

Inside this Issue

• NATIONAL WEIGHTS AND MEASURES WEEK	1
• WORLD METROLOGY DAY	1
• TRAINING AND EVENTS CALENDAR	2
• LABORATORY METROLOGY PUBLICATION NEWS	4
• EDUCATIONAL OPPORTUNITY - SCHOLARSHIP	7
• PUBLICATION NEWS - EDITORIAL UPDATES FOR HANDBOOKS 133 AND 130 RELEASED	7
• BEYOND THE OFFICE OF WEIGHTS AND MEASURES	12
A Statistical Approach to Ballistic Comparisons	



NATIONAL CONFERENCE ON WEIGHTS AND MEASURES

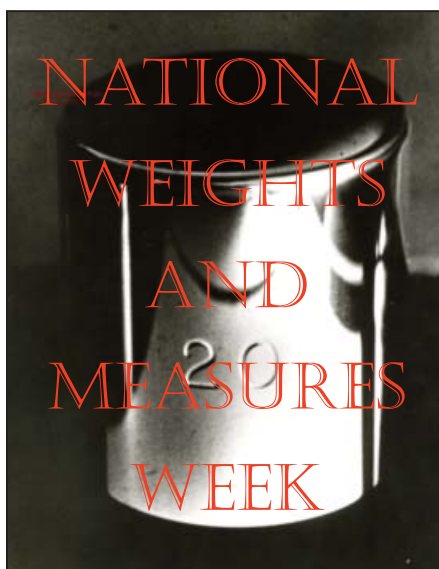
2018 ANNUAL MEETING
JULY 15 - 19, 2018
TULSA, OKLAHOMA

Registration, lodging, agenda, and supporting documentation is available online at:

https://www.ncwm.net/sems/event_detail/2018-annual-ok

OFFICE OF WEIGHTS AND MEASURES

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The kilogram mass prototype pictured above is from the Mass Standards Collection at the National Institute of Standards and Technology. This Prototype Kilogram is a representative of the Kilogramme des Archives developed after the Treaty of the Metre.



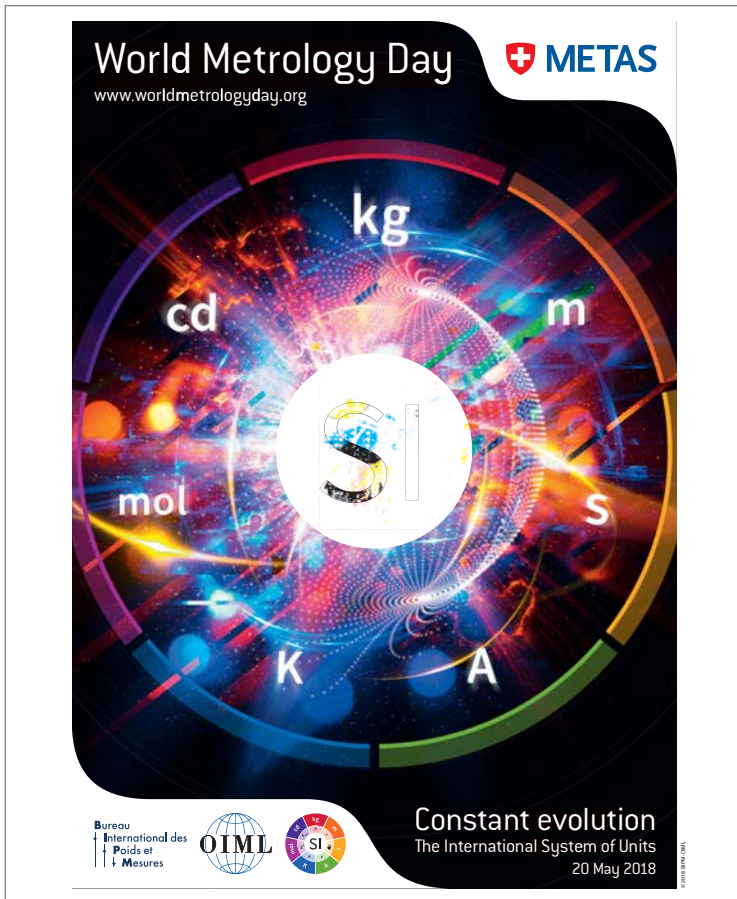
WORLD METROLOGY DAY

May 20, 2018

CONSTANT EVOLUTION OF THE INTERNATIONAL SYSTEM OF UNITS (SI)

May 20 is World Metrology Day, commemorating the anniversary of the signing of the Metre Convention in 1875. This treaty provides the basis for a coherent measurement system worldwide that underpins scientific discovery and innovation, industrial manufacturing and international trade, as well as the improvement of the quality of life and the protection of the global environment.

The theme for World Metrology Day 2018 is Constant evolution of the International System of Units (SI). This theme was chosen because in November 2018, the General Conference on Weights and Measures is expected to agree on one of the largest changes to the International System of Units



(the SI) since its inception. The proposed changes are based on the results of research into new measurement methods that have used quantum phenomena as the basis for standards that are fundamental. The SI will be based on a set of definitions each linked to the laws of physics and have the advantage of being able to embrace further improvements in measurement science and technology to meet the needs of future users for many years to come.

Across the world, national metrology institutes continually advance measurement science by developing and validating new measurement techniques at whatever level of sophistication is needed. The national metrology institutes participate in comparisons coordinated by the *Bureau International des Poids et Mesures* (BIPM) to ensure the reliability of measurement results worldwide. The BIPM also provides a forum for its Member States to address new measurement challenges. The International Organization of Legal Metrology (OIML) develops International Recommendations, the aim of which is to align and harmonize legal metrology requirements worldwide in many fields.

World Metrology Day recognizes and celebrates the contribution of all the people that work in intergovernmental and national organizations throughout the year on behalf of all.

Further information, including a message from the Directors, posters, and a list of events, is available at www.worldmetrologyday.org – Contact: wmd@worldmetrologyday.org

Training and Events Calendar

2018

Registration for training in the NIST Office of Weights and Measures is handled by Yvonne Branden at yvonne.branden@nist.gov.

Course descriptions can be viewed on the Office of Weights and Measures website at - <https://www.nist.gov/pml/weights-and-measures/about-owm/calendar-events> and clicking on the name of the course.

March 12 - 15 (4 days)
NIST Handbook 130, Uniform Packaging and Labeling Regulation
Class No. 5509
Orange County, CA

March 15 (2 hr)
Webinar - Software Verification and Validation, Part I
2:00 p.m. - 4:00 p.m.
Class No. 5536

March 26 - 29 (4 days)
NIST Handbook 133 - *Checking the Net Contents of Packaged Goods - Basic*
Class No. 5513
Lebanon, MO

April 3 - 5 (3 days)
NTEP Lab Meeting
Gatineau, Quebec
Contact: info@ncwm.net

April 12 (2 hr)
Webinar - Software Verification and Validation, Part II
2:00 p.m. - 4:00 p.m.
Class No. 5536

April 4 - 10 (3 days)
Livestock and Animal Scales
Class No. 5548
Harrisonburg, VA

April 16 - 19 (4 days)
NIST Handbook 133 - *Checking the Net Contents of Packaged Goods - Basic*
Class No. 5520
Montgomery, AL

April 16 - 20 (5 days)
Fundamentals of Metrology
Class No. 5552
NIST/Gaithersburg, MD

April 22 - 24 (3 days)
National Industrial Scale Association (NISA)
Sheraton Sand Key Resort
Clearwater, FL
Contact: www.nisa.org

(continued on pg 3)

Notes for Editors:

World Metrology Day is an annual event during which more than 80 countries celebrate the impact of measurement on our daily lives.

This date was chosen in recognition of the signing of the Metre Convention on 20 May 1875, the beginning of formal international collaboration in metrology. Each year World Metrology Day is organized and celebrated jointly by the International Bureau of Weights and Measures (BIPM) and the International Organization of Legal Metrology (OIML) with the participation of the national organizations responsible for metrology.

The international metrology community which works to ensure that accurate measurements can be made across the world endeavors to raise awareness each World Metrology Day through a poster campaign, events, and web site. Previous themes have included topics such as measurements for the global energy challenge, for safety, for innovation, and measurements in sport, the environment, medicine and trade.

About the BIPM

The signing of the Metre Convention in 1875 created the BIPM and for the first time formalized international cooperation in metrology. The Convention established the International Bureau of Weights and Measures and laid the foundations for worldwide uniformity of measurement in all aspects of our endeavors, historically focusing on and assisting industry and trade, but today just as vital as we tackle the grand challenges of the 21st Century such as climate change, health, and energy. The BIPM undertakes scientific work at the highest level on a selected set of physical and chemical quantities. The BIPM is the hub of a worldwide network of national metrology institutes (NMIs) which continue to realize and disseminate the chain of traceability to the SI into national accredited laboratories, industry, and state weights and measures laboratories.

About the OIML

In 1955 the *International Organization of Legal Metrology* (OIML) was established as an Intergovernmental Treaty Organization in order to promote the global harmonization of legal metrology procedures with the *Bureau International de Métrologie Légale* (BIML) as the Secretariat and Headquarters of the OIML. Since that time, the OIML has developed a worldwide technical structure whose primary aim is to harmonize the regulations and metrological controls applied by the national metrological services, or related organizations.

Credits – Contacts

The 2018 World Metrology Day project was realized jointly by the BIPM and the OIML.

Meet the Team:

- WMD Project development by Andy Henson, BIPM
- Poster designed by METAS
- WMD web site designed and maintained by Chris Pulham, BIML
- IT support provided by Jean-Christophe Esmiol, BIML and Laurent Le Mée, BIPM

If you would like to send us your opinion or feedback, or if you have any questions, please send an email to: wmd@world-metrology.org.

**CHECK OUT THE NEW CLASSES ADDED TO THE
TRAINING AND EVENTS
CALENDAR FOR 2018**

Laboratory Metrology Publication News

Updated Laboratory Metrology Publications

Byline: Georgia L Harris

Three metrology publications were recently updated and one draft handbook is posted for comment.

NISTIR 6969 (2018) “Selected Laboratory and Measurement Practices, and Procedures to Support Basic Mass Calibrations”

This publication was updated to include revisions that have been made since the 2014 edition and to update procedures for compliance with the latest revision of ISO/IEC 17025 (2017).

A critical update was completed for Standard Operating Procedure (SOP) 1, Preparation of Calibration Certificates, to ensure compliance with ISO/IEC 17025:2017, Section 7.8. Specific clarification was added to Good Measurement Practice (GMP) 11 and GMP 13 for Calibration Intervals and Ensuring Traceability based on reviews of the annual submissions from state laboratories in 2017. Good Laboratory Practice (GLP) 1, Quality Assurance of the Measurement Process, was updated in 2017 to incorporate risk based thinking and compliance with the new ISO/IEC 17025 standard as well. Statistical Section 8 and Reference Tables, Section 9, were updated based on numerous follow-up questions about related laboratory applications. The associated sections of the SOP procedures were updated as well. Changes were made specifically to address the integration of F-tests, t-tests, and normalized errors within the procedures and for control chart analyses.

A detailed, three-page table is included in the publication that identifies significant changes between the 2015 and 2018 versions. If anyone wants an intermediate draft of “track changes,” you can contact Georgia Harris (gharris@nist.gov) directly to make the request.

NISTIR 5672 (2018) “Advanced Mass Calibrations and Measurements Assurance Program for the State Calibration Laboratories”

SOP 5, 3-1 Weighing Design, and SOP 28, Advanced Weighing Designs, were updated in this document to match the statistical changes that were made to the mass procedures in NISTIR 6969. In addition, the core of the document was updated based on input and feedback during the 2015 and 2017 Advanced Mass seminars and the 2017 annual submission review for recognition

(continued on pg 5)

April 30 - May 3 (4 days)
Southeast Measurement Assurance Program (SEMAP)**
Class No. 5525
Bay St. Louis/Biloxi, Seminar, MS

May 7 - 10 (4 days)
Western Regional Assurance Program (WRAP)**
Class No. 5526
Salt Lake City, UT

May 7 - 10 (4 days)
Northeastern Weights and Measures Association (NEWMA)
Saratoga Springs, NY
Contact: jcassidy@cambridgema.gov

May 8 - 9 (2 days)
NTEP MDMD Work Group
Columbus, OH
<https://www.ncwm.net/meetings/ntep/mdmd/registration>

May 14 - 17 (4 days)
Handbook 133 - *Checking the Net Contents of Packaged Goods* - Basic
Class No. 5512
Pompano Beach, FL
(See May 18 - Handbook 130 - Price Verification Class follows this class.)

May 14 - 18 (5 days)
Liquefied Petroleum Gas (LPG) Liquid-Measuring Systems
Class No. 5550
Sacramento, CA

May 14 - 25 (10 days)
Mass Metrology Seminar
Class No. 5531
NIST/Gaithersburg, MD

May 18 (1 day)
NIST Handbook 130 - Price Verification
Class No. 5530
Plantation, FL

May 21 - 24 (3 days)
Central Weights and Measures Association (CWMA)
Springfield, IL
Contact: sherry.turvey@ks.gov

June 4 - 8 (5 days)
Volume Metrology Seminar
Class No. 5523
NIST/Gaithersburg, MD

June 5 - 7 (3 days)
NIST Handbook 130 - Uniform Packaging and Labeling Regulation
Class No. 5510
Cleveland, OH

June 7 (2 hr)
Webinar - Calibration Certificate Evaluation Part II
2:00 p.m. to 4:00 p.m.
Class No. 5545

June 11 - 15 (5 days)
Fundamentals of Metrology
Class No. 5546
NIST/Gaithersburg, MD (continued on pg 5)

of state laboratories.

The associated Excel file is posted with SOP 28 and had some design updates that were submitted and verified during 2017.

NISTIR 7082, “Proficiency Test (PT) Policy Plan”

This document was recently updated to ensure compliance with the latest International Laboratory Accreditation Cooperation (ILAC) and Accreditation Body policies related to proficiency testing for accredited laboratories.

The updates included moving policies that were formerly in NISTIR 7214, PT Quality Manual, into this document to maintain all policies in one place.

Several sections were clarified to address commonly asked questions from outside of the weights and measures community regarding participation and availability outside of the narrow program scope. These sections were related to the required training for participants and the fact that all OWM proficiency tests are OPEN (anonymity is not provided to any participant). The sample plan tables continue to be similar in structure and format to what is already being used in the PT plans of the Regional Measurement Assurance Program groups. (Initially proposed changes to this 2004 document were reviewed by a PT Working Group in 2012).

This document will be reviewed during the Regional Measurement Assurance Program training sessions in 2018 per the planned agenda.

NIST Handbook 105-8, (2018) “Specifications and Tolerances for Field Standard Weight Carts”

This handbook has been updated and posted for comment. The comment period is open now through November 1, 2018. Mr. Val Miller provided training on the inspection of weight carts and the review of SOP 33 for the calibration of weight carts at all the 2017 Regional Measurement Assurance Program training sessions. Based on questions he has received since this document was first published in 2003, the observations and notes that have come up during training, and the use of weight carts in the past 15 years, the handbook has been updated. Both a “track change” version of the document and a PDF of a final draft are posted on the OWM website

(www.nist.gov/pml/weights-and-measures/nist-handbooks)

Comments may be made through the OWM Contacts System, and everyone who submits comments will be added to an informal working group and have an opportunity to discuss and resolve any concerns later in 2018. Additional discussions will take place at the Regional Measurement Assurance Program training sessions in 2018, but comments will only be accepted through the OWM Contacts System. You may contact Mr. Miller (val.miller@nist.gov) for more information or to discuss your input to this draft document.

The NIST Office of Weights and Measures

homepage: www.nist.gov/owm

June 11 - 15 (5 days)
Liquefield Petroleum Gas (LPG) Liquid-Measuring Systems
Class No. 5549
Columbus, OH

July 15 - 19 (5 days)
NCWM 103rd Annual Meeting
Tulsa, OK
Contact: info@ncwm.net
<https://ncwm.net/meetings>

August 9 (2 hr)
Webinar - Contract Review
2:00 p.m. - 4:00 p.m.
Class No. 5426

August 13 - 23 (10 days)
Advanced Mass Seminar
Class No. 5532
NIST/Gaithersburg, MD

August 15 - 16 (2 days)
NTEP Grain Analyzer Meeting
Kansas City, MO
Contact: info@ncwm.net
<https://www.ncwm.net/committees/ntep/sectors/grain-analyzer/registration>

August 21 - 23 (3 days)
NTEP Weighing/Software Meeting
Louisville, KY
Contact: info@ncwm.net
<https://www.ncwm.net/committees/ntep/sectors/weighing/registration>

August 25 - 30 (6 days)
NCSLI Workshop and Symposium
“Measurements of Tomorrow”
Oregon Convention Center
Portland, OR
Contact: <http://www.ncsli.org/aws>

August 30 (2 hr)
Webinar - Document Control and Recordkeeping
2:00 p.m. - 4:00 p.m.
Class No. 5427

September 10 - 13 (4 days)
Northeastern Measurement Assurance Program (NEMAP)**
Class No. 5527
Montpelier, VT

September 17 - 20 (4 days)
Southwest Assurance Program (SWAP)
Class No. 5528
Oklahoma City, OK

September 16 - 20 (5 days) TENTATIVE
Western Weights and Measures Association (WWMA)
Cheyenne, WY
Contacts: Michelle Wilson, mwilson@azda.gov or
Jeri Kahana, jeri.m.kahana@hawaii.gov

September 25 - 26 (2 days)
NTEP Measuring Meeting
Baltimore, MD
Contact: info@ncwm.net
https://www.ncwm.net/sems/event_detail/2018-measuring/registration

(continued on pg 6)

NIST Handbook 143, Program Handbook for State Weights and Measures Laboratories and NISTIR 7214, PT Program Quality Manual

These two publications are now being updated. Opportunities will be presented in the near future for comment and discussion in the OWM Contacts System, through the Laboratory Metrology Info Hour sessions, and the RMAP training sessions during 2018.

How to Submit Comments on Draft Publications

Here are the three easy steps for submitting comments on posted NIST 105-X Handbooks. In fact, the first two may be optional!

1. Obtain a **user account** and log-in password for the OWM Contacts System (if you don't already have one):

<https://tsapps.nist.gov/WMD/default.aspx>

If you already have a user account, you may skip this step!

2. Process to **download** and **review** the draft documents:
 - a. Login to the OWM Contacts System;
 - b. Select MY ITEMS (top menu);
 - c. Scroll down to the document you want and press REQUEST;
 - d. Press SUBMIT;
 - e. Press DOWNLOAD.

If you download the document from the OWM website, you may skip this step!

3. Process to **submit** comments:

To **comment** on the document, login to the OWM Contact System and select:

- a. MY COMMENTS (top menu)
- b. Press SUBMIT a Comment (above list; in the middle of the screen, on the left side);
- c. Select the Document on which you will comment (button on left next to Documents in list);
- d. Enter the Section, Page number, and your Comment (include suggested language if you want something to be different) (all three sections are required);
- e. Press CONTINUE (at bottom); then
- f. Press either EDIT or SUBMIT (at the bottom).

Then you will be given the choice to add another comment or return to the main pages. Your comments will be processed by the technical advisor and kept for later discussion. The complete list of comments is consolidated automatically in this system and will then be available to the NIST Technical Advisors. OWM staff can make the list of comments available to the submitters and working group when it's time for review and discussion.

The Office of Weights and Measures

will gladly include your weights and measures related events in our calendar.

Contact the Editor: Linda.Crown@nist.gov

October 1 - 4 (4 days)
MidAmerica Measurement Assurance Program (MidMap)**
Class No. 5529
Burnsville, MN

October 2 - 3 (2 days)
Northeast Weights and Measures Association (NEWMA) Interim Meeting
Norwich, CT
Contact: James Cassidy, jcassidy@cambridgema.gov
<https://www.newma.us/meetings/interim>

October 7 - 10 (4 days)
Southern Weights and Measures Association (SWMA)
Jacksonville, FL
Contact: Hal Prince,
harold.prince@freshfromflorida.com
<https://www.swma.org/calendar/meetings>

October 15 - 17 (3 days)
Central Weights and Measures Association (CWMA)
St. Charles, MO
Contact: Sherry Turvey, sherry.turvey@ks.gov

October 18 (2 hr)
Webinar - Internal Auditing Best Practices
2:00 p.m. - 4:00 p.m.
Class No. 5428

2019

January 13 - 16 (4 days)
National Conference on Weights and Measures (NCWM) Interim Meeting
Charleston, SC
Info@ncwm.net

*State W&M labs only or invitation only.
**Regional Measurement Assurance Program "MEMBERS" (State and Industry RMAP member laboratories.)

INTERNATIONAL ORGANIZATIONS

The following international organizations hold meetings/conferences concerning varied weights and measures topics.

Asia-Pacific Legal Metrology Forum (APLMF)
<http://www.aplmf.org/>

Bureau of International des Poids et Mesures (BIPM)
Calendar of BIPM Meetings
<https://www.bipm.org/en/about-us/>

Inter-American Metrology System (SIM)
Calendar of SIM Meetings
<http://sim-metrologia.org.br/meetings.php>

International Organization of Legal Metrology (OIML)
Calendar of OIML Meetings
<https://www.oiml.org/en/events/calendar>

International Society of Weighing and Measurement (ISWM)
2019 Conference and Expo (TBD)
<http://www.iswm.org/>

Educational Opportunity

ACCEPTING APPLICATIONS FOR THE 2018 U.S. METRIC ASSOCIATION (USMA) BLAKE FAMILY METRIC SCHOLARS

U.S. high school seniors may apply for the \$2500 USMA/Blake Family Metric Scholarship (Deadline: March 15, 2018, www.us-metric.org/usa-blake-family-foundation-metric-awards/). This award has been established in an effort to increase awareness and usage of the International System of Units (SI) in the United States. The scholarship may be applied to two- or four-year undergraduate degree tuition for the 2018 - 2019 academic year. Students are asked in this application to explain their efforts to promote the SI in the United States. Applicants must complete and submit the application by mail or electronically to the USMA headquarters (P.O. Box 471, Windsor, CO 80550-0471). Congratulations to last year's winner, Eimhear Davis of Gulport, Mississippi.

For more information, please contact Mr. Mark Henschel, USMA Central Area Director (779) 537-5611. The USMA, Inc., is a national non-profit organization that was founded in 1916 and advocates completing the U.S. conversion to the SI (www.us-metric.org/).

Point of Contact: Elizabeth Gentry, elizabeth.gentry@nist.gov

Publication News

Editorial Updates for Handbooks for 133 and 130 Released

Update for the Test Procedure for

3.13. Determining Net Contents of Compressed Gas in Cylinders

The NIST Office of Weights and Measures (OWM) received an inquiry about compressed gases and legal metrology requirements. Upon research and discussion with Dr. Eric Lemmon, NIST Thermophysical Properties of Fluids Group, we learned that NIST Handbook 133, "Checking the Net Contents of Packaged Goods," Section 3.13. Determining the Net Contents of Compressed Gas in Cylinders test procedures did not provide an updated reference document. The current test procedure cites an obsolete NIST Technical Note 1079 (1985), "Table of Industrial Gas Container Contents and Density for Oxygen, Argon, Nitrogen, Helium, and Hydrogen."

Dr. Lemmon has advised that the current reference of the NIST Standard Reference Database 23 "Reference Fluid Thermodynamic and Transport Properties Database {REFPROP}" has replaced NIST Technical Note 1079 (refer to step 5 in test procedure 3.13.2.).

NIST OWM has updated the current online WORD and Adobe PDF versions of Chapter 3 of NIST Handbook 133, and this correction will appear in the next printed edition. It is recommended that you print the following change and place within your hard copy.

3.13.2. Test Procedures

a. Test Procedure for Cylinders Labeled by Weight

1. Follow Section 2.3.1. "Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample.
2. The cylinder should be marked or stenciled with a tare weight. The marked value may or may not be used by

the filling plant when determining the net weight of those cylinders sold or filled by weight. If there is a tare weight marked on the net contents tag or directly on the cylinder, then an actual tare weight was determined at the time of fill. If there is no tare weight marked on a tag or on the cylinder, then the stamped or stenciled tare weight is presumed to have been used to determine the net contents.

Note: Check the accuracy of the stamped tare weights on empty cylinders whenever possible. The actual tare weight must be within (a) ½ % of the stamped tare weight for 9.07 kg (20 lb) tare weights or less or (b) P¹P/R₄R % of the stamped tare weight for greater than 9.07 kg (20 lb) tare weights. (See NIST Handbook 130, “Method of Sale Regulation.”)

3. Place cylinder on scale and remove protective cap. The cap is not included in the tare weight. Weigh the cylinder and determine net weight, using either the stamped or stenciled tare weight, or the tare weight marked on the tag. Compare actual net weight with labeled net weight, or use the actual net weight to look up the correct volume declaration (for Acetylene Gas), and compare that with the labeled volume.

Note: Most producers will replace acetone in the cylinder before the cylinder is refilled, filling the cylinder with acetone to the stamped tare weight. Other producers, although not following recommended procedures, do not replace the acetone until it drops to a predetermined weight. In the latter situation, the refilling plant must note the actual tare weight of the cylinder and show it on the tag containing the net content statement or on the cylinder itself. Refer to tables for acetylene if necessary (if the acetylene is labeled by volume).

b. Test Procedure for Cylinders Labeled by Volume

1. Follow Section 2.3.1. “Define the Inspection Lot.” Use a “Category A” sampling plan in the inspection; select a random sample.
2. Determine the temperature of the cylinders in the sample. Place the thermometer approximately halfway up a cylinder in contact with the outside surface. Take the temperature of three cylinders selected at random and use the average temperature of the three values.
3. Using the appropriate pressure gage, measure the pressure of each cylinder in the sample.
4. Determine the cylinder nominal capacity from cylinder data tables or from the manufacturer. (These tables must be obtained in advance of testing.)
5. **The SCF/CF volume of compressed gases (e.g., oxygen, argon, nitrogen, helium, or hydrogen) shall be determined using NIST Standard Reference Database 23 “Reference Fluid Thermodynamic and Transport Properties Database” (REFPROP) (see www.nist.gov/srd/REFPROP). (Note: Weights and measures officials should contact the NIST Office of Weights and Measures at 301-975-4004 or owm@nist.gov for access to the database.)**
6. Multiply the cylinder nominal capacity by the value (SCF/CF) obtained from the content tables. This is the actual net quantity of gas.
7. Subtract the labeled net quantity from the actual net quantity to determine the error.

3.13.3. Evaluation of Results

Follow Section 2.3.7. “Evaluate for Compliance” to determine lot conformance.

(continued on pg 9)

NIST Handbook 130, Method of Sale

2.16. Compressed or Liquefied Gases in Refillable Cylinders

In addition, a change has been identified for **NIST Handbook 130**, “Uniform Laws and Regulations in the Areas of Legal Metrology and Engine Fuel Quality,” Method of Sale, Section 2.16., which will also be corrected in the next printed handbook edition. The correction is currently noted on the NIST Handbook 130 (2018) webpage (www.nist.gov/pml/weights-and-measures/publications/nist-handbooks/handbook-130).

2.16. Compressed or Liquefied Gases in Refillable Cylinders.

2.16.1. Application. – This section does not apply to disposable cylinders of compressed or liquefied gases.

2.16.2. Net Contents. – The net contents shall be expressed in terms of cubic meters or cubic feet, kilograms, or pounds and ounces. See Section 2.21. Liquefied Petroleum Gas for permitted expressions of net contents for liquefied petroleum gas. A standard cubic foot of gas is defined as a cubic foot at a temperature of 21 °C (70 °F) and a pressure of 101.35 kilopascals (14.696 psia), except for liquefied petroleum gas as stated in Section 2.21.

2.16.3. Cylinder Labeling. – Whenever cylinders are used for the sale of compressed or liquefied gases by weight, or are filled by weight and converted to volume, the following shall apply:

2.16.3.1. Tare weights.

- (a) **Stamped or Stenciled Tare Weight.** – For safety purposes, the tare weight shall be legibly and permanently stamped or stenciled on the cylinder. All tare weight values shall be preceded by the letters “TW” or the words “tare weight.” The tare weight shall include the weight of the cylinder (including paint), valve, and other permanent attachments. The weight of a protective cap shall not be included in tare or gross weights. The Code of Federal Regulations Title 49, Section 178.50-22 requires the maker of cylinders to retain test reports verifying the cylinder tare weight accuracy to a tolerance of 1 %.
- (b) **Tare Weight for Purposes of Determining the Net Contents.** – The tare weight used in the determination of the final net contents may be either:
 - (1) the stamped or stenciled tare weight; or
 - (2) the actual tare determined at the time of filling the cylinder. If the actual tare is determined at the time of filling the cylinder, it must be legibly marked on the cylinder or on a tag attached to the cylinder at the time of filling.
- (c) **Allowable difference.** – If the stamped or stenciled tare is used to determine the net contents of the cylinder, the allowable difference between the actual tare weight and the stamped (or stenciled) tare weight, or the tare weight on a tag attached to the cylinder for a new or used cylinder, shall be:
 - (1) $\frac{1}{2}$ % for tare weights of 9 kg (20 lb) or less; or
 - (2) $\frac{1}{4}$ % for tare weights of more than 9 kg (20 lb).
- (d) **Average requirement.** – When used to determine the net contents of cylinders, the stamped or stenciled tare weights of cylinders at a single place of business found to be in error predominantly in a direction favorable to the seller and near the allowable difference limit shall be considered to be not in conformance with these requirements.

2.16.3.2. Acetylene Gas Cylinder Tare Weights. – Acetone in the cylinder shall be included as part of the tare weight.

2.16.3.3. Acetylene Gas Cylinder Volumes. – The volumes of acetylene shall be determined from the product weight using approved tables such as those published in NIST Handbook 133 or those developed using 70 °F (21 °C) and 14.7 ft³ (101.35 kPa) per pound at 1 atmosphere as conversion factors.

2.16.3.4. Compressed Gases such as Oxygen, Argon, Nitrogen, Helium, and Hydrogen. – The volumes of

compressed gases such as oxygen, argon, nitrogen, helium, or hydrogen shall be determined using ~~the tables and procedures given in NIST Technical Note 1079, Tables of Industrial Gas Container Contents and Density for Oxygen, Argon, Nitrogen, Helium, and Hydrogen~~ NIST Standard Reference Database 23 “Reference Fluid Thermodynamic and Transport Properties Database” (REFPROP) (see www.nist.gov/srd/REFPROP) and supplemented by additional procedures and tables in NIST Handbook 133.

(Added 1981) (Amended 1990)

We extend our gratitude to Dr. Lemmon for his time and guidance on the REFPROP program. If you have any questions, please contact either David Sefcik or Lisa Warfield, NIST OWM – Laws and Metric Staff at (301) 975-4004.

NIST Handbook 130, “Uniform Laws and Regulations in the Areas of Legal Metrology and Engine Fuel Quality,” 2018 edition

Editorial corrections noted as followed with **bold underscored** text to indicate new language and **bold strikeouts** to indicate removed language.

G. Uniform Engine Fuels and Automotive Lubricants Regulation

Section 2. Standard Fuel Specifications

2.14. Products for Use in Lubricating ~~Automatic~~ Transmissions. – Transmission fluids shall meet the original equipment manufacturer’s requirements for those transmissions or have demonstrated performance claims to be suitable for use in those transmissions. Where a fluid can be licensed against an original equipment manufacturer’s specification, evidence of current licensing by the marketer is acceptable documentation of performance against the specification. In the absence of a license from the original equipment manufacturer, adherence to the original equipment manufacturer’s recommended requirements shall be assessed after testing per relevant methods available to the lubricants industry and the state regulatory agency. Suitability for use claims shall be based upon appropriate field, bench, and/or transmission rig testing. Any manufacturer of a transmission fluid making suitable-for-use claims shall provide, upon request by a duly authorized representative of the Director, credible documentation of such claims. If the product performance claims published by a blender and/or marketer are based on the claim(s) of one or more additive suppliers, documentation of the claims may be requested in confidence by a duly authorized representative of the Director. Supporting data may be supplied directly to the Director’s office by the additive supplier(s).

(Added 2004) (Amended 2017)

2.14.1. Conformance. – Conformance of a fluid per Section 2.14. Products for Use in Lubricating Transmissions does not absolve the obligations of a fluid licensee with respect to the licensing original equipment manufacturer or the original equipment manufacturer’s licensing agent(s), where relevant.

(Added 2017)

2.14.2. Transmission Fluid Additives. – Any material offered for sale or sold as an additive to transmission fluids shall be compatible with the transmission fluid to which it is added, and shall meet all performance claims as stated on the label or published on any website referenced by the label. Any manufacturer of any such product sold in this state shall provide, upon request by a duly authorized representative of the Director, documentation of any claims made on their product label or published on any website referenced by the label.

(Added 2017)

Section 3. Classification and Method of Sale of Petroleum Products

3.14. Transmission Fluid.

(continued on pg 11)

3.14.1. Labeling and Identification of Transmission Fluid. – Transmission fluid shall be labeled or identified as described below.

(Added 2017)

3.14.1.1. Container Labeling. – The label on a container of transmission fluid shall not contain any information that is false or misleading. Containers include bottles, cans, multi-quart or liter containers, pails, kegs, drums, and intermediate bulk containers (IBCs). In addition, each container of transmission fluid shall be labeled with the following:

- (a) the brand name;
- (b) the name and place of business of the manufacturer, packer, seller, or distributor;
- (c) the words “~~Automatic~~ Transmission Fluid,” which may be incorporated into a more specific description of transmission type such as “Automatic Transmission Fluid” or “Continuously Variable Transmission Fluid”;
- (d) the primary performance claim or claims met by the fluid and reference to where any supplemental claims may be viewed (e.g., website reference). Performance claims include **by but** are not limited to those set by original equipment manufacturers and standards setting organizations such as SAE and JASO and are acknowledged by reference; and
- (e) an accurate statement of the quantity of the contents in terms of liquid measure.

(Amended 2017)

3.14.1.2. Identification on Documentation. – Transmission fluid sold in bulk shall be identified on the manufacturer, packer, seller or distributor invoice, bill of lading, shipping paper, or other documentation with the information listed below:

- (a) the brand name;
- (b) the name and place of business of the manufacturer, packer, seller, or distributor;
- (c) the words “Transmission Fluid” which may be incorporated into a more specific description of transmission type such as “Automatic Transmission Fluid” or “Continuously Variable Transmission Fluid”;
- (d) the primary performance claim or claims met by the fluid or reference to where these claims may be viewed (e.g., website reference). Performance claims include but are not limited to those set by original equipment manufacturers and standards-setting organizations such as SAE and JASO and are acknowledged by reference; and-
- (e) an accurate statement of the quantity of the contents in terms of liquid measure.

(Added 2017)

3.14.1.3. Identification on Service Provider Documentation. – Transmission fluid installed from a bulk tank at time of transmission service shall be identified on the customer invoice with the information listed below:

- (a) the brand name;
- (b) the name and place of business of the service provider;
- (c) the words “Transmission Fluid” which may be incorporated into a more specific description of transmission type such as “Automatic Transmission Fluid” or “Continuously Variable Transmission Fluid”;

(continued on pg 12)

(d) the primary performance claim or claims met by the fluid or reference to where these claims may be viewed (e.g., website reference). Performance claims include but are not limited to those set by original equipment manufacturers and standards-setting organizations such as SAE and JASO and are acknowledged by reference; and

(e) an accurate statement of the quantity of the contents in terms of liquid measure.

(Added 2017)

3.14.1.4. Bulk Delivery. – When the transmission fluid is sold in bulk, an invoice, bill of lading, shipping paper, or other documentation must accompany each delivery. This document must identify the fluid as defined in Section 3.14.2. Container Labeling.

(Added 2017)

3.14.1.5. Storage Tank Labeling. – Each storage tank of transmission fluid shall be labeled with the following:

(a) the brand name;

(b) the primary performance claim or claims met by the fluid or reference to where these claims may be viewed (e.g., website reference). Performance claims include but are not limited to those set by original equipment manufacturers and standards-setting organizations such as SAE and JASO and are acknowledged by reference.

(Added 2017)

3.14.1.6. Documentation of Claims Made Upon Product Label. – Any manufacturer, packer, or distributor of any product subject to this article and sold in this state shall provide, upon request of duly authorized representatives of the Director, credible documentation of any claim made upon their product label, including claims made on any website referenced by said label. If the product performance claims published by a blender and/or marketer are based on the claim(s) of one or more additive suppliers, documentation of the claims may be requested in confidence by a duly authorized representative of the Director. Supporting data may be supplied directly to the Director’s office by the additive supplier(s).

(Added 2004) (Amended 2017)

Beyond the Office of Weights and Measures

A STATISTICAL APPROACH FOR BALLISTIC COMPARISONS

The television is saturated with police based shows like NCIS and CSI, and true-life crime on the news. When a firearm is used to commit a crime, one way to solve the identity of a shooter is through the identification of the spent bullet and using its characteristics to find the firearm used, which can lead to the perpetrator.

NIST researchers have taken a statistical approach by creating a numerical score to describe the similarities of compared bullets and cartridge cases. The development of this approach is to lessen the possibility of misidentification due to a cartridge being too close of a match to one shot from another firearm, which could create a false match. Forensic techniques are constantly improving to identify crime evidence.

You are invited to read an interesting and informative article from the NIST, Physical Measurement Laboratory titled, “How Good a Match is It? Putting Statistics into Forensic Firearms Identification.” (<https://www.nist.gov/news-events/news/2018/02/how-good-match-it-putting-statistics-forensic-firearms-identification>)