, and borax that have been accepted for consideration by NCWM.
- FTC published a revision to the Fair Packaging and Labeling regulations that incorporated OWM recommended changes including incorporating NIST conversion tables in the CFR.

Legal Metrology Devices Program

- Weigh-in-Motion Equipment (highway weight enforcement screening)
 - Standards developed; collaboration with U.S. DOT and NCWM
- Hydrogen Vehicle Refueling Equipment
 - Standards developed and adopted for equipment and “method of sale”
 - Test methods being refined; collaboration with NIST
- Electric Vehicle Refueling Equipment
 - Standards developed and adopted for equipment and “method of sale”
 - Test methods being developed
- Taximeters and Transportation Network Systems
 - Existing taximeters code updated
 - New standards for GPS-based transportation network companies being developed

International Legal Metrology Program

- Publication of OIML R117: Standard for Measurement of Liquids other than Water
 - Includes petroleum products
- Secretariat of the OIML TC/SC on Road Traffic Safety
 - OWM released three technology-specific annexes
 - Covers radar, lidar, and time/distance measurement
- OIML Breath Testing Standard
 - Engaging International Association for Chemical testing (IACT) – DOT/NHTSA, Law enforcement and Manufacturers
 - Harmonization of national & international device specifications

Weight and Measures Outreach

- Outreach events conducted: 26 (actual) vs. 10 (projected)
- Contacts made: 1169 (actual) vs. 500 (projected)

MESSAGE FROM THE CHIEF

When the Office of Weights and Measures (OWM) was created back in 1836, no one could have imagined the transformation that would take place over the next 180 years.

From the assessment of U.S. Custom Houses and the manufacture and distribution of state standards, to the formation of the National Bureau of Standards and the National Conference on Weights and Measures, the Office of Weights and Measures has played an integral role in the success of our nation's commercial marketplace. Having been a part of this organization for the past ten years, I have developed an incredible respect for the history surrounding OWM and also for the people who have worked here.

Our mission: To improve the accuracy of measurements, enhance consumer protection, foster fair competition, and facilitate economic growth and trade through technical activities that promote uniformity in national and international legal metrology laws, regulations, standards, test procedures, and enforcement.

We accomplish our mission, in cooperation with our partners and stakeholders, through the following activities and programs: training, publications, laboratory metrology program, laws program, legal metrology devices program, international legal metrology program, and the metric program.

We've put together this Annual Report to summarize our accomplishments during the past year, but also to chart where we're going in the years to come. We welcome your feedback, comments, and questions, and look forward to improving upon this first edition of the OWM Annual Report.

While OWM has changed and evolved to fulfill its mission, we remain true to our original goal of uniformity in commerce.





GOAL

The NIST Office of Weights and Measures analyzes weights and measures training needs, obtains input from the weights and measures community, designs and delivers training for laboratory metrologists and weights and measures officials, measures the impact and effectiveness of training to ensure ongoing continual improvement, and consults with the weights and measures community to ensure ongoing professional development.

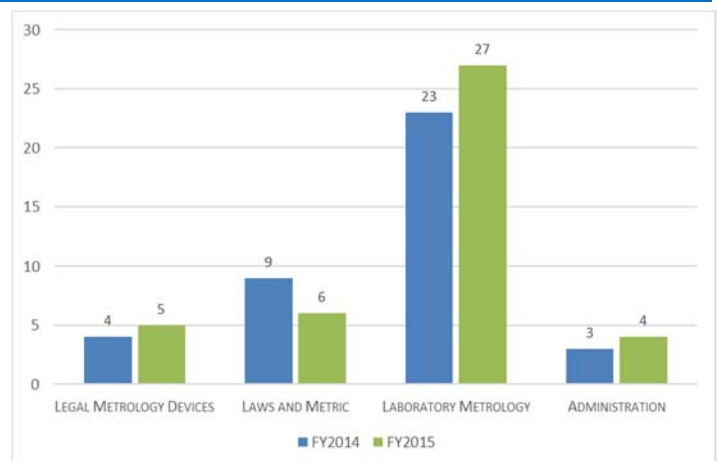
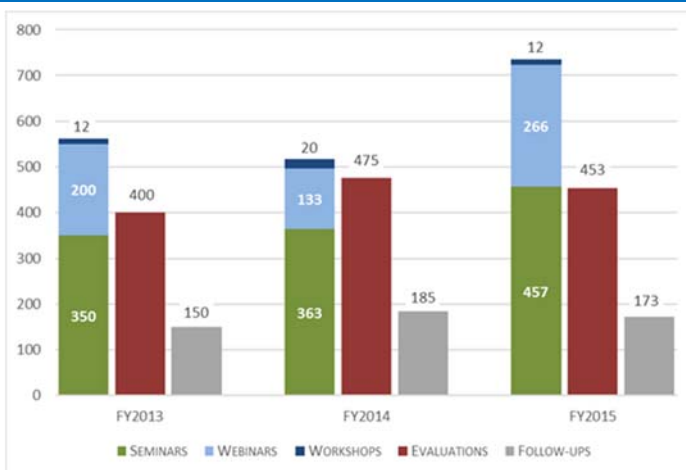
TRAINING PROGRAM

NIST Mentoring/Training Results: Two More State Metrology Labs Apply for NVLAP Accreditation. With the support and encouragement of the Office of Weights and Measures (OWM), Colorado and Alaska have both applied for NVLAP accreditation, bringing the total number of state labs that are seeking or currently have accreditation to 19. Both laboratories were the recipients of on-site assessments and training through the NIST Office of Weights and Measures. To encourage the states to pursue accreditation, OWM subsidizes the cost of NVLAP administrative and on-site assessment fees in support of measurement acceptance and credibility for legal metrology.

Workshop for New Administrators offered by NIST Office of Weights and Measures: The NIST Office of Weights and Measures hosted a New Administrators Workshop for Directors of the state Weights and Measures programs. Participants from 14 states engaged in three days of intensive training, acquiring the skills, knowledge, and tools they need to manage their regulatory programs back home. As a result of this training, all of the administrators committed to strengthening and improving their programs in some way. State Weights and Measures programs ensure the seamless occurrence of commercial transactions across the country, impacting approximately 50 % of the Gross Domestic Product each year. NIST is responsible for securing uniformity in weights and measures laws and applications, and fulfills this mission in part through its training program.

Students Counts and Survey Responses

Training Types Offered

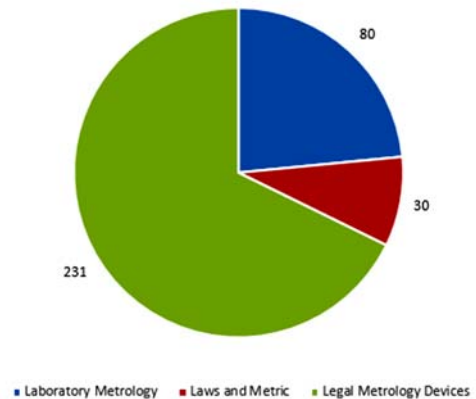


Total number of training for FY2014 = 37 vs. FY2015 = 41

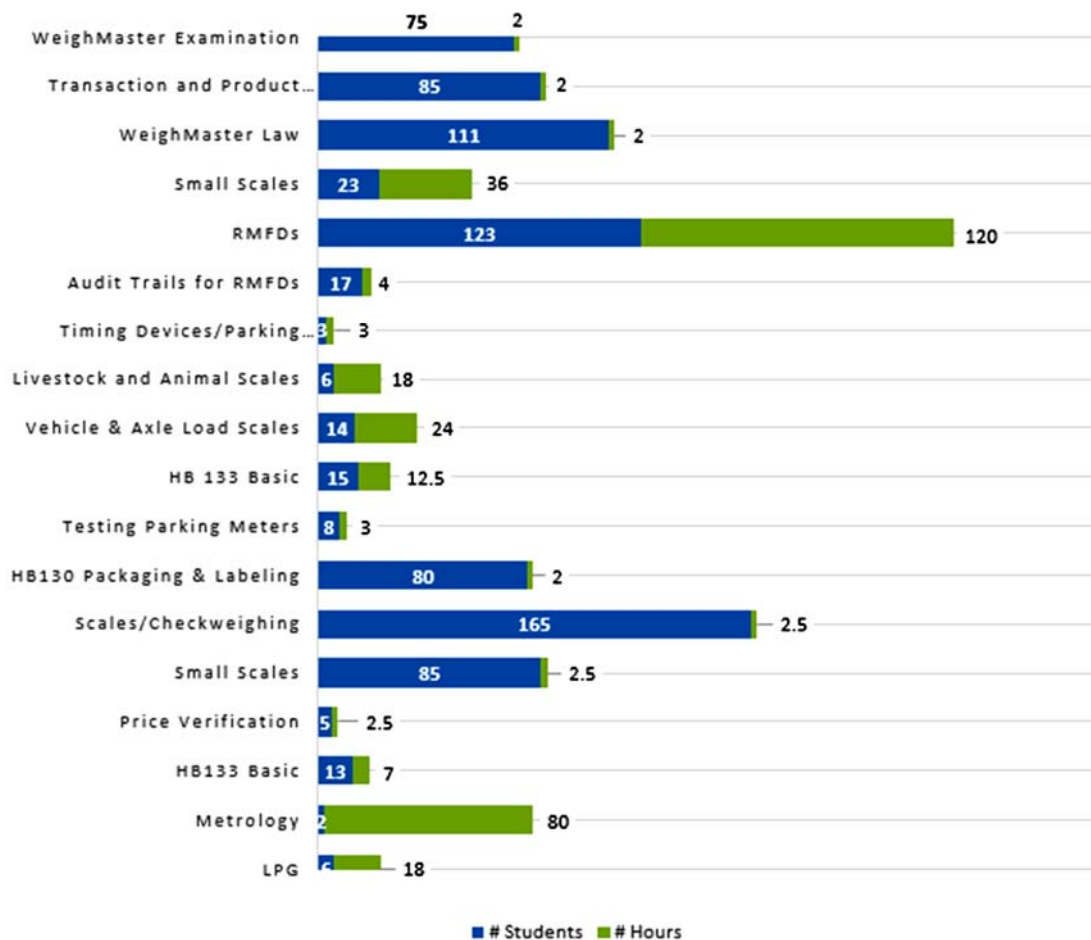
CONT...TRAINING DONE BY NON-NIST TRAINERS

NIST Trains Trainers for Weights and Measures Programs. The NIST Office of Weights and Measures (OWM) hosted 27 students at a three day workshop (April 14 – 16) as part of their Train the Trainer program for regulatory weights and measures officials. The agenda included development and assessment of instructors, the importance of using participant centered activities, and the opportunity to design and critique exercises to be used in future training. As part of its mission to secure uniformity in weights and measures laws and applications, OWM conducts training for regulators and industry. By preparing regulatory experts to conduct training on NIST's behalf, OWM is expanding its reach beyond the 600 or so students that attend NIST training each year.

By Program
(Students-Hours of Training)



By Subject





GOAL

The OWM Laboratory Metrology Program provides the basis for ensuring traceability of state weights and measures standards to NIST. State legal metrology laboratories are custodians at the State level of measurement standards that serve as the basis for ensuring equity in the marketplace and as reference standards for calibration services for indigenous industry.

LABORATORY METROLOGY PROGRAM

Laboratory Recognition

- Required for legal metrology

Training The newly revised **Advanced Mass Seminar** was taught June 1 to 11, 2015. A previous version of the class was taught in conjunction with NIST staff in the Office of Weights and Measures, the Statistical Engineering Division, and the Mass and Force Group since 1993 in alternating years. This year, training also included staff from the Fundamental Electrical Measurements Group, who talked about the Watt Balance and the new SI. The updated class has been extended to 9 days and combines the previous classroom seminar and hands-on seminar to integrate hands-on activities in all sessions and to be in compliance with the OWM IACET training accreditation. Since 1993, nearly 250 participants have been trained in mass dis-

semination techniques in the Advanced Mass Seminar and Advanced Hands-On Seminar. Attendees include all branches of the U.S. military, U.S. Department of Energy, weight and balance manufacturers, industry, and State weights and measures laboratories, as well as a number of international metrologists from Central and South American National Measurement Institutes. An overwhelming majority of laboratories accredited in the United States to perform precision mass calibrations through dissemination techniques have attended this course.

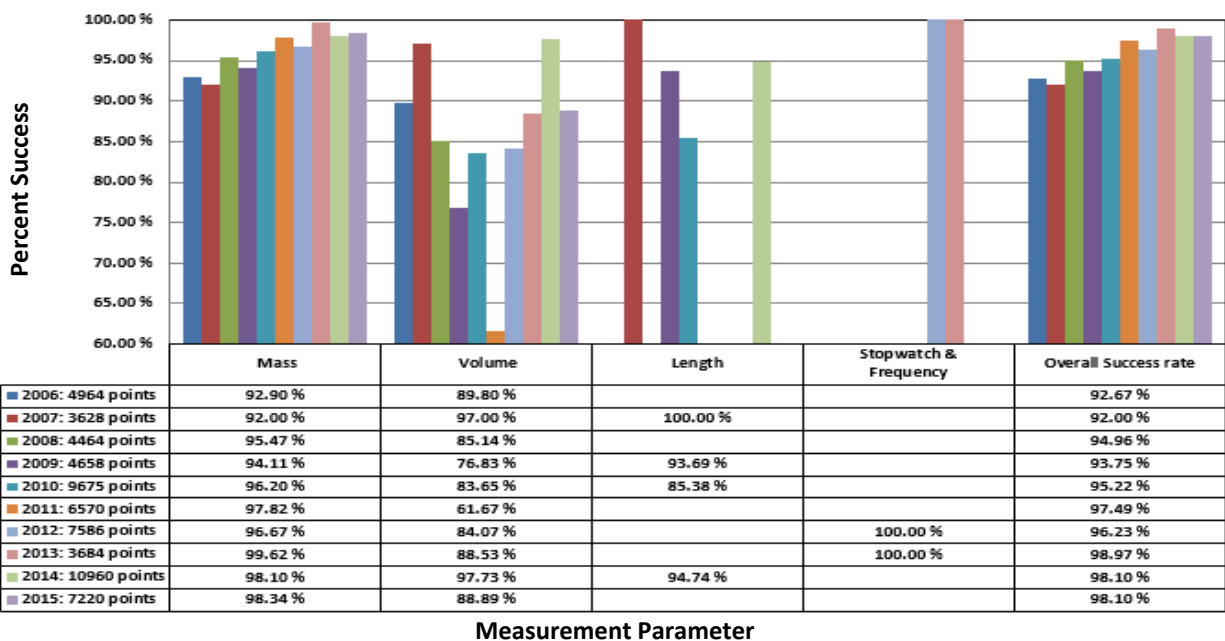
Proficiency Testing

- Objective evidence of the success of training
- Required for Lab Recognition/Accreditation

Standards Development

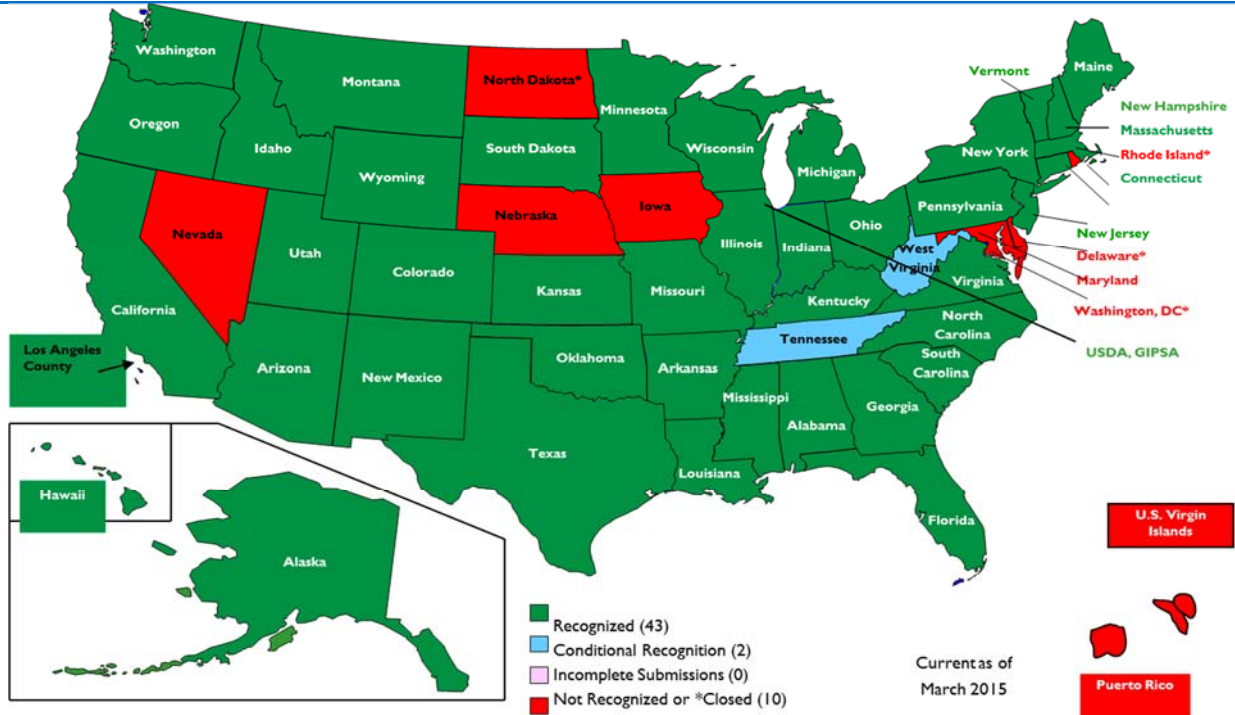
- Supports W & M field standards

Proficiency Testing Success Rate

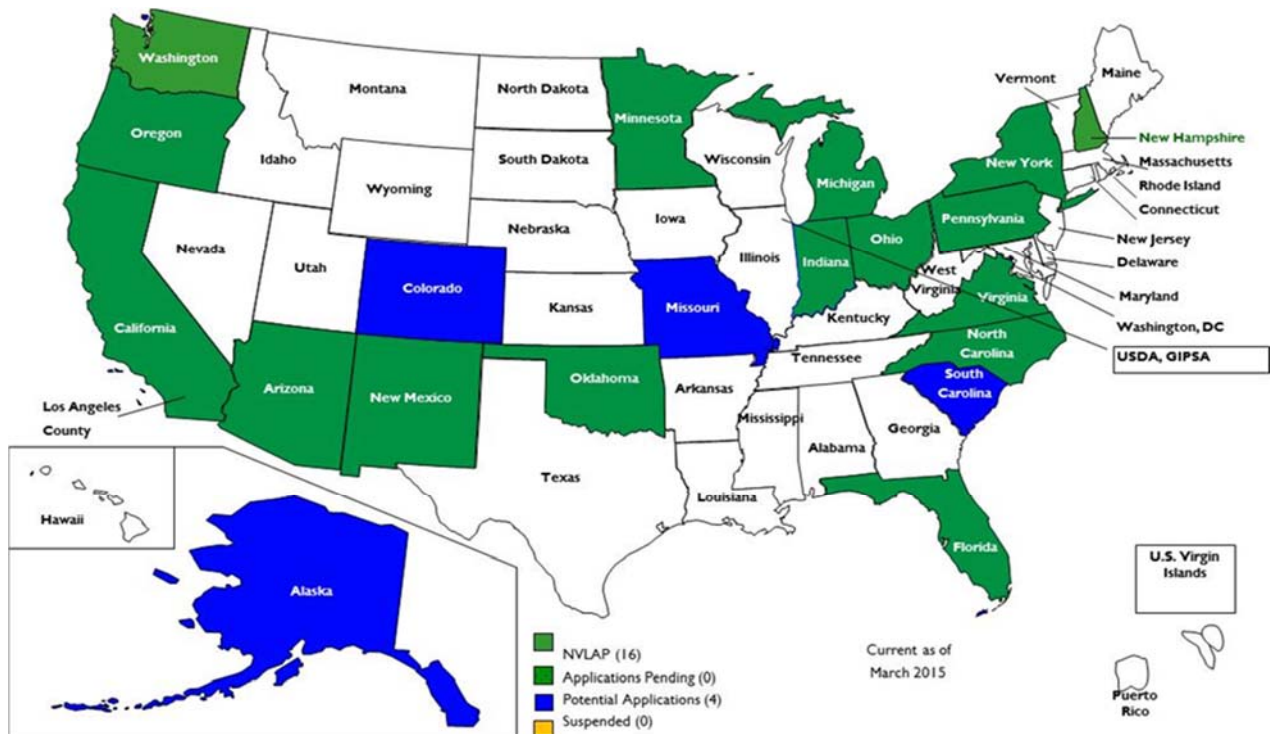


CONT...LABORATORY METROLOGY PROGRAM

U.S. State Metrology Laboratories—OWM Recognition Status (2015)



U.S. State Metrology Laboratories—NVLAP Accreditation Status (2015)





LAWS PROGRAM

GOAL

Promotes uniformity in legal metrology laws and regulation and test methods for commodities and packaged goods.

At a Glance:

Training on laws and regulations, package inspection, labeling, and price verification

Standards development – NIST Handbooks 130, 133; and OIML Recommendations on packaging and labeling.

Field Handbook on Uniform Fuel and Motor Oil Sampling Procedures

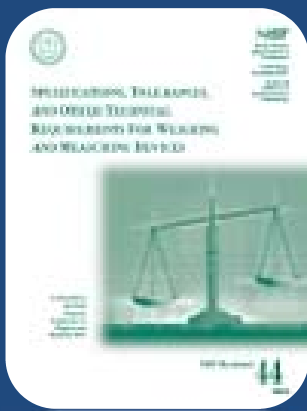
Coordinate federal and state regulations on packaging and labeling

Unit Pricing Guide SP1181 Best Practice Guide

Provide technical assistance to officials and industry

NIST Training for California County Officials fills Gap left by Budget Reductions to State: During the week of March 9-12, NIST Office of Weights and Measures presented a training class on NIST Handbook 133 “Checking the Net Contents of Packaged Goods” Chapter 2 for 20 weights and measures inspectors from several California counties including Los Angeles and San Luis Obispo. The class included both technical lectures and extensive hands-on testing of a wide variety of products sold by weight and fluid measure. This was the first NIST class for many students because previously almost all of the training received by California county inspectors was provided by the California Division of Measurement Standards (CDMS), part of the state’s Department of Agriculture. Unfortunately the CDMS has had to suspend its training program due to budget reductions. Student evaluations indicated the class was especially useful because NIST was able to give them a national perspective on package control and relate many examples of inspection activities and findings by other states. In California, the counties are largely responsible for enforcing weights and measures laws while the State provides support, coordination and, until now, training, much as NIST does for the state weights and measures programs.

NIST Provides Training for Walmart Weights and Measures Compliance Department and Consumer Product Testing Labs. On March 24-26, the NIST Office of Weights and Measures presented an Industry training class to 15 Walmart associates on uniform Weights and Measures laws, regulations and test procedures. This was attended by senior managers and several test engineers from Walmart’s three third party Consumer Product Testing labs. Labs play a major role for Walmart in ensuring the packaging and labeling of products sold in its stores comply with the NIST HB130 “Uniform Packaging and Labeling Regulation”. This 3 day training included technical presentations on NIST Handbook 130 “Uniform Packaging and Labeling Regulation”, the basics of NIST Handbook 133 “Checking the Net Content of Packaged Goods”, and the NIST HB130 “Examination Procedure for Price Verification”, used in determining whether a store has good pricing practices. Feedback from class participants indicated that they recognized immediate changes that needed to be made to their methods of evaluating packages as a result of the training. Walmart is the largest retailer in the world with over \$404 billion in sales. They test most of their products to ensure they meet legal requirements before they are distributed to Walmart stores. Through this education and training, greater voluntary compliance will be achieved to ensure regulatory requirements are being met. This will ultimately benefit the consumer and manufacturers (fair competition) by providing accurate and adequate information on packages as to the identity and quantity of contents.



GOAL

Promotes uniformity in standards and practices for weighing and measuring devices (scales, gas pumps, taximeters, etc.) to facilitate trade and protect U.S. businesses and citizens.

LEGAL METROLOGY DEVICES PROGRAM

At a Glance

Standards development

- Technical advisors to national and international standards bodies (e.g., NCWM, OIML) and other programs and agencies (e.g., NTEP, GIPSA)
- NIST Handbook 44

Technical guidelines and interpretations development

Test procedures development

Training for weights and measures officials and industry

Technical assistance/guidance to officials, industry, and consumers

- Particularly in areas of new technology and applications

NIST Office of Weights and Measures staff conducted a training seminar in Madison, Wisconsin. NIST Office of Weights and Measures training course for inspection and testing liquefied petroleum gas metering systems. On June 1-5, 2015, Twenty regulatory officials from the State of Wisconsin's Department of Agriculture were taught to inspect and test commercial liquefied petroleum gas (LPG) liquid-measuring metering systems for compliance with the requirements in NIST Handbook 44, Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices. This training helps state officials to implement NIST-recommended standards and test procedures; promotes traceability of commercial measurements to NIST standards; facilitates trade for U.S. industry; and helps ensure equity for consumers and businesses. In 2012, the American Petroleum Institute reported sales of LPG totaled approximately 17.8 billion gallons.

NIST Offers Livestock and Animal Scale Training in Nashville, Tennessee. The Tennessee Dept. of Agriculture, Consumer and Industry Services, Weights and Measures Section hosted 25 students for a three-day course on the inspection and testing of livestock and animal scales that was presented by the NIST

Office of Weights and Measures (OWM) and three co-instructors from OWM's train-the-trainer program. The training was provided to state regulatory officials from Tennessee, West Virginia, Mississippi, North & South Carolina, Arkansas, and Nebraska. Also attending the class were employees of the USDA - Grain Inspection Packers and Stockyards Administration (GIPSA), and private scale manufacturers and service agents. The training event included practical hands-on training involving the application of the standards contained in NIST Handbook 44 and other requirements specified under USDA regulations. According to the 2013 USDA annual report, at least \$68 billion in transactions occur across the over 2000 livestock scales in the United States each year.

PML Staff Visit Graniteville, South Carolina to Test a Hydrogen Fuel Metering Standard. A local newspaper for Aiken County, SC published a story titled, "National group runs hydrogen tests in Graniteville," about the successful visit of Jodie Pope of the Sensor Science Division and Juana Williams of the Office of Weights and Measures to the Applied Research Center in Graniteville, SC on March 24th and 25th, 2015 to test a NIST-developed prototype device for measuring the amount of fuel delivered by gaseous hydrogen dispensers designed for automobiles.



GOAL

Represents U.S. interests in the development of international legal metrology standards.

INTERNATIONAL METROLOGY PROGRAM

At a Glance

Designated by State Dept. as the U.S. representative to the International Committee of Legal Metrology (CIML)

Participates in regional legal metrology organizations (SIM and APLMF)

Leads JCGM VIM Committee; participates in GUM committee

U.S. Hosts the Asia-Pacific Legal Metrology Forum

During the last week of October, the United States hosted the 22nd Annual Meeting of the Asia-Pacific Legal Metrology Forum (APLMF), in Honolulu. APLMF seeks to develop and harmonize legal metrology activities and to remove technical and administrative barriers to trade in the Pacific Rim region. The Office of Weights and Measures had extensive interactions with the Chinese Secretariat of the organization to develop and coordinate all aspects of the meeting.

Delegates and representatives from 15 nations participated in the highly successful meeting that focused on increasing and improving legal metrology training for developing economies in the region. This included discussions on five training classes that were held in conjunction with the Asia Pacific Metrology Programme (APMP) in 2015, and four more training efforts that are planned for 2016. The meeting also provided an excellent opportunity to explain the roles and interactions of NIST, NCWM, and the individual states in implementing legal metrology in the United States.

OIML R117 on Liquid Measuring Systems Now Published

In April 2015, Part 2 and Part 3 of International Organization of Legal Metrology (OIML) Recommendation R117 “Dynamic Measuring Systems for Liquids other than Water” were published. These two new parts of the Recommendation achieved 100% international consensus approval on their third committee drafts, their preliminary ballot drafts, and their final drafts. Now that all three parts are published, OIML R117 is considered the international standard for almost all dynamic liquid measuring systems, including: fuel dispensers, road tankers, pipelines, milk, fueling aircraft, loading ships, and several other systems. Serving as both the Co-Secretariat of the technical subcommittee and Convener of the project group, the NIST Office of Weights and Measures led both the multi-year technical effort and the international consensus-building effort to make this new standard a reality.

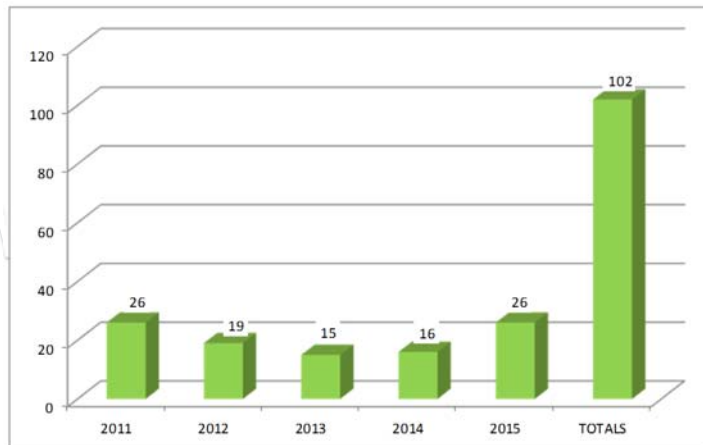


GOAL

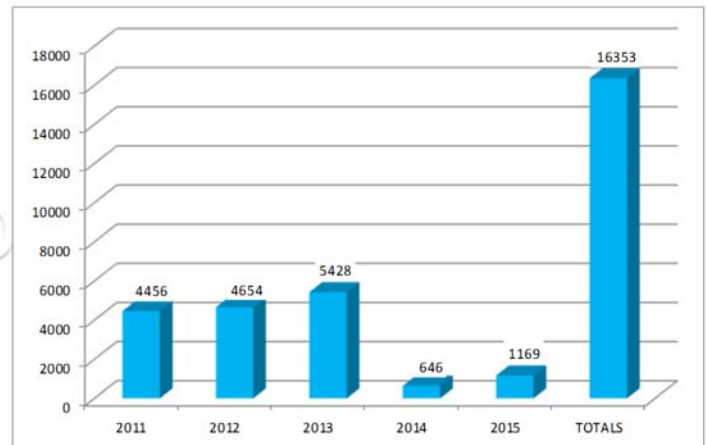
The Metric Program helps implement the national policy to establish the SI (International System of Units, commonly known as the metric system) as the preferred system of weights and measures for U.S. trade and commerce. It provides leadership and assistance on SI use and conversion to federal agencies, state and local governments, businesses, trade association, standards development organizations, educators, and the general public.

WEIGHTS AND MEASURES OUTREACH

Outreach Events



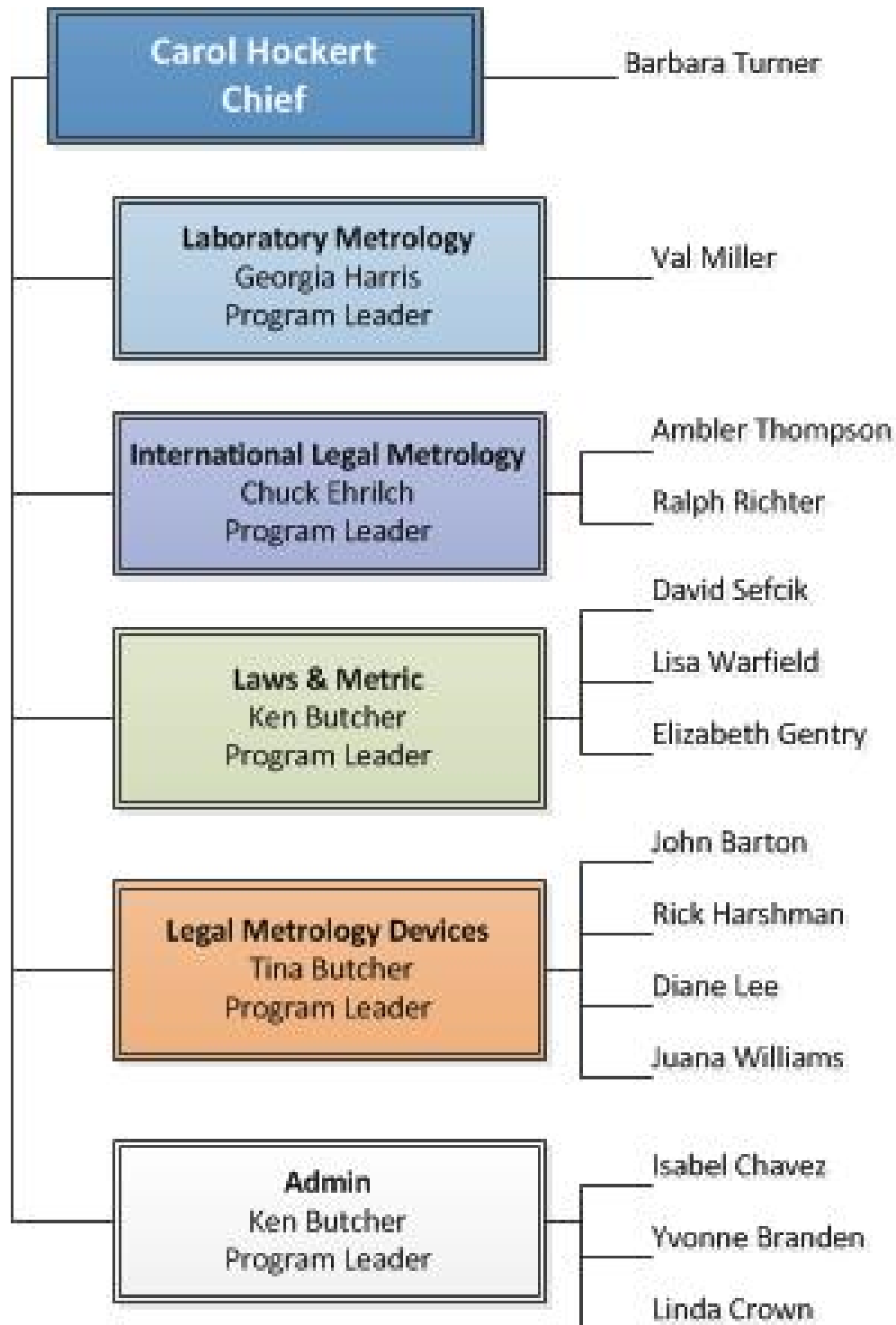
Outreach Participants

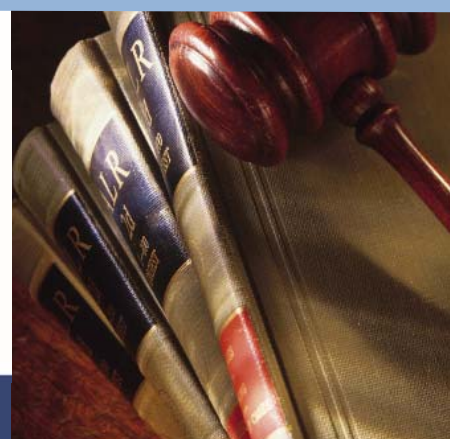
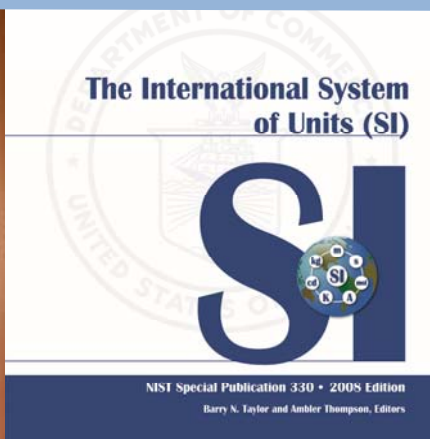


Metric Publications Distributed

FY	Events	Students (K-12, University)	Teachers	Parents	Other	Total
2011	26	4141	184	54	77	4456
2012	19	4036	336	87	195	4654
2013	15	4922	276	47	183	5428
2014	16	451	34	56	105	646
2015	26	713	314	132	10	1169
TOTALS	102	14263	1144	376	570	16353

ORGANIZATIONAL CHART





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<http://www.nist.gov/pml/wmd/index.cfm>