

# **NATIONAL CONFERENCE ON WEIGHTS AND MEASURES**



**Interim Meeting of the 94<sup>th</sup> NCWM**

**January 11 - 14, 2009  
The Hilton Daytona Beach Oceanfront Resort  
Daytona, Florida**

**NCWM  
Publication 15**



# National Conference on Weights and Measures

## Interim Meeting of the 94<sup>th</sup> NCWM

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\*Drafts of the sector summaries can be viewed at [www.ncwm.net/ntep/index.cfm?fuseaction=meetings](http://www.ncwm.net/ntep/index.cfm?fuseaction=meetings)

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## National Conference on Weights and Measures, Inc. (NCWM) Organization Chart 2008/2009

NCWM Board of Directors			
Office Representation		Name/Affiliation	Term Expires
<b>Chairman:</b>		Jack Kane, MT*	2009
<b>Chairman-Elect:</b>		Randy Jennings, TN*	2009
<b>NTEP Committee Chair:</b>		Judy Cardin, WI*	2009
<b>Treasurer:</b>		Will Wothlie, MD	2009
<b>Active Membership/Northeastern:</b>		Charles Carroll, MA*	2009
<b>Active Membership/Central:</b>		Steven Malone, NE*	2010
<b>Active Membership/Southern:</b>		Stephen Benjamin, NC	2013
<b>Active Membership/Western:</b>		Steven Grabski, NV	2012
<b>At-Large:</b>		Stephen Langford, Cardinal Scale	2013
<b>At-Large:</b>		Tim Tyson, KS	2011
<b>Associate Membership:</b>		Robert Murnane, Seraphin Test Measure	2012
<b>*National Type Evaluation Program (NTEP) Committee Member</b>			
<b>Honorary NCWM President:</b>		Dr. Patrick D. Gallagher, NIST Deputy Director	
<b>NCWM Executive Secretary:</b>		Carol Hockert, Chief, NIST W&M Division	
<b>NCWM Executive Director:</b>		Don Onwiler, NCWM Headquarters	
<b>BOD Advisor:</b>		Gilles Vinet, Measurement Canada	
<b>NTEP Administrator:</b>		Jim Truex, NCWM Headquarters*	
NCWM Committees			
<i>Laws &amp; Regulations Committee</i>		<i>Specifications &amp; Tolerances Committee</i>	
Position	Name/Affiliation (Term Ends)	Position	Name/Affiliation (Term Ends)
<b>Chair:</b>	Joe Gomez, NM (2009)	<b>Chair:</b>	Todd Lucas, OH (2009)
<b>Members:</b>	Joe Benavides, TX (2011) Terrance McBride, Memphis, TN (2010) John Gaccione, Westchester County, NY (2012) Jonelle Brent, IL (2013)	<b>Members:</b>	Brett Saum, CA (2010) Kristin Macey, CO (2011) Steve Giguere, ME (2012) Ken Ramsburg, MD (2013)
<b>Associate Member Rep:</b>	Rob Underwood, Petroleum Marketers Association	<b>Canadian Tech Advisor:</b>	Ted Kingsbury
<b>Canadian Tech Advisor:</b>	Doug Hutchinson	<b>NIST Tech. Advisors:</b>	Tina Butcher Steven Cook
<b>NIST Tech. Advisors:</b>	Kenneth Butcher Lisa Warfield		

Organization Chart

<b>NCWM Committees (continued)</b>			
<i>Professional Development Committee</i>		<i>Metrology Committee</i>	
<b>Position</b>	<b>Name/Affiliation (Term Ends)</b>	<b>Position</b>	<b>Name/Affiliation (Term Ends)</b>
<b>Chair:</b>	Ross Andersen, NY (2010)	<b>Chair:</b>	TBD
<b>Members:</b>	Richard Cote, NH (2009) John Sullivan, MS (2011) Stacy Carlsen, CA (2012) Julie Quinn, MN (2013)	<b>Co-Chair:</b>	TBD
<b>NIST Advisor:</b>	Tina Butcher, NIST/W&M	<b>Members:</b>	
<b>Safety Liaison:</b>	TBD		
<b>Associate Member Rep:</b>	TBD	<b>NIST Tech Advisor:</b>	TBD
<i>Nominating Committee</i>		<i>Legislative Liaison</i>	
<b>Chair:</b>	Judy Cardin, WY	<b>Chair:</b>	TBD
<b>Members:</b>	Ross Andersen, NY Dennis Ehrhart, AZ Thomas Geiler, MA Maxwell Gray, FL Steve Malone, NE	<b>Members:</b>	TBD
<i>Credentials Committee</i>		<i>Appointed Officers</i>	
<b>Chair:</b>	Raymond Johnson, NM (2009)	<b>Parliamentarian:</b>	Lou Straub, Fairbanks Scales
<b>Members:</b>	Dave Pfahler, SD (2010) Kim Connor, Barnstable, MA (2011)	<b>Chaplain:</b>	Stephen Langford, Cardinal Scale Manufacturing Company
<b>Coordinator:</b>	Don Onwiler, NCWM	<b>Sergeants-At-Arms:</b>	TBA TBA
		<b>Presiding Officers:</b>	Tim Chesser, AR Ivan Hankins, IA Kirk Robinson, WA Jack Walsh, Framingham, MA
<i>Associate Membership Committee</i>			
<b>Chair:</b>	Paul Lewis, Rice Lake Weighing Systems (2009)		
<b>Vice Chair:</b>	Michael Gaspers, Farmland Foods, Inc. (2011)		
<b>Secretary/Treasurer:</b>	TBD		
<b>Members:</b>	Christopher Guay, Procter and Gamble (2009) Rob Underwood, Petroleum Marketers (2009) Thomas Herrington, Nestle USA (2010) Doug Biette, Sartorius North America (2010) Paul Hoffman, Kraft (2011) Darrell Flocken, Mettler Toledo (2011)		

<b>National Type Evaluation Technical Committees (NTETC)</b>	
<i>NTETC Weighing Sector</i>	<i>NTETC Measuring Sector</i>
<p><b>Chair:</b> Darrell Flocken, Mettler-Toledo</p> <p><b>Technical Advisor:</b> Steven Cook, NIST/WMD</p> <p><b>Public Sector Members:</b> Cary Ainsworth, GIPSA Ross Andersen, NY William Bates, GIPSA Luciano Burtini, Measurement Canada Tina Butcher, NIST/WMD Dan Reiswig, CA Terry Davis, KS Ken Jones, CA Jack Kane, MT Todd Lucas, OH Ronald Rigdon, MN Juana Williams, NIST/WMD</p> <p><b>Private Sector Members:</b> Steven Beitzel, Systems Associates, Inc. Doug Biette, Sartorius North America Neil Copley, Thurman Scale Co. Mitchell Eyles, Flintec, Inc. Robert Feezor, Norfolk Southern Corp. Scott Henry, NCR John C. Hughes, Avery Weigh-Tronix Rafael Jimenez, Association of American Railroads Stephen Langford, Cardinal Scale Mfg. Paul Lewis, Rice Lake Weighing Systems Thomas Luna, Scales Unlimited, Inc. L. Edward Luthy, Brechbuhler Scales, Inc. Nigel Mills, Hobart Corporation Stephen Patoray, Consultant on Certification, LLC Louis Straub, Fairbanks Scales, Inc. Jerry Wang, A&amp;D Engineering, Inc. William West, Consultant Nathaniel Wieselquist, Sick, Inc. Walter Young, Emery Winslow Scale</p>	<p><b>Chair:</b> Michael Keilty, Endress &amp; Hauser Flowtec AG</p> <p><b>Technical Advisor:</b> Tina Butcher, NIST/WMD</p> <p><b>Public Sector Members:</b> Ross Andersen, NY Jerry Butler, NC Gary Castro, CA Mike Frailer, MD Steve Hadder, FL Ted Kingsbury, Measurement Canada Todd Lucas, OH John Makin, Measurement Canada Dan Reiswig, CA Richard Wotthlie, MD</p> <p><b>Private Sector Members:</b> Marc Buttler, Emerson Process Management - Micro Motion Joe Buxton, Daniel Measurement &amp; Control Rodney Cooper, Actaris Neptune Maurice Forkert, Tuthill Transfer Systems Mike Gallo, Clean Fueling Technologies Paul Glowacki, Murray Equipment Alex Gutierrez, MEGGITT Fueling Products, Whittaker Controls Gordon Johnson, Gilbarco, Inc. Yefim Katselnik, Dresser Wayne, Inc. Douglas Long, RDM Industrial Electronics Wade Mattar, Invensys/Foxboro Daniel Maslowski, LTS Sales Richard Miller, FMC Measurement Solution Robert Murnane, Jr., Seraphin Test Measure Andre Noel, Neptune Technology Charlene Numrych, Liquid Controls Johnny Parrish, Brodie Meter Company, LLC Stephen Patoray, Consultant on Certification, LLC David Rajala, Veeder-Root Company Richard L. Tucker, RL Tucker Consulting</p>

<b>National Type Evaluation Technical Committees (NTETC) (continued)</b>	
<i>NTETC Software Sector</i>	<i>NTETC Grain Analyzer Sector</i>
<p><b>Co-Chairs:</b> Norm Ingram, CA James Pettinato, FMC Technologies</p> <p><b>Technical Advisor:</b> Jim Truex, NCWM</p> <p><b>Public Sector Members:</b> Dennis Beattie, MC Bill Fishman, NY Mike Frailer, MD Todd Lucas, OH John Roach, CA Ambler Thompson, NIST/WMD</p> <p><b>Private Sector Members:</b> John Atwood, Tyson Foods Doug Bliss, Mettler-Toledo Cassie Eigenmann, DICKEY-john Corp. André Elle, Endress &amp; Hauser Flowtec AG Travis Gibson, Rice Lake Weighing Systems Teri Gulke, Liquid Controls LLC Keith Harper, Gencor Industries, Inc. Tony Herrin, Cardinal Scale Mfr. Co. Robert Hoblit, IBM Gordon Johnson, Gilbarco, Inc. Paul Lewis, Rice Lake Weighing Systems Mike McGhee, Actaris US Liquid Measurement Richard Miller, FMC Measurement Solutions Charlene Numrych, Liquid Controls, LLC Michael Parks, Vulcan Materials Co. Stephen Patoray, Consultant on Certification, LLC Steve J. Pollmann, Tyson Foods Mike Roach, Verifone Robin Sax, CompuWeigh Corp. Mark Schwartz, Accu-Sort Scott Szurek, Emerson Process Management David Vande Berg, Vande Berg Scales Roland Wagner, Flow Measurements &amp; Engineering GmbH Nathaniel Wieselquist, Sick, Inc.</p>	<p><b>Chair:</b> Cassie Eigenmann, DICKEY-john Corp.</p> <p><b>Technical Advisors:</b> G. Diane. Lee, NIST/WMD John Barber, J. B. Associates</p> <p><b>Public Sector Members:</b> Randy Burns, AR Tina Butcher, NIST/WMD Karl Cunningham, IL Todd Lucas, OH Richard Pierce, GIPSA Edward Szesnat, Jr., NY Cheryl Tew, NC</p> <p><b>Private Sector Members:</b> James Bair, NA Miller’s Association Martin Clements, The Steinlite Corp. Victor Gates, Shore Sales Company Andrew Gell, Foss North America Charles Hurburgh, Jr., Iowa State University David Krejci, Grain Elevator &amp; Processing Society Jess McCluer, National Grain &amp; Feed Association Thomas Runyon, Seedboro Equipment</p>

<b>National Type Evaluation Technical Committees (NTETC) (continued)</b>	
<i>NTETC Belt Conveyor Sector</i>	
<b>Chair:</b>	TBD
<b>Technical Advisor:</b>	Steven Cook, NIST/WMD
<b>Public Sector Members:</b>	Tina Butcher, NIST/WMD
<b>Private Sector Members:</b>	R. Jimenez, Association of American Railroads L. Marmsater, Merrick Industries S. Patoray, Consultant on Certification, LLC B. Ripka, Thermo Electron P. Sirrico, Thayer Scale - Hyer Industries, Inc. T. Vormittag, Sr, SGS Minerals Services

<b>Regional Weights and Measures Associations</b>	
<i>Regional Weights and Measures Contacts</i>	
<b>Northeastern Weights and Measures Association (NEWMA):</b>  Annual Meeting 2009: May 11 - 14 South Portland Sheraton Portland, Maine	James Cassidy (617) 349-6133 jcassidy@cambridgema.gov Charles Carroll (617) 727-3480 ext. 21131 Charles.Carroll@state.ma.us
<b>Southern Weights and Measures Association (SWMA):</b>  Annual Meeting 2009: October 4 - 7 (Tentative) The Hilton Clearwater Beach Resort (Tentative) Clearwater, Florida	Steve Hadder Florida Department of Agriculture & Consumer Services (850) 487-2634 hadders@doacs.state.fl.us
<b>Central Weights and Measures Association (CWMA):</b>  Annual Meeting 2009: May 3 - 6 Millennium Hotel St. Louis St. Louis, Missouri	Steve Gill Missouri Department of Agriculture (573) 751-4278 steve.gill@mda.mo.gov
<b>Western Weights and Measures Association (WWMA):</b>  Annual Meeting 2009: September 20 - 24 Hotel Encanto de Las Cruces Las Cruces, New Mexico	Joe Gomez New Mexico Department of Agriculture (575) 646-1616 jgomez@nmda.nmsu.edu



Organization Chart

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## General Conference Information

### Introduction

This document contains the Board of Directors and Standing Committee agendas for the **Interim Meeting of the National Conference on Weights and Measures, Inc.**, (NCWM) scheduled for January 11 - 14, 2009, at the Hilton Daytona Beach Oceanfront Resort, Daytona Beach, Florida. To reserve a room, call Hilton Reservations at (866) 536-8477 or call the hotel directly at (386) 254-8200 and ask for the National Conference on Weights and Measures meeting rate of \$93 single or double. The rate is guaranteed through December 12, 2008.

Agenda items to be addressed by the Standing Committees are assigned Reference Key numbers as follows:

<b>Committee</b>	<b>Reference Key</b>
Board of Directors	100 series
Laws and Regulations	200 series
Specifications and Tolerances	300 series
Professional Development Committee	400 series
National Type Evaluation Program Committee	500 series
Nominating Committee	800 series

The subject matter listed on each Standing Committee's agenda will be open for discussion as noted. Each committee may also take up routine or miscellaneous items brought to its attention after the preparation of this document. At its discretion, each committee may decide to accept items for discussion that are not listed in this document.

The agendas:

1. include items brought to the attention of the Standing Committees prior to the submission deadline of November 1, 2008, and approved for inclusion in their agendas by the Committees, and
2. serve as the basis for the Standing Committee Interim Reports (to be printed in the Program and Committee Reports of the National Conference on Weights and Measures 94<sup>th</sup> Annual Meeting, NCWM Publication 16). The final reports of the Committees will be published in the NIST Special Publication Report of the 94<sup>th</sup> Annual Meeting of the NCWM, following the Annual Meeting in 2009, scheduled for July 12 - 16 at the Marriott Plaza San Antonio, San Antonio, Texas.

The Committees have not determined whether the items presented will be voting or informational in nature; these determinations will result from their deliberations at the Interim Meeting.

### Special Meetings

Several Annual Committees and other organizations are conducting meetings concurrently with the Standing Committees of the Conference.

### Joint Meetings for All Committees

A joint meeting for all committees will be held on Sunday, January 11, and Wednesday, January 14, 2009. Each Standing Committee will highlight the major decisions made during the week, and the Nominating Committee will present its report.

## Participation

Sunday meetings are scheduled for Committee members to review their agendas (see the particular committee agenda for details). Although the sessions are open to all delegates, participation in discussions during agenda reviews is normally limited to Committee members. Comments and input are welcome when specific topics are scheduled in the Committee agendas.

All sessions of NCWM meetings are normally open to members of the Conference. If a Committee chairman recognizes a special situation involving a proprietary issue (e.g., NTEP appeals) or sensitive issue or other substantive need, that portion of the session dealing with the special issue may be closed, provided that: (1) the Conference chairman (or in his absence, the chairman-elect) approves, and (2) announcement of the closed meeting is posted on or near the door to the meeting session and on the announcement board at the registration desk. If at all possible, the posting will be done at least a day prior to the planned closed session. Please note that the one-day notice will not always be possible if a closed meeting is called on Sunday. Since Sunday is a day for agenda reviews and participants may make their travel reservations in order to observe these agenda reviews, if a closed meeting becomes necessary on Sunday, every effort will be made to limit such a meeting to only part of the day.

To request an appearance with a Standing Committee, contact the appropriate technical advisor by December 31, 2008:

Board of Directors	Carol Hockert	(301) 975-4004
Laws and Regulations Committee	Kenneth Butcher or Lisa Warfield	(301) 975-4859 (301) 975-3308
Specifications & Tolerances Committee	Tina Butcher or Steve Cook	(301) 975-2196 (301) 975-4003
Professional Development Committee	Ross Andersen	(518) 457-3146
National Type Evaluation Program Committee	Judith Cardin	(608) 224-4945

You may also contact the Executive Secretary at the following address and telephone number:

Weights and Measures Division  
National Institute of Standards and Technology  
100 Bureau Drive, STOP 2600  
Gaithersburg, MD 20899-2600  
Telephone: (301) 975-4004

## Contact for More Information

If you have questions about the program, registration, lodging, or meeting arrangements, contact NCWM Headquarters at the following address and telephone number:

National Conference on Weights and Measures  
1135 M Street, Suite 110  
Lincoln, NE 68508  
Telephone: (402) 434-4880

## Reports

There will **not** be a transcript made of the proceedings of the Interim Meetings. Each committee will prepare its report to the NCWM containing its recommendations based upon the presentations, discussions, and deliberations on all matters on its agenda that were addressed during the Interim Meetings. These reports will be published in the Committee Reports for the 94<sup>th</sup> Annual Meeting, NCWM Publication 16, to be posted to the NIST WMD website at [www.nist.gov/owm](http://www.nist.gov/owm) and to the NCWM website at [www.ncwm.net](http://www.ncwm.net) in early April. Printed copies of Publication 16 will be distributed to meeting attendees at the Annual Meeting in July.

## **94<sup>th</sup> Annual Meeting of the National Conference on Weights and Measures**

The National Conference on Weights and Measures 94<sup>th</sup> Annual Meeting will be held at the Marriott Plaza San Antonio, San Antonio, Texas, from July 12 - 16, 2009. The room rate for the Annual Meeting will be \$119 per night, single or double, plus tax. For reservations, please call the hotel at (800) 228-9290. The special rate is guaranteed through Friday, June 12, 2009.

### **Units of Measurement**

In keeping with the provisions of the Omnibus Trade and Competitiveness Act of 1988, which establishes the metric system as the preferred system of measurement for commerce and trade, units of the metric system have been used in this document, except where industry has not yet converted from the inch-pound system. In some instances, submitted proposals quoted in the Committee agendas may appear in inch-pound units only.

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**2009 NCWM Interim Meeting  
January 11 - 14, 2009**

**Hilton Daytona Beach Oceanfront Resort ♦ Daytona Beach, Florida**

**Schedule of Events  
(as of December 8, 2008)**

		<b>Location</b>
<b>Friday, January 9</b>		
8:30 a.m. - 5:00 p.m.	<b>Board of Directors Meeting</b>	Oceanview Room
<b>Saturday, January 10</b>		
8:30 a.m. - 5:00 p.m.	<b>Board of Directors Meeting</b>	Oceanview Room
<b>Sunday, January 11</b>		
7:30 a.m. - 9:00 a.m.	Morning Coffee	Tomoka Foyer
7:30 a.m. - 5:00 p.m.	Registration and Exhibits	Tomoka Foyer
8:30 a.m. - 10:30 a.m.	<b>Industry Committee on Packaging &amp; Labeling</b>	Flagler AB
10:30 a.m. - 12:00 p.m.	<b>Associate Membership Committee</b>	Tomoka AB
12:00 p.m. - 12:30 p.m.	Lunch on your own	
1:00 p.m. - 1:30 p.m.	<b>Joint Meeting for all Standing Committees</b>	Tomoka AB
1:30 p.m. - 5:00 p.m.	<b>STANDING COMMITTEES REVIEW SESSIONS</b>	
	Board of Directors/NTEP Committee	Flagler AB
	Laws & Regulations Committee	Halifax
	Professional Development Committee	Flagler C
	Specifications & Tolerances Committee	St. John's
2:45 p.m. - 5:00 p.m.	Moisture Loss Work Group	Ponce de Leon
5:30 p.m. - 7:00 p.m.	<b>Chairman's Reception</b>	Coquina Pre-Function South



**2009 NCWM Interim Meeting**  
**January 11 - 14, 2009**  
**Hilton Daytona Beach Oceanfront Resort ♦ Daytona Beach, Florida**

**Schedule of Events**  
*(as of December 8, 2008)*

<b>Monday, January 12</b>		<b>Location</b>
7:30 a.m. - 9:00 a.m.	Morning Coffee	Tomoka Foyer
7:30 a.m. - 5:00 p.m.	Registration and Exhibits	Tomoka Foyer
8:30 a.m. - 9:30 a.m.	<p><b>PRESENTATION</b>  <b>California Energy Commission Report on Automatic Temperature Compensation</b>                      Gordon Schremp, California Energy Commission  <i>Mr. Schremp is the Senior Fuels Specialist at the California Energy Commission and has been working in the Fuels and Transportation Division since 1991. He advises the Commissioners, Executive Officer, Governor's Office, Legislature, state agencies, and various local government officials on policy and technical matters associated with the supply and price of transportation fuels in California, and the United States. Mr. Schremp will be providing an overview of the Energy Commission's recent report concerning automatic temperature compensation at retail stations.</i></p>	Crystal Tomoka
9:30 a.m. - 11:30 a.m.	<p><b>STANDING COMMITTEES OPEN HEARINGS</b>  <i>(Note: Times of hearings are not firm; when one committee finishes, the next committee will begin.)</i>                      Laws &amp; Regulations Committee                      Specifications &amp; Tolerances Committee                      Professional Development Committee                      Board of Directors/NTEP Committee</p>	Crystal Tomoka
11:30 a.m. - 12:30 p.m.	Lunch on your own	
12:30 p.m. - 5:00 p.m.	<p><b>STANDING COMMITTEES OPEN HEARINGS</b>  <i>(Note: Times of hearings are not firm; when one committee finishes, the next committee will begin.)</i>                      Laws &amp; Regulations Committee                      Specifications &amp; Tolerances Committee                      Professional Development Committee                      Board of Directors/NTEP Committee</p>	Crystal Tomoka



## 2009 NCWM Interim Meeting January 11 - 14, 2009

**Hilton Daytona Beach Oceanfront Resort ♦ Daytona Beach, Florida**

### Schedule of Events

*(as of December 8, 2008)*

<b>Tuesday, January 13</b>		<b>Location</b>
7:30 a.m. - 9:00 a.m.	Morning Coffee	Tomoka Foyer
7:30 a.m. - 5:00 p.m.	Registration and Exhibits	Tomoka Foyer
8:30 a.m. - 12:00 p.m.	<b>STANDING COMMITTEES OPEN HEARINGS</b> <i>(Note: Times of hearings are not firm; when one committee finishes, the next committee will begin.)</i> Laws & Regulations Committee Specifications & Tolerances Committee Professional Development Committee Board of Directors/NTEP Committee <b>Note:</b> Each committee will begin their individual work sessions at the conclusion of the Open Hearings/Technical Session.	Crystal Tomoka
12:00 p.m. - 1:00 p.m.	Lunch on your own	
1:00 p.m. - 5:00 p.m.	<b>STANDING COMMITTEES WORK SESSIONS</b> Board of Directors/NTEP Committee Laws & Regulations Committee Professional Development Committee Specifications & Tolerances Committee	Flagler AB Halifax Flagler C St. John's
<b>Wednesday, January 14</b>		
7:30 a.m. - 9:00 a.m.	Morning Coffee	Tomoka Foyer
7:30 a.m. - 12:00 p.m.	Registration and Exhibits	Tomoka Foyer
8:30 a.m. - 11:00 a.m.	<b>STANDING COMMITTEES WORK SESSIONS</b> Board of Directors/NTEP Committee Laws & Regulations Committee Professional Development Committee Specifications & Tolerances Committee	Flagler AB Halifax Flagler C St. John's
11:00 a.m. - 12:00 p.m.	<b>JOINT MEETING – ALL STANDING COMMITTEES</b>	Tomoka AB

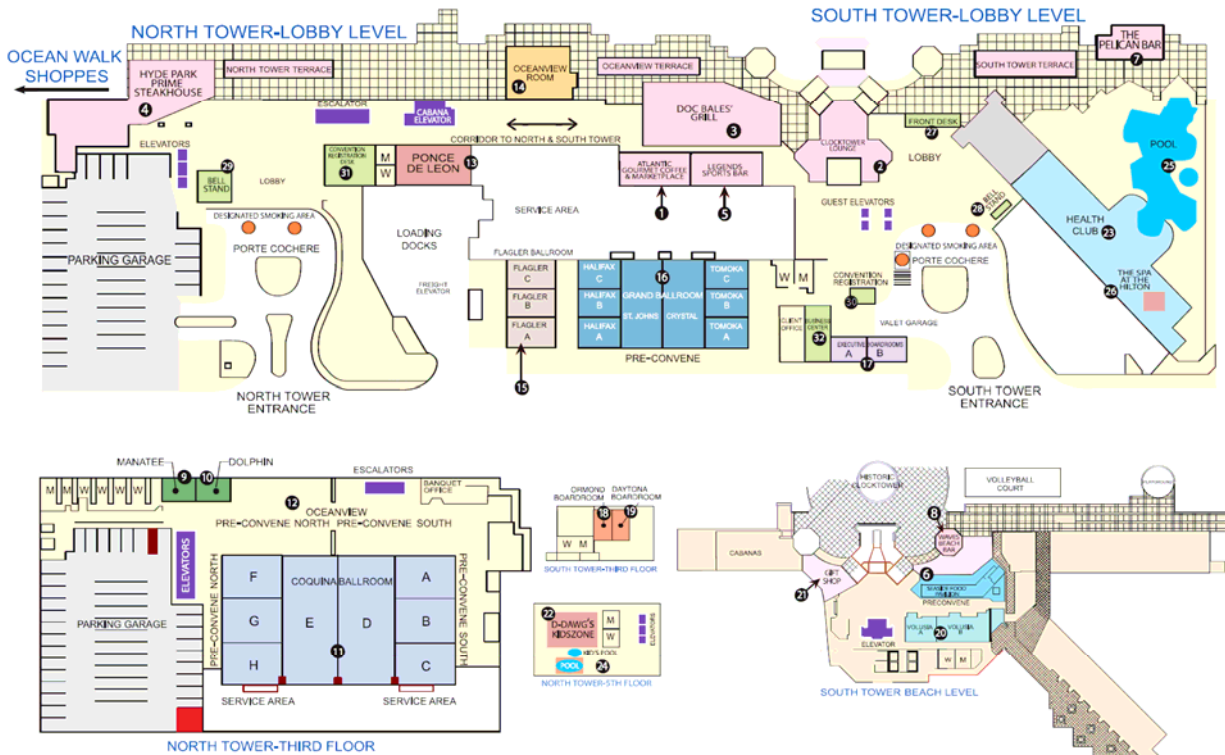
**NOTE:** 2009 Interim Meeting schedule of events is tentative and subject to change.



## Hilton Daytona Beach Layout

NORTH TOWER	L x W x H	Sq. Ft.	Theater	Classroom	Boardroom	U-shape	Reception	Penip	8 x 10 Tables
Lobby Level									
Ponce de Leon	31 x 52 x 10'	1,620	177	108	42	38	170	144	10
Third Floor									
Coquina	100 x 180 x 20'	18,000	2,000	1,252			2,000	1,608	116
D & E (ea.)	100 x 44 x 20'	4,276	500	306			475	420	31
A, B, C, F, G, H (ea.)	33 x 46 x 20'	1,500	165	105		52	160	120	9
A, B, C (combined)							450	384	27
F, G, H (combined)							450	384	27
North Pre-convene	84 x 61 x 14'	5,125					450	360	23
South Pre-convene	96 x 40 x 14'	3,840					450	300	20
Manatee	20 x 25.6 x 10'	465	55	35	20	20	50	40	
Dolphin	20 x 25.6 x 10'	465	55	35	20	20	50	40	

SOUTH TOWER	L x W x H	Sq. Ft.	Theater	Classroom	Boardroom	U-shape	Reception	Penip	8 x 10 Tables
Beach Level									
Volusia A	26 x 25 x 8'	650	50	24	24	15	60	50	
Volusia B	26 x 55 x 8'	1,400	120	70	36	30	100	80	
Lobby Level									
Grand Ballroom	62.4 x 135 x 15.8'	8,675	1,000	600			1,000	790	50
Halifax A, C, Tomoka A, C (ea.)	21.8 x 33.5 x 15.6'	735	70	50	30	25	90	60	
Halifax B, Tomoka B (ea.)	21.3 x 33.4 x 15.6'	715	70	50	30	25	90	60	
St. Johns & Crystal (ea.)	62.2 x 33.4 x 15.6'	2,145	250	150	75	70	300	198	13
Flagler Ballroom	65 x 36.8 x 13.6'	2,400	275	160	75	70	320	200	14
Flagler A & C (ea.)	21.8 x 36 x 13.6'	805	80	50	32	25	90	72	
Flagler B	21.3 x 36.8 x 13.6'	790	80	50	34	25	90	72	
Oceanview Room	37 x 52 x 9'	1,925	150	117	30	24	150	140	
Executive Boardroom A	17.5 x 27 x 9.4'	475					14	15	
Executive Boardroom B	17.5 x 28 x 9.4'	490					14	15	
Third Floor									
Daytona Boardroom	15 x 26 x 8'	375					12	12	
Ormond Boardroom	15 x 26 x 8'	375					12	12	



**FOOD & BEVERAGE**

- Atlantic Gourmet Coffee & Marketplace - Lobby Level South Tower
- Clocktower Lounge - Lobby Level South Tower
- Doc Bales' Grill - Lobby Level South Tower
- Hyde Park Prime Steakhouse - Lobby Level North Tower
- Legends Sports Bar - Lobby Level South Tower
- Seaside Food Pavilion - Beach Level South Tower
- The Pelican Bar - Lobby Level South Tower
- Waves Beach Bar - Beach Level South Tower

**MEETING SPACE - NORTH TOWER**

- Manatee - 3rd Floor
- Dolphin - 3rd Floor
- Coquina Ballroom A-H - 3rd Floor
- Coquina Ballroom Pre-convene - 3rd Floor
- Ponce de Leon - Lobby Level
- Oceanview Room - Lobby Level

**MEETING SPACE- SOUTH TOWER**

- Flagler A-C - Lobby Level
- Grand Ballroom (Halifax A-C, St. Johns, Crystal, Tomoka A-C) - Lobby Level

- Executive Boardroom A, B - Lobby Level
- Ormond Boardroom - 3rd Floor\*
- Daytona Boardroom - 3rd Floor\*
- Volusia A, B - Beach Level

**RECREATION & LEISURE**

- Beach Emporium Gift Shop - Beach Level South Tower
- D-Dawg's Kidszone - 5th Floor North Tower\*
- Heath Club open 24 hours - Lobby Level South Tower\*
- Pool / whirlpool - 5th Floor North Tower\*
- Pool / whirlpool - Lobby Level South Tower\*
- The Spa at the Hilton - Lobby Level South Tower

**OTHER**

- Front Desk - Lobby Level South Tower
- Bell Stand - Lobby Level South Tower
- Bell Stand - Lobby Level North Tower
- Convention Registration Desk - Lobby Level South Tower
- Convention Registration Desk - Lobby Level South Tower
- Business Center - Lobby Level South Tower

● Designated Smoking Area

\* need room/elevator key to access



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**Board of Directors  
Interim Agenda**

Jack Kane  
Deputy Administrator  
Business Standards Division – Montana Department of Labor and Industry

Reference  
Key Number

**100 INTRODUCTION**

The Board will hold its quarterly Board of Directors meeting on Friday and Saturday, January 9 - 10, 2009, and continue that meeting during work periods throughout the remainder of the Interim Meetings. Except when posted, all meetings are open to the membership. The Board of Directors and NTEP Committee will hold open hearings at the Interim Meeting and members will be invited to engage in dialogue with the Board on issues the Board and NTEP Committee have on their agenda. The Board of Directors is currently working on the following issues: the feasibility of marketplace surveys, membership services, web hosting, website and newsletter improvements, NCWM efficiency and effectiveness as an organization, and strategic planning. In addition to these items, the Board Agenda contains two appendices that cover the Activities of the International Organization of Legal Metrology (OIML) and Regional Legal Metrology Organizations (Appendix A) and the Interim Agenda of the Associate Membership (AMC) (Appendix B).

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**Details of all Items**  
**(In order by Reference Key Number)**

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### 1. NCWM Automatic Temperature Compensation Steering Committee

The ATC Steering Committee was formed in 2007 to assist NCWM in forming a consensus on issues before the Specifications and Tolerances Committee and the Laws and Regulations Committee. The Board receives quarterly activity reports from the Chair of the ATC Steering Committee. In addition, they review future Steering Committee activities and related NCWM work on this issue.

To date, the Steering Committee has forwarded numerous recommendations to the standing committees to assist them in the development of their respective agenda items. The Board of Directors has chosen to continue the support of this committee through the 2009 NCWM Annual Meeting and will reassess the need for ongoing activity at that time.

### 2. Marketplace Surveys Update

The Board will review the feasibility and value of marketplace surveys as it sets the direction for conducting any further surveys in the future.

### 3. Membership and Meeting Attendance

The Board is considering ways to add value to NCWM membership. One proposal being considered is allowing "Members Only" access to the searchable NTEP database. Non-members would still be able to download PDF listings of certificate holders, certificate numbers, and models covered, but they would not be able to enter the Certificates of Conformance database to view the certificates.

<b>NCWM Membership Report</b>										
	<b>10/30/08</b>		<b>10/29/07</b>		<b>10/01/06</b>		<b>10/18/05</b>		<b>10/01/04</b>	<b>10/01/03</b>
Associate	(157)	742	(161)	771	(156)	736	(124)	751	713	712
Foreign Assc	(14)	44	(8)	50	(18)	44	(8)	43	41	29
Federal Gov't	(0)	10	(1)	9	(5)	9	(3)	13	12	17
NIST	(1)	13	(2)	14	(1)	14		11	11	18
State Gov't	(201)	603	(207)	684	(224)	620	(113)	765	637	613
Local Gov't	(65)	499	(67)	537	(76)	512	(82)	434	417	450
Int'l Gov't	(2)	23	(10)	22	(7)	28	(13)	21	20	15
Retired	(7)	214		220		227	(5)	220	222	229
<b>Total</b>	<b>(447)</b>	<b>2148</b>	<b>(456)</b>	<b>2307</b>	<b>(487)</b>	<b>2190</b>	<b>(348)</b>	<b>2258</b>	<b>2097</b>	<b>2083</b>
(Memberships not renewed as of date at top of column)										

### 4. NCWM Newsletter and Website

In the recent past, Steven Grabski agreed to serve as Subcommittee Chair for the newsletter and website. The Committee was charged with continuing to improve and monitor the content of the newsletter and website. Now that the new NCWM staff is in place, NCWM has the in-house expertise to make some improvements and enhancements to the site. Some of these enhancements have already taken place. Comments and suggestions for improvements should be directed to NCWM Headquarters at (402) 434-4880 or via e-mail at info@ncwm.net.

NCWM will be adding information to the "Members Only" portion of the website including NCWM policies, and approved minutes of the Board of Directors meetings.

## 5. Hosting Regional Websites

Several regional association websites are hosted through the NCWM website. In the past, regional associations have paid NCWM for updates to these websites on an hourly rate. This has caused the regional associations to economize by only requesting updates to information posted on their sites once or twice per year. The Board of Directors is considering a new plan for hosting that would require a reasonable flat rate annual fee to NCWM for hosting and updating regional websites. The purpose would be to keep the service affordable for the regions and promote keeping the information on the regional sites up to date.

## 6. Meetings Update

### *Interim Meetings*

January 11 - 14, 2009	Hilton Daytona Beach Hotel, Daytona Beach, Florida
January 24 - 27, 2010	Hilton Nashville Downtown, Nashville, Tennessee
January 23 - 26, 2011	The Fairmont Dallas, Dallas, Texas

### *Annual Meetings*

July 12 - 16, 2009	Marriott Plaza Hotel, San Antonio, Texas
July 11 - 15, 2010	Crowne Plaza St. Paul Hotel, St. Paul, Minnesota

The 2011 Annual Meeting will be held in the Western Region. The WWMA Board of Directors will make recommendations to NCWM for potential sites for this meeting.

## 7. Participation in International Standard Setting

Chuck Ehrlich and other NIST Weights and Measures Division (WMD) staff will brief the NCWM Board and NCWM members on key activities of OIML and regional legal metrology organizations (see Appendix A).

## 8. Efficiency and Effectiveness

The Board is examining cost efficiency measures to control meeting and administrative costs. We welcome member feedback on this topic and any ideas to increase the effectiveness of the Conference.

**NCWM Staff:** The recent transition in NCWM management has provided an opportunity for significant cost savings to NCWM. However, this transition must not sacrifice service to the NCWM stakeholders or our mission. It is the hope of the Board of Directors that, in fact, the cost savings will enable NCWM to enhance its level of service and effectiveness.

**Meetings:** The Board is implementing a plan whereby members may volunteer for meeting staffing. This will reduce meeting staffing costs and possibly provide local officials, who may not otherwise be able to attend, the opportunity to participate. Staffing needs will be assessed on an on-going basis to ensure successful events for our members.

**Travel Policy:** The NCWM Travel Policy applies to any person traveling at NCWM expense. The policy will be amended to clarify that meals occurring before departure on the first day of travel and after return on the last day of travel do not qualify for reimbursement.

## 9. Bylaws Amendment: Article IX, Section 4 – Ad Hoc Committees, Subcommittees, Task Forces, and Study Groups

Proposal: Amend Article IX, Section 4 as follows:

Ad hoc committees, subcommittees, task forces, and study groups are appointed by the Corporation Chairman from the active, advisory, ~~or~~ associate membership, or NCWM staff in any combination, as the need arises or the Corporation requests. All committees are subject to an annual review by the Board.

Discussion: The Board recognizes that full-time staff dedicated to NCWM could provide beneficial support and participation in the activities of special work groups. Currently, the bylaws may not provide the flexibility for this use of NCWM staff in this manner.

## **10. Strategic Planning**

Now that the management transition to NCWM employees is complete, the Board of Directors is reassessing its short-term and long-term goals. The Board will use this opportunity to review and update its Strategic Plan to ensure the organization is moving forward and in the right direction.

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Jack Kane, Montana, NCWM Chairman  
Randy Jennings, Tennessee, Chairman-Elect  
Judy Cardin, Wisconsin, NTEP Chairman  
Will Wotthlie, Maryland, Treasurer  
Charles Carroll, Massachusetts, Northeastern Regional Representative  
Steven Malone, Nebraska, Central Regional Representative  
Stephen Benjamin, North Carolina, Southern Regional Representative  
Steven Grabski, Nevada, Western Regional Representative  
Stephen Langford, Cardinal Scale, At-Large  
Tim Tyson, Kansas, At-Large  
Robert Murnane, Seraphine Test Measure, Associate Membership  
Don Onwiler, NCWM Executive Director  
Carol Hockert, Chief, Weights and Measures Division, Executive Secretary

## **Board of Directors**

## Appendix A

### Report on the Activities of the International Organization of Legal Metrology (OIML) and Regional Legal Metrology Organizations

Weights and Measures Division, NIST

#### INTRODUCTION

The Weights and Measures Division (WMD) of the National Institute of Standards and Technology (NIST) is responsible for coordinating U.S. participation in the International Organization of Legal Metrology (OIML) and other international legal metrology organizations. Learn more about OIML at the website [www.oiml.org](http://www.oiml.org) and about NIST Weights and Measures Division at the WMD website [www.nist.gov/owm](http://www.nist.gov/owm). Dr. Charles Ehrlich, Group Leader of the International Legal Metrology Group (ILMG), can be contacted at [charles.ehrlich@nist.gov](mailto:charles.ehrlich@nist.gov) or at (301) 975-4834 or by fax at (301) 975-8091.

*Please note: OIML publications are available without cost at <http://www.oiml.org>.*

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**Table B**  
**Glossary of Acronyms**

BIML	International Bureau of Legal Metrology	IR	International Recommendation
B	Basic Publication	IWG	International Work Group
CD	Committee Draft <sup>1</sup>	MAA	Mutual Acceptance Arrangement
CIML	International Committee of Legal Metrology	MC	Measurement Canada
CPR	Committee on Participation Review	OIML	International Organization of Legal Metrology
D	Document	R	Recommendation
DD	Draft Document <sup>2</sup>	SC	Technical Subcommittee
DR	Draft Recommendation <sup>2</sup>	TC	Technical Committee
DoMC	Declaration of Mutual Confidence	WD	Working Draft <sup>3</sup>
DV	Draft Vocabulary <sup>2</sup>	USNWG	U.S. National Work Group
ILMG	International Legal Metrology Group		

<sup>1</sup> CD: a draft at the stage of development within a technical committee or subcommittee; in this document, successive drafts are numbered 1 CD, 2 CD, etc.

<sup>2</sup> DD, DR, and DV: draft documents approved at the level of the technical committee or subcommittee concerned and sent to BIML for approval by CIML.

<sup>3</sup> WD: precedes the development of a CD; in this document, successive drafts are number 1 WD, 2 WD, etc.

**Details of All Items**  
**(In Order by Reference Key Number)**

**I. Report on the Activities of the OIML Technical Committees**

This section reports on recent activities and the status of work in OIML technical committees (TCs) and technical subcommittees (SCs) of specific interest to members of the NCWM. Also included are schedules of future activities of the Secretariats, the U.S. National Work Groups (USNWGs), and the International Work Groups (IWGs) of the committees and subcommittees.

*TC 3/SC 1 “Pattern approval and evaluation” (United States)*

The Subcommittee approved the U.S. proposal for a combined revision of OIML D 19 “Pattern evaluation and pattern approval” and D 20 “Initial and subsequent verification of measuring instruments and processes” into a single document entitled “Principles of metrological control of measuring instruments: type approval and verification.” Key elements of OIML D 3 “Legal qualification of measuring instruments,” R 34 “Accuracy classes of measuring instruments,” and R 42 “Metal stamps for verification officers” will also be incorporated into the combined revision of OIML D 19 and D 20. The revised documents will incorporate recent developments such as the OIML certificate system, D 27 “Initial verification of measuring instruments utilizing the manufacturer’s quality management system,” and the “Framework for a mutual acceptance arrangement (MAA) on OIML type evaluations.” Consideration will be given to the appropriate conformity assessment options developed by the ISO Council Committee on Conformity Assessment (ISO CASCO), including quality systems, product certification, and accreditation. Consideration will also be given to information technology and statistical methods to increase or decrease verification intervals based upon proven instrument performance. For more information on this activity, contact Dr. Ambler Thompson at (301) 975-2333 or at [ambler@nist.gov](mailto:ambler@nist.gov).

*TC 3/SC 5 “Conformity assessment” (United States and BIML)*

The Subcommittee held a meeting in May 2008 to discuss the revision of the documents B 3 (Certificate System) and B 10 (MAA). The meeting included discussion of a new document on the incorporation of measurement uncertainty into conformity assessment decisions in legal metrology; in January 2008, a revised WD was sent to the BIML and other technical advisors for review. For more information on this activity, contact Dr. Charles Ehrlich at (301) 975-4834 or at [charles.ehrlich@nist.gov](mailto:charles.ehrlich@nist.gov).

*TC 5/SC 2 “Software” (Germany and BIML)*

The new OIML Document D 31 “General requirements for software-controlled measuring instruments” was approved by the CIML in October 2008 and will serve as guidance for software requirements in International Recommendations by OIML technical committees. The United States participated in the technical work on this document and submitted votes and comments on several drafts of the document. The ILMG participated in NCWM Software Sector meetings in Lake Tahoe, California, and Little Rock, Arkansas, in October and May 2007. Please contact Dr. Ambler Thompson at (301) 975-2333 or at [ambler@nist.gov](mailto:ambler@nist.gov) if you would like to discuss OIML software efforts.

*TC 6 “Prepackaged products” (South Africa)*

In September 2007, NIST hosted the OIML TC 6 at NIST in Gaithersburg, Maryland. There was continued discussion on the issue of an OIML International Quantity Mark, referred to as an IQ Mark. The IQ Mark, designed to eliminate trade barriers, would be a program that would allow for an international system of acceptance of prepackaged goods. Receiving countries want imported packages to meet all requirements and packers in exporting countries want to ensure prepackages will not be rejected after arriving in the destination country. Such a program would also require that participants meet specific requirements in order to participate in a program for quantity control and marking of prepackaged goods.

The United States is participating in a work group that is developing guidelines on good manufacturing practices and additional documentation for selected criteria that would be used in the IQ Mark’s accreditation programs. It was agreed that all members of the TC 6 would send out a questionnaire to all current stakeholders, including industry, and federal and state agencies seeking input to specific questions. NIST WMD surveyed U.S. industry, including the largest manufacturers of packaged goods, in April 2008 and found no support for the IQ Mark effort. The United States believes the effort to manage and certify quality control systems will add costs to all participating suppliers. Even though there is significant opposition to the IQ Mark effort from several countries (including the United States), the technical committee continues to move forward with this project. A TC 6 meeting is scheduled for March 2009 in South Africa. Please contact Lisa Warfield at (301) 975-3308 or at [lisa.warfield@nist.gov](mailto:lisa.warfield@nist.gov) if you would like more information about the work of this subcommittee or to participate in any of these projects.

*TC 8/SC 1 “Static volume and mass measurement” (Austria and Germany)*

Two revised Recommendations, OIML R 71 “Fixed storage tanks” and R 85 “Automatic level gages for measuring the level of liquid in fixed storage tanks,” received final approval in October 2008. The United States, however, had serious opposition to the inclusion of specialized tanks (including pressurized tanks and non-vertical tanks) in the scope statements of both R 71 and R 85 because the requirements in the Recommendations did not fully reflect this inclusion. The United States has agreed to chair a work group that will draft the separate sections or separate appendices of R 71 and R 85 that will include the specific requirements for specialized tanks. OIML R 80 “Road and rail tankers” is currently being revised, and final approval is expected in 2009. Please contact Ralph Richter at (301) 975-3997 or at [ralph.richter@nist.gov](mailto:ralph.richter@nist.gov) if you would like copies of the documents or to participate in any of these projects.

*TC 8/SC 3 “Dynamic volume and mass measurement for liquids other than water” (United States and Germany)*

OIML R 117-1 “Dynamic measuring systems for liquids other than water, Part 1: Metrological and technical requirements” has undergone an extensive revision. The Recommendation obtained 100 % international “yes” votes and final CIML approval in October 2007 and was published in March 2008. The revision incorporates new instrument technologies and includes a merger with OIML Recommendations R 86 “Drum meters” and R 105 “Mass flowmeters.” The ILMG has worked closely with the USNWG, Germany, and the Netherlands on this effort. Meetings of the USNWG on flowmeters were held during the NCWM Annual Meeting in July 2007 in Utah and the NCWM Annual Meeting in July 2008 in Burlington, Vermont. Measurement Canada has also been a strong contributor to this effort. Subcommittee work on the development of R 117-2 “Test methods” and R 117-3 “Test



report format” has begun. If you have any questions or would like to participate in the next phases of this project, please contact Ralph Richter at (301) 975-3997 or ralph.richter@nist.gov.

*TC 8/SC 6 “Measurement of cryogenic liquids” (United States)*

The Secretariat (United States) requested that Participating members and U.S. stakeholders decide if there was sufficient justification for opening a new project to revise R 81 “Dynamic measuring devices and systems for cryogenic liquids.” The response received by the Secretariat indicated that a revision of R 81 was justified to update: (1) electronic tests in accordance with the latest edition of OIML D 11 (2004) and/or the latest IEC and ISO standards, (2) technical requirements to include new developments in hydrogen measurements, (3) Annex C to include current recommendations for density equations, and (4) existing sections into three distinct parts similar in format to recently-developed OIML Recommendations. The Secretariat will ask members of TC 8/SC 6 to review and formally comment on R 81. The Secretariat is also forming a national work group to establish a U.S. position on the appropriate updates to the document. To obtain more information or to participate in this project, please contact Juana Williams at (301) 975-3989 or juana.williams@nist.gov.

*TC 8/SC 7 “Gas metering” (Netherlands)*

In October 2007, the CIML approved the merger of TC 8/SC 7 (with France and Belgium as Co-secretariats) and TC 8/SC 8 “Gas meters” (with Netherlands as Secretariat). Netherlands has assumed responsibility of this newly merged technical subcommittee. In October 2007, the CIML approved a new Recommendation R 139 “Compressed gaseous fuel measuring systems for vehicles.” The United States voted “no” on this document at the CIML meeting because some of the systems testing requirements were considered to be excessive and very expensive, and there are presently no testing facilities anywhere in the world that can fully perform all of the tests. The Recommendation is scheduled for a revision in the near future that should address these excessive testing requirements.

Another new Recommendation R 140, “Measuring systems for gaseous fuel” also received CIML approval in October 2007. This Recommendation is intended for large pipelines with large flow rates and high operating pressures.

OIML R 137-1 “Gas meters” was published in 2007. It combines and replaces three old Recommendations that will soon be withdrawn: R 6 “General provisions for gas volume meters,” R 31 “Diaphragm gas meters,” and R 32 “Rotary piston gas meters and turbine gas meters.” Development of R 137-2 “Test methods” is now underway. Please contact Ralph Richter at (301) 975-3997 or ralph.richter@nist.gov if you would like to obtain a copy of any of these gas measurement documents or if you would like to participate in future work of this subcommittee.

*TC 9 “Instruments for measuring mass” (United States)*

At the 43<sup>rd</sup> CIML meeting in October 2008, the CIML approved a new work item to begin revision of OIML R 60:2000 “Metrological regulation for load cells.” It is anticipated that this revision will cover everything from the basic principles of R 60 (e.g., tolerances and accuracy classes) to exploring the addition of new requirements. For more information on these efforts, please contact Steve Cook at (301) 975-4003 or steven.cook@nist.gov.

*TC 9/SC 1 “Nonautomatic weighing instruments” (Germany and France)*

The revision of R 76 “Non-automatic weighing instruments” is of major importance to U.S. interests because the Recommendation serves as the foundation for a majority of the laws and regulations that govern weighing instruments around the world. The revision includes new language addressing metrological controls for type evaluations, conformity, initial and subsequent inspections, suitability of separable components and requirements for metrological software. The USNWG was consulted concerning proposals to harmonize NIST Handbook 44 and R 76. Most recently, the United States voted “yes” on R 76-2 “Test report format,” and it was published in December 2007. For more information on these efforts, please contact Steve Cook at (301) 975-4003 or steven.cook@nist.gov.

*TC 9/SC 2 “Automatic weighing instruments” (United Kingdom)*

The Recommendation R 134-1 “Automatic instruments for weighing road vehicles in motion – total load and axle weighing” has been approved by CIML and published. U.S. comments concerning terminology and document scope were incorporated in the document. The test report format of this document, R 134-2, has been approved by the Subcommittee and is going through a final editorial process at the BIML.

The 3 CD of R 106 Parts 1 and 2, “Automatic rail-weighbridges” were distributed by the Secretariat to members of TC 9/SC 2 in September 2007. In distributing the 3 CD, the Secretariat commented that although the 2 CD achieved majority approval, there were substantial comments and some amendments to the technical requirements of the 2 CD. Comments and a U.S. “yes” vote on the 4 CD of R 106 Parts 1 and 2 were sent in July 2008.

The Subcommittee approved a revision of R 107 “Discontinuous totalizing automatic-weighing instruments (totalizing hopper weighers),” and final approval was granted in October 2007 by the CIML. However, the Secretariat first accommodated U.S. concerns by inserting into the document that national legislation will dictate whether the automatic zero-tracking feature is allowed in a country. If you would like to receive copies of these documents or work on these projects, please contact Richard Harshman at (301) 975-8107 or at harshman@nist.gov and John Barton at (301) 975-4002 or john.barton@nist.gov.

*TC 17/SC 1 “Humidity” (China and United States)*

The Co-secretariats (China and the United States) are working with a small IWG to revise OIML R 59 “Moisture meters for cereal grains and oilseeds.” All drafts have been distributed to the USNWG, which for the most part is a subset of the NTEP Grain Sector. A TC 17/SC 1 meeting was hosted by NIST in September 2007 to discuss the comments to the 4 CD. At the TC 17/SC 1 September 2007 meeting, the Subcommittee also discussed harmonization of the Recommendation for moisture with the TC 17/SC 8’s Recommendation for protein. In October 2008, the Secretariat of TC 17/SC 1 was jointly allocated to China and the United States. Please contact Diane Lee at (301) 975-4405 or at diane.lee@nist.gov if you would like to participate in this work group.

*TC 17/SC 8 “Quality Analysis of Agricultural Products” (Australia)*

This subcommittee was formed to study the issues and write a working draft document “Measuring instruments for protein determination in grains.” Australia is the Secretariat. A work group meeting was held in September 2006 in Ottawa, Canada, to discuss comments on the 1 CD. A TC 17/SC 8 meeting was hosted by NIST in September 2007 to discuss the 2 CD. At the September 2007 meeting, the TC 17/SC 8 also discussed comments concerning the maximum permissible errors (MPEs) and harmonization of the TC 17/SC 8 Recommendation for protein with the TC 17/SC 1 Recommendation for moisture. Please contact Diane Lee at (301) 975-4405 or at diane.lee@nist.gov if you would like to participate in this work group.

**OIML Mutual Acceptance Arrangement (MAA)**

Note: The report on the OIML Mutual Acceptance Arrangement (MAA) has moved. It can now be found in the NTEP section of the Publication 15. For further information on the MAA and its implementation, please contact Dr. Charles Ehrlich at charles.ehrlich@nist.gov or at (301) 975-4834 or by fax at (301) 975-8091.

**II. Report on the 43<sup>rd</sup> CIML Meeting in Sydney, Australia, October 2008**

The International Committee of Legal Metrology (CIML) opened with addresses given by Mr. Alan E. Johnston, CIML President.

The Committee welcomed Montenegro as a new Corresponding Member and expressed its appreciation for the growing interest shown by many countries in joining the OIML. The Committee instructed its President and the Bureau to continue to raise the level of awareness of the advantages of OIML membership in order to encourage the widest possible participation in the International Legal Metrology System.

The Committee took note of the ongoing work on the revision of the MoUs with ISO and the IEC and instructed the Bureau to pursue this revision taking into consideration the specific aspects of importance to legal metrology and to the OIML.

The Committee noted the importance given to OIML publications and conformity assessment and certification systems in the implementation of the World Trade Organization/Technical Barriers to Trade (WTO/TBT) Agreement. It instructed the CIML President and the BIML Director to continue to cooperate with the WTO and to promote the OIML as an organization facilitating compliance with the WTO/TBT Agreement.

The Committee emphasized the importance of maintaining close relations with organizations representing legal metrology stakeholders and encouraged them to participate in OIML work. It instructed the CIML President and the BIML Director to continue to identify such stakeholder organizations and to raise their awareness of OIML work.

The CIML decided that a new or revised draft OIML document or recommendation that has received CIML approval shall be available on the OIML website immediately after approval. This will allow manufacturers and OIML issuing authorities to begin preparing to issue Certificates before the document completes the final editing process and is actually published. However, OIML Basic Certificates will not be allowed until the date of final publication. The date from which an OIML MAA Certificate can be issued is specified in the corresponding DoMC.

As soon as an OIML Recommendation including the Test Report Format is published, the relevant OIML Recommendation is automatically included in the OIML Basic Certificate System. The Bureau will publish the appropriate information on the website. If a new version of an OIML Recommendation is published, the earlier version is maintained in the OIML Basic Certificate System or in the relevant OIML DoMC together with the new version.

The CIML discussed several issues concerning the OIML Mutual Acceptance Arrangement (MAA); information concerning these discussions and the committee's resolutions can be found in the NTEP section of the Publication 15.

The Committee expressed its appreciation to the BIML staff for providing the first training session to TC/SC Secretariats in April 2008 and instructed the BIML to extend and update this training to those Secretariats that did not participate in the first session.

The CIML approved the following publications in Australia:

- R 85-3:2008 “Automatic level gauges for measuring the level of liquid in stationary storage tanks, Part 3: Report format for type evaluation”
- R 99-3:2008 “Instruments for measuring vehicle exhaust emissions, Part 3: Report Format”
- D 29:2008 “Guide for the application of ISO/IEC Guide 65 to assessment of measuring instrument certification bodies in legal metrology”
- D 30:2008 “Guide for the application of ISO/IEC 17025 to the assessment of testing laboratories involved in legal metrology testing”
- D 31:2008 “General requirements for software controlled measuring instruments”

The CIML decided to disband OIML TC 10/SC 5 “Hardness standardized blocks and hardness testing machines” (in favor of using ISO hardness standards) and approved the withdrawal of the following OIML hardness publications:

- V 3 “Hardness testing dictionary (quadrilingual)”
- R 9 “Verification and calibration of Brinell hardness standardized blocks”
- R 10 “Verification and calibration of Vickers hardness standardized blocks”
- R 11 “Verification and calibration of Rockwell B hardness standardized blocks”
- R 12 “Verification and calibration of Rockwell C hardness standardized blocks”
- R 36 “Verification of indenters for hardness testing machines”
- R 37 “Verification of hardness testing machines (Brinell system)”

- R 38 “Verification of hardness testing machines (Vickers system)”
- R 39 “Rockwell hardness machines”

The CIML also approved the withdrawal of the following publications:

- R 121 “The scale of relative humidity of air certified against saturated salt solutions”
- D 15 “Principles of selection of characteristics for the examination of measuring instruments”

The CIML approved the following new work items:

- Revision of V 1:2000 “International Vocabulary of Legal Metrology”
- Revision of R 16:2002 “Mechanical non-invasive sphygmomanometers”
- Revision of R 18:1989 “Visual disappearing filament pyrometers”
- Revision of R 49:2006 “Water meters intended for the metering of cold potable water and hot water”
- Revision of R 60:2000 “Metrological regulation for load cells”
- Revision of R 91:1990 “Radar equipment for the measurement of the speed of vehicles”
- Revision of the requirements in R 138 on measuring container bottles by TC 6
- Revision of D 1:2004 “Elements for a Law on Metrology”
- Revision of D 11:2004 “General requirements for electronic measuring instruments”
- New project: Document “Software – Methods and means of verification”

The Committee allocated the Secretariats of the following Technical Committee and Subcommittees:

- TC 7/SC 4 “Measuring instruments for road traffic” allocated to the United States;
- TC 12 “Instruments for measuring electrical quantities” allocated to Australia;
- TC 17/SC 1 “Humidity” allocated jointly to China and the United States.

The Committee voted to renew the contract of Mr. Ian Dunmill, Assistant Director of the Bureau.

### **III. Report on the 13<sup>th</sup> International Conference on Legal Metrology in Sydney, Australia, October 2008**

The Conference made the recommendation that CIML members make their regulatory requirements available to the public on the Internet and that they update their Member State data on the OIML website with links to these national websites.

The Conference made the recommendation that CIML members complete the inquiry on the implementation of OIML Recommendations as accurately as possible and as soon as possible and further made the recommendation that Member States update it each time a new or revised national regulation is adopted.

The Conference made the recommendation to CIML members to keep their other governmental agencies informed of OIML work and invite them to contribute to this work.

In order to better assist developing countries, the Conference considered it important that OIML D 1 “Elements for a law on metrology” be revised to take account of the latest developments in world trade, such as conformity assessment, certification, and globalization. The Conference instructed the CIML to start a revision of OIML D 1.

The Conference sanctioned the following publications previously approved by the Committee and made the recommendation that Member States use them as the basis for their national regulations as far as possible:

- R 21:2007 “Taximeters”
- R 35-1:2007 “Material measures of length for general use, Part 1: Metrological and technical requirements”
- R 49-1:2006 “Water meters intended for the metering of cold potable water and hot water, Part 1: Metrological and technical requirements”
- R 49-2:2006 “Water meters intended for the metering of cold potable water and hot water, Part 2: Test methods”
- R 51-1:2006 “Automatic catchweighing instruments, Part 1: Metrological and technical requirements, Tests”
- R 65:2006 “Force measuring system of uniaxial material testing machines”
- R 76-1:2006 “Non-automatic weighing instruments, Part 1: Metrological and technical requirements, Tests”
- R 82:2006 “Gas chromatographic systems for measuring the pollution from pesticides and other toxic substances”
- R 83:2006 “Gas chromatograph/mass spectrometer systems for the analysis of organic pollutants in water”
- R 107-1:2007 “Discontinuous totalizing automatic weighing instruments (totalizing hopper weighers), Part 1: Metrological and technical requirements – Tests”
- R 116:2006 “Inductively coupled plasma atomic emission spectrometers for the measurement of metal pollutants in water”
- R 117-1:2007 “Dynamic measuring systems for liquids other than water”
- R 134-1:2006 “Automatic instruments for weighing road vehicles in motion and axle-load measuring, Part 1: Metrological and technical requirements – Tests”
- R 137-1:2006 “Gas Meters, Part 1: Requirements”
- R 138:2007 “Vessels for commercial transactions”
- R 139:2007 “Compressed gaseous fuel measuring systems for vehicles”
- R 140:2007 “Measuring systems for gaseous fuel”

The Conference directly sanctioned the following publications (without prior CIML approval) and made the recommendation that Member States use them as the basis for their national regulations as far as possible:

- R 56:2008 “Standard solutions reproducing the electrolytic conductivity”
- R 71:2008 “Fixed storage tanks, General requirements”
- R 85:2008 “Automatic level gauges for measuring the level of liquid in stationary storage tanks”
- R 99-1:2008 “Instruments for measuring vehicle exhaust emissions, Part 1: Metrological and technical requirements”
- R 99-2:2008 “Instruments for measuring vehicle exhaust emissions, Part 2: Metrological controls and performance tests”
- R 141:2008 “Procedure for calibration and verification of the main characteristics of thermographic instruments”
- R 142:2008 “Automated refractometers: Methods and means of verification”

The Conference took note of the comments made by some Member States regarding the necessity of revising the following publications as soon as possible:

- R 71:2008 “Fixed storage tanks, General requirements”
- R 85:2008 “Automatic level gauges for measuring the level of liquid in stationary storage tanks”
- R 139:2007 “Compressed gaseous fuel measuring systems for vehicles”

The Conference sanctioned the withdrawal of the OIML hardness publications listed in the CIML section of this report and also the following publications:

- R 74 “Electronic weighing instruments”
- R 121 “The scale of relative humidity of air certified against saturated salt solutions”

The Conference encouraged Member States to actively participate in the development and revision of OIML mutual acceptance and recognition systems. Member States were encouraged to participate in these systems, to actively promote them to all concerned parties, and to help make them acceptable in their countries.

The Conference approved the latest draft of the OIML Strategic Plan and instructed the CIML to implement it and to report on the progress in its implementation at the 14<sup>th</sup> Conference.

#### **IV. Future OIML Meetings**

The 44<sup>th</sup> CIML meeting will be held in Kenya in October 2009. The Committee thanked the United States for inviting the CIML to hold its 45<sup>th</sup> meeting in the United States in 2010 and accepted this invitation.

#### **V. Regional Legal Metrology Organizations**

##### Meeting of the SIM General Assembly and SIM Legal Metrology Work Group (LMWG)

The SIM General Assembly was held in San Pedro, Honduras during the first week of October 2008. Dr. Humberto S. Brandi, Director of Scientific and Industrial Metrology (SIM) at INMETRO Brazil, is the SIM President (elected last year). Marcos Senna (senna@inmetro.rs.gov.br), also of INMETRO in Brazil serves as the new Chairman of the SIM Legal Metrology Work Group (LMWG). A meeting of the SIM LMWG was held in

March 2008. Topics that were discussed at the meeting included composition of the SIM Legal Metrology Work Group, SIM Legal Metrology directory, survey on training needs and their implementation, events organization costs (translation, mikes, data-show, etc.), events calendar (dates, venue, organization committee, instructors, etc.), budget for 2008 - 2009, and correspondence/communications in LMWG. Please contact Dr. Ambler Thompson at (301) 975-2333 or at [ambler@nist.gov](mailto:ambler@nist.gov) for more information.

Asia-Pacific Legal Metrology Forum (APLMF) Meeting

The 15<sup>th</sup> APLMF meeting was held October 22 - 24, 2008, in the Hunter Valley, Australia (two hours north of Sydney). The Peoples Republic of China holds the Presidency and Secretariat of the APLMF. The United States was represented by Dr. Charles Ehrlich, who serves as Chairman of the APLMF Work Group on Mutual Recognition Arrangements. APLMF activities are facilitated through its seven work groups. The most active is the work group on Training Coordination, chaired by Australia. There were three training courses and a workshop given by APLMF this year. The training courses were offered primarily to assist the developing countries in APLMF, covering requirements in the following OIML Recommendations: automated sphygmomanometers (blood pressure instruments), water meters, and a train-the-trainer course on scales. The workshop was on Metrology in Food Safety, Agricultural Products, and Product Safety. Future priorities for APLMF training courses were identified as OIML R 117 (flowmeters for liquids other than water, for which the United States is now Co-secretariat), OIML R 46 (Electricity Meters), and Traffic Safety OIML R 126 (Breathalyzers) and R 91 (Radar Devices). The next meeting of the APLMF will be in Thailand (date and venue are yet to be decided).

**Associate Membership Committee (AMC)  
Interim Agenda  
January 2009**

- Call to Order
- Approval of July 14, 2008, AMC Minutes
- Financial Condition
- NCWM Industry Rep Reports
  - Board of Directors Report (Bob Murnane)
  - Professional Development Report (Position left open)
  - Laws & Regulations Report (Rob Underwood)
- AMC Fund Disbursement Requests
  - 2008 Training Funds Report
  - New Training Requests
  - 2009 Special Event
- Agenda Review Report
- Recommendations for AMC Members on PDC
- Old Business
- New Business
- Adjournment

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Paul Lewis, Rice Lake Weighing Systems, Chair (2009)  
Michael Gaspers, Farmland Foods, Inc, Vice Chair (2013)  
Tom Herrington, Nestlé Foods, Secretary/Treasurer (2010)

Rob Underwood, Petroleum Marketer's Assoc. (2009)  
Chris Guay, Procter & Gamble, Chair (2010)  
Dave Wankowski, Kraft Foods (2012)  
Doug Biette, Sartorius North America (2012)  
Darrell Flocken, Mettler-Toledo (2013)  
Paul Hoffman, Kraft Foods (2013)

**ASSOCIATE MEMBERSHIP COMMITTEE**



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## Laws and Regulations Committee Interim Agenda

Joe Gomez, Chairman  
Las Cruces, New Mexico

Reference  
Key Number

### 200 INTRODUCTION

The Laws and Regulations Committee (Committee) will address the following items at its Interim Meeting. Table A identifies agenda items by Reference Key Number, title, and page number. The first three digits of the Reference Key Numbers of the items are assigned from the subject series listed below. The fact that an item may appear on the agenda does not mean it will be presented to the NCWM for a vote; the Committee may withdraw some items, present some items for information and further study, issue interpretations, or make specific recommendations for changes to the publications listed below. The recommendations presented in this agenda are statements of proposal and not necessarily recommendations of the Committee. The appendices to the report are listed in Table B.

This agenda contains recommendations to amend National Institute of Standards and Technology (NIST) Handbook 130, “Uniform Laws and Regulations,” (2009), and NIST Handbook 133, “Checking the Net Contents of Packaged Goods,” (2005) Fourth Edition. Revisions proposed for the handbooks are shown in **bold face print** by ~~crossing out~~ information to be deleted and underlining information to be added. Additions proposed for the handbooks are designated as such and are shown in **bold face print**. Proposals presented for information only are designated as such and are shown in *italic* type. “SI” means the International System of Units. “FPLA” means the Fair Packaging and Labeling Act. The section mark, “§,” is used in most references in the text and is followed by the section number and title, (for example, Section 1.2. Weight). When used in this report, the term “weight” means “mass.”

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### Subject Series

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<b>INTRODUCTION</b> .....	200 Series
<b>NIST Handbook 130 – General</b> .....	210 Series
Uniform Laws.....	220 Series
Weights and Measures Law (WML) .....	221 Series
Weighmaster Law (WL).....	222 Series
Engine Fuels, Petroleum Products, and Automotive Lubricants Inspection Law (EFL).....	223 Series
Uniform Regulations .....	230 Series
Packaging and Labeling Regulation (PLR).....	231 Series
Method of Sale Regulation (MSR).....	232 Series
Unit Pricing Regulation (UPR) .....	233 Series
Voluntary Registration Regulation (VRR).....	234 Series
Open Dating Regulation (ODR).....	235 Series
Uniform National Type Evaluation Regulation (UNTER).....	236 Series
Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation (EFR).....	237 Series
Examination Procedure for Price Verification.....	240 Series
Interpretations and Guidelines.....	250 Series

**NIST Handbook 133** ..... 260 Series

**Other Items** ..... 270 Series

**Table A**  
**Index to Reference Key Items**

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<b>237</b>	<b>ENGINE FUELS, PETROLEUM PRODUCTS AND AUTOMOTIVE LUBRICANTS</b>	
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237-1	Revise Section 2.1. Gasoline and Gasoline-Oxygenate Blends.....	20
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270-1	Amend Section 2.2.1. in Handbook 130 Uniform Engine Fuels Regulation - Premium Diesel Lubricity .....	23
270-2	Amend Handbook 133 Section 2.3. Moisture Allowances to Provide Clearer Guidance.....	25
270-3	Laws and Regulations Committee Work Group (WG) on Moisture Loss.....	25
270-4	Fuels and Lubricants Subcommittee (FALS) .....	27
270-5	Pelletized Ice Cream.....	28
270-6	Amend Interpretations and Guidelines Section 2.2.13. and 1.5.1.....	28
270-7	Method of Sale and Engine Fuel Quality Requirements for Hydrogen .....	29
270-8	Method of Sale for Fireplace and Stove Wood, flavoring chips and packaged natural wood .....	29

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Appendix A.	GAO-08-1114 Motor Fuels: Stakeholder Views on Compensating for the Effects of Gasoline Temperature on Volume at the Pump .....	A1
Appendix B	9 CFR Parts 317, 381, and 442 – Determining Net Weight Compliance for Meat and Poultry Products .....	B1
Appendix C	L&R Committee Work Group on Moisture Loss .....	C1
Appendix D	Letter Submitted from the International Ice Cream Association to the Food and Drug Administration.....	D1
Appendix E	Minutes to Pelletized Ice Cream Meeting.....	E1

**Table C**  
**Glossary of Acronyms**

API	American Petroleum Institute	L&R	Laws & Regulations Committee
ASTM	American Society for Testing and Materials International	LPG	Liquefied petroleum gas
ATC	Automatic Temperature Compensation	NCWM	National Conference on Weights & Measures
ATCSC	Automatic Temperature Compensation Steering Committee	NEWMA	Northeast Weights & Measures Association
BOBs	Blend stock for Oxygenate Blending	NTEP	National Type Evaluation Program
CEC	California Energy Commission	S&T	Specifications & Tolerances Committee
CWMA	Central Weights & Measures Association	SMA	Scale Manufacturers Association
FALS	Fuels and Lubricants Subcommittee	SWMA	Southern Weights & Measures Association
FDA	Food and Drug Administration	USDA	U.S. Department of Agriculture
GAO	Government Accountability Office	WG	Work Group
HB 44	NIST Handbook 44	WMD	NIST Weights & Measures Division
HB 130	NIST Handbook 130	WWMA	Western Weights & Measures Association
HB 133	NIST Handbook 133		

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**Daily Schedule**

**Sunday, January 11**

1:30 p.m. - 2:45 p.m.

**Committee Review Session:** This session is open to all NCWM members but participation in discussions is usually limited to members of the Committee.

2:45 p.m. - 5:00 p.m.

**Moisture Loss Working Group:** Participation is open to all NCWM members.

**Monday, January 12**

**L&R Committee Open Hearings:** Comments will be accepted on the following topics during the L&R Committee session:

9:30 a.m. - 5:00 p.m.

- 232 Method of Sale of Commodities Regulation
- 237 Engine Fuels, Petroleum Products and Automotive Lubricants Inspection Regulation
- 260 NIST Handbook 133
- 270 Other Items – Developing Items

**Tuesday, January 13**

8:30 a.m. - 12:00 p.m.

**Committee Open Hearings (continued):** Comments will continue to be accepted on the above topics if the session is not completed on Monday.

1:00 p.m. - 5:00 p.m.

**Committee Work Session:** This session is open to all NCWM members but participation in the discussions is usually limited to members of the Committee.

**Wednesday, January 14**

8:30 a.m. - 11:00 a.m.

**Committee Work Session:** This session is open to all NCWM members but participation in the discussions is usually limited to members of the Committee.

11:00 a.m. - 12:00 p.m.

**Joint Session with all Standing Committees**

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**Details of all Items**  
(In order by Reference Key Number)

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**232 METHOD OF SALE REGULATION****232-1 Automatic Temperature Compensation (ATC) for Petroleum Products**

**Background/Discussion:** At the 2007 Annual Meeting the Committee received 18 comments requesting this item be made Informational to allow the Committee time for additional study and deliberation. The Committee believed the concerns of the commentators were valid, but they were issues to be addressed by the S&T and NTEP Committees. Additional studies of the method of sale proposal would not bring anything new to the current recommendation that could not be addressed through further revisions next year if needed. The Committee believed adopting this proposal would provide guidance to policymakers and others currently considering action on temperature compensation at the national, state, or local level. Jurisdictions opposing the proposal because their state laws or their policies were against it would not be affected by the adoption of this method of sale because their laws prohibited it. The implementation of temperature compensation will be a slow process primarily because there is not an existing nationally approved temperature-compensation device, and NIST HB 44 must be revised to set forth the specifications, tolerances, and other technical requirements for this technology. NTEP will then need to undertake this work where needed. The Committee acknowledged that some states may move ahead with their own type approvals to allow temperature compensation. The majority of the Committee believed the proposed method of sale was ready for NCWM adoption as there was not a reasonable justification for delaying the adoption of the proposal as presented. Therefore, the Committee recommended adoption of this item. This item was subjected to a lengthy discussion at the general voting session and several issues were raised along with calls for further study. The vote in the House of Representatives was 23 yeas and 16 nays while the vote in the House of Delegates was 24 yeas and 16 nays; therefore, the item did not garner enough support to pass. When an item does not clearly pass or fail under NCWM procedures, it is carried forward for reconsideration by the appropriate committee.

At the 2008 Interim Meeting, the Committee considered the recommendations and comments received from the consumer groups, petroleum marketers associations, and independent business operators on this issue. The Committee received written comments (refer to L&R Appendix A from the report of the 93<sup>rd</sup> NCWM Annual Meeting (2008) for written comments received on this item). During the open hearings, the committee received comments, opinions, and concerns from more than 36 attendees. Opponents of the regulation argue that it may put the small business owners out of business due to the cost to retrofit their older equipment. A majority of the opposing comments argued that consumers would pay more for fuel at the pump to cover the implementation of ATC and that they would receive no benefit from the change in methods of sale. The comments also expressed concern that weights and measures officials would burden their already strained resources because of the additional time that would be needed to test pumps equipped with ATC. There was a recommendation that, if the proposed method of sale were adopted, an exemption be included for the small business owner. Several speakers said the only winners in ATC are the equipment and testing companies, lawyers, and lobbyists.

Supporting comments were received from a few state and local officials, an organization of independent truckers and a consumer advocacy group. Supporters argued that consumers obtaining gas in “hot spots” are not getting what they pay for when they purchase fuel. A few jurisdictions requested that the NCWM act to provide a uniform national standard should retailers begin selling on the basis of temperature compensated deliveries in states where the practice is permissive. Concern was voiced over the possibility that national uniformity in the method of sale of fuels at retail will diminish if some jurisdictions allow temperature compensation at retail stations while others do not. It was decided to make this item Informational, so that additional information and data could be received.

At the 2008 Annual Meeting it was reported that the California Energy Commission (CEC) is conducting a study entitled “AB868 Fuel Delivery Temperature Study.” One of the goals of this study will be to determine what impact ATC will have on consumers, businesses, agencies and the marketplace within the State of California. The CEC advisory panel held three public meetings prior to the NCWM Annual Meeting in July. In September 2008, the CEC panel has plans to publish preliminary staff findings and recommendations. Two members requested that this item be developed to assist states where ATC is prohibited by a state law or regulation.

The Government Accountability Office (GAO) is actively working on a study on ATC. GAO submitted the following statement to the NCWM since they were not able to attend the 2008 NCWM Annual Meeting.

At the request of the Chairman of the House Committee on Science and Technology, the United States Government Accountability Office (GAO) is conducting a review of the issues surrounding automatic temperature compensation in the retail sales of motor vehicle fuels. This fall the GAO plans to release a report that provides information on 1) the views of stakeholders on the costs related to the use of automatic temperature compensation devices; 2) who would bear the costs of implementation and the support for those views; 3) other factors that might affect the decision of whether or not to install such devices; and 4) the reasons some states and nations have promoted or rejected implementation of automatic temperature compensation. In its work GAO has or will interview stakeholders including state, federal, and international officials as well as representatives of industry and consumer organizations.

The Committee will continue to monitor the progress of the CEC and GAO studies. The Committee agrees with the majority of the comments that the cost and benefits of temperature compensation at the retail level are still unknown. The members unanimously agreed that further information is needed before a proposal for a temperature compensation method of sale can be considered by the NCWM. For the reasons detailed above and in the written comments (refer to L&R Appendix A from the report of the 93<sup>rd</sup> NCWM Annual Meeting (2008) for written comments received on this item), this item was kept in Informational status.

The CEC canceled the September 19, 2008 and October 27, 2008 Fuel Delivery Temperature (AB868) study committee workshops. CEC will hold a workshop on Tuesday, December 9, 2008. The final AB868 report is scheduled to be delivered to the California Legislature on February 12, 2009.

The GAO report was released in October 2008. The report can be viewed at [www.gao.gov/new.items/d081114.pdf](http://www.gao.gov/new.items/d081114.pdf) (refer to Table B Appendix A). The report summarizes that there is technology available to compensate for the effects of temperature on gas volume but the costs to implement ATC remain unclear. Benefits of ATC reflect improved measurement accuracy and greater equity between retailers and consumers. For those that oppose ATC it is argued that the cost to upgrade existing equipment would pose an economic hardship on retailers.

Information on the consideration of this item by the Regional Associations following the NCWM Annual Meeting in July 2007 is presented below. Items are broken out by region with the earliest information appearing first in the report.

**Central Weights and Measures Association (CWMA):** This is an excerpt from the report of the CWMA's Laws and Regulations Committee, which considered this item at its 2007 Interim Meeting in Bettendorf, Iowa, on September 16 - 19, 2007. (Full report is available at [www.ncwm.net/central/lr/lr\\_2007\\_interim.doc](http://www.ncwm.net/central/lr/lr_2007_interim.doc).)

The CWMA L&R Committee reported that it received:

...considerable testimony both in support and opposition of the Temperature Compensation proposal during the open hearings. Many industry representatives opposed the item due to the anticipated cost of equipment and the lack of data that supports whether a better system of measurement is worth the cost. The CWMA L&R Committee cannot support the item as proposed due to the considerable opposition to the permissive language. Several state regulators feel that if permissive is adopted, it will be implemented in the northern states, not in the southern states where there appears to be more pressure to implement temperature compensation. A good example of this was given that in Canada where temperature compensation is allowed, it is not widely used in areas west of the Rockies where the climate is more temperate. The Committee further feels that making the item "Informational" will not resolve the issue. The most requested information of a cost-benefit analysis is not currently being conducted by any organization. Although several statements were made that temperature compensation may be a more equitable method of sale, many stated that it is not "perfect" nor will it resolve current issues of fraud such as artificial heating of fuel. To address the concern of "hot spots," the Committee discussed the

option of amending the proposal to exclude sales at retail based upon the flow rate of dispensers as previously proposed. The Committee feels that another potential solution for a more equitable method of sale is to formulate an alternate proposal to change the method of sale to mass. Technology exists to sell motor fuel through mass flow meters. This method of sale would be more equitable for all types of fuel including alternative fuels which would allow consumers to make value comparisons. The Committee expects that the ATC Steering Committee will provide more information which will provide direction to the conference on this issue. We look forward to their information which will provide answers to many questions. Based upon the testimony heard, the Committee recommends that the item be Withdrawn. Note: In response to the ATC Steering Committee request, the CWMA L&R Committee suggests that if this proposal goes forward as a Voting item, that there be a mandatory implementation date with little to no permissive period as a transition.

At the CWMA 2008 Annual Meeting, the L&R committee recommended that this item continue to remain Informational. They heard from an industry representative that this item does not resolve the issue of consumers being shorted at the pump. This representative further commented that there are alternative methods for measuring BTU contents, but does not support these alternative methods. A regulatory official opposed the word "permissive."

During the CWMA Interim Meeting held September 14 - 17, 2008, in Rock Island, Illinois, the CWMA L&R Committee continued to oppose the word "permissive" in the current language of this proposal. In addition, they would like to review the GAO and CEC reports to assess their relevance.

**Northeastern Weights and Measures Association (NEWMA):** This is an excerpt from the report of the Laws and Regulations Committee meeting held at that association's 2007 Interim Meeting in Springfield, Massachusetts, on October 9 - 10, 2007.

It is clear from the majority of comments received (both in written and oral form) that strong opposition exists to the item as proposed, especially the inclusion of permissive ATC sales. NEWMA could not support an item which allowed for two methods of sale. Confusion would be widespread. Additionally, the item raises far too many questions and uncertainties that to date have not been answered. Further research must be conducted to answer those questions. The National Conference on Weights and Measures is an organization made up of weights and measures officials and industry representatives that consistently over the years has worked as a consensus organization. A consensus on this item does not exist and the item should be Withdrawn. Making the item "Informational" would not bring us to the needed consensus.

At the 2008 NEWMA Annual Meeting this issue was discussed extensively. NEWMA would like to see wording developed in the method of sale to assist states where ATC is prohibited by state law or regulation. In the past, NEWMA had recommended a method of sale of gross gallons at retail only. They would like to have further development of the method of sale of gross gallons at retail. This could possibly be reviewed as a separate item.

NEWMA held their 2008 Interim Meeting October 15 - 16 in Springfield, Massachusetts, members discussed the viability of submitting a proposal to NCWM to mandate that all sales of retail motor fuel be sold by "gross gallons" (ambient temperature). This would counter the argument "if it is not prohibited, then it is permitted." Also, it would exempt states which choose to permit ATC. The consensus of NEWMA is that ATC should be a "state issue." Although the majority of members would be comfortable with this, it was debated whether the "timing" of such a proposal may be premature. The debate resulted with a consensus to develop the proposal and postpone any action with it until the California (CEC) study is complete.

The GAO report was released in October 2008, and after reviewing this report NEWMA members were disappointed by its conclusion. Comments within the report included "the continued uncertainties outlined by the GAO support the argument that no action be taken to adopt Automatic Temperature Compensation."

NEWMA recommends that this item remain Informational.



**Western Weights and Measures Association (WWMA):** The WWMA had an Annual Meeting September 9 - 13, 2007, in Lake Tahoe, Nevada. It voted to recommend that the Committee move a modified version of the original proposal forward as a Voting item at the 2008 NCWM Annual Meeting. The WWMA recommended removal of the term “Permissive” from the title in Section 2.30. *Refined Petroleum Products – Permissive-Temperature Compensation*. The full report is available from NIST WMD.

WWMA met in Anchorage, Alaska, September 7 - 11, 2008. It recommended that this item continue to remain Informational. WWMA would like to review the CEC report. It was requested from an industry representative that NCWM work on developing a temperature statistical analysis and to define “what is the problem” and “what is the solution” to this issue. Industry voiced concern on the cost of implementing ATC and how it will affect the retailers and consumers. On the other hand, a state W&M official expressed that something should be in place for when ATC does become available and used in the marketplace.

**Southern Weights and Measures Association (SWMA):** The SWMA held its Annual Meeting October 21 - 24, 2007, in Little Rock, Arkansas. It voted to recommend that the Committee move a modified version of the original proposal forward as a Voting item at the 2008 NCWM Annual Meeting. The amendments and other changes proposed by the SWMA are presented below. (The full report is available from the NIST L&R Technical Advisor)

The SWMA L&R Committee heard opposition to permissive temperature compensation for retail and other meters during the open hearing primarily from industry representatives many of whom suggested that further study was needed to determine if the cost versus benefit justified adoption of the original proposal. The Committee agrees that more information would be helpful in determining the value of using ATC on retail motor-fuel dispensers that are marked to deliver less than 30 gallons per minute. Several comments called for the withdrawal of the item but the Committee recognized that the item will be on the NCWM L&R Interim Agenda in 2008 because it was carried over from the 2007 Annual Meeting and because the Western Weights and Measures Association supported adoption of the original item at its recent meeting. The Committee also believes that withdrawing this item as some regions have suggested would only delay consideration of this issue, which has been on the NCWM agenda in one form or another for almost a decade, because the item would likely be resubmitted by a regional association. There were other comments recommending that no further action be taken on this item or that it be tabled. One comment suggested that the original proposal be amended to limit the method of sale to Loading-Rack Meters, Vehicle-Tank Meters and Retail Dispensers which are marked to deliver 30 gallons per minute or more (which are typically used in making larger quantity deliveries at truck stops). The Committee believes that separating large flow meters (some of which are already equipped with ATC) from the proposal may reduce the opposition to the proposed method of sale for ATC. A majority of the Committee recommends the following to the SWMA for adoption.

SWMA recommendation to the NCWM L&R Committee:

1. Remove the word “Permissive” from the title of the proposed method of sale for ATC.
2. Divide the item into two separate proposals.
  - a. For retail motor-fuel dispensers marked to deliver less than 30 gal/min, make it Developmental and recommend that the NCWM ATC Steering Committee lead or coordinate a study to determine if the cost/benefit justifies the implementation of ATC.
  - b. For retail motor-fuel dispensers marked to deliver 30 gal/min or more, amend the method of sale proposal and establish a mandatory implementation date. The SWMA recommends that the NCWM L&R Committee move this item for adoption at the 2008 Annual Meeting with the following amendments:

- i. Amend Section 2.30.2. to read: When products are sold on the basis of temperature-compensated volume through Loading-Rack Meters, Vehicle-Tank Meters and Retail Motor-Fuel Dispensers marked to deliver 30 gal/min or more.
- ii. Add an implementation date of 10 years from date of adoption.

The SWMA held its Annual Meeting in Atlanta, Georgia, October 5 - 8, 2008. The Committee supports this item to remain Informational until they can review the reports and documentation issued by (CEC).

### **METHOD OF SALE PROPOSAL DEVELOPED BY THE NCWM ATCSC**

The Method of Sale is presented in two parts. Part I includes a proposed method of sale developed by the NCWM Automatic Temperature Compensation Steering Committee (ATCSC). Part II includes the original recommendation for a method of sale developed by the Committee at the 2007 Interim Meeting. Part II was not adopted at the 2007 NCWM Annual Meeting.

#### **Part I. Automatic Temperature Compensation Steering Committee (ATCSC) Background and Recommended Method of Sale**

**Background:** The ATCSC held a meeting August 27 - 29, 2007, in Chicago, Illinois, to address issues associated with potential implementation of ATC for retail motor fuel. Valuable input was received during that meeting from marketers, manufacturers, consumers, and regulatory officials. Following the meeting, the ATCSC continued to receive input from the four regional weights and measures associations.

It is not the charge of the ATCSC to endorse or oppose the implementation of ATC at retail. The ATCSC is tasked with addressing issues associated with the implementation of ATC to assist the NCWM membership in coming to a consensus on the issue. The proposals of the ATCSC reflect the committee's opinion on the best approach to ATC if NCWM votes to implement it.

The ATCSC considered the following discussion points in forming a proposal for the Method of Sale Regulation:

#### **1. Permissive vs. Mandatory ATC**

In cold climates, voluntary introduction of ATC can be fairly successful. In regions where fuel temperatures average below 60 °F, a retailer who implements ATC could lower the unit price while maintaining the same profit margin. This acts as an enticement for retailers to take that step. Conversely, in regions where fuel temperatures average above 60 °F, retailers would find it necessary to raise the unit price to maintain profit margins. As a result, it could be expected that, under a permissive implementation, cooler regions will see implementation of ATC while warmer climates will not. In regions where there is no definite advantage one way or the other, it is possible that consumers will find price and quantity comparisons impossible between retail outlets that compensate and outlets that do not.

The preamble to the Method of Sale Regulation states, "The purpose of this regulation is to require accurate and adequate information about commodities so that purchasers can make price and quantity comparisons." The ATCSC is convinced that introduction of ATC in the marketplace without making ATC mandatory is in direct conflict with the purpose of the regulation. Therefore, the ATCSC proposal provides a transition to ATC where the equipment is made available, followed by a period of time when ATC may be implemented (turned on), followed by a date when ATC would be mandatory. The timeline for this transition should provide a reasonable timeframe for natural replacement of the majority of dispensers in the country.

It is unclear whether ATC would provide a cost savings to consumers in the United States; the ATCSC believes we must make this decision based on facts and data. ATC is a superior method of measurement that provides a higher degree of transparency in unit pricing. With mandatory ATC at retail, consumers would have assurance that, no matter where they choose to purchase motor fuel, the price stated represents a gallon at 60 °F. This level of transparency does not exist in a gross gallon market or a permissive ATC market.

## **2. Referencing 60 °F and 15 °C**

The ATCSC realized that the difference between 60 °F and 15 °C is relevant and must be rectified. Testimony disclosed that many international markets have established 60 °F as the reference temperature. This practice is also implemented throughout the U.S. distribution of petroleum products. One option is to only reference 60 °F, but this approach conflicts with the NCWM's commitment to acknowledge the metric system. To balance the need to recognize the metric system without disrupting the current marketing practices throughout the production and distribution system in the United States, the ATCSC recommends referencing 60 °F with the metric equivalent of 15.56 °C. The ATCSC proposes the use of 60 °F (15.56 °C) as the reference temperature for both gallons and liters to maintain a common reference temperature in the United States when both gallons and liters are used. However, the ATCSC recognizes that when liters are used as the volume measurement unit in other countries, then the reference temperature of 15 °C is used. The ATCSC recommends that other parties provide input to the NCWM committees on this subject for further discussion.

## **3. Establish Standardized Product Densities for Calculating Volume Correction Factors**

To implement ATC for retail motor fuel, there must be an agreement on product densities to be used in volume correction factors. In late July 2007, the ATCSC conducted an outreach to accumulate data on the densities for various products falling under ASTM Committee D02 standards across the United States. Outreach went to weights and measures jurisdictions, the Alliance of Automobile Manufacturers, and the American Petroleum Institute. The ATCSC also considered standard densities used in Canada for temperature compensation. The ATCSC set out to use this data to develop a single set of standard densities to be used throughout the country for volume correction factors. Details of this item can be reviewed in the reports of the ATCSC, which are available at [www.ncwm.net](http://www.ncwm.net) on the Internet.

There was much discussion on whether to reference standard density as Canada has done, or reference standard API gravity as is done throughout much of the U.S. petroleum market. Ultimately, the ATCSC has opted to reference standardized API gravity for the following products based on the density data it has reviewed.

- 62 API for gasoline, including ethanol blends up to E10
- 37 API for No. 2 diesel, including biodiesel blends up to B20

More data are needed to determine standard densities for additional products such as No. 1 diesel and higher blends of biodiesel and ethanol.

## **4. Disclosure – Street Signs, Dispensers, Receipts or Invoices, and Other Advertisements**

Based on comments the ATCSC received, the following issues were considered regarding disclosure when ATC is in use.

- Terminology needs to be uniform to assist consumer recognition.
- Disclosure on street signs must be prominent to be seen and not too wordy to allow for easy recognition by motorists while operating their vehicles.
- Disclosure on the dispenser should be near the display of volume delivered.
- Any other advertising of unit price for motor fuel should also disclose if it represents the price of temperature-compensated volume.
- Examples were provided of disclosure labeling for dispensers in Canada for the ATCSC's consideration.

The ATCSC recommends a simple, uniform, and prominent display of "ATC" on street signs. It will eventually become understood and recognized by motorists. For disclosure on dispensers, receipts, or invoices, the ATCSC

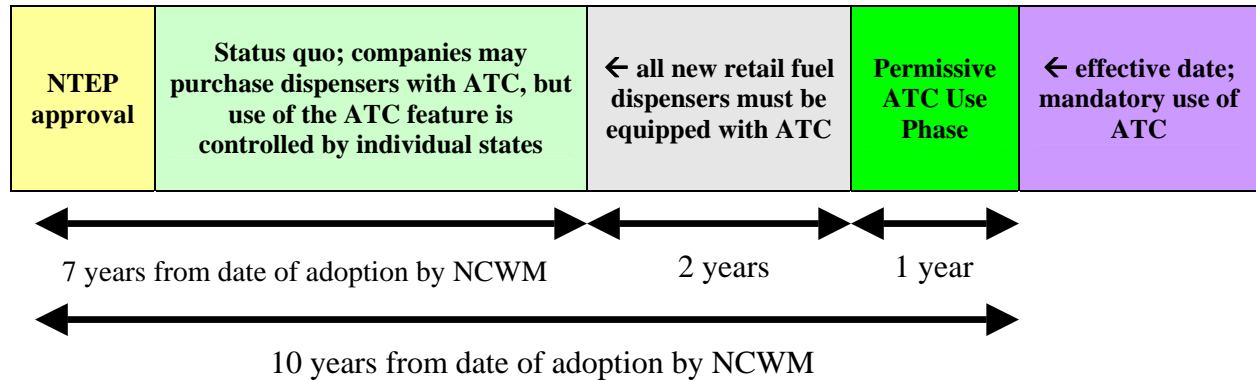
recommends the statement, "Volume Corrected to 60 °F." This follows the model found in Canada and seems to be clear and concise.

**5. Implementation**

Following the August 27 - 29, 2007, meeting of the ATCSC, its members suggested several options that could be considered to address the implementation of ATC in the United States. The ATCSC discussed different proposals and comments made at the meetings of the regional weights and measures associations on this subject. While it is not the charge of the ATCSC to endorse or oppose the implementation of ATC at retail, it is tasked with addressing issues associated with the implementation of ATC. The proposal will also allow ATCSC to assist NCWM membership in coming to consensus on the issue. Hence, the ATCSC discussed the various options again and has decided to recommend a single option to the NCWM's Specifications and Tolerances Committee and Laws and Regulations Committee for consideration.

The recommended option is shown below.

**Implementation Option:**



**Discussion (ATCSC):** The ATCSC believes that if temperature compensation is adopted for the retail sales of refined petroleum products, then the ultimate goal is to have mandatory use of ATC to provide a single method of sale. The time period before the mandatory use of ATC is a debatable point. The ATCSC recommends that 10 years after the adoption of an ATC method of sale, using temperature compensation should be mandatory. During the first 7 years after adoption, the use of ATC should be controlled by the individual states based upon existing state laws and regulations. A relatively short period of time (2 years) is suggested during which new dispensers must be equipped with ATC capability before permissive use of ATC would be permitted. This will allow station owners to decide, based on their business needs and plans, when to buy dispensers equipped with ATC and this limits the time period during which they could not use the feature after being purchased. This requirement should be placed in NIST HB 44, as a nonretroactive requirement, to address this design requirement.

The time period for the permissive use of ATC should be kept reasonably short to reduce the potential confusion that may exist in the marketplace when both compensated and uncompensated sales occur. One year is a recommended time period for the permissive use of ATC. The ATCSC discussed whether to have different implementation dates for large and small service stations based upon throughput. The ATCSC recommends a single implementation date for all service stations to reduce the time period during which gasoline and diesel fuel will be sold in compensated and uncompensated volumes. A short time period must be provided for the permissive use of ATC. Time is needed to activate the ATC capability in dispensers equipped with ATC and to allow service companies and weights and measures officials to test the accuracy of dispensers equipped with ATC.

Under this implementation plan, there will be a 7-year period of continued uncertainty regarding the legal method of sale of these products. Some have argued that the lack of definitive language in setting a method of sale means that any volume unit is acceptable, compensated or uncompensated. This is based on the principle that laws proscribe activity. All other activities, not proscribed, are legal. Another interpretation is the broad policy change made by the NCWM in 1969 and 1970 in adopting specific language on ATC use. Language in NIST HB 44 was clear and

directed specifically, and solely, to wholesale sales of petroleum products and for both wholesale and retail sales of LPG products. The ATCSC believes that inevitably each state will have to resolve this issue, unless it is resolved for us through federal class action suits currently pending.

### **Alternative Proposal for a Method of Sale for Engine Fuels and Non-Engine Fuels**

**Source:** The NCWM Automatic Temperature Compensation Steering Committee (ATCSC).

#### **2.31. Engine Fuels and Non-Engine Fuels.**

##### **2.31.1. Definitions.**

**2.31.1.1. Engine fuel – any liquid or gaseous matter used for the generation of power in an internal combustion engine.**

**2.31.1.2. Non-engine fuel. – any liquid or gaseous matter used for the generation of heat, power, or similar uses.**

**2.31.1.3. Temperature correction. – the process of correcting volume measurements at any temperature to an equivalent volume at a reference temperature.**

**2.31.1.4. Net volume. – the volume after temperature correction.**

**2.31.1.5. Gross volume. – a volume measurement that has not been subject to temperature correction.**

##### **2.31.2. Quantity.**

###### **2.31.2.1. Quantity, Wholesale Transactions.**

- (a) **All engine fuels and non-engine fuels shall be sold, offered, or exposed for sale to wholesale customers either in terms of liquid volume in liters or gallons or barrels, or in terms of liquid volume automatically temperature corrected to 60 °F (15.56 °C) in liters or gallons or barrels.**
- (b) **Effective January 1, 200X, all engine fuels and non-engine fuels shall be sold, offered, or exposed for sale to wholesale customers in terms of liquid volume automatically temperature corrected to 60 °F (15.56 °C) in liters or gallons or barrels.**
- (c) **When engine fuels and non-engine fuels are sold temperature corrected to wholesale customers:**
  - (1) **Correction shall be made automatically for the fuel temperature either based on the fuel standard density and reference tables specified in Table 2.31.X, or based on the actual measured density of the fuel and using reference tables specified in Table 2.31.X.**
  - (2) **If using a measured density, the seller shall maintain records of the density determination for one year and shall make those records available for inspection by a weights and measures official on request during normal business hours.**
  - (3) **All primary indications of net volume quantities on measuring devices and all receipts, invoices, bills of lading, and other transfer documents shall clearly and conspicuously identify net volume quantities with the unit of measure and the terms “Volume corrected to 60 °F” or “Volume corrected to 15.56 °C.”**

- (4) Unless otherwise agreed to by both the buyer and seller in writing, engine fuels and non-engine fuels sold temperature corrected shall be sold in that manner over at least a consecutive 12-month period.

**2.31.2.2. Quantity, Retail Transactions.**

- (a) Effective January 1, 2XXX, all engine fuels and non-engine fuels identified in Table 2.31.X, shall be sold, offered, or exposed for sale to retail customers either in terms of liquid volume in liters or gallons, or in terms of liquid volume automatically temperature corrected to 60 °F (15.56 °C) in liters or gallons.
- (b) Effective January 1, 2XXX, all engine fuels and non-engine fuels identified in Table 2.31.X, shall be sold, offered, or exposed for sale to retail customers in terms of liquid volume automatically temperature corrected to 60 °F (15.56 °C) in liters or gallons.
- (c) When engine fuels and non-engine fuels are sold temperature corrected to retail customers:
- (1) Correction shall be made automatically for the fuel temperature based on the fuel standard density and reference table in Table 2.31.X.
- (2) All primary indications on measuring devices and all receipts, invoices, and other transfer documents shall clearly and conspicuously identify net volume quantities with the unit of measure and the terms “Volume corrected to 60 °F” or “Volume corrected to 15.56 °C.”
- (3) If a fuel is sold temperature corrected from a measuring device at a business or fleet location, all sales of the same fuel from that business or fleet location shall be sold temperature corrected over at least a consecutive 12-month period.
- (4) All unit price advertisements shall be clearly and conspicuously marked with the term “ATC.”

<b><u>Table 2.31.X. Reference Tables and Fuel Densities for Temperature Correction</u></b>		
<b><u>Fuel</u></b>	<b><u>Reference Table for Wholesale or Retail Temperature Correction</u></b>	<b><u>Standard Fuel Density for Retail Transactions (optional density for wholesale transactions)</u></b>
<b><u>Gasoline, gasoline-oxygenate blends (3.7 mass percent oxygen, maximum), gasoline ethanol blends (10 volume percent maximum)</u></b>	<b><u>API Table 6b</u></b>	<b><u>62 API (730 kg/m<sup>3</sup>)</u></b>
<b><u>Diesel Fuel (grade 2-D), biodiesel blends (20 volume percent biodiesel, maximum)</u></b>	<b><u>API Table 6b</u></b>	<b><u>37 API (840 kg/m<sup>3</sup>)</u></b>
<b><u>Other fuels TBD</u></b>	<b><u>-</u></b>	<b><u>-</u></b>

**(Added 200X)**

## **Part II. Permissive Temperature Compensation for Refined Petroleum Products and Other Fuels**

(The following text describes the original proposal which was returned to the Committee after it was not adopted at the 2007 NCWM Annual Meeting)

**Sources:** The Southern Weights and Measures Association (SWMA), the Western Weights and Measures Association (WWMA), and the Central Weights and Measures Association (CWMA).

**Note:** This or similar proposals, which have been on the Committee's agenda for several years, were reviewed by each of the regional weights and measures associations. The review process resulted in the submission of several different proposals and numerous comments and suggestions for the Committee to consider. Everyone expressed concern over the scope, cost, and impact of establishing a method of sale for petroleum products which required temperature compensation. This subject was widely discussed by the NCWM at public forums dating back more than 30 years. A similar proposal was made by NEWMA as recently as 2000, but the Committee withdrew it in 2001. NEWMA noted at that time that Pennsylvania, New Hampshire, Maine, and Canada permit temperature-compensated sales of products like home heating fuel and retail gasoline. Additional historic and background information is available in previous editions of the Committee's agenda. For recent discussions on this subject, see Item 232-1 in the report of the 91<sup>st</sup> NCWM Annual Meeting (2006) on the Internet at [www.nist.gov/owm](http://www.nist.gov/owm). This information is also available from NIST WMD on a searchable DVD, NIST Special Publication 979 "Reports of the National Conference on Weights and Measures 1905 to 2007," (Spring 2008).

**Background:** At its 2007 Interim Meeting, the Committee received correspondence from consumer groups and other organizations and heard testimony from weights and measures officials, the petroleum industry (including the American Petroleum Institute (API)), consumers and others regarding temperature compensation of refined petroleum products. The Committee appreciates all of the data, discussion, and especially the high level of interest. The Committee acknowledges the media attention this item has drawn, and the members were pleased to learn that some agricultural commissioners and other policy makers, as well as some governors and state attorneys general, have expressed interest in temperature compensation.

Proponents for the item spoke for a need to improve the accuracy of measurements of petroleum products because of their cost and of the need to improve accountability. Opponents spoke to the cost of implementing temperature compensation and the potential for confusion in the marketplace. The Committee was made aware of legislation under consideration in Missouri and Texas that would establish different definitions for a gallon based on the ambient temperature in various areas of their states. The Committee was especially sensitive to concerns expressed by weights and measures inspectors about the potential cost and increased inspection time they may expend if temperature compensation is allowed in all applications, especially at the retail level.

The Committee duly considered the presentations, discussions, letters, data, media stories, comments received at public hearings and in hallways, and the proposed legislation. The NCWM has posted this information and information on the activities of its ATCSC at [www.ncwm.net](http://www.ncwm.net).

Following is a list of justifications for adopting a standard that will facilitate the implementation of an orderly yet permissive approach to allowing broader use of temperature compensation in the marketplace:

- Cost of fuel has led to increased consumer and business interest in better methods of measurement, inventory control, and accountability. By now, everyone has realized or should realize that ambient temperatures are but one factor which impacts the volume of any liquid. Thus, basing a state's temperature-compensation program on regional ambient temperatures is not a technically valid approach to addressing the issue.
- The use of dual-wall storage tanks and deliveries of fuel directly from refineries result in higher temperature product.
- Awareness and concerns over the impact of temperature on the cost of fuel has come about at the same time advances in technology such as electronics and software have made compensation possible in both new and existing measuring devices at lower costs.

- Increased consumer requests that temperature compensation be used, especially in high volume deliveries, for improved measurement accuracy.
- The dramatic growth of public interest in recent years is evidenced by articles in many newspapers and widely-read magazines such as *Scientific America*. This national conversation about energy has led to greater consumer awareness, as well as interest on the part of political leaders, of energy issues and has contributed to creating an opportunity for change.

After a thorough discussion and polling by its chairman, the Committee was unanimous that it would recommend to the NCWM the adoption of a method of sale for refined petroleum products and other fuels. This would allow industry the option of selling these products on the basis of temperature-compensated sales. The decision to submit the permissive temperature-compensated method of sale for NCWM consideration was unanimous, the representative from the CWMA supported going forward with the recommendation but did not agree with including retail sales in the scope of the regulation. The Committee ultimately decided it was in the best interest of the U.S. commercial measurement system if the NCWM adopted a standard that would provide guidance to states considering legislation in this area; thus, supporting the work of the Specifications and Tolerances Committee, the National Type Evaluation Program (NTEP), and others to develop technical requirements and test procedures for both type approval and field testing for devices equipped with temperature compensation. The Committee believed those efforts were critical to facilitating the introduction of temperature compensation to the marketplace, especially in NTEP states as the NCWM learned there were no retail motor-fuel dispensers available with Certificates of Conformance that included temperature compensation functions.

The following topics/considerations were addressed by the Committee:

**1. Temperature compensation was already legal for use in trade unless prohibited by state or local requirements.**

The Committee was aware that temperature compensation was already required or permitted in a number of states for vehicle-tank meters, liquefied petroleum gas, and wholesale deliveries to retailers, and that it had been used in the marketplace in these applications for decades. At the WWMA Annual Meeting, the State of California reported that for transactions involving 5000 gal or more, purchasers may request temperature compensation; Idaho said that for transactions involving 8000 gal or more, the purchaser had an option to buy, on a yearly basis, temperature-compensated product and that all terminal transactions were temperature compensated; Arizona responded that any transactions involving more than 5000 gal must be compensated for temperature; and currently the State of Hawaii was the only jurisdiction that has taken some action to account for temperature variations in retail sales. The Committee heard enough supportive comments from a broad base of weights and measures directors, inspectors, and metrologists to recognize that temperature compensation may find broad acceptance in the marketplace, especially once the potential benefits it offers were realized and implementation costs fall.

The Committee also believed that unless prohibited by state law, temperature compensation at retail dispensers was already legal in most states. Additionally, the Committee believed it would be difficult to argue against a measurement practice that could only improve the accuracy and reproducibility of a volumetric measurement. The Committee position was that legal metrology must not stand in the way of the marketplace striving to change the way fuels and other products are marketed and sold.

**2. Under a permissive approach consumers and businesses will decide where and when to implement temperature compensation.**

The Committee was convinced the marketplace will best determine where and when the benefits from temperature compensation should be implemented to improve accuracy. The Committee recommended the adoption of a method of sale that would allow temperature compensation to be used in sales of petroleum products on a permissive (voluntary) basis, allowing the marketplace (e.g., industry, consumers and other government agencies) to decide if and when it was appropriate to use temperature compensation in specific commercial applications (e.g., sales at truck stops). This recommendation was proposed solely for the purpose of ensuring the delivery of an accurate volume of petroleum at a specific reference temperature. It was not the intent of the Committee to attempt to define a standard energy content of a liter or gallon of gasoline or other engine fuel with this recommendation.



**3. Temperature compensation would be permissive, but controlled.**

Although the Committee's recommendation allowed for permissive use of temperature compensation, it included mandatory provisions requiring compensation be made by automatic means to ensure the measured quantity was accurately determined. It also defined a temperature-compensated volume for both liters and gallons, requiring the posting of information on dispensers, street signs, and on documents to ensure full disclosure and fair competition. Additionally, it required a business location to have all of the devices operating on temperature compensation on a year-round basis unless a written waiver was granted by the Director.

**4. The basis of the Committee's recommendation was the proposal from the WWMA.**

The Committee's recommendation was based on the proposal submitted by the WWMA, which was developed at its 2006 Annual Meeting in Salt Lake City, Utah. The Committee made several amendments to the proposal, but found it represented a well-reasoned foundation for the recommendation presented below. The CWMA L&R Committee supported the WWMA's proposal and supported submitting it to the NCWM for a vote. The CWMA agreed with the WWMA that temperature compensation is the most equitable method of sale, which is currently utilized at every step of distribution except for retail sales. Additionally, the CWMA believed the proposal should not be restricted only to petroleum products, but should also include alternative fuels such as E85, biodiesel and biodiesel blends. The Committee's recommendation incorporated some of the CWMA's suggestions and included additional requirements to address many of the concerns raised at the 2007 NCWM Interim Meeting open hearings and discussions. For the purpose of this recommendation, the Committee used the definition for "refined petroleum products" as presented in HB 130 *Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Inspection Law* which reads, "products obtained from distilling and processing of petroleum (crude oil), unfinished oils, recycled oils, natural gas liquids, refinery blend stocks, and other miscellaneous hydrocarbon compounds," with the understanding that its intent was that the requirements would apply when petroleum was blended with other products such as ethanol.

**5. Full disclosure will allow informed consumers to make value comparisons.**

The Committee believes that consumers, when educated through marketing and outreach efforts, will accept new technology and measurement practices. When provided with sound information, consumers will gain confidence that government oversight will prevent deceptive practices. The Committee believes that full disclosure provisions of the method of sale will reduce both unfair competition and consumer confusion. If, for example, a truck stop offers temperature-compensated sales of diesel fuel through high-speed dispensers for truckers, the road signs with price per unit of volume (e.g., gallon or liter) and dispensers must include a declaration that the volume is sold on the basis of temperature compensation. If the price per gallon is higher or lower than the usual price per gallon, consumers will be informed that the volume was compensated to a reference temperature. Several people expressed concern over marketplace confusion if diesel fuel is sold on the basis of both compensated and uncompensated volume. It is incorrect to say that there would be two methods of sale for the same product under this recommendation just as it is inaccurate to say that some consumers will not receive a "full" gallon if temperature compensation is used as some opponents to this method of sale have claimed. The reality is that consumers will be able to compare price per gallon between stations and they will receive a "full" gallon as defined under the Method of Sale of Commodities Regulation. While confusion is possible with any method of sale, the Committee was not deterred by that possibility. If confusion occurs, the proper response is to educate consumers and address any changes identified from the confusion through further refinement of the method of sale. In this application, full disclosure will inform consumers that one product is sold on the basis of temperature compensation and one is not. When consumers are educated, they can make sound value comparisons between these choices just as they already make decisions when choosing between different brand name products, octane ratings, additive offerings, and types of fuels. Business and industry is also well equipped and very experienced in educating its customers, whenever they introduce new products or services to the marketplace. Should they decide to use the method of sale, they should be sure to introduce it using an informative marketing effort.

The Committee was urged to clarify that there may be situations in which there is a valid contract where the price is based on the fuel being sold on the basis of uncompensated measurement. The Committee agreed with the comment that if a purchaser operating under such a contract fills up at a location where the dispensers are temperature

compensated, the contract should prevail in those transactions. Similarly, the Committee heard from the American Petroleum Institute (API) that it should permit either uncompensated or compensated methods of sale at loading-rack meters when such sales are under contract. The Committee believes its proposal will not interfere with the contracts or understandings that API described.

## **6. Costs**

The Committee heard from some users that the lack of temperature compensation was costing them great sums of money while industry representatives said the cost of equipment and installation will cost industry and, ultimately, consumers even larger amounts of money. The cost of any NCWM action is a concern to the Committee, which must defend its actions on both sides of any issue. However, it is very difficult to give each side everything it wants in any recommendation. While the Committee was concerned about cost, it was skeptical of the economic claims from both sides in this debate. For example, at the 2007 Interim Meeting one estimate of the cost of implementing temperature compensation dropped nearly \$2 billion dollars once industry learned that an alternative technology was available in the marketplace.

That is but one illustration of the weaknesses the Committee saw in cost or damage claims over the years. It dates back to its work in the 1990s on the price verification procedures where some groups claimed that supermarkets were overcharging consumers billions of dollars a year. The Committee never saw data that supported such claims; yet the damage values received wide notice in the media. Some members of the NCWM may remember the claims made during Congressional consideration of the Metric Conversion Act of 1975 that changing to the metric system would cost billions of dollars. In reality those high costs never materialized, which was confirmed through several reliable studies. One reason Congress made conversion to the metric system voluntary was to allow industry to make changes as part of their normal equipment replacement cycle. The automotive industry, for instance, found it cost effective to make the change to metric units when purchasing replacement equipment. Advancements in technology also made conversions easier or allowed dual-unit displays on equipment as standard features. These factors were key contributors in reducing costs.

Each state Director in the NCWM determines whether or not to incorporate what is adopted by the NCWM into his state law or regulations, not the Committee. Even states that adopt the Method of Sale of Commodities Regulation by reference or citation can take action to exclude a specific section of a uniform regulation that conflicts with other requirements or policies. As for taking time for additional study, the NCWM record on consideration of the issue of temperature compensation dates back to the mid-1970s and has arisen for consideration every few years since then. The Committee was aware of the history, the issues, the various points of view, and the potential costs of temperature compensation, and believed it was time for the NCWM to move forward on temperature compensation by establishing standards by which this method of sale can be brought into the marketplace on a voluntary, yet controlled, basis. The Committee also heard that no action should be taken pending further studies. The Committee was wary of calls for no action pending another study or action by Congress.

As one speaker alluded to in his presentation, the marketplace is to some degree “intelligent” in that it helps address many factors through its price-setting function and can generally be trusted to balance costs and prices as well as justify investment in new technology and marketing practices if there is a need, demand, or opportunity. A voluntary approach will allow early adopters to develop experience and pull advances in technology into the equipment market while competition and other factors will reduce costs even further if the method of sale is broadly adopted. The Committee believed a permissive approach to temperature compensation turned the choice over to the marketplace where, if consumer demand was sufficient, sellers would make a business decision to invest in the technology and marketing according to the new method of sale when the benefits offset costs.

## **7. Limiting the option of temperature compensation to specific applications**

The Committee received suggestions that temperature compensation be limited to certain applications or not allowed in retail sales, but it did not hear sufficient justification for taking such positions. Temperature compensation is not new to the commercial measurement system. It is widely used in wholesale transactions in many jurisdictions, and consumers in many states have purchased LPG and oil for heating and other uses for decades on the basis of temperature-compensated sales. No information was presented to the Committee that its use in those applications has been anything but successful. The Committee recognizes that verifying devices with temperature compensation

may require additional inspection time and require weights and measures officials to purchase thermometers or other equipment for testing. However, those factors are not sufficient justification to prohibit the marketplace from implementing this method of sale. If a jurisdiction adopts this method of sale and a business decides to use temperature compensation, the weights and measures agency would need to obtain funding to implement appropriate testing procedures to verify devices. However, the Committee would expect that innovation, risk-based testing, and random sampling techniques, as well as technology, would lessen the time required to conduct additional tests just as those factors have reduced the burden of testing many weighing and measuring instruments in the past.

#### **8. Permissive vs. Mandatory Implementation**

The Committee heard from the regional associations and others that temperature-compensated sales should be implemented on a permissive basis. The Committee opposed the inclusion of a future mandatory date at this time. The Committee believed temperature-compensated sales should be market driven and that suppliers will conduct sales on a compensated basis when consumers demand it and should not be required to do so before then. The Committee, based on the comments of many jurisdictions, believed the imposition of a mandatory requirement was too burdensome on the industry, requiring upgrades and possibly the replacement of many meters without adequate justification.

The Committee agreed that a mandatory requirement would not be justified at this point in time. The Committee felt it was important to get some form of regulation regarding temperature-compensated sales of petroleum into HB 130 and thought as many barriers as possible should be removed in order to achieve that goal. Although the Committee's recommendation is a permissive requirement for temperature-compensated sales, the Committee was willing to consider establishing future mandatory dates if a justified need was demonstrated after this permissive regulation was implemented and used for a period of time.

#### **9. Comments Reviewed by the Committee at the 2007 Annual Meeting**

- a. The Committee noted if the temperature compensation proposal was adopted at the 2007 Annual Meeting, it would go into effect January 1, 2008, in the 18 jurisdictions that indicated they automatically adopt that regulation by reference or citation (see 2008 Edition of NIST HB 130, "II Uniformity of Laws and Regulations" (page 9) for a list of those states). The Committee recognized that if the recommendation was adopted in July 2007, some jurisdictions might want to delay its implementation or exempt that particular section from being automatically adopted. Since typically, rulemaking takes longer than six months to complete, the Committee debated whether or not it should include a delayed effective date of July 1, 2009, for this regulation but took no action on this issue.
- b. The Committee discussed the subject of unscrupulous retailers artificially heating fuels and that this deceptive practice has occurred from time to time. The State of Arizona actually forbids the practice; however, the Committee did not address that issue in the following recommendation. The Committee considered if a prohibition on the artificial heating of fuels for the purpose of increasing volume at the time of sale should be added to the recommendation but no action was taken on this issue.
- c. The Committee asked to receive comments on whether or not the recommendation should allow the state director to grant (and, when justified, revoke) written waivers to some provisions if sufficient justification was provided by the business owner. The Committee discussed whether or not the requirement that all devices that dispense product at a single location might result in a hardship for some retailers or difficulties in implementing the new method of sale for specific customers (e.g., over-the-road truckers). For example, if a station decided to sell gasoline and diesel fuel on a temperature-compensated basis but also had a dispenser for K-1 Kerosene, from which limited sales were made, a waiver from the temperature-compensation requirement on all dispensers could be justified. Likewise, if a chain of truck stops decided to sell diesel fuel on a temperature-compensated basis through its high-output dispensers to truckers (e.g., its prime customers), but did not want to implement temperature-compensated sales through its gasoline dispensers, a waiver could also be justified. The purpose of the requirement that all devices at a single location be temperature compensated or not was to prevent a retailer from selling through the compensated or uncompensated dispensers when it benefited the seller. The Committee agreed flexibility

was warranted and could make acceptance of the method of sale easier to implement but took no action on this issue.

**Committee Recommendation:** Amend the Method of Sale of Commodities Regulation in HB 130 by adding a new Section 2.30. Refined Petroleum Products:

**2.30. Refined Petroleum Products - Permissive Temperature Compensation.**

**2.30.1. Where not in conflict with other statutes or regulations, these products may be sold on the basis of temperature-compensated volume.**

**2.30.2. When products are sold on the basis of temperature-compensated volume:**

- (a) **All sales shall be in terms of liters or gallons with the delivered volume adjusted to 15 °C or gallons with the delivered volume adjusted to 60 °F;**
- (b) **Temperature compensation must be accomplished through automatic means.**

**2.30.3. Full Disclosure Requirements.**

**2.30.3.1. The primary indicating elements of measuring devices, recording elements, and all recorded or display representations (e.g., receipts, invoices, bills of lading, etc.) shall be clearly and conspicuously marked to show that the product was delivered on the basis of temperature-compensated volume;**

**2.30.3.2. When a product is offered for sale on the basis of temperature-compensated volume, street signs or other advertisements of its unit price must clearly and conspicuously indicate that the volume is temperature compensated.**

**2.30.4. Other Provisions.**

**2.30.4.1. At a business location all sales on a temperature-compensated basis shall be made continuously and for a period of not less than 12 months (e.g., a person may not engage the automatic temperature compensator on a device only during certain times of the year to prevent the person from taking advantage of temperature compensation).**

**2.30.4.2. At a business location which offers products for sale on the basis of a temperature-compensated volume, all measuring devices shall dispense on the basis of temperature-compensated volume (e.g., a person must not operate some devices at a location with automatic temperature compensators and others without compensators to prevent them from taking advantage of temperature variations).**

Annotations:

1. **As defined in Handbook 130 Engine Fuels, Petroleum Products, and Automotive Lubricants Inspection Law, refined petroleum products are products obtained from distilling and processing of petroleum (crude oil), unfinished oils, recycled oils, natural gas liquids, refinery blend stocks, and other miscellaneous hydrocarbon compounds as well as biofuels such as E85 and biodiesel at various blends.**
2. **A temperature-compensated liter is defined as having a reference temperature of 15 °C and a temperature-compensated gallon is defined as 231 in<sup>3</sup> at a reference temperature of 60 °F;**
3. **When a product is sold on the basis of a temperature-compensated volume, it is typically called “net” or “net volume,” whereas the volume before compensation is called the “gross” or “gross volume.”**

4. The metric units are shown solely for the purpose of showing metric equivalents in this uniform regulation in this NIST handbook. There is no requirement that dual units be shown in any full disclosure information required under this section.
5. Temperature Compensation may be abbreviated (e.g., “Temp Comp.” or “Compensated to 60 °F”) in the interest of space as long as its meaning is clear.
6. The seller is not prohibited from providing both gross and net gallons on receipts, invoices, bills of lading or other documentation as long as it is not misleading or deceptive.
7. A “business location” means a single outlet and should not be interpreted to mean all of the outlets or locations that a business or company operates in a jurisdiction.

## 237 ENGINE FUELS, PETROLEUM PRODUCTS AND AUTOMOTIVE LUBRICANTS INSPECTION REGULATION

### 237-1 Revise Section 2.1. Gasoline and Gasoline-Oxygenate Blends

**Source:** Chairman, Fuels and Lubricants Subcommittee/NIST Technical Advisor

**Background:** The proposed changes for the current Section 2.1. of the regulation are based on the belief by some members of the Subcommittee that there is ambiguity in the current regulation and a lack of acceptance of the current requirements by some states. Some of the members of the Subcommittee believe the uniform regulation should include a set of enforceable limits that provides consumers’ protection yet builds a bridge to the future predominance of blend stock use.

1. *Ambiguity in the Current Regulation* – Discussions between regulators and industry, both during Fuel and Lubricants Subcommittee meetings and during the course of performing regulatory functions within the jurisdictions, have revealed that the current regulation has varying interpretations. The current regulation provides three options for blending.
  - a. Option 1 (2.1.1.1. *The base gasoline used in such blends shall meet the requirements of ASTM D4814*) is generally interpreted to mean that if the base gasoline meets the ASTM requirements, then the blend is exempt from all ASTM volatility control parameters when splash blending occurs downstream with a finished gasoline. Others suggest that, based on the wording, when blending under these conditions, the blend is exempt from any ASTM standards. Still others suggest that the section fails to clearly exempt the blend from any standards; therefore, they do not feel that this section provides the final blend with any relaxation from the ASTM standards.
  - b. Option 2 (2.1.1.2. *The blend shall meet the requirements of ASTM D4814*) is unclear to most readers that were not present when the rule was originally drafted. Obviously, a spark ignition engine fuel can certainly meet the ASTM standard and be compliant without question. In actuality, the rule was written to *require* that blends constructed at a refinery using ethanol as a blend stream component meet the ASTM standard.
  - c. Option 3 (2.1.1.3. *The base gasoline used in such blends shall meet all the requirements of ASTM D4814 except distillation, and the blend shall meet the distillation requirements of the ASTM specification*) is also unclear to many. This section was constructed by the original drafters of the rule to apply to blending with Blend Stock for Oxygenate Blending (BOBs). The original intent was based upon the fact that the blender knows the effect that the ethanol will have on the fuel, and the BOB should be manufactured with refinery stream components that will result in an ASTM-compliant fuel after the addition of the ethanol. Again, many readers do not understand this option and find that it is hard to distinguish from Option 2. The proposed revision combines Option 2 and Option 3 into a clear and concise statement.

2. *Lack of Acceptance by States* – The current model regulation has proven unacceptable to many states. According to a recent survey conducted, eleven states have adopted Section 2.1. into regulation with approximately five other states that have adopted similar versions of this section. Seven states have not adopted any **motor engine** fuel quality standards. The remaining twenty-seven states have not adopted this section of the model regulation. This section has been available for states to consider since 1995. Thirteen years later, there remains considerable resistance by states to adopt the current language.
3. *Sets an Enforceable Limit that Provides Minimum Consumer Protection and Builds a Bridge to the Future Predominance of Blend Stock Use* – The proposed revision provides state regulators with limits that will provide at least minimal protection to consumers when ethanol is blended with finished gasoline and removes the ambiguity that was left in the original wording. Major oil companies have asked states for a compromise standard that can be reasonably met when blending finished gasoline with ethanol. This is needed now in many markets because ethanol blends are not established, and it is not practical for many reasons to ship blend stock and finished gasoline into those markets. The proposed revisions provide that compromise while maintaining the ability for regulators to react in the rare event that an abnormal base fuel is imported or entered into a marketplace and the gasoline blended with ethanol results in a blend that possesses unacceptable volatility characteristics that would result in vehicle operability issues. The proposed revision seeks to build a bridge to the time when ethanol blends may become the default fuel in a market place. At such time, it is likely that refiners will provide BOBs to those markets, and the resulting fuel would then be expected to meet ASTM standards. Finally, changes in the ASTM standards since the original regulation was passed also support a change in the model regulation. ASTM now allows a minimum T50 Distillation point of 150 °F for gasoline in volatility Classes D and E. It is generally accepted that if ethanol were blended with a base gasoline with a T50 of 150 °F, the final blend would very possibly be problematic.

**Recommendation:** Amend Section 2.1. of the Uniform Engine Fuel, Petroleum Products, and Automotive Lubricants Regulation by replacing the current text with the following:

**2.1. Gasoline and Gasoline-Oxygenate Blends. – (as defined in this regulation) shall meet the most recent version of ASTM D4814 “Standard Specification for Automotive Spark Ignition Engine Fuel” except for ethanol blends as provided below and be consistent with state and federal laws and regulations.**

**2.1.1. When finished gasoline is used as the base gasoline for blending, the base gasoline used in such blends shall meet the requirements of ASTM D4814 and the ethanol shall meet the requirements of ASTM D4806. The finished blend shall meet ASTM D4814 with the following permissible exceptions:**

**2.1.1.1. The distillation minimum temperature at the 50 volume percent evaporated point shall not be less than 66 °C (150 °F).**

**2.1.1.2. The Minimum Temperature for a Vapor/Liquid Ratio of 20 shall be as follows for the applicable vapor lock protection class:**

**Class 1 shall be 51.5 °C (125 °F)**

**Class 2 shall be 49.0 °C (120 °F)**

**Class 3 shall be 45.0 °C (113 °F)**

**Class 4 shall be 41.5 °C (107 °F)**

**Class 5 shall be 37.0 °C (99 °F)**

**Class 6 shall be 35.0 °C (95 °F)**

**2.1.1.3. The maximum vapor pressure shall not exceed the D4814 limits by more than 1.0 psi for:**

**(a) Only 10 % ethanol by volume blends (9 % minimum to 10 % maximum) from June 1 through September 15.**

**(b) All blends of up to 10 % ethanol by volume from September 16 through May 31.**

**2.1.2. When blend stock for ethanol blending is used, or when an ethanol blend is created with various refinery streams, the final blend shall meet the requirements of D4814 except that the vapor pressure requirements of 2.1.1.3. are permissible.**

**2.1.3. Blends of gasoline and ethanol shall contain no more than 10 volume percent ethanol.**

**Discussion:** The Fuel and Lubricants Subcommittee had met at the 2007 Interim Meeting in Jacksonville, Florida, to undertake a review of a number of significant issues related to fuel standards. One of their projects was to review and update the Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation in NIST HB 130 and submit a draft revision of the regulation for consideration by the Committee at the 2008 Interim Meeting.

The Subcommittee met at the 2007 NCWM Annual Meeting and continued its work on a number of items including a substantive revision of the fuel ethanol labeling requirement that the NCWM adopted at that meeting. The Subcommittee met again on December 5, 2007, at the ASTM International (ASTM) meeting in Phoenix, Arizona, and considered proposed amendments to Section 2.1. as shown below but a consensus agreement could not be reached at that meeting. The Subcommittee held a conference call on January 15, 2008, to complete its work on the draft revisions of the law and regulation and to consider the proposed revisions to Section 2.1. Again, after extensive deliberation a consensus agreement on the proposed revisions to Section 2.1. could not be obtained.

At the 2008 Interim Meeting comments were made during the open hearings where stakeholders voiced their concerns that this item is not ready to move forward. Stakeholders would like this item to go back to the Fuels and Lubricants Subcommittee for additional work on the language. The L&R Committee voted to make this item Informational and requested that the Fuel and Lubricants Subcommittee reconsider this issue. If the Subcommittee can resolve its differences on the proposal, it can submit amendments to this section as part of the revision to the Engine Fuels and Automotive Lubricants regulation under Item 237-1 above (refer to L&R Appendix B from the report of the 93<sup>rd</sup> NCWM Annual Meeting (2008) for written comments received on this item).

This item was sent to the full Laws and Regulations Committee for consideration at the 2008 Interim Meeting on the recommendation of NIST's Technical Advisor and with the agreement of the Subcommittee Chairman. The section must be reviewed by the NCWM because the current language may be in conflict with federal fuel waiver provisions.

At the 2008 Annual Meeting the Committee received one written comment (refer to L&R Appendix B from the report of the 93<sup>rd</sup> NCWM Annual Meeting (2008) for written the comment received on this item). This section will continue to remain Informational until additional information is received from the Fuels and Lubricants Subcommittee.

At the CWMA 2008 Interim Meeting it was commented that the proposal needs clarification to identify that this regulation applies to blends containing up to 10 volume percent ethanol. They voiced this concern due to the emerging use of ethanol blends between 10 % and 70 %. The CWMA L&R Committee recommends this item remain Informational until the FALS reaches consensus.

At the 2008 WWMA and SWMA Annual and the NEWMA Interim Meeting the Committees recommend that this item remain Informational until work is received from FALS.

Ron Hayes, Chairperson FALS, can be contacted at (573) 751-2922 or at ron.hayes@mda.mo.gov.

## 260 NIST HANDBOOK 133

### 260-1 Determining Net Weight Compliance for Meat and Poultry Products – 9 CFR Parts 317, 381, and 442

**Background:** The United States Department of Agriculture (USDA), Food Safety and Inspection Service (FSIS) issued a final ruling on 9 CFR parts, 317, 381, and 442 (refer to Table B Appendix B) “Determining Net Weight Compliance for Meat and Poultry Products” which state the procedures set forth for determining “net weight compliance”. This rule which requires the use of the 4<sup>th</sup> Edition of NIST HB 133 “Checking the Net Contents of Packaged Goods” for use in all inspections of packages of meat and poultry products subject to federal law and USDA regulations effective October 9, 2008. Therefore, the incorporated provisions of NIST Handbook 133 do not serve merely as compliance guidance, but are a part of the meat and poultry products inspection regulations.

To be consistent with this final rule, state and local officials must determine net weight compliance for meat and poultry products, including single-ingredient, raw poultry, in a manner that includes the free flowing liquids as part of the product and not part of the tare weight.

Currently the NIST WMD Technical Advisors are updating NIST HB 133 Section 2.3. “Basic Test Procedure” to be consistent with 9 CFR parts, 317, 381, and 442. This will mean removing any reference to the “wet tare” method for determining net weight of USDA restricted products, since FSIS considers free-flowing liquid to be part of the product.

## 270 OTHER ITEMS – DEVELOPING ITEMS

### INTRODUCTION

The NCWM established a mechanism to disseminate information about emerging issues which have merit and are of national interest. Developing items have not received sufficient review by all parties affected by the proposals or may be insufficiently developed to warrant review by the NCWM L&R Committee. The Developing items listed are currently under review by at least one regional association, subcommittee, or work group (WG).

The Developing items are marked according to the specific NIST handbook into which they fall – HB 130 or HB 133. The Committee encourages interested parties to examine the proposals included in the appendices and to send their comments to the contact listed in each part.

The Committee asks that the regional weights and measures associations, subcommittees, and WGs continue their work to develop fully each proposal. Should an association, subcommittee, or WG decide to discontinue work on a Developing item, the Committee asks that it be notified. When the status of an item changes because the submitter withdraws the item, the item will be listed in a table below. For more details on items moved from the Developing items list to the Committee’s main agenda, refer to the new reference number in the main agenda.

### 270-1 Amend Section 2.2.1. in Handbook 130 Uniform Engine Fuels Regulation - Premium Diesel Lubricity

**Source:** Southern Weights and Measures Association (SWMA) (See Item 270-5 in the Report of the 92<sup>nd</sup> Annual NCWM Meeting in 2006)

**Background:** A member of the petroleum industry believed the test and associated tolerances for lubricity on premium diesel specified in Section 2.2.1.(d) were inconsistent with that for regular diesel. Effective January 1, 2005, the test tolerance for regular diesel lubricity was the ASTM D6079 reproducibility of 136  $\mu\text{m}$  (see ASTM D975-04b). The NCWM chose to accept the ASTM reproducibility limits for all diesel (D975) and gasoline (D4814) properties (see Section 7.2.2. Reproducibility), but chose a different reproducibility limit for premium diesel lubricity without providing any explanation as to why the ASTM reproducibility limit was insufficient. If the NCWM intended to impose a stricter lubricity requirement for premium diesel, it should have designated a tighter specification for this property, not a different test tolerance (e.g., for regular and premium gasoline, premium has a different octane specification than for regular, but the test tolerance is the same). ASTM reproducibility limits were,



by definition, based on establishing a 95 % probability that product that should pass, will pass. Applying an average test as specified in Section 2.2.1.(d) reduced that probability to 80 %.

The Committee received comments from several members of the Premium Diesel Work Group (WG) who did not support the item as presented by the petroleum industry member. WG members believed the process that led to the current definition was very thorough and complete and the premium diesel lubricity requirements were established with a full understanding of their implications. The WG members felt that knowledgeable individuals provided input to the process, which led to the consensus position contained in the current regulation. The work being done by the WG was reported at meetings of ASTM Subcommittee E-2 every six months. The current regulation has been endorsed by the American Petroleum Institute, the Engine Manufacturer's Association, and the NCWM.

Prior to the current requirement being adopted, the ASTM Lubricity Task Force conducted a great deal of research on this topic. Based on their research, the ASTM Lubricity Task Force concluded that a limit of 520  $\mu\text{m}$  would meet the requirements of equipment in the field. Since the passage of this model regulation, ASTM included a lubricity requirement for No. 1 and No. 2 diesel fuel effective January 1, 2005. The ASTM requirement is also 520  $\mu\text{m}$ .

WG members reported that when this regulation was written, fuels with adequate lubricity provided a functional benefit to the end user. The WG agreed with the ASTM Lubricity Task Force that 520  $\mu\text{m}$  was the correct limit to set for premium diesel. However, the WG's review process also indicated increased pump wear for fuels with High-Frequency Reciprocating Rig (HFRR) values greater than 560  $\mu\text{m}$ . The current reproducibility value of the HFRR test method would have placed enforcement well beyond the 560  $\mu\text{m}$  level, essentially allowing fuels with little lubricity protection to be sold as "Premium." The WG believed they could not recommend a premium fuel standard that would permit excessive pump wear. Using the statistical tools provided in ASTM D3244, the WG evaluated an enforcement limit of 560  $\mu\text{m}$ . The statistical tools indicated that a single laboratory reporting the assigned test value would have an enforcement limit of approximately 80 % probability of acceptance, while the average of two separate laboratories reporting the assigned test value would have an enforcement limit of approximately 90 % probability of acceptance. It was agreed that for a premium fuel the average of two test results was the best approach given the current test methods and precision available. Therefore, if a test exceeded 560  $\mu\text{m}$ , then a second test must be run. The average of the two tests must exceed 560  $\mu\text{m}$  before a violation would occur. At the 2005 WWMA meeting, the Fuels and Lubricants Subcommittee agreed the proposal was the best approach at that time, and lacking new information, it continues to hold that position.

**Discussion:** At the WWMA 2006 Annual Meeting, the WWMA L&R Committee received only one comment regarding this item, acknowledging the ongoing review by the Fuels and Lubricants Subcommittee. The WWMA noted that the NCWM L&R Committee forwarded the proposal for review by the Subcommittee and agreed this item should remain Developmental pending its recommendation.

At its 2006 Interim Meeting, the CWMA indicated the NCWM Fuel and Lubricant Subcommittee would make recommendations after ASTM improved the test method's precision and after the conclusion of other tests. The CWMA L&R Committee was awaiting the recommendation from the Subcommittee.

During the 2007 Interim Meeting the Committee carried this item over as an Information item. The Committee sent this proposal to the Subcommittee and requested its recommendation on how to proceed with the issue. The Subcommittee suggested this item remain on the agenda as an Information item until further notice and reported that the activities of ASTM International and the Coordinating Research Council were continuing.

At the 2008 Interim Meeting the Committee carried this item over as a Developing item. This proposal was sent to the Fuel and Lubricants Subcommittee (FALS) for its recommendation on how to proceed with the issue. FALS suggested this item remain on the agenda as a Developmental item.

At the 2008 Annual Meeting there were no changes or recommendations received from FALS. This item will remain Developmental and will await further development from FALS.

At the CWMA 2008 Interim Meeting the Committee requested that this item remain Informational pending release of the FALS recommendation, Coordinating Research council study and the ASTM Lubricity Test Method Task

Force reports. At the NEWMA, WWMA and SWMA 2008 Annual Meetings the Committees recommended that this item remain Informational from FALS.

NEWMA held their Interim Meeting in October 2008 where they heard from a representative of the bio-diesel industry who briefed members on the newly adopted FTC standards regarding bio-diesel products, including the labeling of B-5, B-20, and B-100. One member expressed a concern regarding the “field testing” of bio-fuel blends and quality. This member also expressed that not enough testing occurs with regard to “octane quality” and that bio-blend testing would probably be conducted even less.

**Proposal:** Amend Section 2.2.1. Premium Diesel Fuel in Handbook 130 Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation. The following reflects the current text as it was modified in 2003.

**2.2.1. Premium Diesel Fuel.** – All diesel fuels identified on retail dispensers, bills of lading, invoices, shipping papers, or other documentation with terms such a premium, super, supreme, plus, or premier must conform to the following requirements:

- (a) **Cetane Number.** – A minimum cetane number of 47.0 as determined by ASTM Standard Test Method D613.
- (b) **Low Temperature Operability.** – A cold flow performance measurement which meets the ASTM D975 tenth percentile minimum ambient air temperature charts and maps by either ASTM Standard Test Method D2500 (Cloud Point) or ASTM Standard Test Method D4539 (Low Temperature Flow Test, LTFT). Low temperature operability is only applicable October 1 - March 31 of each year.
- (c) **Thermal Stability.** – A minimum reflectance measurement of 80 % as determined by ASTM Standard Test Method D6468 (180 min, 150 °C).
- (d) **Lubricity.** – A maximum wear scar diameter of 520  $\mu\text{m}$  as determined by ASTM D6079. If an enforcement jurisdiction’s single test of more than 560  $\mu\text{m}$  is determined, a second test shall be conducted. If the average of the two tests is more than 560  $\mu\text{m}$ , the sample does not conform to the requirements of this part.

(Amended 2003)

For additional information, please contact Ron Hayes, FALS Chairman, (573) 751-2922 or [ron.hayes@mda.mo.gov](mailto:ron.hayes@mda.mo.gov) by e-mail.

## **270-2 Amend Handbook 133 Section 2.3. Moisture Allowances to Provide Clearer Guidance**


(See Item 270-2 in the Report of the 93<sup>rd</sup> Annual NCWM Meeting in 2008)

This item was added to the agenda of the Committee’s Work Group (WG) on Moisture Loss (refer to Table B Appendix C) following the 2008 NCWM Interim Meeting. Also, see Item 270-3 for an explanation of the WG’s role and responsibilities and discussion on this item.

## **270-3 Laws and Regulations Committee Work Group (WG) on Moisture Loss**

(See Item 270-3 in the Report of the 93<sup>rd</sup> Annual NCWM Meeting in 2008)

**Background:** An issue about NIST Handbook 133 raised during the WG discussion was that the established moisture allowances listed in the handbook are not shown in one location in the text. The following table was prepared by NIST and may be considered for possible future inclusion in the handbook at the next WG meeting. The new Table 1.3. Moisture Allowances would bring all of the Moisture Allowance information together in one location in HB 133. A sample of a USDA Seal of Inspection was provided because NIST frequently receives inquiries from field officials asking what the USDA seal looks like.

<b>Table 1.3. Moisture Allowances</b>		
<b>If you are verifying the net weight of packages of:</b>	<b>The Moisture Allowance is:</b>	<b>Notes</b>
Flour	3 %	
Dry Pet Food	3 %	Dry pet food means all extruded dog and cat foods and baked treats packaged in Kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at time of pack.
Borax	See Section 2.4.	
<b>Wet Tare Only</b>		
<b>If you are using Wet Tare in verifying the net weight of packages of one of the products listed below that bear a USDA seal of inspection:</b>	<b>The Moisture Allowance is:</b>	 <p>One example of a USDA Seal of Inspection. Seals may vary by product.</p>
Fresh poultry	3 %	Fresh poultry is defined as poultry at a temperature of 3 °C (26 °F) that yields or gives when pushed with the thumb.
Franks or hotdogs	2.5 %	
Bacon, Fresh sausage, and Luncheon meats	0 %	If there is no free-flowing liquid or absorbent materials in contact with the product and the package is clean of clinging material.

**Discussion:** At the 2007 NCWM Interim Meeting, the Committee created a WG to undertake a review of a number of moisture loss and other issues relating to NIST Handbook 133 “Checking the Net Contents of Packaged Goods.” NIST recommended the NCWM L&R Committee retain responsibility for this project instead of creating a task force because that would entail additional travel and meeting expenses for all parties. The Board of Directors and the Committee agreed with that proposal because a large portion of this project can be accomplished using e-mail and teleconferences to reduce costs. The Committee also noted the number of items on their agenda has declined making time available during the Committee’s work sessions to address this project. If additional meetings are needed, they will be scheduled to coincide with the regional meetings to reduce travel and other costs. Another justification for this approach was that it allowed regional representatives on the Committee to develop a greater understanding of moisture loss and enabled them to better explain the subject matter to their constituents. Participation in this effort is open to all interested parties.

At the 2007 Annual Meeting the first WG meeting took place on Sunday, July 8, 2007, following the Committee’s regular work session. The first major subject of discussion was the determination of tare using gel-soaker pads. The participants agreed that information on the appropriate test procedures for using gel soaker pads should be distributed to weights and measures officials and industry following the NCWM Annual Meeting. NIST agreed to publish an article in the upcoming edition of WMD’s newsletter. A discussion of that issue is contained in Item 1 of Appendix C attached to this report. The group developed a formal work plan and addressed additional items listed in Appendix C as time allowed.

The Moisture Loss Work Group (WG) met at the 2008 Interim Meeting. There was limited time for discussion, so it was decided that no changes to NIST Handbook 133 would be recommended at this time. There were 25 representatives from state and local weights and measures programs, packagers, and other stakeholders in attendance. This was the first formal meeting of the WG, there was an extensive discussion of the goals, objectives, and effort, and a review of the history of the NCWM’s efforts to address moisture loss issues. After a lengthy discussion, it was agreed that there is a need to develop informational materials to explain the average and individual package requirements and moisture allowances in NIST HB 133 so that handbook users can understand how to

effectively apply the statistical allowances and moisture loss adjustments when conducting package inspections. Also identified was the need to provide an explanation of federal net quantity of contents requirements. It was agreed that NIST WMD would draft a set of graphics to describe how the Sample Error Limit (SEL), Moisture Allowance, and other corrections are determined in NIST Handbook 133. NIST WMD will also prepare a compilation of laws and terms related to net quantity of contents verification for use by the WG in providing guidance to users of NIST HB 133 on allowing reasonable variations.

At the 2008 Annual Meeting the Moisture Loss Work Group met to review an animated PowerPoint presentation provided by Kenneth Butcher. This presentation explained the statistical requirement and moisture allowances of NIST HB 133. The WG was able to give input on the presentation. NIST will make revisions to the current presentation. Once finalized, this presentation will be posted on the NCWM and NIST WMD websites, for use in training and/or self study.

This WG will also develop a draft guideline on small lot testing for use by inspectors and administrators. The WG will also develop guidelines for determining moisture loss allowances for products that are not listed in HB 133. The WG felt this additional information would be resourceful.

At the CWMA 2008 Interim Meeting held in October a comment was made that a critical element which needs to be developed is a guide stating what data is needed to demonstrate the need for moisture allowance to enable companies to collect the pertinent information for moisture allowance.

At the WWMA 2008 Annual Meeting the Committee agrees that additional work does need to be done and would like to see progress made at a quicker pace. The Committee would like to see any information that was developed out of recommendations from the July Annual Meeting. It was recommended that if costs are prohibiting additional meetings, meetings could be held on the web or they could consider using funding from the NCWM or regionals. The NIST Technical Advisor informed the Committee that due to funding and limits on most participants the Committee will continue to hold WG meeting at the Interim and Annual Meetings.

At the SWMA 2008 Annual Meeting the Committee agrees that this item remain Developmental as work develops out of NIST WMD.

At the NEWMA Interim Meeting in October 2008 a member asked whether the WG has explored the viability of expanding the categories of products affected by moisture loss. NEWMA recommends that this item remain a Developing item.

To participate in this WG, contact Lisa Warfield at (301) 975-3308, or by e-mail: [lisa.warfield@nist.gov](mailto:lisa.warfield@nist.gov) or Ken Butcher at (301) 975-4859, e-mail: [kbutcher@nist.gov](mailto:kbutcher@nist.gov).

#### **270-4 Fuels and Lubricants Subcommittee (FALS)**

**Background:** The Subcommittee had previously met on January 24, 2007, at the 2007 NCWM Interim Meeting to undertake a review of a number of significant issues related to fuel standards. Their first project was to undertake a major review and update of the Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation in HB 130. The Subcommittee also met at the 2007 Annual Meeting and continued its work on a number of items in addition to preparing a major revision of the Fuel Ethanol Labeling requirement in Item 232-2.

An additional project will be to update and possibly expand the Basic Engine Fuels, Petroleum Products, and Lubricants Laboratory Publication, which will then be made available on the Internet. The Subcommittee will undertake other projects as time and resources permit.

At the ASTM International meetings on December 5, 2007, in Phoenix, Arizona, the Subcommittee met to finalize its work on a number of projects that included a revision of the Uniform Engine Fuels Law and Regulation. A teleconference was held immediately prior to the 2008 Interim Meeting.

**Discussion:** At the 2008 NCWM Interim Meeting the Committee changed the name of the Petroleum Subcommittee to the Fuels and Lubricants Subcommittee (FALS). At the 2008 Interim Meeting the Subcommittee

prepared and submitted a major revision of this regulation for consideration by the Committee at the 2008 Interim Meeting. The Subcommittee also conducted a review of the Engine Fuels, Petroleum Products, and Automotive Lubricants Law and will prepare suggested changes for this Uniform Law as well (see Item 223-1). This item was reviewed at the 2008 Annual Meeting; this item continues to remain Developmental.

If you would like to participate in this work contact Ron Hayes, Chairperson Fuels and Lubricants Subcommittee at (573) 751-2922, e-mail: ron.hayes@mda.mo.gov or Ken Butcher at (301) 975-4859, e-mail: kbutcher@nist.gov.

#### **270-5 Pelletized Ice Cream**

**Background:** At the 2008 Annual Meeting open hearings Cary Frye from the International Ice Cream Association (IICA) gave a briefing on behalf of industry on pelletized ice cream. Ms. Frye gave a briefing on the product, standard of identity, test method procedures and several other key points. Ms. Frye informed that conference that additional assistance would be required from the Food and Drug Administration (FDA) (refer to Table B Appendix D). Once FDA has addressed the issues and concerns, NIST will host a second meeting at NIST in Gaithersburg, Maryland, to follow up and seek resolution on the outstanding concerns. NIST will send out a meeting announcement to all state Directors and all other interested parties via the NIST W&M list server.

The NIST Weights and Measures Division submitted to the Committee detailed minutes pertaining to the June 27, 2008, meeting held at NIST in Gaithersburg, Maryland, concerning issues and concerns with the pelletized ice cream product. The minutes (refer to Table B Appendix E) provide great detail of the current issue, background information, representatives and manufacturers, method of sale, and test method procedure.

This item has been presented at the WWMA and SWMA Annual Meeting and at the NEWMA and CWMA Interim Meetings. NEWMA discussed this issue, including the FDA's role and their impact on the NCWM process. One member stated that the FDA may be slow to reach a decision because of an impending change in leadership. Another member expressed the difficulty (practical experience) of testing this product.

All regions are in agreement that this item remains Developmental until further information is received from FDA.

To participate in the work on pelletized ice cream, contact Lisa Warfield, at lisa.warfield@nist.gov or (301) 975-3308, or Cary P. Frye, International Dairy Foods Association at cfrye@idfa.org or (202) 220-3543.

#### **270-6 Amend Interpretations and Guidelines Section 2.2.13. and 1.5.1.**

**Source:** Southern Weights and Measures Association (SWMA)

**Proposal:** Amend the Interpretations and Guideline Section of the 2009 Edition of NIST HB 130 by replacing the current contents of Section 2.2.13. Declaration of Identity: Consumer Package (UPLR) and 1.5.1. In Combination with other Foods (UMSCR) with the URL for the USDA's "Food Standards and Labeling Policy Book" which is available online at the following Uniform Resource Locators (URL). The information in Section 2.2.13. Declaration of Identity: Consumer Package (UPLR) and 1.5.1. In Combination with Other Foods (UMSCR) (HB 130-2009) is incomplete and out of date. Current and more comprehensive information on the labeling of packages of meat and poultry products is now available on the USDA websites.

Food Standards and Labeling Policy Book URL is:  
[www.fsis.usda.gov/OPPDE/larc/Policies/Labeling\\_Policy\\_Book\\_082005.pdf](http://www.fsis.usda.gov/OPPDE/larc/Policies/Labeling_Policy_Book_082005.pdf)

A Guide to Federal Food Labeling Requirements for Meat and Poultry Products (2007) URL is:  
[www.fsis.usda.gov/PDF/Labeling\\_Requirements\\_Guide.pdf](http://www.fsis.usda.gov/PDF/Labeling_Requirements_Guide.pdf)

This proposal was discussed at the 2008 WWMA Annual, NEWMA Interim and at the SWMA Annual Meeting. All regions agree that the L&R National Committee recommend that the NIST Technical Editor have editorial privileges to replace the current printed information with a web link.

For additional information on this item, contact Lisa Warfield, NIST at lisa.warfield@nist.gov or (301) 975-3308.

### **270-7 Method of Sale and Engine Fuel Quality Requirements for Hydrogen**

**Source:** Western Weights and Measures Association (WWMA)

**Proposal:** The proposal is to add a Developing item to the 2008 - 2009 L&R agenda for method of sale and engine fuel quality requirements for hydrogen in NIST Handbook 130 (HB 130) to address gaseous hydrogen refueling applications. Note: There is a corresponding proposal to add a Draft Hydrogen Gas Measuring Devices Code in NIST HB 44 to address requirements for hydrogen gas refueling equipment.

**Background:** Eighteen states have hydrogen refueling dispensers in operation. Hydrogen stations using permanent and mobile refueling systems for automobiles, fleet vehicles (buses), forklifts, airport totes, are increasing and may go unnoticed. Many stakeholders who are not familiar with the Weights and Measures standards process will need to participate at this stage rather than after this is a commercial application. This effort by the U.S. National Work Group (USNWG) is to ensure there are appropriate standards and test procedures in place in time for dispenser manufacturers, service agencies, and officials, and to educate the general public, not if, but when hydrogen becomes commercially available.

Existing codes do not fully address hydrogen refueling applications because of hydrogen's properties and other technical differences in the setup and operations of dispensing systems. The development of legal metrology standards for newly emerging hydrogen technology is a necessary component of the hydrogen infrastructure. The weights and measures community must have time to consider requirements for hydrogen-refueling systems before this application is available for public access at corner service stations.

The USNWG is bringing the proposal before the Weights and Measures community to share this information about upcoming standards for an emerging technology. The simultaneous development of the code and corresponding test procedures will allow for input from the W&M and hydrogen communities, appropriate trials of the standards, and to address all areas of concerns early in the standards development process.

This item was reviewed at the WWMA and SWMA 2008 Annual Meeting and at the NEWMA 2008 Interim Meeting. NEWMA members generally discussed the "hydrogen issue" and its usage in the marketplace. It is anticipated that hydrogen at first will be relegated to "fleet vehicles" (such as CNG), and that retail sales will be slow in coming to the marketplace. NEWMA recommends that this item remain a Developing item.

For additional information on this item, contact Kenneth Butcher, NIST at [Kenneth.butcher@nist.gov](mailto:Kenneth.butcher@nist.gov) or (301) 975-4859 or Lisa Warfield at [lisa.warfield@nist.gov](mailto:lisa.warfield@nist.gov) or (301) 975-3308.

### **270-8 Method of Sale for Fireplace and Stove Wood, flavoring chips and packaged natural wood**

**Source:** Southern Weights and Measures Association (SWMA)

**Background:** A state cited a company in violation of their net quantity contents labeling for flavoring chips. This citation also led to this company's product being pulled from sale and they were asked to review all their packaging and labeling. The company requested assistance from NIST W&M on the appropriate unit of metric measure for their flavoring chip packaging. Upon further review from NIST W&M, it became evident that the regulation lacked clarity for the proper unit use of metric measure by volume. Cubic meter carried out to three decimal points has limited meaning.

Section 2.4.3.(d) in the Method of Sale Regulation for Flavoring Chips states that they shall be sold by volume, but falls short of saying which volume units are required. Most packers go to 2.4.3. Quantity, where the guidance given implies that it must be sold by the cubic meter. This places the Method of Sale in conflict with UPLR Declaration of Quantity for Consumer Packages Rule of 1000. Using cubic centimeters puts packers in conflict as well. Most states, if not all, give precedent to UPLR over the Method of Sale.

This item was presented at NCWM 2008 Annual Meeting and at all of the regional meetings.

**Proposal:**

2.4.3. Quantity. – ~~Fireplace and stovewood shall be advertised, offered for sale, and sold only by measure, using the term “cord” and fractional parts of a cord or the cubic meter, except that:~~

**Note: In determining the appropriate Method of Sale, a clear distinction must be made as to whether the wood is being sold primarily as fuel (some wood is sold as fuel but flavoring is a byproduct) or strictly a wood flavoring.**

(a) **Fireplace and stovewood – Shall be advertised, offered for sale, and sold only by measure, using the term “cord” and fractional parts of a cord or the cubic meter.**

(~~a~~) (b) Packaged natural wood. – Natural wood offered for sale in packaged form in quantities less than  $0.45 \text{ m}^3$  ( $1/8$  cord or  $16 \text{ ft}^3$ ) shall display the quantity in terms of ~~cubic meters~~ **liters**, to include decimal fractions of cubic meters; or cubic feet **or cubic inches**, to include fractions of cubic feet.

(~~b~~) (c) Artificial compressed or processed logs. – A single fireplace log shall be sold by weight, and packages of such individual logs shall be sold by weight plus count.

(~~c~~) (d) Stove wood pellets or chips. – Pellets or chips not greater than 15 cm (6 in) in any dimension shall be sold by weight. This requirement does not apply to flavoring chips.

(Amended 1976 and 1991)

(~~d~~) (e) Flavoring chips. – ~~Flavoring chips shall be sold by volume.~~

(Added 1998) **Flavoring chips offered for sale in packaged form in quantities less than  $0.45 \text{ m}^3$  ( $1/8$  cord or  $16 \text{ ft}^3$ ) shall display the quantity in terms of liters, to include decimal fractions of liters; or cubic feet or cubic inches, to include fractions of cubic feet.**

For additional information on this item, contact David Sefcik at david.sefcik@nist.gov or (301) 975-4868.

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Joe Gomez, NM, Chairman

Joe Benavides, Texas  
Jonelle Brent, Illinois  
John Gaccione, New York  
Terence McBride, Tennessee

Ron Hayes, MO, Chairman FALS

Rob L. Underwood, Associate Member Representative  
Doug Hutchinson, Canada, Technical Advisor

Ken Butcher, NIST Technical Advisor: e-mail: kenneth.butcher@nist.gov  
Lisa Warfield, NIST Technical Advisor: e-mail: lisa.warfield@nist.gov  
David Sefcik, NIST Technical Advisor: e-mail: david.sefcik@nist.gov

**Laws and Regulations Committee**

## **Appendix A**

### **GAO-08-1114 Motor Fuels: Stakeholder Views on Compensating for the Effects of Gasoline Temperature on Volume at the Pump**



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United States Government Accountability Office

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GAO

Report to the Chairman, Committee on  
Science and Technology, House of  
Representatives

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September 2008

# MOTOR FUELS

## Stakeholder Views on Compensating for the Effects of Gasoline Temperature on Volume at the Pump



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GAO-08-1114

September 2008



Highlights of [GAO-08-1114](#), a report to the Chairman, Committee on Science and Technology, House of Representatives

### Why GAO Did This Study

The volume, but not the energy content, of hydrocarbon fuels, such as gasoline and diesel, varies in response to changes in temperature. Thus, because of expansion, the energy content per gallon of 90 degree fuel is less than that of 60 degree fuel. States and localities adopt and enforce weights and measures regulations, often using the model regulatory standards published by the National Institute of Standards and Technology (NIST). Although technology now exists to compensate for the effects of temperature on gas volume, the costs of doing so at the retail level have become the subject of much debate among weights and measures officials, consumer groups, and representatives of the petroleum and fuel marketing industries.

GAO was asked to provide information on (1) the views of U.S. stakeholders on the costs to implement automatic temperature compensation, (2) the views of U.S. stakeholders on who would bear these costs, and (3) the reasons some state and national governments have adopted or rejected automatic temperature compensation. To do this work, GAO reviewed NIST and other documents and congressional testimony; interviewed stakeholders from 3 federal agencies, 17 states, and 15 groups representing a variety of interests, including consumers, truck drivers, and the oil and gas industry; and interviewed officials in 5 other nations.

Various stakeholders and officials provided technical and other comments, which were incorporated in the report as appropriate.

To view the full product, including the scope and methodology, click on [GAO-08-1114](#). For more information, contact David Maurer at (202) 512-3841 or [maurerd@gao.gov](mailto:maurerd@gao.gov).

## MOTOR FUELS

### Stakeholder Views on Compensating for the Effects of Gasoline Temperature on Volume at the Pump

#### What GAO Found

The costs to implement automatic temperature compensation are unclear. Most stakeholders said that implementing automatic temperature compensation for retail sales would involve the cost to purchase, install, and inspect new equipment on pumps, as well as costs to educate consumers about the change. Some stakeholders said the costs to adopt automatic temperature compensation ranged from \$1,300 to \$3,000 per pump, but none had estimated the total costs nationwide, in part because complete data are not available. Estimates of the cost to inspect the new equipment varied. Officials in a small number of states said inspection times would increase by 20 to 50 percent, while officials in three other states said the costs would not be significant. No stakeholders had developed estimates of the costs to educate consumers.

Stakeholders differ on whether retailers, consumers, or both would ultimately bear the costs of implementing automatic temperature compensation at the retail level. Some stakeholders, including state officials and industry representatives, said that the costs would be passed on to consumers through higher prices for fuel or other goods sold at retail stations. Others, such as consumer groups, said that retailers and consumers would share the costs and benefits. That is, some retailers could use funds they receive from major oil companies for remodeling to pay for the equipment. These stakeholders also said the benefits include consistent energy content for consumers and improved inventory management for retailers. Stakeholder views were largely based on professional judgment and general economic theory rather than on studies or other data, and most stakeholders said that a comprehensive cost-benefit analysis would provide policymakers with important information.

Governments that have adopted or permitted automatic temperature compensation for retail fuel sales cited improved measurement accuracy and greater equity between retailers and consumers as reasons for making the change; those that have prohibited it largely cited concerns that the costs would outweigh the benefits. Hawaii adopted temperature compensation more than 26 years ago because it provided purchasing equity for the industry and consumers. In 2008, Belgium mandated temperature compensation to help ensure more consistent energy content for consumers. Canadian officials cited improved measurement equity and accuracy as reasons for allowing retailers to sell temperature-compensated fuel in the early 1990s. In the United States, officials from eight states that have laws or regulations that prohibit automatic temperature compensation said the decision should be based on an analysis of the costs and benefits, with some expressing concern that the costs would outweigh the benefits. None of the governments that have adopted automatic temperature compensation have studied its impact.

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## Abbreviations

EPA	Environmental Protection Agency
EU	European Union
FTC	Federal Trade Commission
NCWM	National Conference on Weights and Measures
NIST	National Institute of Standards and Technology

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United States Government Accountability Office  
Washington, DC 20548

September 25, 2008

The Honorable Bart Gordon  
Chairman  
Committee on Science and Technology  
House of Representatives

Dear Mr. Chairman:

Consumers and businesses alike are concerned about the steep rise in fuel prices in recent years. Because the volume of hydrocarbon fuels, such as gasoline and diesel,<sup>1</sup> varies in response to changes in temperature, some are concerned about the potential impact of temperature-related changes in volume on the amount they pay. More specifically, the volume of gasoline expands or contracts by 1 percent for each 15 degree increase or decrease in temperature, while the energy content of gasoline remains the same. For example, 10 gallons of gasoline at 60 degrees Fahrenheit (F) expands to 10.2 gallons of gasoline at 90 degrees F but maintains the same total energy content.<sup>2</sup> As a result, the average energy content per gallon of the 90 degree fuel will be less than that of the 60 degree fuel. In the United States, wholesale fuel transactions are routinely adjusted for temperature-related changes in volume. However, at the retail level, gasoline and diesel are sold by volume—specifically, 231 cubic inches per gallon—without regard to temperature, leading some to believe that the retail price of a gallon of fuel may not reflect its true value. Advances in measurement technology have allowed the development of devices that can automatically compensate for the effects of temperature on volume when dispensing fuel at retail gas pumps.<sup>3</sup> While some argue that extending temperature compensation to the retail level could provide greater transparency in fuel prices, others contend that the cost to upgrade existing equipment could be substantial and impose economic hardship on retailers.

The National Conference on Weights and Measures (NCWM), a consensus-building organization composed of state and local regulatory officials and

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<sup>1</sup>This report focuses on gasoline and diesel rather than other petroleum products, such as heating oil or jet fuel.

<sup>2</sup>This example assumes the use of the same blend of gasoline. Energy content can also vary depending on the blend of gasoline.

<sup>3</sup>Throughout this report, we refer to the devices that dispense fuel as pumps. Individual pumps may dispense multiple types of fuel, such as regular and high-octane gasoline.

other interested parties, has discussed whether to adopt standards for temperature compensation of gasoline and diesel for over 30 years, most recently at its meeting in July 2008. NCWM plays a key role in the debate because states adopt and enforce weights and measures regulations.

NCWM receives technical guidance on this and other matters from the Office of Weights and Measures in the Department of Commerce's National Institute of Standards and Technology (NIST). In partnership with NIST, NCWM develops model regulatory standards that are available for adoption and enforcement by state or local weights and measures authorities. NIST publishes these standards in various handbooks, and any proposed changes to these handbooks are considered by NCWM.

Since 2000, NCWM has considered various proposals related to automatic temperature compensation, including proposals in 2007 and 2008 to adopt model regulatory standards that states could use to implement temperature compensation in retail sales of gasoline and diesel. Neither of the proposed model standards has been adopted. In addition to the deliberations of NCWM, the Congress has held hearings on the issue, and federal legislation has been proposed to require the use of temperature compensation in retail transactions. However, the economic implications of temperature-induced changes in the volume of motor fuels on the price of gasoline and diesel remains a topic of considerable debate, and the issue continues to elicit strong opinions, both for and against, from parties such as petroleum marketers, retailers, independent truckers, fleet owners, and consumer advocates.

In the context of this debate, you asked us to provide information on (1) the views of U.S. stakeholders<sup>4</sup> on the costs to implement automatic temperature compensation, (2) the views of U.S. stakeholders on who would bear these costs, and (3) the reasons some state and national governments have adopted or rejected automatic temperature compensation. For each of these issues, we agreed to report on the support, such as studies or data, that stakeholders use for their views.

To obtain information from U.S. stakeholders on the costs to implement automatic temperature compensation and who would bear those costs, we reviewed NCWM documents and congressional testimony and performed a

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<sup>4</sup>Throughout this report, we use the word "stakeholder" to refer to domestic individuals and groups with an interest in the current debate in the United States on this issue, including NCWM, NIST, current and former government officials, consumer groups, representatives of the petroleum and trucking industries, and fuel retailers.

literature search to identify relevant documents and stakeholders likely to have a view on the implementation of automatic temperature compensation in the United States. To identify additional stakeholders, we asked each stakeholder we interviewed for recommendations of knowledgeable other entities and selected for interviews those who would provide us with a broad and balanced range of perspectives on temperature compensation of gasoline and diesel. We used a standard set of questions to interview each of these individuals to ensure we consistently discussed each aspect of automatic temperature compensation. Specifically, we interviewed representatives of two consumer advocacy groups, five fleet owners and operators, a former NIST official, and officials at seven organizations that represent independent truck drivers, the oil and gas industry, independent petroleum marketers, convenience store and truck stop owners, and the trucking industry. To obtain views from governments that have adopted or rejected temperature compensation, we contacted officials in 16 states that have taken specific steps to adopt or prohibit automatic temperature compensation. We also contacted officials in California who are conducting a cost-benefit analysis of temperature compensation. In addition, we contacted officials from Australia, Belgium, Canada, the United Kingdom, and a European weights and measures organization because literature and interviews indicated these governments had adopted or had considered implementing automatic temperature compensation. We also interviewed officials from the Environmental Protection Agency (EPA), the Federal Trade Commission (FTC), and NIST because these agencies help oversee the marketplace generally or oversee aspects of the retail petroleum industry. See appendix I for a more detailed description of the methodology we employed.

We conducted our work from March 2008 to September 2008, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for the information we present for each of our audit objectives.

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## Results in Brief

The costs to implement automatic temperature compensation are unclear. Stakeholders said that implementing automatic temperature compensation for retail fuel sales would involve costs to purchase, install, and inspect new equipment on fuel pumps, as well as costs to educate consumers about the change. Although some stakeholders had limited estimates for costs associated with the adoption of automatic temperature

compensation, ranging from \$1,300 to \$3,000 per pump for the costs to purchase and install automatic temperature compensation equipment, none had estimated the total magnitude of these costs nationwide. These estimates from stakeholders were generally consistent with information we obtained from equipment manufacturers. Specifically, costs ranged from \$900 to \$1,800 to buy a kit to retrofit an existing pump and \$200 to install the kit. Stakeholders said the costs to adopt temperature compensation could be affected by such factors as whether the investment to adopt the devices occurred immediately or more gradually to accommodate routine replacement decisions by retailers. A small number of stakeholders said estimates of the magnitude of costs had not been developed, in part, because certain data are missing, such as the number of mechanical pumps still in use nationwide. Estimates of the cost to inspect the new equipment as part of state enforcement of weights and measures standards varied. Officials in a small number of states said inspection times would increase by 20 to 50 percent, while in three other states, officials said the costs would not be significant. However, none of these officials had estimated the costs. Finally, although adopting temperature compensation would require that consumers be educated about it, no stakeholders had developed estimates of the costs to, for example, provide disclosure on street signs, fuel pumps, and customer receipts.

Stakeholders differ on whether retailers, consumers, or both would ultimately end up paying the implementation costs. For example, some stakeholders, including state officials and industry representatives, said that the costs of implementing automatic temperature compensation would be passed on to consumers. In their view, the costs to purchase and install compensation equipment would be passed on to consumers through higher prices for fuel or other goods purchased at retail fueling stations. Other stakeholders, such as consumer groups, said that retailers and consumers would share both the costs and the benefits of implementing temperature compensation. That is, one stakeholder said some retailers could use funds provided to them by major oil companies for remodeling to pay for the equipment. Consumers, they say, currently pay retailers for energy content they do not receive when they buy fuel that is warmer than 60 degrees F. Moreover, these stakeholders said that consumers would gain by receiving more consistent energy content, and one said that retailers would benefit because the automatic temperature compensation technology would make it easier to detect gas leaks and to manage inventory. Stakeholder views were based on professional judgment, general economic theory, and assumptions about how the fuel market operates rather than on studies or other data, and most stakeholders said



that a comprehensive cost-benefit analysis would provide policymakers with important information.

Governments that have adopted or allowed automatic temperature compensation cited improved measurement accuracy and greater equity between retailers and consumers as reasons for making the change, whereas those that had not adopted automatic temperature compensation cited concerns that the costs would outweigh the benefits. For example, Hawaii adopted temperature compensation more than 26 years ago because, according to Hawaiian officials, it provided purchasing equity for both the industry and the consumer. According to Belgian officials, Belgium mandated temperature compensation beginning in January 2008 to help ensure greater consistency in the energy content of the fuel sold to consumers. To improve measurement accuracy and equity, among other things, Canada developed standards in the early 1990s that allowed, but did not require, retailers to sell temperature-compensated fuel, according to a Canadian official. In the United States, officials from eight states that prohibited automatic temperature compensation said the decision should be based on an analysis of the costs and benefits, with some expressing concern that the anticipated costs would outweigh any benefit to consumers and fuel retailers. Governments have not formally studied the impact of their decisions to implement or allow automatic temperature compensation. Specifically, neither Hawaii nor Canada has studied the impact of temperature compensation, although officials reported it had been well accepted by both consumers and the industry and was not controversial. In Belgium, temperature compensation has not been in effect long enough to study its impact.

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## Background

From the beginning of the modern petroleum industry in the early 1900s, both industry and the federal government have recognized the problem that temperature-induced changes in volume present for inventory control. Specifically, the fact that petroleum products, like most other substances, expand when heated and contract when cooled means that the amount of fuel in the inventories of retailers changes, literally, with the weather. Following a study of the issue conducted by the American Petroleum Institute from 1912 to 1917, the United States and Great Britain established the standard measure for petroleum products: at an ambient temperature of 60 degrees F, 231 cubic inches equals a gallon.

The effect of temperature on fuel volume varies depending on the density of the fuel. For example, gasoline's volume changes approximately 1 percent for every 15 degree temperature change, whereas diesel, which is a more dense fuel, changes approximately 1 percent in volume for every 22

degree temperature change. In practice, the density of gasoline and diesel sold to consumers varies depending on such things as the crude oil used to produce the fuel and the addition of other components to achieve certain ends. For example, federal efforts to reduce petroleum consumption and greenhouse gas emissions require the increased use of some components in fuel blends, such as ethanol, biodiesel, and other alternative fuels. In addition, ethanol is added to gasoline in certain geographic areas to help reduce the emissions that contribute to the formation of ground-level ozone, which has been linked to respiratory and other health problems. As a result, the composition and density of gasoline and diesel products vary considerably across the country. In 2004, at least 45 different kinds of gasoline were produced in the United States.

Certain properties of fuels other than volume, such as mass and energy content, do not change in response to changes in temperature. However, energy content can be affected by changes in the density of fuel that arise from the addition of alternative fuels or other blending components that have densities different from the gasoline itself.

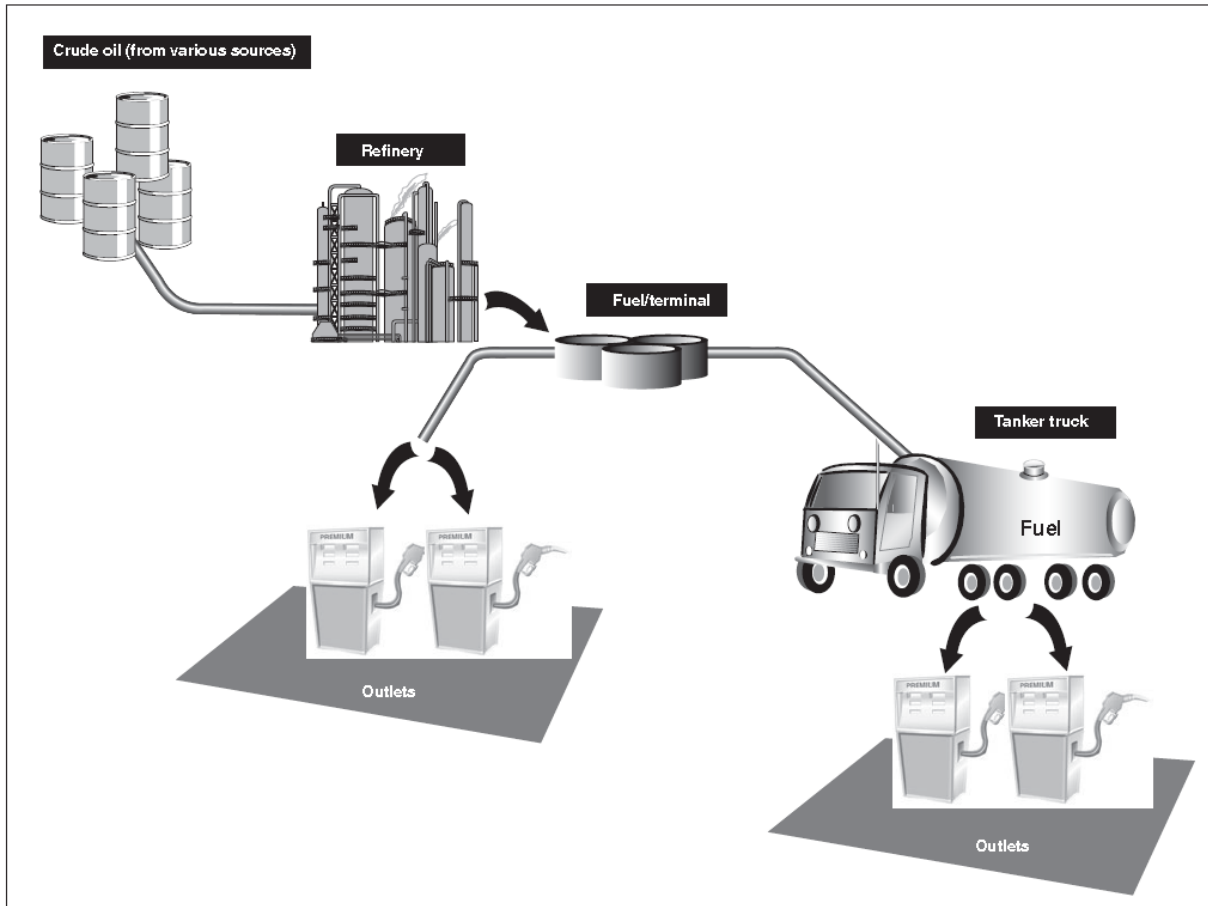
In the United States, the petroleum industry often adjusts for temperature-related changes in wholesale transactions for gasoline and diesel and in retail sales for other petroleum products, such as home heating oil, liquefied petroleum gas, and prepackaged liquids such as motor oil. In contrast, virtually all gasoline and diesel sold at the retail level is sold at 231 cubic inches per gallon regardless of the temperature of the fuel.

Temperature compensation can be achieved through several methods. First, volumetric changes can be calculated manually when the fuel density and temperature are known. Second, technological advances have led to the development of devices that automatically measure both the volume and temperature of the fuel at the time of purchase and correct the volume to the amount that would exist if the fuel were at 60 degrees F. Finally, in areas where the ambient temperature remains relatively constant throughout the year, pumps can be recalibrated to dispense the volume a gallon would occupy at 60 degrees F. For example, if the temperature in an area is relatively constant at 75 degrees F, pumps can be recalibrated to dispense 233 cubic inches per gallon.

Gasoline and diesel are distributed nationwide to fuel wholesalers through a supply infrastructure composed of pipelines, barges, tanker vessels, marine terminals, railroads, trucks, and storage tanks. At various points along the distribution chain, fuel is stored at terminal stations that generally have several large storage tanks. Fuel is then distributed, usually

by trucks, to retail gasoline stations, where it is typically stored in underground tanks (see fig. 1).

Figure 1: Distribution Network for Gasoline and Other Petroleum Products



Sources: GAO and Art Explosion (clip art).

Changes in the temperature of gasoline and other petroleum products can occur for several reasons from the time these products leave the refinery until they are deposited into a vehicle. For example, retail fueling stations located near a refinery or a pipeline may receive fuel that is still hot from the refining process, and the heated fuel will affect the temperature of the

fuel already in the storage tank.<sup>5</sup> In addition, the use of underground storage tanks—particularly those with double walls—may lengthen the time required for the fuel to cool to ground temperature of about 55 degrees F. A common misconception is that the use of underground storage tanks helps ensure that fuel remains at or below 60 degrees F. According to a 2004 NIST study based on 2 years of data, the average temperature nationwide for fuel stored underground was about 64 degrees and varied among states from about 82 degrees in Florida to 53 degrees in Minnesota. Finally, the temperature of the fuel in the supply line to the pump will affect the temperature of the fuel initially deposited into the vehicle.

State and local governments adopt and enforce weights and measures regulations, including those to ensure that retail fuel pumps accurately measure motor fuels. Unlike many other countries, the United States does not have a federal weights and measures regulatory agency, although two federal agencies help oversee the marketplace generally, and a third oversees aspects of the retail petroleum industry. Among other things, NIST cooperates with other entities, including state and local governments, to establish standard practices, codes, and specifications. The FTC enforces consumer protection laws, including laws related to unfair and deceptive practices in the marketplace. EPA and authorized states regulate underground storage tanks that store petroleum.<sup>6</sup> These regulations require a leak detection system on the underground storage tanks. None of these agencies has formally endorsed or opposed the implementation of automatic temperature compensation.

State and local governments develop regulations for weights and measures with input from NCWM and NIST. Established in 1905, NCWM is composed of state and local weights and measures officials, as well as related public and private sector members. A key goal of NCWM is to help ensure that consumers get the quantity of goods they pay for and that businesses sell the quantity that they advertise and intend to sell. NCWM helps ensure that uniform standards are applied to commercial transactions by developing regulatory standards for consideration by each jurisdiction, with technical, scientific, and administrative support provided

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<sup>5</sup>The refining process “boils” crude oil to separate it into its various components. Gasoline is distilled from crude oil at temperatures ranging from 194 degrees F to 428 degrees F, while diesel is distilled at temperatures up to 698 degrees F.

<sup>6</sup>The underground storage tank regulations apply to underground tanks and pipes used to store or move petroleum and certain other hazardous chemicals.

by NIST. Membership in NCWM is open to all interested individuals, including regulatory officials, device manufacturers, and consumers; however, only regulatory officials may vote on the disposition of proposals under consideration by NCWM.

Most proposals for regulatory standards that come before NCWM originate in one of its regional weights and measures groups located throughout the nation or in one of its four standing committees, each of which focuses on a specialized area, such as laws and regulations. At each of NCWM's annual conferences, standing committees review the proposals submitted for consideration and hold open hearings to discuss them. Final reports containing the NCWM-approved model regulatory standards are presented in open forum to representatives and voted upon. Actions or subjects under consideration, but not proposed for voting, may be carried over for further consideration at a later time. NIST publishes NCWM's newly adopted model regulatory standards in handbooks. If a state chooses to adopt the model regulatory standards in state law or regulation, they will then have the effect of law in that state.

For over 30 years, NCWM has debated the pros and cons of compensating for temperature-induced changes in the volume of petroleum products, including gasoline and diesel. This debate is guided in part by NCWM's principles that any method of sale or measurement must provide accurate and adequate information about products so that purchasers can make price and quantity comparisons. In 2007, a standing committee recommended a proposal to allow, but not require, automatic temperature compensation at the retail level. NCWM did not reach consensus on the proposal, and the issue was deferred for further consideration. In 2008, a steering committee established by NCWM recommended a proposal to require automatic temperature compensation following a 10-year period during which retailers could decide when to purchase the equipment based on their business needs. According to the committee, this would allow the marketplace to determine when and whether to adjust retail sales for temperature. However, NCWM members did not reach consensus on the proposal, and the issue was deferred for further consideration. Also in 2007, the California legislature directed the state Energy Commission to study the costs and benefits of using automatic temperature compensation devices for retail sales, among other things. The commission is to complete its work by February 2009.

## The Magnitude of Equipment and Education Costs of Adopting Automatic Temperature Compensation Is Unclear

Stakeholders said that implementing automatic temperature compensation for retail fuel sales would involve costs to purchase, install, and inspect new equipment on gasoline pumps, as well as costs to educate consumers about the change. Some stakeholders estimate the costs to purchase and install the temperature compensation devices would range from \$1,300 to \$3,000 per pump. To provide context for the estimates from stakeholders, we obtained information from two equipment manufacturers. These manufacturers said the costs can vary by the type of equipment. More specifically, the price of retrofit kits for electronic pumps ranges from \$900 to \$1,800, plus \$200 to install them. Costs to retrofit mechanical pumps are higher: \$2,000 to purchase and install a kit for one hose and \$3,800 for a dual hose pump. The costs to individual retailers would vary, in part, depending on the number of pumps, the number of hoses per pump, and the mix of electronic and mechanical pumps that would need to be replaced or retrofitted. In addition, an equipment manufacturer said that maintenance costs for electronic pumps would be negligible over the useful life of a pump, 10 to 12 years. Some stakeholders noted that the magnitude of costs has not been estimated, in part, because certain data, such as the number of mechanical pumps still in use across the country, are not available. As a result, the costs to adopt automatic temperature compensation are not known.

Several stakeholders said costs to purchase and install temperature compensation equipment could also be affected by other factors. For example, under a phased implementation schedule, retailers could upgrade their equipment in the normal course of replacing equipment, whereas immediate implementation would require retailers to invest in the equipment without regard to their business plans or ability to pay immediately. Also, a small number of companies in North America manufacture new pumps equipped to automatically compensate for temperature or kits to retrofit existing pumps. Two stakeholders said that the costs to purchase and install the equipment could rise in the face of shortages of both equipment and skilled installers that would occur if implementation of automatic temperature compensation were to occur suddenly rather than over a longer period of time.

Estimates of the magnitude of inspection costs varied. A small number of state officials said that automatic temperature compensation could increase inspection time by 20 to 50 percent and might require the purchase of testing equipment. In contrast, officials in three other states said that inspection costs to adopt temperature compensation would not be significant, although they had not estimated the cost. In Missouri, state officials said legislation was introduced, but not enacted, to divide the state into regions, each of which would adopt a new reference

temperature based on its average ambient temperature. State officials reported that adoption of temperature compensation by changing reference temperatures would require increasing staff by six inspectors and one clerical person for a cost of about \$1 million in the first 3 years.

No stakeholders have developed estimates of the costs to educate consumers when automatic temperature compensation is in use. However, costs would be incurred to provide disclosure on fuel pumps, customer receipts, and the street signs that show the retail price of fuel. A number of stakeholders noted that, if some retailers sold compensated fuels and others did not, consumers could be confused and might lack the ability to make informed value comparisons for their fuel purchases. According to some stakeholders, disclosure on pumps might be accomplished by adding the phrase “Volume corrected to 60 degrees F” to the face of the pump near the display of total gallons purchased. For customer receipts, printers could be programmed to add the same phrase. If automatic temperature compensation is in place throughout the nation, the need to disclose its use on pump signs might no longer be needed.

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## It Is Unclear Who Would Bear the Costs of Implementing Automatic Temperature Compensation

Stakeholders differ on whether consumers or a combination of retailers and consumers would bear the costs of implementing automatic temperature compensation. Specifically, many stakeholders, including state officials and industry representatives, said that the costs to purchase, install, and inspect compensation equipment would be passed on to consumers, generally through higher retail fuel prices, higher prices for nonfuel goods sold at retail fueling stations, or a combination of both. A few of these stakeholders said that retail prices must generally reflect the cost of goods sold or businesses will not remain in operation. However, since the information retailers use to make pricing decisions is proprietary in nature, it would be difficult to estimate how much prices would increase to cover the costs of implementing automatic temperature compensation. Some of these stakeholders also noted that differences in the cost of fuel and other goods sold could vary among retailers based on such factors as whether they owned or leased the land, the number of staff they employ, and whether the costs of inspections are paid directly by retailers or funded from tax receipts. However, one state official said that the ability of states to increase inspection fees may be limited by state statute.

Some stakeholders said the costs to implement automatic temperature compensation may result in disproportionate economic impacts on certain classes of retailers, such as small retailers and those in rural areas, that might be put out of business in the face of the investment to upgrade their

equipment. Retailers that are small or located in rural areas may dispense fewer gallons of fuel than larger retailers and, consequently, have fewer gallons from which to recover any costs associated with upgrading their equipment. A few stakeholders said an exemption for small retailers may be needed, such as an exemption based on the number of gallons dispensed. In contrast, another stakeholder said implementation that allowed retailers to make the decision of whether to add the devices to their equipment would eliminate the potential for disproportionate impacts.

However, other stakeholders, such as consumer groups, said that retailers and consumers would share in both the costs and the benefits of implementing temperature compensation. For example, one stakeholder noted that some retailers could use funds they receive from the major oil companies for remodeling to cover the cost of temperature compensation equipment. According to these stakeholders, consumers have already paid retailers for energy content they did not receive. That is, consumers generally buy fuel that is warmer than 60 degrees and has less energy content, according to these stakeholders. Such overpayments are greater in southern and western states than in other areas. Moreover, these stakeholders said consumers would benefit from greater transparency in fuel pricing, the ability to purchase fuel with more consistent energy content, and an enhanced ability to compare purchases from competing retailers because price differences would be based largely on differences in customer service or amenities such as clean rest rooms. One noted that retailers would also benefit because the automatic temperature compensation technology would allow retailers to manage inventory for both their deliveries and their sales of fuel on a temperature-compensated basis. Moreover, retailers could more easily identify fuel leaks by reconciling their inventory records to measurements of the fuel in their storage tanks. Specifically, if a measurement of stored fuel showed a retailer had less fuel on hand than it had sold, the difference could be the result of a leak.

Stakeholders also differed on the benefits of automatic temperature compensation. Many noted that temperature compensation provides a more accurate and replicable measurement method, but some expressed concern that the potential cost outweighed the benefit. Within the weights and measures community, support has been growing for the adoption of automatic temperature compensation standards, in part because of the improved accuracy and the availability of equipment that makes implementation more feasible than in the past. Several stakeholders noted that automatic temperature compensation brings equity to the marketplace and provides both consumers and retailers with comparable



information about their fuel purchases. Specifically, when retailers and consumers purchase temperature-compensated fuel, they each receive comparable products. According to two stakeholders, consumers currently cannot determine before or after a purchase the actual best price for a gallon of gas because they do not know the temperature of the fuel. Some stakeholders who thought the cost would outweigh the benefit said that the increased accuracy in measurement would not benefit consumers because fuel costs would increase as retailers recouped their investment in the compensation devices.

Stakeholders also held different opinions on whether automatic temperature compensation would ensure consistent energy content in each gallon of fuel. While temperature compensation adjusts for the impact of fuel temperature on the energy content of each gallon, it would not affect other factors that impact energy content, such as the use of fuel blends and additives. That is, multiple stakeholders said that the use of ethanol and other additives, as well as seasonal fuel blends, results in fuels that may vary in energy content by season or by retail outlet. More specifically, they noted other factors may affect the energy content of fuel, including the refining process itself and the crude oil used as the source for the gasoline. Others said automatic temperature compensation will ensure greater consistency in energy content and mileage per gallon. One stakeholder said that, as fuel prices increase, the issue of energy loss from the lack of temperature compensation will become more important, while another said that the use of blends could increase the significance of the effect of temperature on fuel in the future.

Stakeholders' views that various factors may affect fuel prices are consistent with our prior work on gasoline pricing.<sup>7</sup> Specifically, in a series of reports issued from 2000 through 2007, we concluded that higher gasoline prices resulted from a range of local and global factors, including higher crude oil prices, recent mergers and increased market concentration in the petroleum industry, the increased use of blended

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<sup>7</sup>GAO, *Energy Markets: Increasing Globalization of Petroleum Products Markets, Tightening Refining Demand and Supply Balance, and Other Trends Have Implications for U.S. Energy Supply, Prices, and Price Volatility*, [GAO-08-14](#) (Washington, D.C.: Dec. 20, 2007); GAO, *Gasoline Markets: Special Gasoline Blends Reduce Emissions and Improve Air Quality, but Complicate Supply and Contribute to Higher Prices*, [GAO-05-421](#) (Washington, D.C.: June 17, 2005); GAO, *Energy Markets: Mergers and Many Other Factors Affect U.S. Gasoline Markets*, [GAO-04-951T](#) (Washington, D.C.: July 7, 2004); GAO, *Motor Fuels: Gasoline Prices in Oregon*, [GAO-01-433R](#) (Washington, D.C.: Feb. 23, 2001); and GAO, *Motor Fuels: California Gasoline Price Behavior*, [GAO/RCED-00-121](#) (Washington, D.C.: Apr. 28, 2000).

fuels, the level of state gasoline taxes, and costs to transport gasoline from refineries to retailers. We also found in our work on the use of special gasoline blends that it can be difficult to establish a definitive causal link between factors and prices because only some of the many factors that may affect gasoline prices at various times are readily and consistently observable.

Regardless of their views, stakeholders based their opinions largely on professional judgment and general economic theory or assumptions about how the fuel market operates rather than on studies or other data. For example, one stakeholder commented that it was unreasonable to assume that retailers would absorb the costs to upgrade 14 or 16 pumps without trying to recoup those costs through the prices of retail goods they sell. However, none of the stakeholders based their views on studies of the impact of the costs on fuel or retail goods. Some stakeholders said that because the petroleum market is fiercely competitive, particularly in areas that sell high volumes of fuel, consumers already receive the lowest fuel price that retailers can offer, and one said that temperature is not likely to be a relevant factor in their pricing decisions. Because the fuel market is so competitive, one stakeholder said, retailers do not generate enough profit to cover the costs of temperature compensation equipment and so would pass the costs on to consumers. In contrast, other stakeholders said that retailers may already adjust their prices to account for the expansion and contraction of fuel, while still others questioned the benefit to consumers from investing in temperature-compensating devices in areas where the average ambient temperature is close to 60 degrees F.

The majority of stakeholders—including state officials, consumer and industry representatives, and fleet owners—said that a cost-benefit study such as the one under way in California would provide policymakers with important information. The California study will examine the costs for retailers to purchase and install appropriate equipment and calibrate it. In addition, the study will develop data on the costs to agencies to develop appropriate test procedures, acquire calibration equipment, and inspect the pumps at retail stations. Information on the costs and benefits was needed to make an informed decision on automatic temperature compensation, according to many stakeholders. A small number said they would wait to see the results of California's study before deciding whether to support or oppose the implementation of automatic temperature compensation. Moreover, some who oppose automatic temperature compensation said they would support it if a cost-benefit analysis showed a benefit for the consumer.

**Governments That Have Adopted Automatic Temperature Compensation Did So Largely to Improve Purchasing Equity, and Those That Have Not Cited Concerns That the Costs Would Outweigh the Benefits**

Governments that have adopted or permitted automatic temperature compensation, or are considering doing so, cited improved measurement accuracy and greater equity between retailers and consumers as reasons for making the change, whereas those governments that do not allow temperature compensation cited concerns that the costs would outweigh the benefits. Hawaii, Belgium, Canada, and the European Union (EU) have each adopted a policy on temperature compensation—mandatory in Hawaii and Belgium and permissive in the remaining jurisdictions. In addition, the United Kingdom is considering a national approach to temperature compensation, and Australia may do so again. Both countries debated the issue in the 1990s but did not adopt nationwide policies for retail fuel sales at that time.

Because retail motor fuel dispensers equipped with automatic temperature compensation devices were not readily available 26 years ago, Hawaii developed its own method to achieve temperature compensation for retail sales of fuel to provide purchasing equity for both the industry and the consumer, according to a state official. The method is based on test procedures that rely on both the temperature and density of the fuel. A 5-year study of the average temperature of fuel delivered to consumers in Hawaii found that the fuel temperature was approximately 80 degrees F. More specifically, Hawaiian weights and measures officials test retail pumps to ensure that they meet the state standard—to deliver the amount of fuel a 231 cubic inch gallon would occupy at 60 degrees F, or its expanded or contracted equivalent at any other temperature. In Hawaii, the expanded equivalent is about 234 cubic inches per gallon—to reflect the increased volume at the higher fuel temperature. Implementation was phased in over 1 year. A state official said retailers may apply for a variance from the state standard provided they can demonstrate that the temperature of the fuel they deliver to consumers in their location differs from 80 degrees F. According to a state official, temperature compensation is a matter of fairness and equity.

Belgium mandated temperature compensation for retail sales of fuel beginning in January 2008. Belgium adopted temperature compensation for retail sales, in part, because some retailers were artificially heating fuel, and the government sought greater consistency in the energy content of the fuel sold to consumers, according to a weights and measures official. After January 2008, any newly installed pumps must be equipped for temperature compensation and, by January 2015, all pumps must be equipped to dispense temperature-compensated fuel. A Belgian official told us that the 7-year transition period will allow retailers to make adjustments over time, in the normal course of their operations, thereby reducing the overall cost to implement temperature compensation. While

retailers will decide when to install temperature compensation equipment, they are prohibited from turning it off. That is, once the equipment is in place and dispensing temperature-compensated fuel, all hoses attached to the equipment must continue to dispense temperature-compensated fuel. To date, the Belgian government has not developed guidance for consumers or retailers, in part because the transition to temperature compensation has just begun, according to the official.

Canada has adopted a permissive policy on automatic temperature compensation for the retail sale of liquid petroleum products, such as gasoline, diesel, and home heating oil. Specifically, Canada established technical and other standards in the early 1990s that allowed retailers to sell temperature-compensated fuel, but it did not require them to do so. According to a Canadian official, Canada developed the standards largely for three reasons: advances in measurement technology had made temperature compensation equipment more readily available, automatic temperature compensation is thought to be a more equitable and accurate method of measuring fuel, and temperature compensation addresses retailers' concerns about inventory losses potentially due to temperature-related changes in volume. Today, over 90 percent of Canadian fuel retailers sell temperature-compensated fuel. Canada imposed policy controls on the use of temperature-compensated equipment to prevent practices that might harm consumers or businesses, and any change to pumps requires an inspection by government officials. For example, pumps with automatic temperature compensation devices must be operable and dispense temperature-compensated fuel at all times throughout the year. In addition, pumps equipped with the devices must have a sticker that says "Volume Corrected to 15 degrees C"<sup>8</sup> adjacent to the pump's visual and printed net quantity display. Retailers may elect to convert only selected pumps or product lines, provided that all pumps for the same grade or blend of fuel are converted and the compensation equipment is activated at the same time.<sup>9</sup> Because Canada's regulations are permissive rather than mandatory, retailers may choose to stop using compensation devices provided they obtain permission from Canadian weights and measures officials. Permission would not be granted if retailers wanted to only use automatic temperature compensation

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<sup>8</sup>The reference standard of 15 degrees Celsius (C) is roughly equivalent to 60 degrees F.

<sup>9</sup>Canada also allows partial conversion to automatic temperature compensation based on "trade levels" that use different types of pumps, such as those mounted on vehicles or those that dispense fuel at high speed. In such cases, all pumps for a given trade level must be converted and activated at the same time.

seasonally when it was to their benefit, according to a Canadian official, who also said no retailers have sought to stop using the devices.

In addition, the EU currently permits member states to adopt temperature compensation, although fewer than 2 percent of retailers have installed the necessary equipment, according to an official with a European weights and measurement organization. This official said that making adoption possible, but not required, allows the market to make the decision when business owners decide it is in their interests to do so. As a result, implementation will occur gradually, thereby avoiding a “shock wave” from immediate mandatory implementation, according to the official. A shock wave would occur if retailers were required to purchase the equipment without regard to whether they had the funds to do so. The EU does not have a harmonized policy on temperature compensation, but, according to the official we interviewed, information on fuel temperature received by the retailer and dispensed to consumers would be important to the debate. However, the official also noted that retailers may, at their discretion, adjust prices to compensate for temperature-related changes in volume.

Currently, in Australia the states and territories require retailers to sell fuel on a compensated basis. However, by July 2010, responsibility for weights and measures regulation will shift from the states and territories to the federal government. According to an Australian official, the new national trade measurement legislation will replicate the current state and territory requirements for the sale of fuel. As part of the consultation process for developing new trade measurement regulations, comments on any aspect of trade measurement controls, such as temperature compensation, will be invited from all stakeholders, and the matter of temperature conversion of fuel sales at the retail level may well be raised.

Officials in the United Kingdom said they anticipate issuing a statement in the fall of 2008 that temperature compensation for retail fuel sales will be permitted nationwide but not mandated.

In the United States, officials in eight states that have laws or regulations prohibiting automatic temperature compensation largely said the decision should be based on an analysis of the costs and benefits, with some expressing concern that the anticipated costs would outweigh any benefit to consumers and fuel retailers. In some cases, these decisions were made more than 20 years ago, and the officials we interviewed had limited information about the reasons. More recently, Missouri and Texas considered state legislation to implement temperature compensation. In Missouri, where the average temperature of stored fuel is 62 degrees F,

officials said that consumers would be negatively affected if temperature compensation were adopted by changing the reference temperature because they would have to buy more temperature-adjusted gallons than uncompensated gallons to obtain the same amount of fuel. In addition, the state would need to add six inspectors and one clerical person at a cost of about \$1 million in the first 3 years. Moreover, they said retailers would face significant expense to purchase the compensation equipment if temperature compensation were achieved by the use of compensation devices. Specifically, Missouri officials in 2006 estimated that 65 percent of the state's pumps could be retrofitted, and 35 percent would need to be replaced, at a cost of about \$341 million. In Texas, officials have postponed further consideration of temperature compensation until a comprehensive nationwide cost-benefit analysis has been completed. In addition, officials in some states said that evidence of benefits to consumers from automatic temperature compensation could lead states to reconsider their current position.

Finally, governments have not formally studied the impact of their decisions to implement or not to implement automatic temperature compensation. Specifically, neither Hawaii nor Canada has studied the impact of temperature compensation, although officials reported it was not controversial and was generally well accepted by both consumers and the industry. In Belgium, temperature compensation has been implemented too recently to study its effects.

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## Concluding Observations

The weights and measures community has debated the costs and benefits of automatic temperature compensation for more than three decades with no resolution. The issues have not changed substantially, and both sides continue to passionately put forth their views. In general, supporters say that extending temperature compensation to the retail level could provide more transparency in fuel prices, while those who are opposed argue that upgrading existing equipment would be costly and pose potential economic hardship on retailers.

It remains unclear, however, what it would actually cost to implement automatic temperature compensation and whether consumers or businesses would end up paying those costs. Moreover, the two governments with the longest experience in temperature compensation of retail fuel sales (Hawaii and Canada) have not studied the effect of their policies. As a result, a policy debate is being played out without good information about the potential costs and benefits, and with both proponents and opponents basing their views on their professional judgment and their general understanding of economic theory.

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Looking forward, there appears to be a real need for an objective analysis of the key issues stakeholders raise about costs and benefits, including the potential for higher costs to consumers and improved inventory management for retailers. Such a study would need to bring together petroleum-related scientific, engineering, and economic expertise. Absent such analyses, NCWM and state governments face potentially significant challenges to informing their decisions regarding automatic temperature compensation.

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As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to the Chief, Weights and Measures Division, National Institute of Standards and Technology; stakeholders we interviewed; appropriate congressional committees; and other interested parties. We will also make copies available to others upon request. In addition, the report will be available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-3841 or [maurerd@gao.gov](mailto:maurerd@gao.gov). Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made contributions to this report are listed in appendix II.

Sincerely yours,



David C. Maurer  
Acting Director  
Natural Resources and Environment

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## Appendix I: Scope and Methodology

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In conducting our work on each of our objectives, we reviewed National Conference on Weights and Measures (NCWM) documents and congressional testimony and performed a literature search to identify relevant documents and stakeholders likely to have a view on the implementation of automatic temperature compensation. We used the individuals identified through our document review and literature search as a starting point for the sampling technique that we used to identify additional stakeholders. That is, we used an iterative process (often referred to as the “snowball sampling” technique) to identify other stakeholders and selected for interviews those who would provide us with a broad and balanced range of perspectives on temperature compensation of gasoline and diesel. We used a standard set of questions to interview each of these individuals to ensure we consistently discussed each aspect of automatic temperature compensation. We also asked open-ended questions to allow people to share their views on this issue. To develop the questions, we reviewed NCWM and National Institute of Standards and Technology (NIST) documents, as well as congressional testimony. We used content analysis to identify the main themes among responses.

We continued interviewing and soliciting names until we determined we had appropriate coverage from all the relevant stakeholder groups. During the course of our review, we interviewed officials from the following 15 organizations, listed alphabetically: American Automobile Association; American Petroleum Institute; American Trucking Association; Consumer Watchdog; Defense Energy Support Center; National Association of Convenience Store Owners; NATSO, an organization representing travel plaza and truck stop owners; Owner Operator Independent Drivers Association; Petroleum Marketing Association of America; Society of Independent Gasoline Marketers of America; Schneider National, Incorporated; Swift Transportation Incorporated; United Parcel Service; United States Postal Service; and Weights and Measures Consulting. In addition, we interviewed federal officials at NIST, the Environmental Protection Agency, and the Federal Trade Commission because these agencies help oversee the marketplace generally or oversee aspects of the retail petroleum industry. We also obtained information from two of the three manufacturers who produce equipment that allow for automatic temperature compensation at retail pumps.

We also contacted officials in 17 states that the literature suggested may have taken or considered specific steps to adopt or prohibit automatic temperature compensation. Some of these states had proposed legislation, were identified in a survey conducted by NIST on state practices, or were recommended by other officials. One state—California—is conducting a state-mandated cost-benefit analysis of automatic temperature



Appendix I: Scope and Methodology

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compensation. These 17 states included a mix of states that could be considered hot (5), cold (4), or neutral (7) based on NIST's analysis of temperature data for stored fuel. The 17th state was not included in NIST's analysis because of a lack of data. We interviewed officials in the following 17 states, listed alphabetically: Arizona, California, Florida, Hawaii, Iowa, Maine, Massachusetts, Minnesota, Missouri, Montana, Nebraska, New York, Oregon, Pennsylvania, South Dakota, Texas, and Wyoming.

Finally, we interviewed officials in Australia, Belgium, Canada, the Netherlands, and the United Kingdom because literature indicated they either had adopted or had considered implementing automatic temperature compensation, as well as officials at a European weights and measures organization.

We conducted our work from March 2008 to September 2008 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for the information we present for each of our audit objectives.

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## Appendix II: GAO Contact and Staff Acknowledgments

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### GAO Contact

David C. Maurer, (202) 512-3841 or [maurerd@gao.gov](mailto:maurerd@gao.gov)

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### Staff Acknowledgments

In addition to the individual named above, Cheryl Williams (Assistant Director), Cynthia Norris, and Henry Clay made key contributions to this report. Also contributing to this report were Pedro Almoguera, Nancy Crothers, and Cindy Gilbert.

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## **APPENDIX B**

### *Federal Register*

### **Notice from the Department of Agriculture**

### **Food and Safety Inspection Service**

**9 CFR Parts 317, 381, and 442**

### **Determining Net Weight Compliance for Meat and Poultry Products**

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**§93.916 Special provisions.**

(a) *Slaughter.* Live VHS-regulated fish from VHS-regulated regions may be imported directly for slaughter under the following conditions:

(1) An import permit has been obtained under § 93.912 and all conditions of the permit are observed.

(2) An APHIS representative at the port seals the means of conveyance with official seals.

(3) The shipment is moved directly from the port of entry to a slaughtering establishment that meets the following conditions:

(i) The slaughtering establishment discharges its waste water to a municipal sewage system that includes waste water disinfection sufficient to neutralize any VHS virus or to either a non-discharging settling pond or a settling pond that disinfects, according to all applicable local, State, and Federal regulations, sufficiently to neutralize any VHS virus.

(ii) Offal, including carcasses, from the slaughtering establishment is either rendered or composted.

(4) An APHIS representative will unseal the vehicle upon arrival at the slaughtering establishment.

(5) Any water used to transport the fish is disposed to a municipal sewage system that includes waste water disinfection sufficient to neutralize any VHS virus or to either a non-discharging settling pond or a settling pond that disinfects, according to all applicable local, State, and Federal regulations, sufficiently to neutralize any VHS virus.

(b) *Research or laboratory use.* Live VHS-regulated fish may be imported from a VHS-regulated region for research or laboratory use under the following conditions:

(1) An import permit has been obtained under § 93.912 and all conditions of the permit are observed.

(2) The laboratory or research facility disposes of effluent to a municipal sewage system that includes waste water disinfection sufficient to neutralize any VHS virus or to either a non-discharging settling pond or a settling pond that disinfects, according to all applicable local, State, and Federal regulations, sufficiently to neutralize any VHS virus.

(3) Carcasses must be rendered or composted.

(4) Any water used to transport the fish is disposed to a municipal sewage system that includes waste water disinfection sufficient to neutralize any VHS virus or to either a non-discharging settling pond or a settling pond that disinfects, according to all applicable local, State, and Federal regulations, sufficiently to neutralize any VHS virus.

Done in Washington, DC, this 4th day of September 2008.

Kevin Shea,

*Acting Administrator, Animal and Plant Health Inspection Service.*

[FR Doc. E8–20852 Filed 9–8–08; 8:45 am]

BILLING CODE 3410–34–P

**DEPARTMENT OF AGRICULTURE****Food Safety and Inspection Service****9 CFR Parts 317, 381, and 442**

[Docket No. FSIS–2008–0015]

RIN # 0583–AD17

**Determining Net Weight Compliance for Meat and Poultry Products**

AGENCY: Food Safety and Inspection Service, USDA.

ACTION: Final rule.

**SUMMARY:** The Food Safety and Inspection Service (FSIS) is amending its regulations to reference the most recent version of the National Institute of Standards and Technology (NIST) Handbook 133 that contains standards for determining the reasonable variations allowed for the declared net weight on labels of immediate containers of meat and poultry products; the procedures to be used to determine the net weight and net weight compliance of meat and poultry products; and related definitions. The Agency is also consolidating the separate net weight regulations for meat and poultry products in a new CFR part, applicable to both meat and poultry products.

This final rule does not incorporate by reference sections in Handbook 133 that concern the “wet tare” method for determining net weight. The “wet tare” method does not include free-flowing liquid as part of the product but as part of the tare weight. The Agency regards any solutions that are added to meat or poultry to be part of the product and considers free-flowing liquids to be an integral component of these products, and therefore uses the “dry tare”, not the “wet tare” method.

**DATES:** *Effective Date:* This regulation is effective October 9, 2008. The incorporation by reference of the NIST Handbook 133, Fourth Edition, is approved by the Director of the Federal Register as of October 9, 2008.

**FOR FURTHER INFORMATION CONTACT:** Charles Gioglio, Director, Labeling and Program Delivery Division, Food Safety and Inspection Service, U.S. Department of Agriculture, Washington, DC 20250–3700; (202) 205–0010.

**SUPPLEMENTARY INFORMATION:****Background**

FSIS administers the Federal Meat Inspection Act (FMIA) (21 U.S.C. 601–695), the Poultry Products Inspection Act (PPIA) (21 U.S.C. 451–470), and the regulations that implement these Acts. The FMIA and the PPIA require that packages of meat and poultry products bear an accurate statement of the quantity of their contents in terms of weight, measure, or numerical count (21 U.S.C. 601(n)(5) and 453(b)(5)). The FMIA and PPIA also provide the Secretary of Agriculture with the authority to prescribe standards of fill of containers for such articles (21 U.S.C. 607(c)(2), 457(b)(2)) that are not inconsistent with any such standards established under the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 301–392). In implementing regulations, FSIS has elected to adopt the relevant NIST standards established for determining compliance with the net weight contents statement of packaged goods that are enumerated in NIST Handbook 133. Consequently, FSIS has incorporated by reference certain NIST standards in the Federal meat and poultry inspection regulations.

NIST was established by Congress in 1988 to assist industry in the development of technology to improve product quality, to modernize manufacturing processes, to ensure product reliability, and to facilitate rapid commercialization of products based on new scientific discoveries. NIST’s basic functions include developing, maintaining, and retaining custody of the national standards of measurement and providing the means and methods for comparing standards used in science, engineering, manufacturing, commerce, industry, and education with the standards adopted or recognized by the Federal Government.

NIST Handbook 133 is a procedural guide for compliance testing of net content statements on packaged goods. FSIS has elected to make mandatory the NIST standards in Handbook 133 regarding the determination of the reasonable variations allowed from the declared net weight on labels of immediate containers of meat and poultry products, the procedures to be used to determine net weight and net weight compliance for meat and poultry products, and related definitions.

Consequently, FSIS currently incorporates by reference the NIST standards from Handbook 133 in its meat and poultry regulations. The Agency first incorporated NIST Handbook 133 by reference in

November 1990 (FR 55 49826) as instructions to inspection personnel for determining net weight compliance. In January 2005, NIST published a revised edition of Handbook 133.

On March 28, 2006, FSIS published a proposed rule in the *Federal Register* to amend the Federal meat and poultry products inspection regulations to reference the most recent version of NIST Handbook 133, which contains standards for determining reasonable variations allowed for the declared net weight on labels of immediate containers of meat and poultry products; the procedures used to determine the net weight and the net weight compliance of meat and poultry products; and related definitions (71 FR 15340). The Agency also proposed to consolidate the separate net weight regulations for meat and poultry products in a new CFR part applicable to both meat and poultry products. On April 19, 2006, FSIS published a technical correction to the proposed rule to reference the NIST Handbook 133 dated January 2005 (71 FR 20041). The proposed rule incorrectly referenced the NIST Handbook 133 dated January 2002.

This final rule is consistent with the proposed rule. However, the rule proposed to incorporate by reference tare procedures and definitions in NIST Handbook 133 that concern the “wet tare” method. After considering the comments on the proposed rule, FSIS has decided not to incorporate by reference sections in Handbook 133 that concern the “wet tare” method for determining net weight. As explained below, these sections are not relevant to how FSIS enforces the FMIA and the PPIA, and therefore there is no reason to incorporate them. Also in response to comments, 9 CFR 442.3 has been modified to refer to scales used to determine the net weight of meat and poultry products. FSIS made this change to clarify the regulations.

#### Comments and Responses

FSIS received 5 comments in response to the March 28, 2006, proposed rule. Four comments were from meat and poultry trade associations. One of those comments was jointly submitted by six trade associations. One comment was from an individual. The trade associations, in general, supported the incorporation of the NIST Handbook 133 by reference and combining and consolidating the meat and poultry net weight provisions into one part. The comment from the individual opposed using any standards referenced in another document.

*Comment:* One comment stated that while the proposed rule was intended to simply update the regulations to incorporate the current edition of the NIST Handbook 133, FSIS should take the opportunity to underscore the guidance that the Agency has communicated concerning how to account for free-flowing liquid that is contained within the packaging of meat and poultry products.

Three comments, including two petitions that the Agency is treating as comments, stated that by referencing the NIST Handbook 133 “wet tare” procedures, the Agency is continuing to incorporate inconsistencies and should remove the conflicting reference.

*Response:* FSIS agrees that the regulations should be modified to remove references to the “wet tare” method for determining net weight compliance.

The “tare weight” is “the weight of a container, wrapper, or other material that is deducted from the gross weight to obtain the net weight.” FSIS regards any solutions that are added to meat or poultry, or into which the meat or poultry is placed for flavoring, seasoning, or tenderizing, to be part of the product. Similarly, FSIS considers free-flowing liquids in packages of meat and poultry products to be integral components of these products. Therefore, when FSIS inspectors determine net weight compliance in official establishments, inspectors include any free flowing liquid contained in the packaging. This method of determining net weight is called a “dry tare” method. When net weight is determined based on a dry tare method, the gross weight of the product includes free-flowing liquid and excludes the dry or dried packaging material.

The NIST Handbook 133 describes “Tare Procedures,” in Chapter 2, Section 2.3 “Basic Test Procedure.” In this section there are two methods for determining the dry tare of products, the “used” and “unused” methods. The “used dry tare” method considers the actual packaging material the product was removed from to be tare. The “unused dry tare” method is used for testing packages in retail store locations where they are packaged and allows samples of the packaging material available in the store to be considered tare. FSIS inspectors use the used dry tare method, but both dry tare methods are consistent with FSIS’ position concerning product net weight. In determining net weight of meat or poultry products, both dry tare methods include the free flowing liquids in product packages.

The Tare Procedures section of Handbook 133 also describes the “wet tare” method for determining net weight compliance. The “wet tare” method does not include free-flowing liquids as part of the product but as part of the tare weight. As stated previously, FSIS considers free-flowing liquid part of the product and does not use the “wet tare” for determining net weight compliance.

After considering the comments received, FSIS agrees that it makes little sense to incorporate a method that it does not use. Doing so only creates confusion and ambiguity about what method is used by FSIS. Consequently, FSIS is modifying the regulations so that the references to the “wet tare” method for determining net weight compliance in NIST Handbook 133 are *not* incorporated by reference. As previously stated, the Agency considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products.

Although State and county government officials have concurrent authority to enforce net weight requirements for meat and poultry products at the local level, they must do so in a manner that does not conflict with Federal requirements. Under 21 U.S.C. 678 and 476e, marking, labeling, packaging, or ingredient requirements in addition to, or different than, those made under the FMIA or PPIA may not be imposed by any State or Territory or the District of Columbia with respect to articles prepared at any establishment under inspection. To be consistent with this final rule, State and local officials must determine net weight compliance for meat and poultry products, including single-ingredient, raw poultry, in a manner that includes the free flowing liquids as part of the product and not part of the tare weight.

*Comment:* One comment requested that the regulation pertaining to scale requirements, 9 CFR 442.3(a), be amended to clarify the definition and intent of “all scales” to say “scales used to weigh meat and poultry products in compliance with NIST Handbook 133.” The comment also requested that the scale testing regulation be amended to clarify that “any repairs, adjustments, or replacements” that require reinspection and retesting are those “repairs, adjustments, or replacements” affecting the accuracy of the scale. In addition, the comment requested clarification as to the identity of the “USDA official” who would be authorized to reinspect and retest a repaired scale.

*Response:* FSIS agrees that 9 CFR 442.3 should be clarified to refer to the

scales that are used to weigh meat and poultry products for net weight compliance. Therefore, FSIS has amended the regulation (9 CFR 442.3(a), (b), and (c)) to refer to “scales used to determine the net weight of meat and poultry products.”

Regarding the comment to clarify that only repairs, adjustments, or replacements that affect accuracy need to be reinspected and retested before the scale can be used, FSIS cannot adequately specify in the regulations that repairs, adjustments, or replacements will or will not affect accuracy. If a scale needs a battery replacement, computer program upgrade, or new cord installation, there is no way to determine whether the repairs, adjustments, or replacements affect the accuracy of the scale without retesting or reinspecting the scale. Therefore, FSIS is not amending 9 CFR 442.3(a) in response to the comment.

FSIS also is not amending the regulations to specify which USDA officials are authorized to reinspect and retest a scale that has been found inaccurate, repaired, adjusted, or replaced. The Agency requires flexibility in determining who is available and qualified to reinspect and retest scales used to weigh meat or poultry products at federally inspected establishments.

*Comment:* Two comments agreed with the proposed changes and requested that FSIS use this opportunity to provide a more complete explanation as to the procedural nature of NIST Handbook 133, and that it cannot serve as a compliance document.

*Response:* FSIS’ net weight regulations (9 CFR 317.18–317.22 and 381.121a–381.121e) state that the procedures set forth are for determining “net weight compliance.” This final rule incorporates the relevant parts of the latest edition of the NIST Handbook 133 into FSIS regulations. Therefore, the incorporated provisions of NIST Handbook 133 do not serve merely as compliance guidance but are in fact made part of the meat and poultry products inspection regulations.

*Comment:* One comment objected to the use of standards that are not specifically listed in the regulation but are in a referenced publication that is not publicly available.

*Response:* FSIS does not agree with this comment. The NIST Handbook 133 is available to the public via the National Institute of Standards and Technology Web site <http://ts.nist.gov/WeightsAndMeasures/h1334-05.cfm>.

In addition, the regulations provide that a notice of any change in the

Handbook cited therein will be published in the Federal Register.

#### Executive Order 12988

This final rule has been reviewed under the Executive Order 12988, Civil Justice Reform. Under this final rule: (1) All State and local laws and regulations that are inconsistent with this rule will be preempted; (2) no retroactive effect will be given to this rule; and (3) no retroactive proceedings will be required before parties may file suit in court challenging this rule.

#### Executive Order 12866 and the Regulatory Flexibility Act

This final rule has been reviewed under Executive Order 12866. The rule has been determined to be not significant for the purposes of Executive Order 12866 and, therefore, has not been reviewed by the Office of Management and Budget (OMB).

There are no costs associated with this final rule. The intent of this final rule is to amend the meat and poultry inspection regulations to incorporate by reference the relevant standards in revised Handbook 133, which are not substantively changed from those in the version of Handbook 133 that is currently reflected in FSIS’ meat and poultry inspection regulations regarding the procedures to be used to determine the net weight of, and net weight compliance for, meat and poultry products. In addition, this final rule consolidates the meat and poultry net weight regulations into a new 9 CFR part 442 which will be applicable to both meat and poultry products.

#### Effect on Small Entities

FSIS has determined that this final rule would not have a significant economic impact on a substantial number of small entities, as defined by the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*). The final rule reflects an updated version of the NIST Handbook 133 standards for determining net weight compliance for meat and poultry products.

#### Paperwork Reduction Act

This final rule has been reviewed under the Paperwork Reduction Act and imposes no new paperwork or recordkeeping requirements. The information collection was approved under OMB number 0583–0094. This proposed rule contains no other paperwork requirements.

#### Government Paperwork Elimination Act (GPEA)

FSIS is committed to compliance with the GPEA, which requires Government

agencies, in general, to provide the public the option of communicating electronically with the government to the maximum extent possible. The Agency will ensure that all forms used by the establishments are made available electronically.

#### Additional Public Notification

Public awareness of all segments of rulemaking and policy development is important. Consequently, in an effort to ensure that minorities, women, and persons with disabilities are aware of this final rule, FSIS will announce it online through the FSIS Web page located at [http://www.fsis.usda.gov/regulations\\_&\\_policies/2008\\_interim\\_&\\_final\\_rules\\_index/index.asp](http://www.fsis.usda.gov/regulations_&_policies/2008_interim_&_final_rules_index/index.asp). FSIS will also make copies of this Federal Register publication available through the FSIS Constituent Update, which is used to provide information regarding FSIS policies, procedures, regulations, Federal Register notices, FSIS public meetings, and other types of information that could affect or would be of interest to constituents and stakeholders. The Update is communicated via Listserv, a free electronic mail subscription service for industry, trade groups, consumer interest groups, health professionals, and other individuals who have asked to be included. The Update is also available on the FSIS Web page. Through the Listserv and Web page, FSIS is able to provide information to a much broader and more diverse audience. In addition, FSIS offers an e-mail subscription service which provides automatic and customized access to selected food safety news and information. This service is available at [http://www.fsis.usda.gov/news\\_and\\_events/email\\_subscription/](http://www.fsis.usda.gov/news_and_events/email_subscription/). Options range from recalls to export information to regulations, directives and notices. Customers can add or delete subscriptions themselves, and have the option to password protect their accounts.

#### List of Subjects

##### 9 CFR Part 317

Food labeling, Meat inspection.

##### 9 CFR Part 381

Food labeling, Poultry and poultry products.

##### 9 CFR Part 442

Food labeling, Incorporation by reference, Meat inspection, Poultry and poultry products.

■ For the reasons discussed in the preamble, FSIS is amending 9 CFR Chapter III as follows:



**PART 317—LABELING, MARKING DEVICES, AND CONTAINERS**

■ 1. The authority citation for part 317 continues to read as follows:

Authority: 21 U.S.C. 601–695; 7 CFR 2.18, 2.53.

**§§ 317.18 through 317.22 [Removed and Reserved]**

■ 2. Remove and reserve §§ 317.18 through 317.22.

**PART 381—POULTRY PRODUCTS INSPECTION REGULATIONS**

■ 3. The authority citation for part 381 continues to read as follows:

Authority: 7 U.S.C. 138f, 450; 21 U.S.C. 451–470; 7 CFR 2.18, 2.53.

**§§ 381.121a through 381.121e [Removed and Reserved]**

■ 4. Remove and reserve §§ 381.121a through 381.121e.

**Subchapter E—Regulatory Requirements Under the Federal Meat Inspection Act and the Poultry Products Inspection Act**

■ 5. Subchapter E is amended by adding a new part 442 to read as follows:

**PART 442—QUANTITY OF CONTENTS LABELING AND PROCEDURES AND REQUIREMENTS FOR ACCURATE WEIGHTS**

Sec.

- 442.1 Quantity of contents labeling
- 442.2 Definitions and procedures for determining net weight compliance
- 442.3 Scale requirements for accurate weights, repairs, adjustments, and replacement after inspection
- 442.4 Testing of scales
- 442.5 Handling of failed product

Authority: 21 U.S.C. 451–470, 601–695; 7 CFR 2.18, 2.53.

**§442.1 Quantity of contents labeling.**

This part prescribes the procedures to be followed for determining net weight compliance and prescribes the reasonable variations allowed from the declared net weight on the labels of immediate containers of products in accordance with 9 CFR 317.2(c)(4), 317.2(h), and 381.121.

**§442.2 Definitions and procedures for determining net weight compliance.**

(a) For the purpose of § 442.1 of this part, the reasonable variations allowed, and the definitions and the procedures to be used, in determining net weight and net weight compliance are presented in the National Institute of Standards and Technology (NIST) Handbook 133, “Checking the Net Contents of Packaged Goods,” Fourth Edition, January 2005, which is

incorporated by reference. The Director of the Federal Register approves this incorporation by reference in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of NIST Handbook 133 may be purchased from the Superintendent of Documents, U.S. Government Printing Office, 732 N. Capitol Street, NW., Washington, DC, 20401. You may contact the Government Printing Office Toll-Free at 1–866–512–1800 or go to: <http://bookstore.gpo.gov>. You may inspect a copy of NIST Handbook 133 at the FSIS Docket Room, U.S. Department of Agriculture, Food Safety and Inspection Service, 1400 Independence Avenue, SW., Room 2534, Washington, DC 20250. You can contact the FSIS Docket room by calling 202–720–0344 or 202–720–3813. The NIST Handbook 133 is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202–741–6030, or go to: [http://www.archives.gov/federal\\_register/code\\_of\\_federal\\_regulations/ibr\\_locations.html](http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html).

(b) The following NIST Handbook 133 requirements are not incorporated by reference.

**Chapter 2—Basic Test Procedure—Gravimetric Testing**

- 2.3 Basic Test Procedure—Tare Procedures—*Wet Tare*
- 2.3 Basic Test Procedure—Moisture Allowances—*What moisture allowance is used with wet tare when testing packages bearing a USDA seal of inspection?*
- 2.4 Borax

**Chapter 3—Test Procedures—For Packages Labeled by Volume**

- 3.5 Mayonnaise and Salad Dressing
- 3.7 Pressed and Blown Glass Tumblers and Stemware
- 3.8 Volumetric Test Procedures for Paint, Varnish, and Lacquers—Non Aerosol
- 3.9 Testing Viscous Materials—Such as Caulking Compounds and Pastes
- 3.10 Peat Moss
- 3.11 Mulch and Soils Labeled by Volume
- 3.12 Ice Cream Novelties
- 3.13 Fresh Oysters Labeled by Volume
- 3.14 Determining the Net Contents of Compressed Gas Cylinders
- 3.15 Volumetric Test Procedures for Packaged Firewood with a Labeled Volume of 133 L (4 Cu Ft) or Less
- 3.16 Boxed Firewood
- 3.17 Crosshatched Firewood
- 3.18 Bundles and Bags of Firewood

**Chapter 4—Test Procedures—Packages Labeled by Count, Linear Measure, Area, Thickness, and Combinations of Quantities**

- 4.5 Paper Plates and Sanitary Paper Products

- 4.6 Special Test Requirements for Packages Labeled by Linear or Square Measure (Area)
- 4.7 Polyethylene sheeting
- 4.8 Packages Labeled by Linear or Square (Area) Measure
- 4.9 Bailer Twine—Test Procedure for Length
- 4.10 Procedure for Checking the Area Measurement of Chamois Appendix C Glossary—wet tare

**§ 442.3 Scale requirements for accurate weights, repairs, adjustments, and replacements after inspection.**

(a) All scales used to determine the net weight of meat and poultry products sold or otherwise distributed in commerce in federally inspected meat and poultry establishments will be installed, maintained, and operated in a manner that ensures accurate weights. Such scales shall meet the applicable requirements contained in National Institute of Standards and Technology (NIST) Handbook 44, “Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices,” 1999 Edition, November 1988, which is incorporated by reference. This incorporation was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. (These materials are incorporated as they exist on the date of approval.) A notice of any change in the Handbook cited here will be published in the **Federal Register**. Copies may be purchased from the Superintendent of Documents, Government Printing Office, Washington, DC 20402. The incorporation information also is available for inspection at the Office of the Federal Register Information Center, 800 North Capitol Street, NW., suite 700, Washington, DC 20408.

(b) All scales used to determine the net weight of meat or poultry products sold or otherwise distributed in commerce or in States designated under section 301(c) of the Federal Meat Inspection Act and section 5(c) of the Poultry Products Inspection Act shall be of sufficient capacity to weigh the entire unit or package.

(c) No scale will be used at a federally inspected establishment to determine the net weight of meat or poultry products unless it has been found upon test and inspection, as specified in NIST Handbook 44 to provide accurate weight. If a scale is inspected or tested and found to be inaccurate, or if any repairs, adjustments, or replacements are made to a scale, it shall not be used until it has been reinspected and retested by a USDA official, or a State or local government weights and measures official, or a State registered or

licensed scale repair firm or person, and it must meet all accuracy requirements as specified in NIST Handbook 44. If a USDA inspector has put a "Retain" tag on a scale, the tag can only be removed by a USDA inspector. As long as the tag is on the scale, it shall not be used.

#### §442.4 Testing of scales.

(a) The operator of each official establishment that weighs meat or poultry food products will cause such scales to be tested for accuracy in accordance with the technical requirements of NIST Handbook 44, at least once during the calendar year. In cases where the scales are found not to maintain accuracy between tests, more frequent tests may be required and verified by an authorized USDA program official.

(b) The operator of each official establishment shall display on or near each scale a valid certification of the scale's accuracy from a State or local government's weights and measures authority or from a State registered or licensed scale repair firm or person, or shall have alternative documented procedures showing that the scale has been tested for accuracy in accordance with the requirements of NIST Handbook 44.

#### §442.5 Handling of failed product.

Any lot of product that is found to be out of compliance with net weight requirements upon testing in accordance with the methods prescribed in § 442.2 of this subchapter shall be handled as follows:

(a) A lot tested in an official establishment and found not to comply with net weight requirements may be reprocessed and must be reweighed and remarked to satisfy the net weight requirements of this section in accordance with the requirements of this part.

(b) A lot tested outside an official establishment and found not to comply with net weight requirements must be reweighed and remarked with a proper net weight statement, provided that such reweighing and remarking will not deface, cover, or destroy any other marking or labeling required under this subchapter, and the net quantity of contents is shown with the same prominence as the most conspicuous feature of a label.

Done in Washington, DC, on August 13, 2008.

Alfred V. Almanza,  
Administrator.

[FR Doc. E8-20559 Filed 9-8-08; 8:45 am]

BILLING CODE 3410-DM-P

## DEPARTMENT OF AGRICULTURE

### Food Safety and Inspection Service

#### 9 CFR Parts 318, 381, and 439

[FSIS Docket No. 03-020F; FDMS Docket No. 2005-0023]

RIN # 0583-AD09

#### Accredited Laboratory Program

AGENCY: Food Safety and Inspection Service, USDA.

ACTION: Final rule.

**SUMMARY:** The Food Safety and Inspection Service (FSIS) is revising, editing, and consolidating provisions of the standards and procedures for the accreditation of non-Federal analytical chemistry laboratories. Laboratories in the Accredited Laboratory Program (ALP) are accredited to analyze official meat and poultry samples for (1) specific chemical residues or classes of chemical residues, and (2) moisture, protein, fat, and salt. In particular, FSIS is amending its current regulations regarding the accreditation of non-Federal analytical chemistry laboratories to accommodate the adoption of newer methods for analyzing chemical residues and to correct some data. In addition, FSIS is making editorial changes to its accredited laboratory regulations to reflect Agency reorganizations and program changes and to improve the clarity and consistency of application for all laboratories participating in the ALP. Finally, FSIS is consolidating the accredited laboratory regulations from 9 CFR 318.21 of the meat inspection regulations and 9 CFR 381.153 of the poultry products inspection regulations into a single new part, 9 CFR part 439.

**DATES:** This rule will be effective October 9, 2008.

**FOR FURTHER INFORMATION CONTACT:** Eugene Vickers, Chief of the ALP, Office of Public Health Science, FSIS, at (202) 690-6407 or fax (202) 690-6632, or by writing to the ALP, Box 17 Aerospace Center, Room 377, 901 D Street, SW., Washington, DC 20024.

#### SUPPLEMENTARY INFORMATION:

##### Background

On January 17, 2006, FSIS proposed to amend the Federal meat and poultry products inspection regulations by revising, editing, and consolidating provisions of the standards and procedures for the accreditation of non-Federal analytical chemistry laboratories (71 FR 2483).<sup>1</sup> This final

rule is consistent with the proposed rule, except for the following technical revisions. First, FSIS had proposed to codify the Internet and mailing addresses for obtaining information on the ALP and minimum proficiency levels. In the final rule, FSIS is not codifying this address information because it is subject to change. However, Internet and mailing addresses for obtaining information are included in this preamble.

In addition, FSIS had also proposed to establish a new § 439.60 that would have consolidated all references to "violations of law" contained in §§ 318.21(d)(4), 318.21(f), 318.21(g)(4), 381.153(d)(4), 381.153(f), and 381.153(g)(4). These regulations prescribe the conditions under which a laboratory will have its accreditation denied, suspended, or revoked. FSIS had proposed to consolidate references to violations of law to eliminate duplicative provisions within the regulations. The Agency did not intend to propose substantive changes to these regulations.

However, when developing this final rule, FSIS determined that, as proposed, § 439.60 did not adequately delineate the circumstances in which the Agency would deny, suspend, or revoke a laboratory's accreditation for reasons associated with certain violations of law. Therefore, instead of consolidating all references to violations of law into new § 439.60 as proposed, this final rule describes the reasons that FSIS will deny, suspend, or revoke a laboratory's accreditation under separate sections that include specific paragraphs that contain provisions for violations of law.

Thus, under this final rule, instead of providing a cross-reference to § 439.60 as proposed, § 439.50(c) describes the conditions under which FSIS will refuse to provide an accreditation to a laboratory for reasons associated with violations of law. In addition, instead of providing a cross-reference to § 439.60 as proposed, § 439.52 of this final rule provides a complete description of the reasons that FSIS will suspend a laboratory's accreditation. Finally, instead of providing a cross-reference to § 439.60 as proposed, § 439.53(c) of this final rule describes the conditions under which FSIS will revoke a laboratory's accreditation for reasons associated with violations of law. This final rule also removes proposed § 439.60, which proposed to consolidate the provisions for violations of law, and re-designates proposed § 439.70, the provisions for notification and hearings, as § 439.60.

<sup>1</sup> FSIS laboratories are not part of the ALP. FSIS laboratories are ISO17025 accredited. The methods

that FSIS laboratories use are found on the FSIS Web site.

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## Appendix C

### L&R Committee Work Group on Moisture Loss

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**\*NOTE:** The following documents could not be included in this publication because they are only available in Adobe PDF format; NIST will provide copies on request. Please contact Lisa Warfield at (301) 975-3308 or at [lisa.warfield@nist.gov](mailto:lisa.warfield@nist.gov) or Ken Butcher at (301) 975-4859 or at [kbutcher@nist.gov](mailto:kbutcher@nist.gov).

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**Detail of all Items**  
**(In order by Reference Key Number)**

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**Moisture Loss and Other Issues for Consideration by the NCWM Laws and  
Regulations Committee and the Board of Directors**

## **INTRODUCTION**

The Weights and Measures Division (WMD) prepared this document in 2007 at the request of NCWM Chairman Mike Cleary to detail several moisture loss and other package inspection issues to be studied under this project with the goal of developing recommendations for amendments to NIST Handbook 133 (HB 133) in 2008. There are four items listed below and most of the resource material is included to enable this document to serve as an agenda and comprehensive resource. The WMD provided this outline for consideration by the NCWM L&R Committee, the Board of Directors, and other interested parties with the goal of developing a consensus on whether or not there was sufficient justification to study the issues described below.

### **Item 1. Gel Soaker Pads**

Several weights and measures officials are concerned that HB 133 does not provide adequate guidance on how to verify the net weight declaration on packages where “gel soaker pads” are used in the package to absorb moisture.

Based on information that the WMD has received, this discussion paper is provided as a technical examination of the use of “gel type” soaker pads when determining net weight. Gel soaker pads contain granules of a highly absorbent compound that soak up fluid and retain it so efficiently that the “usual” methods of drying (pressure, wiping, and air) do not allow the re-creation of “Used Dry Tare.” According to two manufacturers, “gel-based soaker pads” can absorb up to 50 times their original weights in fluid compared to “cellulose-based fluff pulp” which absorbs only two to four times its weight (see [www.thermasorb.com](http://www.thermasorb.com) and [www.stockhausen-inc.com](http://www.stockhausen-inc.com)). Gel-type soaker pads are used by industry to: (1) extend shelf life; thus, reducing repackaging costs, (2) reduce bacterial growth, and (3) improve the “presentation of packages” by absorbing blood and fluid; eliminating free flowing liquid in the package.

Inspection problems with this type of tare arise when officials attempt to verify net weight declarations on packages which have been wrapped and labeled at a location other than where the commodity is inspected/tested since officials have no access to “unused dry tare.” Some officials report that it is impossible to dry these types of soaker pads using traditional drying procedures and have even attempted to use microwave ovens to establish “used dry tare.” WMD discourages the use of microwave ovens or other extreme drying methods for drying tare materials because (1) unused “dry” tare materials have a natural moisture content which cannot be reestablished using most heating methods (e.g., for gel-pads this could be 5 % or more); (2) the intensity/power of microwave ovens varies substantially from device to device so, given the range of variability, it would be impossible to suggest a power setting or heating time that could be considered reasonable, repeatable, and safe; and (3) a more practical concern is that an official could overheat tare material and damage the microwave or cause even more serious problems such as the possibility of fire.

WMD solicits recommendations and comments from all concerned who have interest in this topic. Please consider possible solutions to allow accurate measurement practices that permit officials to safely recreate “used dry tare” for net weight verification on products using “gel-type” material.

WMD believes the requirements of HB 133 are written broadly enough to apply to all types of tare materials including those which are “gel based.” Under the definition of “Used Dry Tare” officials use air drying, washing, scraping, pressure, or other techniques which can involve more than normal household procedures but do not go so far as to include laboratory procedures such as oven drying. The field test procedures in HB 133 were developed to provide uniform procedures to enable officials to dry out “used” tare to recreate as close as possible the weight of “unused tare material” that the packager used. When a packager uses a tare material that does not permit the recreation of unused dry tare (and the official does not have access to “unused dry tare” material or to readily

accessible reliable information on tare), the official is limited to drying at least two samples of the tare material as best he can using the procedures described by the handbook; he then can use an average tare to determine a net weight. If the packages are then found to be underweight, the packer must be permitted to provide information on whether or not the average tare value used by the official was reasonable or provide other information to the official to defend the net weight claims on the label. Since this is really the same opportunity any packer of any type of tare material has available to him, WMD believes the current guidance in HB 133 is adequate.

A test procedure in HB 133 is necessary to ensure Weights and Measures can continue to maintain marketplace surveillance to ensure equity and fair competition while still recognizing reasonable moisture loss or gain as required under both federal and state laws and regulations. The relevant sections describing the tare definition and determination procedures from the fourth edition of HB 133 (2005) are shown below:

*Used Dry Tare*

*Used Dry Tare is defined as follows: Used tare material that has been air dried, or dried in some manner to simulate the unused tare weight. It includes all packaging materials that can be separated from the packaged product, either readily (e.g., by shaking) or by washing, scraping, ambient air drying, or other techniques involving more than “normal” household recovery procedures, but not including laboratory procedures like oven drying. Labels, wire closures, staples, prizes, decorations, and such are considered tare. Used Dry Tare is available regardless of where the packages are tested. The net content procedures described in this handbook reference Used Dry Tare.*

*How is a tare weight determined?*

*Except in the instance of applying unused dry tare, select the packages for the initial tare sample from the sample packages. Mark the first two (three or five) packages in the order the random numbers were selected; these packages provide the initial tare sample. Determine the gross weight of each package and record it in block a, “Gross Wt,” under the headings “Pkg. 1,” “Pkg. 2,” “Pkg. 3,” etc. on the report form. Except for aerosol or other pressurized packages, open the sample packages, empty, clean, and dry them as appropriate for the packaging material.*

NIST Handbook 133 is available online at <http://ts.nist.gov/WeightsAndMeasures/h1334-05.cfm>.

**Item 2. Moisture Loss Guidance in NIST Handbook 133 (HB 133)**

The three items shown below were taken from the L&R Report of the 2004 89<sup>th</sup> NCWM Annual Meeting proceedings and later agendas including an item from the Committee’s 2007 Interim Meeting agenda. The Committee withdrew two of these items in 2004 and asked NIST to review the moisture loss sections of HB 133, revise them to improve their readability, and, where appropriate, add additional information or clarifications.

NIST conducted the promised review but found there were several suggestions contained in these two items. A few of the suggestions raised substantive questions about what needs to be added to HB 133 and which questions would be the most useful or practical for field officials. NIST believes that responding to some of the suggestions or questions could lead to extensive revisions to the handbook. This level of discussion will take considerable time and effort for the Committee, and WMD would like to ensure everyone has a full understanding of the concerns and agrees to the necessity for change so time and resources will not be wasted. The Committee should review these sections and identify what information administrators need versus what information field officials need to perform their duties.

**270-7 Amend NIST Handbook 133 Section 2.3. Moisture Allowances to Provide Clearer Guidance**  
(This Item was added to the agenda of the WG on Moisture Loss following the 2007 Interim Meeting)

**Source:** Northeast Weights and Measures Association (NEWMA)

**Proposal:** Amend NIST Handbook 133 (HB 133) Section 2.3. Moisture Allowances (pages 17 through 19 of Handbook 133) to provide clearer guidance.

**Background:** The issue of moisture loss is complex. Handbook 133 currently provides specific guidance on the determination and application of moisture allowances for only a limited number of commodities. Concerns have been raised that this guidance is confusing and difficult to understand, particularly with regard to when moisture loss is applied (i.e., at the time of inspection or subsequent to the inspection). Requests have been received to reword this section to make it easier to understand and apply.

In addition, HB 133 provides little guidance on the determination and application of moisture allowances for commodities other than those specifically listed. Weights and measures jurisdictions across the country have been struggling with how to properly handle moisture loss during packaging inspections and need more definite guidance on this issue.

The Committee did not believe it had the time or expertise to address properly the issue of moisture loss within the structure of the NCWM. The Committee decided to request activation of a NIST Moisture Loss WG to establish more effective and extensive guidance to the NCWM regarding the proper determination and application of moisture loss.

**Discussion of this Item by the WWMA:** The WWMA L&R Committee heard that a meeting was tentatively planned for November 2006; the meeting was delayed to allow time for everyone to identify and agree on the issues to be addressed by the group to ensure that expectations for the meeting results were clear. The Weights and Measures Division (WMD) agreed to fund the travel and attendance of one NCWM representative. Leading issues included providing additional guidance in HB 133 regarding the determination and application of appropriate moisture loss allowances in package inspections, with noted examples including how to address gel soaker pads in poultry/meat packages, as well as how to determine moisture allowances for pasta, rice, and other commodities for which no established moisture loss allowances exist. Additionally, guidance regarding application of moisture loss allowances at the point-of-pack needed to be addressed.

An industry representative urged involvement in the meeting and ensuing work on HB 133 amendments from the Food and Drug Administration (FDA) and the U.S. Department of Agriculture (USDA) to ensure input and consensus from all relevant agencies. He further emphasized the need to review and consolidate all decisions and directives from any and all court rulings regarding moisture loss issues. Factors to be considered in determining and applying appropriate moisture loss allowances and influences upon such losses included commodity stability limits and varying environmental conditions at packing plants such as relative humidity and constant temperature rooms maintained at different temperature levels. The industry representative also urged that guidance be provided to industry members regarding the types of data needed to be tracked and provided by packers/manufacturers in addressing moisture allowance determinations.

**Discussion of this Item by the CWMA at its 2006 Interim Meeting:** A comment was heard from industry that this needs to be addressed in order for businesses to be competitive. The USDA and FDA need to be involved in the development of this item. A meeting was tentatively scheduled for November prior to the NCWM Interim Meeting. There was general agreement that in order for this meeting to be effective, the USDA and FDA must be present. Comments were heard in support of using the New York proposal to correct the error in HB 133.

### **Item 3. WMD Package Inspection and Moisture Loss Guidance Letter – Withdrawn**

WMD believed there was some useful information for weights and measures officials and industry contained in the 2005 Memorandum that WMD issued to state weights and measures officials and other interested parties, entitled “Verifying the Net Contents of Packaged Goods and Recommended Procedures for Moisture Allowances.” WMD withdrew the memorandum at the request of Kraft Foods which detailed a number of concerns about the guidance contained in the WMD communication. The Kraft Foods letter, dated January 31, 2006, was prepared by Steven Steinborn of Hogan and Hartson. WMD recommended the committee review both documents to resolve the corporation’s concerns where possible and determine if any information in the WMD letter can be revised and republished to assist weights and measures officials in dealing with net quantity of contents. The WMD memorandum and Kraft’s letter are presented in Reference Section II below.

#### **Item 4. WMD Suggestions**

##### **a. Seek Greater Recognition of NIST Handbook 133 by FDA and other Federal Agencies.**

WMD would like to avoid frequent amendments to HB 133 because, unlike NIST Handbook 44, it is not widely adopted automatically. Many jurisdictions adopt new versions of HB 133 using their Administrative Procedures Acts. Another consideration is that the USDA adopts versions of the handbook which then preempts other versions from being used to verify the net quantity of packages put up under that agency's supervision. In the past, WMD found that several jurisdictions used the wrong edition of HB 133 to take action against USDA-inspected products simply because they used a newer version of the handbook than had been adopted by the USDA. WMD believes that USDA adoption gives a strong endorsement and recognition to the handbook. WMD also believes the fourth edition of HB 133, whose core elements have been in use by the states since 1994, should be recognized by the FDA and all other agencies to eliminate any uncertainty over its use by the states. Perhaps it is time the NCWM consider petitioning the FDA to provide some type of formal recognition of the handbook. WMD believes that establishing a 5-year review cycle for HB 133 may be one way to ensure it is acceptable to other agencies, which will help avoid the confusion over which edition is currently in effect.

##### **b. Create a new supplement or website to NIST Handbook 133 which would provide useful information to administrators, field officials and industry.**

WMD would like to explore the possibility and usefulness of creating a new publication or website called NIST Handbook 133-1 which would provide supplementary information and guidance on net quantity of contents testing and moisture loss for administrators and industry. The publication or website would be "informative;" thus, it would not include regulatory requirements. Instead, it would be used to provide additional guidance and more examples than can be included in HB 133 itself. Such a publication or website could also be used to provide complete full-size copies of the various inspection forms and worksheets contained in HB 133 and other useful tools developed by jurisdictions. The publication or website could also include a variety of other information related to net contents verification and random sampling and could include appropriate information from federal regulations and policies as well as frequently asked questions (FAQs). Currently in NIST Handbook 130 (HB 130) Interpretations and Guidelines there are sections related to moisture loss, point-of-pack inspections and administrative procedures which may not be well known or readily accessible. These could be updated and moved to the new publication or website.

For example:

- 2.2.5. Lot, Shipment, or Delivery
- 2.5.6. Guidelines for NCWM Resolution of Requests for Recognition of Moisture Loss in Other Packaged Products
- 2.6.10. Model Guidelines for the Administrative Review Process
- 2.6.11. Good Quantity Control Practices
- 2.6.12. Point-of-Pack Inspection Guidelines

These documents are shown below in Reference Section I.

Another example of the type of package information which could be included in a publication or website for reference purposes is the following report on a meeting held at NIST in 2005 to address concerns over packer supplied tare values.

#### **NIST Weights and Measures Today November 2005 Report of Meeting on Tare**

On November 2, 2005, the Laws and Metric Group at NIST hosted a meeting to discuss ways to improve the communication of tare information between packers and retailers when meat products are



packaged at a plant, but weighed and labeled at the retail store. Representatives from the meat packing industry, the retail food industry, and several weights and measures agencies attended the meeting.

### **The Problem**

There is a fundamental change occurring in the retail food marketplace. Retail food stores are shifting from having in-store meat cutters to purchasing already-packaged meat from an outside plant. The supplying plant provides the retail store with packaged meat (including tray, soakers, and overwrap), and the store is then responsible for weighing and labeling the package. In order to weigh and label these products properly, the retail store needs to know the weight of the packaging materials used by the plant (i.e., the tare weight). While this may sound simple and straightforward, it is not.

### **Retailers**

Many retail food chains manage their tare weights from a central location. Tares are maintained at the central or regional office and downloaded to the individual stores on a routine basis. While individual stores may have the ability to override the tare provided in a download (e.g., when an official from weights and measures informs them that they are using an incorrect tare), this correction will be erased when the next download occurs. Several retail food chains believe that the centralized management of tare information is critical to the overall success of their meat departments. With little cutting and packaging being done at the retail level, stores rarely have experienced, professional staff in their meat departments. Without significant expertise at the store level, food retailers are reluctant to leave decisions regarding the use and amount of tare to individual store management.

### **Weights and Measures Officials**

When weights and measures officials find inaccuracies in tares being used, often these inaccuracies are not being communicated to the food retailer's central or regional offices. If the food retailer's central or regional office is not informed that a tare value is inaccurate, then the tare value will not get changed in the next download. While some retail food chains require their store managers to submit copies of inspection reports to the central or regional office, many do not. Some chains leave that decision to the discretion of the individual store managers. Individual store managers may be reluctant to forward disparaging information about their store's performance to the central or regional office. As a result, when weights and measures officials find an inaccurate tare being used in a store and only notify store management of the correction necessary, that information may not be communicated to the people who really need to know—the people at the central or regional office who set the tare values for the entire chain of stores.

### **Packers**

The weight of tare materials used at a meat packing plant varies regularly. Whenever the plant changes suppliers, whether it is suppliers providing soakers, trays, or overwrap, the tare must be reevaluated and changed. Whenever suppliers change the materials used in their products, the tare must be reevaluated and changed. Most meat packers monitor tare continuously and regularly make small adjustments to ensure their packages are accurate. While tare information is routinely shared with retailers, it is difficult to ensure that the correct tare goes on the correct package. Packers may ship individual packages from several different production lots (lots which may have been packaged using different tare materials) in a single shipment to a retailer's warehouse. The retailer's warehouse then further breaks up these package groups to distribute packages to individual stores. Even if accurate tare information for all packages is provided to the retailer's central or regional office, the retailer has difficulty using this information effectively since not all packages of the same product at the same location will necessarily have the same tare. In addition, new tare information provided to a retailer may only apply to packages still in the retailer's warehouse (and not those presently in the store). This means retailers must coordinate the updating of tare data with the placement of new packages on the store shelves.

### **Is There a Solution?**

The question remains: How do you effectively ensure that the tare information for a particular package "travels" with the package from the point of production to the final retail destination? One suggestion has been to print tare information directly on individual packages. However, packers and retailers all

agree that printing tare information on packages, shipping cases, or shipping invoice forms would not be effective. Packers order packaging materials and shipping containers months in advance and at that point could only guess as to what amount of tare would need to be preprinted on these materials. In addition, if tare information were provided on individual packages, shipping cases, or shipping invoices, that information would only be available at the retail store and would never reach the retailer's central or regional office in time to be included in the next download. Most retail food chains do not want individual stores making independent decisions about what tares to use.

Ultimately, the key will be for packers and retailers to communicate more frequently and more effectively. To that end, the American Meat Institute (AMI) has agreed to contact other trade associations representing the retail and meat packing industries to ask for their help in reiterating to their members the importance of accurate net weight labeling at retail. AMI will encourage their packer and processor members to communicate tare values to retail customers whenever changes in tare values occur.

#### **How Can Weights and Measures Officials Help?**

Weights and measures agencies can help by sending copies of test reports (especially from failed inspections) to the corporate or regional office of the retailer. While ideally the corporate or regional office will receive this information from the retail store, retailers at this meeting stressed they would rather receive duplicate reports (from the weights and measures agency and the store) than none at all. Retailers consider it absolutely critical that weights and measures officials contact, communicate, and work with the corporate and regional offices early and often. Retailers specifically asked that weights and measures agencies not wait for problems to escalate before they get the corporate or regional offices involved. Weights and measures officials should conduct package inspections in full compliance with NIST Handbook 133 (HB 133). Inspectors are encouraged to properly clean tare materials during inspections to avoid imposing tares larger than they should be.

According to HB 133, Used Dry Tare is "tare material that has been air dried, or dried in some manner to simulate the unused tare weight." Before adding this definition to HB 133, members of the NCWM and NIST did extensive testing to compare the weights of Unused Dry Tare (which the packer uses), and Used Dry Tare (which the inspector uses). If Used Dry Tare is dried and cleaned properly, its weight should not vary significantly from the Unused Dry Tare weight. In addition, NIST strongly discourages the use of microwave ovens when drying tare materials, particularly soaker pads. Past tests have shown that excessive heating of soaker pads and other tare materials can significantly alter their weight, and even start a fire as some officials have learned.

Following the 2007 Annual Meeting NIST WMD published the following article in its quarterly newsletter to provide additional guidance to officials on how to provide moisture allowances for packages.

#### **MOISTURE LOSS AND GEL SOAKER PADS—WHAT DO I DO?**

**Tom Coleman**

#### **Weights and Measures Today – September 2007 – Volume 10 Number 3, Page 4**

Moisture loss is the loss of weight or volume after packaging. Packaged products (e.g., cookies, granulated sugar), however, may gain as well as lose moisture. The amount of loss or gain depends on many factors including but not limited to the nature of the product, packaging material, length of time "offered for sale," environmental conditions, and many other combinations of "similar" circumstances. Loss of weight may include solvent evaporation and natural juices—not just the loss of water. Tare determinations can be very simple or a major concern depending on the type of tare material and the weight consistency of that substance. Unused dry tare (when available and applicable) may be the easiest of the tares to determine. Gel soaker pads may not be seen and tested as often, however they may prove to be equally basic. NIST Handbook 133 "Checking the Net Contents of Packaged Goods" provides the following guideline for all tare determinations:

“Tare material includes all packaging materials that can be separated from the packaged product, either readily (e.g., by shaking) or by washing, scraping, ambient air drying, or other techniques involving more than ‘normal’ household recovery procedures, but not including laboratory procedures like oven drying.” Except for aerosol or other pressurized packages, open the sample packages, empty, clean, and dry the tare material as appropriate for the packaging material. When testing packaged product using gel soaker pads, three types of tare may be used. Used dry tare – used dry tare is tare material that has been air dried or dried in some manner to simulate the unused tare weight. It includes all packaging materials that can be separated from the packaged product, either readily (e.g., by shaking) or by washing, scraping, ambient air drying, or other techniques involving more than “normal” household recovery procedures, but not including laboratory procedures like oven drying. Labels, wire closures, staples, prizes, decorations, and such are considered tare. Used dry tare is available regardless of where the packages are tested. Unused dry tare – if testing packages in retail store locations where they are packaged and sold in small quantities to the ultimate consumers, the basic test procedures may be modified by using samples of the packaging material if available in the store. Wet tare – if wet tare is used, follow the procedures described in the used dry tare section above, except make no effort to dry the tare material. The following six steps apply when gravimetrically testing any type of packaged product:

1. Identify and define the inspection lot.
2. Select the sampling plan.
3. Select the random sample.
4. Measure the net contents of the packages in the sample.
5. Evaluate compliance with the maximum allowable variation (MAV) requirement.
6. Evaluate compliance with the average requirement. If, when following these steps using either unused dry tare, used dry tare, or wet tare, the product is found to contain less than the quantity represented, or if there is a violation of the maximum allowable variation (MAV) requirement, provide a copy of the test results to the appropriate store authority. Once this has been accomplished, the “field” test is complete. If upon receipt of the “official” test report the manufacturer wishes to contest the inspection results based on the “loss or gain of moisture,” official notification shall be directed to the appropriate weights and measures administrator for consideration/verification.

\*\*\*If testing flour, dry pet food or USDA packages of fresh poultry, franks, hotdogs, bacon, fresh sausage, and luncheon meats, specific instructions are provided in NIST Handbook 133, moisture allowances, page 17. Note: dry pet food means all extruded dog and cat foods and baked treat products packaged in Kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at the time of pack.

If you have any questions or need additional information regarding moisture loss, please contact Lisa Warfield at (301) 975-3308 or at [lisa.warfield@nist.gov](mailto:lisa.warfield@nist.gov) or Ken Butcher at (301) 975-4859 or at [kbutcher@nist.gov](mailto:kbutcher@nist.gov).

## **REFERENCE SECTION I – EXCERPTS FROM THE INTERPRETATIONS AND GUIDELINES SECTION OF NIST HANDBOOK 130**

**The following are currently in NIST Handbook 130 (HB 130) Interpretations and Guidelines**

### **2.2.5. Lot, Shipment, or Delivery**

(L&R, 1981, p. 95)

#### **Policy**

The requirements for the average package net contents to meet or exceed the labeled declaration may be applied to production lots, shipments, or deliveries. Shipments or deliveries are smaller collections of packages than production lots that may or may not consist of mixed lot codes.

Emphasis in inspection activities should be placed on warehouse and in-plant testing without neglecting retail consumer protection.

#### **Background**

The Committee heard a petition from the California Brewers Association to define a lot as:

“A selection of containers under one roof produced by a single company of the same size, type and style, manufactured or packed under similar conditions with a minimum number to be equivalent to one production line shift.”

The intention of the petition is to focus Weights and Measures enforcement on production lots as opposed to small collections of packages on retail shelves, because the production lot is under the control of the packager.

An alternative proposal was made that would require mingling of lot and date codes in package inspection at warehouse locations.

The Committee has reviewed the proposals in light of Section 7.6. and Section 12.1. of the Uniform Packaging and Labeling Regulation which refers to “shipment, delivery, or lot.” If the petition is approved, the terms “shipment” and “delivery” would have to be dropped from this Uniform Regulation.

The Committee recognizes the inherent value of in-plant and warehouse inspection and is of the opinion that, wherever possible, such inspections should be carried out. At the same time, the Committee recognizes the need for the state and local weights and measures officials to protect the consumer at the level where the ultimate sale is made. Therefore, the Committee recommends no change to the Uniform Regulation.

The Committee looks forward to the work of the Special Study Group on Enforcement Uniformity of the NCWM which will be exploring the mechanisms that might be instituted to make in-plant inspection workable.

### **2.5.6. Guidelines for NCWM Resolution of Requests for Recognition of Moisture Loss in Other Packaged Products**

(Exec, 1988, p. 94)

The Task Force on Commodity Requirements limited its work to only a few product categories, using these categories as models for addressing moisture loss. The gray-area concept is the result of this work.

Recognizing several candidates for future work in moisture loss, the Task Force recommends that the following guidelines for moisture loss be followed as far as possible by any industry requesting consideration:

1. There should be reasonable uniformity in the moisture content of the product category. For example, since pet food has final moisture contents ranging from very moist to very dry, some subcategorization of pet food needs to be defined by industry before the NCWM study of the issue.

2. The predominant type of moisture loss (whether into the atmosphere or into the packaging materials) must be specified.
3. Different types of packaging might make it necessary to subcategorize the product. For example, pasta is packaged in cardboard, in polyethylene, or other packaging more impervious to moisture loss. The industry should define the domain of packaging materials to be considered.
4. “Real-world” data is needed on the product as found in the retail marketing chain—not just laboratory moisture-loss data.
5. The industry requesting consideration of moisture loss for its product should collect data on an industry-wide basis (rather than from only one or two companies).

Information concerning the relative fractions of imported and domestically produced product should be available, for example, in order to assess the feasibility of interacting with the manufacturer on specific problem lots.

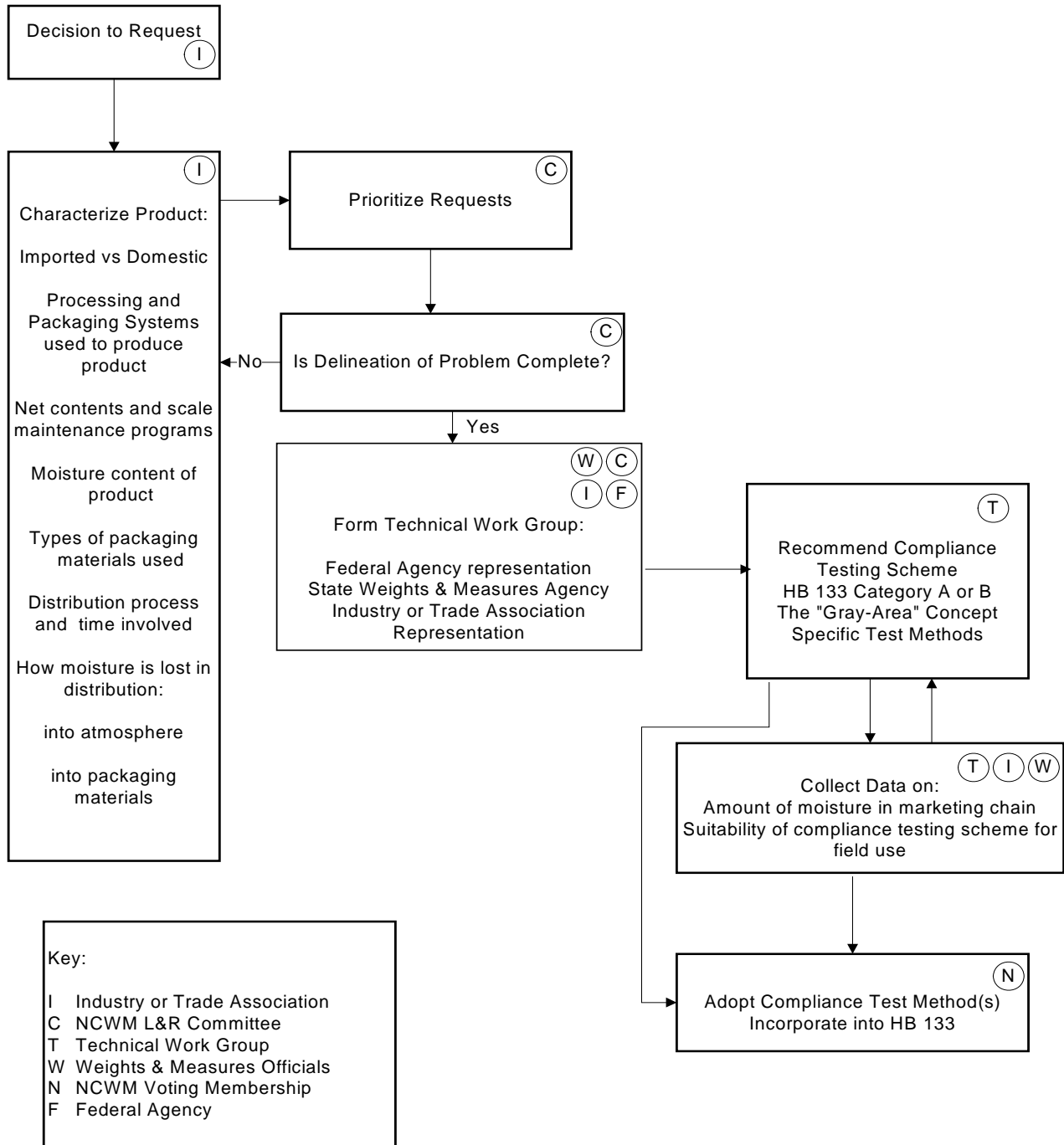
6. Moisture loss may occur either:
  - during manufacturing or
  - during distribution.

Data will be needed to show the relative proportion of moisture loss in these different locations since moisture loss is permitted only under good distribution practices. Geographical and seasonal variations may apply.

7. A description of the processing and packaging methods in use in the industry will be of great value, as will a description of the distribution system and time for manufacturing and distribution. A description of the existing net quantity control programs in place should be given, together with information on how compliance with Handbook 133 is obtained. A description of maintenance and inspection procedures for the scales should be provided, together with information on suitability of equipment and other measurements under Handbook 44.
8. A description of federal and local agency jurisdiction and test should be given, as well as any regulatory history with respect to moisture loss and short weight. Has weights and measures enforcement generated the request? What efforts have addressed the moisture loss issue prior to approaching the NCWM? Are the appropriate federal agencies aware of the industry’s request to the NCWM?
9. The industry should propose the type of compliance system and/or moisture determination methodology to be used. The compliance scheme, if it contains industry data components, should be susceptible to verification (examples: USDA net weight tests for meat; exchange of samples with millers for flour) and should state what the companies will do to provide data to field inspection agencies in an ongoing fashion (as the gray-area approach requires). If in-plant testing is to be combined with field testing, who is to do such testing, and how is this to be accomplished? It should be possible to incorporate the proposed testing scheme into Handbook 133 to be used with Category A or B sampling plans.

When all the preliminary information recommended above has been collected, a field test of the proposed compliance scheme should be conducted by weights and measures enforcement officials to prove its viability. See the plan diagrammed on the next page.

## Plan For NCWM Resolution of Individual Requests For Recognition of Moisture Loss



## **2.6.10. Model Guidelines for the Administrative Review Process**

### **Purpose**

These guidelines are provided to assist weights and measures programs in establishing an administrative review process. They are not intended to be the only process an agency may use nor are they intended to supersede any agency's existing process. Before implementing ANY process, it should be approved by legal counsel.

These guidelines ensure that persons affected by “inspection findings” (e.g., price misrepresentations or shortweight packages), or who are deprived of the use of their property (devices or packages placed under “stop” or “off-sale” order), are provided a timely-independent review of the action. The process enables affected persons to provide evidence which could be relevant in determining whether the enforcement action was proper. The purpose of the process is to ensure that a person's ability to conduct business is not hindered by improper enforcement actions. This process is independent of any other action (e.g., administrative penalties, prosecutions, etc.) that may be taken by the enforcement agency.

### **Background**

In the course of their work, weights and measures officials take enforcement actions that may prohibit the use of devices or the sale of packaged goods (e.g., “stop-sale” or “off-sale” orders for packages and “stop-use” or “condemnation” tags issued on devices). Improper actions (e.g., not following prescribed test procedures, enforcing labeling requirements on exempted packages, or incorrectly citing someone for a “violation”) place the official and the jurisdiction in the position of being liable for the action if it is found that the action was “illegal.” In some cases, weights and measures jurisdictions could be ordered to pay monetary damages to compensate the affected party for the improper action.

This process is one way to provide affected persons an opportunity to present evidence which may be relevant in determining whether the order or finding has been properly made to an independent party. The procedure enables business operators to obtain an independent review of orders or findings so that actions affecting their business can be evaluated administratively instead of through litigation. This ensures timely review, which is essential because of the impact that such actions may have on the ability of a business to operate and in cases where perishable products may be lost.

### **Review Provisions**

Parties affected by enforcement actions must be given the opportunity to appeal enforcement actions.

Inspectors are the primary contacts with regulated firms and thus are in the best position to ensure that the enforcement actions taken are “proper.” “Proper” means that inspections are conducted (1) within the scope of the authority granted by law, (2) according to recognized investigative or testing procedures and standards, and (3) that enforcement actions are lawful. The burden for proving that actions are proper falls on the weights and measures program, not on regulated firms.

Weights and measures officials are law enforcement officers; therefore, they have the responsibility to exercise their authority within the “due process” provisions of the U.S. Constitution. As weights and measure programs carry out their enforcement responsibilities in the future, more and more challenges to their actions and authority will occur. It is in the best interest of any program to establish strict operational procedures and standards of conduct to prevent the occurrence of improper actions that may place the jurisdiction in an untenable position in a court challenge of an enforcement action. The foundation for ensuring proper actions is training, clear and concise requirements, and adoption of and adherence to uniform test procedures and legal procedures.

Prior to taking enforcement actions, the inspector should recheck test results and determine that the information on which the action will be taken is accurate.

Inspections shall be conducted with the understanding that the findings will be clearly and plainly documented and reviewed with the store's representative.

During the review of the findings, the firm's representative may provide information which must be used by the inspector to resolve the problems and concerns before enforcement actions are taken. In some cases, the provided

information may not persuade the inspector to forego the action. In some cases the inspector and business representative may not understand the circumstances surrounding the violations, or there may be a conflict between the parties that they cannot resolve. In other cases, the owner or manufacturer may not learn that an enforcement action has occurred until long after the inspector leaves the establishment.

Steps:

1. Provide a framework that will help in resolving most of these situations where “due process” is of concern. Make sure that the responsible party (e.g., as declared on the package label) is notified of violations and receives copies of inspection reports. Establish standard operating procedures to assure the affected party of timely access to a representative of the weights and measures program so that the firm can provide the relevant information or obtain clarification of legal requirements.
2. Make the process as simple and convenient as possible. Especially in distant or rural areas where there are no local offices, the review should be conducted by a supervisor of the official taking the action if agreed to by the person filing the request for review.
3. The process should include notice that the firm can seek review at a higher level in the weights and measures program or an independent review by a third party. The following procedures are recommended:
  - (a) Any owner, distributor, packager, or retailer of a device ordered out of service, or item or commodity ordered “off-sale,” or inspection finding (e.g., a price misrepresentation or a shortweight lot of packages) shall be entitled to a timely review of such order, to a prompt, impartial, administrative review of such off-sale order or finding.

A notice of the right to administrative review should be included on all orders or reports of findings or violations and should be communicated to the responsible firm (e.g., person or firm identified on the product label).

**Sample Notice**

You have the right to Administrative Review of this order or finding. To obtain a review, contact the Director of Weights and Measures by telephone or send a written request (either postmarked, faxed, or hand delivered) to:

(Name, Address or Fax Number of the Director or other Designated Official)

Your request should reference any information that you believe supports the withdrawal or modification of the order or finding.

- (b) The administrative review shall be conducted by an independent party designated by the Director or before an independent hearing officer appointed by the Department. The officer shall not be a person responsible for weights and measures administration or enforcement.
- (c) No fees should be imposed for the administrative review process.
- (d) The firm responsible for the product or the retailer may introduce any record or other relevant evidence.



For example:

- (i) Commodities subject to the off-sale action or other findings were produced, processed, packaged, priced, or labeled in accordance with applicable laws, regulations or requirements.
  - (ii) Devices subject to the “stop-use” order or “condemnation” were maintained in accordance with applicable laws, regulations or requirements.
  - (iii) Prescribed test procedures or sampling plans were not followed by the inspector.
  - (iv) Mitigating circumstances existed which should be considered.
- (e) The reviewer must consider the inspector’s report, findings, and actions as well as any evidence introduced by the owner, distributor, packager, or retailer as part of the review process.
  - (f) The reviewer must provide a timely written recommendation following review unless additional time is agreed to by the department and the petitioner.
  - (g) The reviewer may recommend to the Department that an order be upheld, withdrawn or modified. If justified the reviewer may recommend other action including a reinspection of the device or commodity based upon information presented during the review.
  - (h) All actions should be documented and all parties advised in writing of the results of the review. The report of action should be detailed in that it provides the reasons for the decision.

#### **2.6.11. Good Quantity Control Practices**

Good Quantity Control Practices means that the plant managers should take all reasonable precautions to ensure the following quantity control standards or their equivalent are met:

1. A formal quantity control function is in place with authority to review production processes and records, investigate possible errors, and approve, control, or reject lots.
2. Adequate facilities (e.g., equipment, standards and work areas) for conducting quantity control functions are provided and maintained.
3. A quantity control program (e.g., a system of statistical process control) is in place and maintained.
4. Sampling is conducted at a frequency appropriate to the product process to ensure that the data obtained is representative of the production lot.
5. Production records are maintained to provide a history of the filling and net content labeling of the product.
6. Each “production lot” contains on the average the labeled quantity and the number of packages exceeding the specified maximum allowable variation (MAV) value in the inspection sample shall be no more than permitted in Tables 2-1 and 2-2 in NIST Handbook 133.
7. Packaging practices are appropriate for specific products and measurement procedures (e.g., quantity sampling, density and tare determinations) and guidelines for recording and maintaining test results are documented.
8. Personnel responsible for quantity control follow written work instructions and are competent to perform their duties (e.g., background, education, experience and training). Training is conducted at sufficient intervals to ensure good practices.

9. Recognized procedures are used for the selection, maintenance, adjustment, and testing of filling equipment to insure proper fill control.
10. Weighing and measuring devices are suitable for their intended purpose, and measurement standards are suitable and traceable to national standards. This includes a system of equipment maintenance and calibration to include recordkeeping procedures.
11. Controls over automated data systems and software used in quantity control ensure that information is accessible, but changeable only by authorized personnel.
12. Tare materials are monitored for variation. Label changes are controlled to ensure net quantity matches labeled declaration.

#### **2.6.12. Point-of-Pack Inspection Guidelines**

##### **A. Weights and Measures Officials' Responsibilities**

1. Conduct inspections during hours when the plant is normally open for business. Open the inspection by making contact with the plant manager or authorized representative (e.g., the quality assurance manager or the production manager).
2. Present the proper credentials and explain the reason for the visit (e.g., routine or follow-up inspection or consumer complaint, etc.).
3. Request access to quantity measurement equipment in the packing room, moisture testing equipment in the laboratory or in the packing room, and product packed on premise or stored in warehouse areas.
4. Obtain permission from a plant representative prior to using a tape recorder or a camera.
5. Conduct inspection-related activities in a professional and appropriate manner and, if possible, work in an area that will not interfere with normal activities of the establishment.
6. Abide by all the safety and sanitary requirements of the establishment and clean the work area upon completion of the inspection/test. Return borrowed equipment and materials.
7. To close the inspection, recheck inspection reports in detail and ascertain that all information is complete and correct.
8. Sample questions and tasks for Inspectors:
  - a. Inside Buildings and Equipment:
    - (i) Is all filling and associated equipment in good repair?
    - (ii) Are net content measurement devices suitable for the purpose being used?
    - (iii) Are standards used by the firm to verify device accuracy traceable to NIST?
  - b. Packing Room Inspection:
    - (i) Observe if the program for net quantity of content control in the packing room is actually being carried out.
    - (ii) Ensure that the weighing systems are suitable and tare determination procedures are adequate. If there are questions regarding tare determination, weigh a representative number of tare and/or filled packages.

(iii) For products labeled and filled by volume and then checked by weight, ensure that proper density is used.

c. Warehouse Inspection:

If an inspection is conducted:

(i) Select lot(s) to be evaluated.

(ii) Determine the number of samples to be inspected. Use the appropriate sampling plan as described in NIST Handbook 133.

(iii) Randomly select the number of samples or use a mutually agreed on plan for selecting the samples.

(iv) Determine the average net quantity of the sample and use the standard deviation factor to compute the Sample Error Limit (SEL) to evaluate the lot.

(v) Look for individual values that exceed the applicable Maximum Allowable Variation as found in NIST Handbook 133.

(vi) Apply moisture allowances, if applicable.

(vii) Review the general condition of the warehouse relevant to package integrity, good quantity control, and distribution practices.

(viii) Prepare an inspection report to detail findings and actions.

9. Close the inspection – Review findings with Plant Representative.

After the inspection, meet with the management representative to discuss inspection findings and observations. Provide additional information as needed (e.g., information on laws and regulations or explanations of test procedures used in the inspection). Be informative, courteous and responsive. If problems/violations are found during the inspection/test, bring them to the attention of the appropriate person.

**B. Plant Management Responsibilities**

1. Recognize that inspectors are enforcing a federal, state or local law.
2. Assist the official in conducting inspection activities in a timely and efficient manner.
3. During the initial conference with the inspector, find out whether the inspection is routine, a follow-up, or the result of a consumer complaint. If a complaint, obtain as much information as possible concerning the nature of the complaint, allowing for an appropriate response.
4. The plant manager, quality assurance manager, or any designated representative should accompany the inspector.
5. Plant personnel should take note of the inspector's comments during the inspection and prepare a detailed write-up as soon as the inspection is completed.
6. When an official presents an inspection report, discuss the observations and, if possible, provide explanations for any changes deemed necessary as a result of the inspection/test.

**Plant Management: Information that must be shared with the inspector.**

1. Establishment name and address.
2. Type of firm and information on related firms or applicable information (e.g., sub-contractor, servant or agent).
3. General description and location of shipping and storage areas where packaged goods intended for distribution are stored.
4. Commodities manufactured by or stored at the facility.
5. Names of responsible plant officials.

**Plant Management: Information that may be shared with the inspector.**

1. Simple flow sheet of the filling process with appropriate net content control checkpoints.
2. Weighing or measuring device maintenance and calibration test records.
3. Type of quantity control tests and methods used.
4. Net content control charts for any lot, shipment, or delivery in question or lots which have previously been cited.
5. Method of date coding the product to include code interpretation.
6. Laboratory reports showing the moisture analysis of the products which are in question or have been previously cited.
7. Product volume of lot sizes or related information.
8. Distribution records related to any problem lots including names of customers.

## **REFERENCE SECTION II – OTHER MOISTURE LOSS GUIDANCE AND RELATED DOCUMENTS**

This section contains the text from a WMD memorandum to state weights and measures directors and other interested parties and a letter from Kraft General Foods stating the reasons justifying a withdrawal of the WMD memorandum.

### **A. Text from the WMD Memorandum that was Issued on January 1, 2006**

#### **Memorandum for State Weights and Measures Directors and Other Interested Parties**

Subject: Verifying the Net Contents of Packaged Goods and Recommended Procedures for Moisture Allowances

This memo supersedes the April 3, 1995, memorandum from the Weights and Measures Division (WMD) concerning the impact of the Nutrition Labeling and Education Act of 1990 (NLEA) on net content testing by State and local weights and measures officials.

I am revising the earlier correspondence primarily in response to the National Conference on Weights and Measures' (NCWM) adoption of the fourth edition (January 2005) of the National Institute of Standards and Technology's Handbook 133 "Checking the Net Contents of Packaged Goods" (Handbook 133). Recent inquiries from State officials on the status of package inspection programs that test products subject to Food and Drug Administration (FDA) jurisdiction have further prompted a response. This memorandum describes guidance provided by FDA. Since 1985 that agency has advised NIST that Handbook 133 has not been in conflict with that agency's practices enforcing net quantity of content on packaged foods.

#### **I. Recommendations for Verifying the Net Quantity of Contents of Packages Subject to FDA Jurisdiction**

WMD recommends that weights and measures officials use the fourth edition of Handbook 133 (January 2005) for all products except those subject to regulation by the U.S. Department of Agriculture (USDA), which has adopted the third edition of Handbook 133 and its 4<sup>th</sup> Supplement.<sup>1</sup> NIST recently learned that the USDA may adopt the 2005 edition of Handbook 133 in the near future. These publications are available on the Internet.<sup>2</sup>

The Category A Sampling Plans in Handbook 133 provide a statistically valid sampling scheme and sample correction factors to enable you to determine if a sample passes or fails a test with a confidence level of at least 97 %. The test methods prescribed for foods are consistent with those used by the FDA.<sup>3</sup>

Weights and measures officials must apply both the "average" and "individual package" requirements in Handbook 133 to the packages they inspect because Federal and State laws and regulations relating to net quantity of content require officials to allow reasonable variations (both plus and minus errors in net contents) from the labeled net contents. By applying both requirements, officials avoid the appearance they

<sup>1</sup> See 9 CFR 317.19 and 9 CFR 381.121.b for the applicable meat and poultry regulations.

<sup>2</sup> The 3<sup>rd</sup> Edition and 4<sup>th</sup> Supplement required by USDA and the January 2005 4<sup>th</sup> Edition of Handbook 133 are free at [ts.nist.gov/WeightsAndMeasures/h1334-05.cfm](http://ts.nist.gov/WeightsAndMeasures/h1334-05.cfm) on the Internet.

<sup>3</sup> Historically, the FDA has used enforcement procedures based on a 95 % confidence level that findings of underfill are accurate. The Category A Sampling Plans in the fourth edition of Handbook 133 are based on an approximate 97 % confidence level that the findings are accurate; therefore, these plans should be acceptable to use in testing packages under FDA jurisdiction.

are imposing a “minimum” net content system<sup>4</sup> while providing a high level of protection for consumers and ensuring fair competition in the marketplace.

Weights and Measures Officials should continue to test packages at retail and should consider Section 1.1. of Handbook 133 before taking enforcement action on small inspection lots of package:

Testing packages at retail outlets evaluates the soundness of the manufacturing, distributing, and retailing processes of the widest variety of goods at a single location. It is an easily accessible, practical means for State, county and city jurisdictions to monitor packaging procedures and to detect present or potential problems. Generally, retail package testing is not conducive to checking large quantities of individual products of any single production lot. Therefore, follow-up inspections of a particular brand or lot code number at a number of retail and wholesale outlets, and ultimately at the point-of-pack are extremely important aspects in any package-checking scheme. After the evaluation of an inspection lot is completed, the jurisdiction should consider what, if any, further investigation or follow-up is warranted. At the point-of-sale, a large number of processes may affect the quality or quantity of the product. Therefore, there may be many reasons for any inspection lot being out of compliance. A shortage in weight or measure may result from mishandling the product in the store, or the retailer’s failure to rotate stock. Shortages may also be caused through mishandling by a distributor, or failure of some part of the packaging process. Shortages may also be caused by moisture loss (desiccation) if the product is packaged in permeable media. Therefore, being able to determine the cause of an error in order to correct defects is more difficult when retail testing is used.

It is important to realize that the Category A Sampling Plans in Handbook 133, while statistically valid, may fail lots that contain the labeled net quantity of content approximately three times out of 100 tests. By basing enforcement actions on samples from multiple lots of the same product from the same manufacturer tested at different locations, you will have a better indication of whether or not an enforcement action is necessary. When a lot fails an inspection, NIST recommends you contact the manufacturer to obtain quantity control records and other production information on the lot to assist in your decision process. To ensure due process, we encourage jurisdictions to follow the NCWM’s Section 2.6.10. Model Guidelines for the Administrative Review Process in NIST Handbook 130 “Uniform Laws and Regulations in the area of legal metrology....” (Those guidelines are shown below this memorandum) for reference but, your agency’s general counsel may of course have you follow other procedures. When following up on possible violations with manufacturers, recognize they are required under Federal and State laws or regulations to follow current good manufacturing practices. The NCWM has also adopted guidelines in Section 2.6.11. on “Good Quantity Control Practices” that officials can use as a tool to assess quantity control systems. (These are provided below).

Weights and Measures officials should conduct inspections at the point of pack whenever possible so they will have access to larger lots of packages and can also assess the packager’s entire packaging system. The NCWM adopted guidelines in Section 2.6.12. on “point-of-pack inspections” to help officials conduct these inspections, (See below this memorandum).

We encourage jurisdictions to collaborate on conducting marketplace surveys to determine the level of compliance of commodity groups (e.g., store-packed random weight items, mulch, polyethylene sheeting, flour, milk, soft drinks, animal food, etc.) and to work together to follow up on possible problems at the point-of-pack where the packaging plant or distribution point is located in a jurisdiction other than where the packages failed to pass a test. The State of California conducts a wide variety of marketplace surveys which can serve as model for other states to follow. NIST encourages all states to follow the example set by California’s Division of Measurement Standards for monitoring compliance in the all areas of weights

<sup>4</sup> Under a “minimum” net content system (these systems are common in European countries), no package in a sample may contain less than the net quantity of contents stated on the package label.

and measures enforcement. NIST will provide assist to states who want to conduct or collaborate in surveys...

Ensure that all samples are selected randomly. The statistical reliability of the sampling plans is valid only when the sample has been randomly selected from the inspection lot.

To be consistent with FDA inspection activities, utilize used dry tare when taking enforcement actions. The handbook permits unused dry tare to be used to conduct audits and to verify net weights of packages put up in retail stores.

Apply the average and individual package requirements to products tested at any point in distribution. Over the last ten years several jurisdictions have contacted WMD concerning industry claims that States can only take action on production lots. FDA advises that there are no provisions in the Federal Food, Drug, and Cosmetic Act or its legislative history that support this claim. Another issue that WMD has been asked about is the claim that the FDA has a “1 %” tolerance that States must permit. FDA advises that they have a policy for their field compliance staff to use in determining whether or not to request enforcement actions by the U.S. Justice Department. The only purpose for the policy is for FDA to prioritize agency resources, not to set a limit for State enforcement actions. The FDA also reports that it did not establish this policy as a statistical allowance or tolerance that could be easily abused by an unscrupulous packager.

Allow for reasonable moisture loss.

The following Federal regulation preempts any State or local requirement that is not identical:

21 CFR § 101.105

(q) The declaration of net quantity of contents shall express an accurate statement of the quantity of contents of the package. Reasonable variations caused by loss or gain of moisture during the course of good distribution practice or by unavoidable deviations in good manufacturing practice will be recognized. Variations from stated quantity of contents shall not be unreasonably large.

State and local jurisdictions must allow reasonable variations in net contents caused by the loss or gain of moisture in food products that occurs during good distribution practice. If not, a jurisdiction may be questioned if enforcement action is taken against the product. The moisture loss issue has challenged weights and measures officials and industry since the Federal Food, Drug, and Cosmetic Act allowing for moisture loss was passed more than 75 years ago. However, the fact that FDA has not adopted specific moisture allowances is not justification for not making reasonable allowances for moisture loss.

The NCWM has adopted moisture allowances (also called “gray areas”) for flour, dry pet food, chicken, and hot dogs. Under the “gray area” concept, any food found short in excess of the allowance is subject to enforcement action. If the product is found short, but within the allowance, the official would take additional steps (such as comparing the moisture content of a sample from the lot to the time-of-pack moisture content provided by the packer) to determine if the product is short because of underweighing at the time of pack, or if the shortage is due to “reasonable” moisture loss that occurred during distribution. WMD recommends that officials use the following guidelines with the “gray area” approach to allow reasonable moisture loss for the listed foods.

WMD only recommends moisture allowances. It is the individual jurisdiction’s responsibility to make the final decision concerning appropriate moisture allowances. Final decisions should be made after considering moisture loss data provided by the packager.

## **II. Recommended Moisture Allowances for Some Foods**

WMD has consulted with State and local weights and measures agencies and affected industries on moisture loss problems associated with hygroscopic foods. The following moisture allowances, beyond those already addressed by the NCWM, are recommended. WMD used data from the FDA’s Quantity of Contents Compendium as the major source for the numerical values for gray area recommendations. Moisture loss has

been identified with flour, pasta, rice, cheese and cheese products, dried fruits and vegetables, fresh and frozen fruits and vegetables, coffee beans, and bakery products. Of all of these commodities, the extent of moisture loss variations is greatest for flour and pasta. Very little current data are available for many other commodities. However, WMD considers the need for allowances for affected commodities to be pressing and believes that States must make some allowance for these commodities until other data can be obtained for the respective commodities. If a recommended allowance is perceived as too lenient, weights and measures agencies may prevent abuses of the allowance through inspections at the point of pack. Allowances if too lenient provide are a disadvantage for firms with products in competition with packers where point-of-pack inspections may not be possible; consequently, such firms may wish to provide information to WMD so that we can recommend a more stringent allowance. Where allowances are too stringent, firms may also provide information justifying a more appropriate allowance. WMD suggests that firms desiring such an allowance be encouraged to work closely with the NCWM in view of its experience in this area. Even though the process of developing moisture allowances is time-consuming, affected firms will be provided some relief during the interim period if State and local agencies implement the following recommendations:

### **III. Moisture Allowances at Point of Pack**

WMD recommends that moisture allowances at the point of pack not be made for packages taken immediately off the production line. However, regulatory officials may often encounter product at the point of pack that has been stored by the packer prior to shipment to other locations. In the past, moisture allowances have not been recognized in tests until the food is “introduced into interstate commerce;” however, since many manufacturers store the product for extended periods at the packing location, moisture loss should be recognized. It is recognized that moisture loss is a natural phenomenon that is not controlled or delayed by any specific schedule, and WMD recommends that, at some point during such storage, allowances be permitted for moisture loss. But, considering the multiplicity of foods, differences in packing materials, and the various environmental factors that affect moisture loss, it would be impossible for WMD to determine moisture loss that occurs on the packaging line or in the first few hours or days following the packaging of any one product type, let alone the tens of thousands of products that might be inspected at the point of pack. Certainly, some products begin to lose moisture immediately after packaging, but there must be some definitive guidance provided for weights and measures officials and industry.

This problem is not unique to the United States where we are trying to encourage state and local officials to focus more on point-of-pack inspections. WMD is aware that point-of-pack inspections are one of the primary tools used in European countries to control net contents in packaged goods. We have learned that in some of these countries officials make no allowance for moisture loss within the first 7 days of the date of pack for some products. As this is the only documented guidance on the issue available, WMD recommends that States consider a similar approach until other guidance on this issue is available. This will provide packers and officials with guidance on when moisture loss allowances must be applied and will enable officials to conduct inspections at point of pack to ensure that packers are not taking advantage of recognized allowances for moisture loss. To minimize the possibility of moisture loss considerations, officials should inspect the most recently packed items.

In 1995 WMD received comments on the 7-day recommendation from the Food Industry Weights and Measures Task Force (Task Force) of the Grocery Manufacturers of America. The Task Force was concerned the 7-day period was not reasonable because the data submitted to the NCWM to develop the gray areas for flour, dry pet food, and other products clearly showed that some products lose as much as 0.5 % to 1 % of their weight due to moisture loss in the first few days of packing. WMD acknowledged the industry’s concerns about the 7-day period but believed then and now that the concerns can be addressed without dropping the recommendation. WMD believes it is crucial to have specific guidelines on moisture loss for use in point-of-pack inspections.

WMD recommends an exception to the 7-day period if the packer can provide daily moisture loss data collected using the following procedures. We have developed the following guidelines in collaboration with industry for packers to use the results of the short-term moisture loss studies at the point of pack. To be acceptable, the data must be computed using the average moisture loss determined on a daily basis (e.g., the weight of each package in each of the sample control lots is determined every day for 7 days) in environmental conditions similar to



those that exist when the product is being inspected. For example, an inspector visits a pet food plant in Ohio in the middle of July to conduct a point-of-pack inspection. If the product tested had been packaged 5 days before the inspection and is found underweight; the moisture loss data must reflect the loss that would occur in July not January. At least three sample control lots, consisting of at least 48 randomly selected packages, must be used to develop the moisture loss data. Each sample lot must be stored under the same conditions that are typical for the product (e.g., if the product is typically placed in a sealed case on a pallet and shrink wrapped, the sample lots must be stored under the same conditions. Moisture loss data obtained by removing the individual packages from the shipping case and storing them in a laboratory would not be acceptable). The three-sample control lots must be placed at various locations in the storage site. The average moisture loss value must be computed from the three-sample control lots with a 95 % prediction interval.

Since point-of-pack inspections are not routinely done in most jurisdictions at this time, there will be many situations where packers may not have “acceptable” moisture loss data for a particular product found to be underweight at the time of a point-of-pack inspection. In these cases, WMD recommends the packer be allowed to conduct a study using the criteria specified above. This data could then be provided to the weights and measures official for use in making a final determination whether or not moisture loss caused the product to be underweight. One benefit of this approach is that the moisture loss study can be conducted within a few days of the inspector finding the inspection lot underweight so the test will more closely reflect the environmental conditions under which the original inspection lot was subject.

A similar recommendation is included for fresh bakery products weighed within 1 day following the end of the day of pack (in this case the moisture loss data would have to be based on the amount of moisture lost on an hourly basis under the same conditions listed above for the 7-day period). WMD will provide technical assistance on request to any jurisdiction to resolve these individual moisture loss cases by working with you and the packer and will seek FDA assistance in resolving these situations.

#### **IV. Recommended Moisture Allowances for Use at Point of Pack and Testing at Any Other Location**

Provide the following allowances for moisture loss (expressed as a percentage of the labeled net quantity of contents):

1. No allowance for moisture loss should be made if:
  - (a) A food, other than a fresh bakery product, while stored by the packer, is weighed within 7 days following the end of the day of pack, except when the packer provides acceptable (see note below) documentation of the moisture loss for the product in storage at the point-of-pack, or
  - (b) A fresh bakery product, while stored by the packer, is weighed within 1 day following the end of the day of pack, except when the packer provides acceptable (see note below) documentation of the moisture loss for the product in storage at the point of pack, or
  - (c) The food is not subject to moisture loss, or
  - (d) The food is packaged in an air-/moisture-tight container (e.g., cans, glass bottles, enclosed in paraffin, etc).
2. Allow 1 % for the following foods: frozen fruits and frozen vegetables, and fresh baked breads, buns, rolls and muffins.
3. Allow 3 % for the following foods: flour, dry pet food, pasta, rice, cheese and cheese products, dried fruits and vegetables, fresh fruits and vegetables, coffee beans, and bakery products other than fresh baked breads, buns, rolls and muffins.

Note for Moisture Allowances at Point of Pack: The data must be computed using the average moisture loss determined on a daily basis (e.g., the weight of each package in each of the sample

control lots is determined every day for 7 days) in environmental conditions similar to those that exist when the product is being inspected. For example, an inspector visits a pet food plant in Ohio in the middle of July to conduct a point-of-pack inspection. If the product tested had been packaged 5 days before the inspection and is found underweight; the moisture loss data must reflect the loss that would occur in July, not January. At least three sample control lots consisting of at least 48 randomly selected packages must be used to develop the moisture loss data. Each sample lot must be stored under the same conditions that are typical for the product (e.g., if the product is typically placed in a sealed case on a pallet and shrink wrapped, the sample lots must be stored under the same conditions. Moisture loss data obtained by removing the individual packages from the shipping case and storing them in a laboratory would not be acceptable). The three-sample control lots must be placed at various locations in the storage site. The average moisture loss value must be computed from the three-sample control lots with a 95 % prediction interval. If the packer does not provide the information, no additional moisture allowance should be permitted.

#### **V. Moisture Loss for Products Not Listed in NIST Handbook 133**

When officials test product for which no moisture loss guidance has been provided NIST can provide technical assistance. In the past NIST has published recommended moisture allowances for use at all locations including Point-of-Pack. If moisture loss studies are required, NIST will assist in the completion of such studies. If studies are a necessity, they should be a collaborative effort between officials and industry and can be very time consuming depending on the product. Because of the potential impact on interstate commerce, studies must be completed on a nationwide basis and not by individual jurisdictions unless circumstances justify only local consideration.

The amount of moisture lost from a package is a function of many factors not the least of which is the product itself (e.g., moisture content), packaging, storage conditions (e.g., temperature, humidity, air flow), time, handling and others. If a packaged product is subject to moisture loss officials must allow for “reasonable” variations caused by moisture either evaporating or draining from the product. Officials cannot set arbitrary moisture allowances based solely on their experience or intuition. Moisture allowances must be based on scientific data and must be “reasonable.” Reasonable does not mean that all of the weight loss caused by moisture evaporation or draining from the product must be allowed. As a result of product and moisture variability the approach used by official must be developed on a case-by-case basis depending on many factors to include, but not be limited to, the manufacturing process, packaging materials, distribution, environmental influence and the anticipated shelf life of the product.

NIST Handbook 130 provides a starting point for developing a workable procedure in Section 2.5.6. in the Interpretation and Guideline Section regarding “Resolution for Requests for Recognition of Moisture Loss in Other Packaged Products.” NIST WMD has worked and will continue to work extensively with the NCWM, The Laws and Regulations Committee, and industry to develop protocol for determining moisture allowances that can serve as models for future studies. Most studies involving nationally distributed products will require that products be tested during different seasons of the year and in different geographic locations to develop a nationally recognized moisture allowance. Some studies may require the development of laboratory tests used for inter-laboratory comparisons to establish moisture content in products at time-of-pack or at the time-of-inspection.

In some cases, manufacturers can and may provide valid moisture loss data for officials to consider in lieu of conducting studies. In cases like this, WMD will provide assistance to determine if the information is complete or if further documentation is required. For example, a major producer of bar soap has provided moisture loss evidence for consideration by officials to determine what, if any, moisture loss could be expected to occur; in some cases, this information has proven to be accurate as a result avoiding the need for national data collection.

Moisture loss or gain is a critical consideration for any net content enforcement effort and one that, in most cases, cannot be addressed by a field official. If moisture loss issues are to be deliberated, it is the regulatory official’s responsibility to resolve the packers concern utilizing available resources and due process procedures. To fulfill this obligation officials may be required to utilize specialized test equipment and specific laboratory procedures. Additionally, the collection of adequate test data may require product examination over a broad

geographical area and consideration of a wide range of environmental factors. If a national effort is required, a coordinated effort involving industry, trade associations, weights and measures officials, and federal agencies may be required. NIST will provide technical support upon request.

## **VI. Background Information on Federal Preemption**

In the previous memorandum, we reported that FDA was expected to adopt regulations identical to those contained in the 4<sup>th</sup> Supplement of the third edition of Handbook 133 adopted by the NCWM in 1994. The FDA published proposed regulations regarding net quantity of contents test procedures for packaged food under its jurisdiction in the March 4, 1997, issue (62 FR 9826) of the *Federal Register*. FDA subsequently withdrew that proposal on November 26, 2004 (69 FR 68831). FDA based the withdrawal on the need to reduce its regulatory backlog and focus its resources on current public health issues. The withdrawal did not speak to the merits of the proposal. Based on the experience reported since the adoption of the substantive revisions in 1994, WMD believes that the latest edition of Handbook 133 provides the basis for nationally uniform test methods and other requirements consistent with the requirements in federal laws relating to net quantity of contents. Therefore, WMD recommends that state and local authorities test products according to the procedures outlined in the latest edition of Handbook 133 unless future FDA guidance or regulations specify otherwise. Moreover, it is extremely important that state and local jurisdictions continue to provide regulatory oversight so businesses can compete in a fair marketplace and consumers can depend on the representations of quantity upon which they make purchasing decisions.

### **a. Federal Preemption under the Nutrition Labeling and Education Act (NLEA) of 1990**

The NLEA was signed into law on November 8, 1990, to amend Title 21 Section 343 of the Federal Food, Drug, and Cosmetic Act (FDCA). The Act requires nutrition labeling on foods and regulates health claims about food nutrients to help consumers select a more healthful diet. Under the Act, State and local laws not “identical” to corresponding FDA requirements are preempted. According to regulations under FDA [21 CFR Part 100.1 (c)(4)], the phrase “not identical” does not refer to the specific words in the requirement. Instead it means that the state or local requirement directly or indirectly imposes obligations or contains provisions that (1) are not imposed by or contained in an FDA requirement, or (2) differ from those specifically imposed by or contained in an FDA requirement or implementing regulation.

The preemption ensures uniformity in labeling requirements and prohibits non-uniform State and local laws, regulations, formal and informal policies, and other enforcement practices that prevent firms from conducting efficient and cost-effective business in all 50 States. Congress recognized that even though federal requirements may preempt more restrictive state requirements in certain instances, the net benefits from national uniformity in these aspects of the food label outweigh any loss in consumer protection that may occur as a result.

The ultimate goal of the NLEA is uniformity in laws, regulations, and test procedures—a goal shared by the NCWM and NIST alike. Under NLEA, state and local labeling requirements must be identical to many of the regulations promulgated under the Federal Food, Drug and Cosmetic Act, as amended by the NLEA, in Title 21 – Code of Federal Regulations, Parts 100 to 169 (current edition). Jurisdictions may continue to enforce state or local regulations on foods where there is no federal requirement and continue to enforce existing state and local laws if they are “identical” to FDA regulations.

### **b. Defining what is “Identical”**

Federal preemption of the net quantity of contents regulations and test procedures occurred on November 8, 1991. On that date, state and local regulations on quantity of contents (e.g., net quantity of contents regulations, sampling plans, and test procedures) were preempted under the NLEA if they were not “identical” to federal requirements. The question is, “What is ‘identical’?” Both state and FDA regulations require packers to express an “accurate” statement of the quantity of contents of packaged food while permitting “reasonable” variations. The most common questions WMD receives are “do the test procedures used by the states and FDA provide identical results” (e.g., do the sampling plans have equal confidence levels, and are the products weighed or measured using recognized procedures) and “are the

criteria for defining reasonable variations (e.g., the values of maximum allowable variations, the sample correction factors, and allowances for moisture loss) consistent with those used by FDA?”

FDA’s test procedures are based on those contained in “Official Methods of Analysis” of the Association of Official Analytical Chemists International (AOAC). Based on information provided by FDA, WMD believes the test procedures contained in the fourth edition of Handbook 133 are identical to the AOAC procedures. If officials implement the recommendations in this memo, they should be using test procedures equivalent to FDA’s.

**c. Preemption Extends Beyond Food Packages Introduced into Interstate Commerce**

Federal courts have ruled that the FDA has jurisdiction over all food products made from ingredients shipped in interstate commerce, regardless of the amount of the ingredient present, even though the finished product has not moved in interstate commerce. Products that have not entered interstate commerce (e.g., bakery products offered for sale in the food store where they are baked and packaged) that are made of ingredients shipped in interstate commerce to the store are subject to the Food, Drug, and Cosmetic Act and, therefore, should only be tested according to the following recommendations in this memorandum until final regulations are adopted by the FDA.

This memorandum is not legal advice. You are encouraged you to review this memo with your State Attorney General or staff attorney before implementing any policy on these issues or before you take enforcement action against a product that falls under FDA or other federal jurisdiction.

**Training and Technical Support**

WMD is committed to supporting state and local jurisdictions in their package inspection programs by providing technical assistance and training classes on Handbook 133. If you need assistance, please contact Lisa Warfield at (301) 975-3308 or by e-mail at [lisa.warfield@nist.gov](mailto:lisa.warfield@nist.gov).

**NOTICE**

The following documents could not be included in this publication because they are only available in Adobe PDF format. They are available from NIST upon request. Please contact Kenneth Butcher at (301) 975-4859 or at [kenneth.butcher@nist.gov](mailto:kenneth.butcher@nist.gov) or Lisa Warfield at (301) 975-3308 or at [lisa.warfield@nist.gov](mailto:lisa.warfield@nist.gov) to obtain copies.

**B. Letter from Kraft Foods Requesting that NIST Withdraw Letter on Moisture Loss**

**C. Chapter 3 from the Third Edition of NIST Handbook 133 and 4<sup>th</sup> Supplement 1994**

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## **Appendix D**

### **Letter Submitted from the International Ice Cream Association to the Food and Drug Administration**

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International Dairy Foods Association  
Milk Industry Foundation  
National Cheese Institute  
International Ice Cream Association

July 10, 2008

Ms. Geraldine A. June  
Team Leader, Food Labeling and Standards  
Office of Nutritional Products, Labeling and Dietary Supplements  
FDA/Center for Food Safety & Applied Nutrition  
CPK1/4D014  
5100 Paint Branch Parkway  
College Park, MD 20740  
*Sent Via E-mail to: [geraldine.june@cfsan.fda.gov](mailto:geraldine.june@cfsan.fda.gov)*

**RE: Request for Interpretation of FDA Food Labeling Regulations for Net Quantity of Contents and Serving Size of Pelletized Ice Cream and Frozen Desserts**

Dear Ms. June:

The International Ice Cream Association (IICA) appreciated the opportunity to meet on June 27, 2008 with officials from FDA's Office of Food Labeling, along with staff from the National Institute of Standards and Technology (NIST) Weights and Measure's Division, and regional Weights & Measures officials to discuss the net contents declaration and method of measurement for pelletized ice cream.

We are writing this letter seeking FDA assistance on determining the net quantity of content statement and serving size declaration that should be used for pelletized ice cream and frozen desserts. For the reasons noted below, IICA believes the net quantity of content statement should be a volumetric declaration that excludes the external air. We also are asking for FDA guidance in identifying the serving size that should appear in the nutrition facts panel for these products.

Pelletized ice cream is a unique and novel ice cream product that entered the market in 1988 under the brand name Dippin' Dots,™ which was predominantly sold in food service venues to consumers for immediate consumption. Due to commercialization and development of processing technology, pelletized ice cream has been introduced into retail stores over the past several years by five companies. Today the product is sold in food service and retail stores both in multi-serving and individual serving packages.

Pelletized ice cream products meet the federal standard of identity (SOI) for ice cream as specified in 21 CFR §135.110. The product is made using pasteurized mix consisting of one or more of the prescribed dairy ingredients, sweeteners, stabilizers and flavorings. The ice cream



mix is stirred via pumping and spraying action as the droplets are frozen at very low temperatures using liquid nitrogen. The freezing process results in small round shaped beads or pellets of ice cream that meet the required 4.5 lbs per gallon weight requirements set forth in the SOI for ice cream. Different flavored ice cream pellets such as strawberry, banana, chocolate and vanilla may be mixed together to create novel flavors such as "banana split," or flavoring can be added to the pellets such as cookie pieces, cookie dough, brownies, and other inclusions. In addition to pelletized ice cream, this same freezing process is also used to produce similar products such as pelletized water ice and pelletized frozen desserts. IICA believes that determination of the method of sale and serving size in the nutrition fact panel should apply to all pelletized ice cream, and all pelletized frozen dessert products.

As we discussed during the June 27<sup>th</sup> meeting, ice cream and frozen desserts are sold by units of fluid measure. Therefore, the declared net quantity of contents for pelletized ice cream and frozen desserts will be expressed in fluid ounces. The ice cream industry's position is that the method of sale and net quantity of contents for pelletized ice cream and pelletized frozen desserts should be declared in fluid ounces without including any external air surrounding the pellets of ice cream or flavoring. We are seeking concurrence from FDA that it agrees with the industry position of using in the net quantity statement fluid ounces that exclude the external air.

We also are seeking FDA guidance on the serving size that should be stated in the nutrition facts panel (NFP) for pelletized ice creams and frozen desserts. During the June 27<sup>th</sup> meeting we discussed the issue and are asking FDA to identify the serving size that should be used on these products.

We would greatly appreciate your prompt reply in this matter, as it is critical to future work on determining the proper method for measuring the volume of the pelletized ice cream and frozen desserts. The IICA would like to propose a new method of measurement for this product to the 2009 National Conference of Weights and Measures. In order to meet that deadline we would need to develop and verify a test method to submit the proposal to the Southern Weights and Measures Association meeting on October 5, 2008.

If you have any questions or require additional information regarding this matter, please feel free to contact me at (202) 220-3543 or via e-mail at [cfrye@idfa.org](mailto:cfrye@idfa.org).

Sincerely,



Cary Frye  
Vice President,  
Regulatory Affairs

cc: K. Butcher, NIST  
L. Warfield, NIST

## **Appendix E**

### **Minutes to Pelletized Ice Cream Meeting June 27, 2008**

#### **To: State Weights and Measures Directors, NCWM Laws and Regulations Committee and Other Interested Parties**

On June 27, 2008, a meeting was held at NIST in Gaithersburg, Maryland, to discuss issues related to the sale of packaged Pelletized Ice Cream (an attendance list is attached). The participants included state and local officials from Maryland, New York, and Pennsylvania (including a representative of the NCWM L&R Committee), officials from the Food and Drug Administration, two producers of pelletized ice cream and a representative of the International Dairy Foods Association (International Ice Cream Association). The International Dairy Foods Association (IDFA), based in Washington, DC, represents the nation's dairy manufacturing and marketing industries and their suppliers. IDFA is composed of three constituent organizations; the Milk Industry Foundation (MIF), the National Cheese Institute (NCI), and the International Ice Cream Association (IICA). IDFA's 220 dairy processing members run more than 600 plants, and range from large multi-national organizations to single-plant companies. Together they represent more than 85 % of the milk, cultured products, cheese, and frozen desserts produced and marketed in the United States. IICA's members that manufacture and sell pelletized ice cream product are: Dippin' Dots, Unilever/Good Humor Breyers, Kemps, and MolliCoolz. Carol Hockert, Chief of the NIST Weights and Measures Division, Lisa Warfield, David Sefcik, Elizabeth Gentry, and Ken Butcher from NIST also attended.

#### **Background Information**

Pelletized ice cream is a unique and novel product that entered the market in 1988 with Dippin' Dots, which was predominantly sold in food service venues direct to consumers. Packaged pelletized ice cream entered the retail marketplace about 2 years ago. A suggested definition for Pelletized Ice Cream is: "beads of ice cream which are quick-frozen with liquid nitrogen." The beads are relatively small, but can vary in shape and size. As with other types of ice cream, the pellets are produced in several flavors and they are frequently mixed with pieces of cookies, brownies or dough and other inclusions. Pelletized ice cream products meet the federal standard of identity (SOI) for ice cream as specified in 21 CFR §135.110. The product is made using pasteurized mix consisting of one or more of the prescribed dairy ingredients, sweeteners, stabilizer and flavoring. The ice cream mix is stirred via pumping and spraying action as the droplets are frozen at very low temperatures using liquid nitrogen. The freezing process results in small round shaped beads or pellets of ice cream that meet the required 4.5 pounds per gallon weight requirements set forth in the SOI for ice cream. By itself, the density of pelletized ice cream is higher than other ice creams because the product contains much less air than regular ice cream. It was noted that using the 4.5 pound density in the FDA's standard of identity is not an effective tool for determining the accuracy of fluid measure because, due to the higher density of pelletized ice cream, a package could easily meet the weight requirement and still not contain the fluid measure declared on the label. Because density variations occur when inclusions are added to packages of pelletized ice cream and, because the inclusions (e.g., cookie bits) themselves vary in size and weight, using gravimetric testing to verify the declared volume of a sample may not be practical. At least two manufacturers label their packages by net weight and the others label their packages in terms of fluid measure. The manufacturers that label their packages by fluid measure include the air surrounding the pellets in their net quantity of contents statement. At least four of the five known producers of pelletized ice cream are currently selling their packaged product in retail stores and their producing facilities are located in California, Florida, Kentucky, and Minnesota. At least one other manufacturer sells this product from bulk as a ready-to-eat food in mall kiosks, sports stadiums and other venues.

Pelletized ice cream products in the market are currently labeled by both weight and volume as follows:

Dippin' Dots - Weight (Dippin' Dots Pouches and product for export), and Volume (Orblets and bulk food service)

Kemps/Hood - Volume (Itty Bits)

Good Humor - Breyer's/Unilever - Weight (Popsicle Shots)

MolliCoolz - Weight (MolliCoolz)

### **Pelletized Ice Cream must be sold by Fluid Volume**

The International Ice Cream Association (IICA) reported that there was a consensus among the manufacturers that pelletized ice cream should be labeled and sold on the basis of fluid volume in accordance with Subsection 1.7.1. Factory Packaged Ice Cream and Similar Frozen Products in the Method of Sale of Commodities Regulation in NIST Handbook 130. That Subsection reads “Ice cream, ice milk, frozen yogurt and similar products shall be kept, offered, or exposed for sale or sold in terms of fluid volume.” FDA officials at the meeting agreed with industry’s recommendation. When a food is frozen and it is sold and consumed in a frozen state, the declaration must express the volume at the frozen temperature. FDA regulations also permit fluid ounces to be used when “there is a firmly established general consumer usage and trade custom of declaring the contents of a ...solid, semisolid, or viscous product by fluid measure.” For ice cream there is a firmly established consumer usage and trade custom of selling ice cream and similar frozen products by volume. (See below for regulatory references.)

### **Volumetric Test Method and Air Measurement Issues**

Once it was agreed that the appropriate method of sale for pelletized ice cream is by fluid volume, discussion moved to whether or not the air surrounding the beads is to be included as part of the fluid declaration. The IICA again reported that there was a consensus among the manufacturers that the air surrounding the beads should not be included as part of the fluid volume of the ice cream (“air-excluded”). To enforce the “air-excluded” standard, the water displacement method for ice cream novelties in Section 3.12. could be used if appropriate modifications were made to ensure the ice cream pellets can be completely and properly submerged. Some states and industry have tried alternative head-space methods and have substituted glycerin for water in the displacement procedures with some limited success. Pelletized ice cream can melt quickly but some states have reported that their tests indicate that with careful handling and strict temperature regulation of the water, the melting can be limited. Reducing melting is crucial to volume determinations because FDA requires that the volume of ice cream be determined while in a frozen state. After ice cream melts, it cannot be refrozen and tested because any air that the product contained is lost. There is also a need to develop a practical means to keep the pellets immersed in the test fluid so that their volume can be accurately determined. One approach which shows promise is to place the beads in a weighted nylon mesh bag (the volume displaced by the bag and weight are deducted). The IICA reported that in testing pelletized ice cream with added inclusions such as cookie pieces, cookie dough or brownies caused inaccurate results due to water absorption by the inclusions. But more testing and a collaborative study are needed before any one test method can be proven to provide reliable results. The group discussed the possibility of using screening tools or audit type tests to reduce destructive testing and to reduce the need to have inspectors collect samples and transport them to a testing laboratory.

It was during this discussion a potential problem with the “air-excluded” net content declaration surfaced. For nutritional labeling purposes, manufacturers must also state the serving size in volume using household measures such as “tablespoon” or “cup” in the nutrition facts panel. Because the air will have to be subtracted from the total volume of the ice cream on the net content label, a consumer who were to measure out the total number of household ½ cup measures of ice cream (with air) would find a greater number of servings than what would be calculated by dividing the total net contents by 4 fl oz. The difference between the two volumes with or without air could be as much as 50 %. While this may not be a significant issue for individual serving size containers, it could be a problem when pelletized ice cream is sold in multiple serving containers. The potential problem is that consumers might be confused or misled by the apparent discrepancies in the declarations. Several suggestions were offered to address the potential problem such as having the manufacturer provide special label information explaining the reason for the difference in volumes, but it became clear during the discussion that this issue would have to be formally submitted to the FDA nutritional labeling experts for resolution. The FDA representatives who attended the meeting were experts in package labeling and standards of identity but could not respond to questions on nutritional labeling. They asked that a written request be submitted to FDA requesting a prompt interpretation of its regulations. IDFA agreed that it would draft and send a request for interpretation to FDA before the NCWM Annual Meeting.

If FDA requires an “air-included” standard (i.e., the air surrounding the pellets is included in the fluid volume of the ice cream), the volume of the ice cream declared in the net quantity statement and the nutritional label serving size

would be in approximate agreement. A test procedure to verify the volume of ice cream sold on this basis would be simpler to develop and verify than the water displacement method in Handbook 133. This test could be as simple as pouring the pelletized ice cream into a chilled cylinder and then taking a direct reading of the volume from the graduations on the cylinder. The suitability of the test equipment in either test would be crucial so that the combined uncertainties of the calibrated test equipment and the uncertainty of the test method do not exceed  $\frac{1}{6}$  of the Maximum Allowable Variation.

The IDFA representative will send a letter to FDA requesting an interpretation of its regulations in regard to whether the air is to be included in the volume of the ice cream and how industry will be expected to provide nutritional information on packages. Once FDA issues a response, IDFA will collaborate with state weights and measures officials and NIST to develop the appropriate test procedures. At this point, NIST will host a second meeting of weights and measures officials, industry and the FDA to move forward on the next steps needed. Once the industry receives notice from FDA on how they will have to package and label pelletized ice cream, the pelletized ice cream manufacturers will need a reasonable period of time to make the necessary changes to packaging for declaration of the net contents in fluid volume (from weight to volume or from volume of product with “air-included” to “air-excluded”). This will include package redesign, and the ability to use up existing inventory of packaging and product in storage and in the market place. Because the shelf life of ice cream can range from 12 to over 18 months, inventories of product may be extensive. IICA asked that during this time period of determining the proper net content declaration and measurement tool if weights and measures officials could consider using regulatory enforcement discretion for pelletized ice cream products.

This report was sent to all state weights and measures officials and other interested parties. It will be presented to the Laws and Regulations Committee at National Conference of Weights and Measures during its 93<sup>rd</sup> Annual Meeting in Burlington, Vermont – July 13 to 17, 2008.

**References:**

NIST Handbook 130 – 2008 Edition – Uniform Laws and Regulations in the Areas of Legal Metrology and Engine Fuel Quality - Uniform Regulation for the Method of Sale of Commodities, pages 104-105.

**1.6. Fluid Milk Products.** – All fluid milk products, including but not limited to milk, lowfat.

**1.7. Other Milk Products.** – Cottage cheese, cottage cheese products, and other milk products that are solid, semi solid, viscous, or a mixture of solid and liquid, as defined in the Pasteurized Milk Ordinance of the U.S. Public Health Service, as amended in 1965, shall be sold in terms of weight.

**1.7.1. Factory Packaged Ice Cream and Similar Frozen Products.** – Ice cream, ice milk, frozen yogurt, and similar products shall be kept, offered, or exposed for sale or sold in terms of fluid volume.

**CFR TITLE 21--FOOD AND DRUGS** Section 101.105 Declaration of net quantity of contents when exempt.

(a) The principal display panel of a food in package form shall bear a declaration of the net quantity of contents. This shall be expressed in the terms of weight, measure, numerical count, or a combination of numerical count and weight or measure. The statement shall be in terms of fluid measure if the food is liquid, or in terms of weight if the food is solid, semisolid, or viscous, or a mixture of solid and liquid; except that such statement may be in terms of dry measure if the food is a fresh fruit, fresh vegetable, or other dry commodity that is customarily sold by dry measure. If there is a firmly established general consumer usage and trade custom of declaring the contents of a liquid by weight, or a solid, semisolid, or viscous product by fluid measure, it may be used. Whenever the Commissioner determines that an existing practice of declaring net quantity of contents by weight, measure, numerical count, or a combination in the case of a specific packaged food does not facilitate value comparisons by consumers and offers opportunity for consumer confusion, he will by regulation designate the appropriate term or terms to be used for such commodity.

To participate in the work on pelletized ice cream please contact: Lisa Warfield at NIST at [lisa.warfield@nist.gov](mailto:lisa.warfield@nist.gov) or at (301) 975-3308 or Cary P. Frye at the International Dairy Foods Association at [cfrye@idfa.org](mailto:cfrye@idfa.org) or at (202) 220-3543.

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## Specifications and Tolerances Committee Interim Agenda

Todd Lucas, Chairman  
Ohio Department of Department of Agriculture  
Weights and Measures

Reference  
Key Number

### 300 INTRODUCTION

The Specifications and Tolerances (S&T) Committee (“Committee”) will address the following items at its Interim Meeting. All items are listed below in Table A by Reference Key Number. The headings and subjects apply to NIST Handbook 44, “Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices.” The Appendices to the Report are listed in Table B. The acronyms for organizations and technical terms used throughout the agenda are identified in a glossary in Table C. In some cases background information will be provided for an item. The fact that an item appears on the agenda does not mean that the item will be presented to the Conference for a vote. The Committee will review its agenda at the Interim Meeting and may withdraw some items, present some items for information meant for additional study, issue interpretations, or make specific recommendations for change to NIST Handbook 44 which will be presented for a vote at the Annual Meeting.

The recommendations are statements of proposals and are not necessarily those of the Committee. Suggested revisions to the handbook are shown in **bold face print** by ~~striking out~~ information to be deleted and underlining information to be added. Requirements that are proposed to be nonretroactive are printed in **bold-faced italics**.

**Note:** The policy of NIST is to use metric units of measurement in all of its publications; however, recommendations received by the NCWM technical committees have been printed in this publication as submitted. Therefore, the report may contain references to inch-pound units.

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**Table C**  
**Glossary of Acronyms**

AWS	Automatic Weighing Systems	NEWMA	Northeastern Weights and Measures Association
BCS	Belt-Conveyor Scales	NIST	National Institute of Standards and Technology
CC	Certificate of Conformance	NTEP	National Type Evaluation Program
CWMA	Central Weights and Measures Association	NTETC	National Type Evaluation Technical Committee
EPO	Examination Procedure Outline	NW&SA	National Weighing and Sampling Association
GS	Grain Analyzer Sector	OEM	Original Equipment Manufacturer
GMM	Grain Moisture Meters	Pub 14	NCWM Publication 14
GPMA	Gasoline Pump Manufacturers Association	RMFD	Retail Motor-Fuel Dispenser
HB 44	NIST Handbook 44	SI	International System of Units
HB 130	NIST Handbook 130	SMA	Scale Manufacturers Association
LMD	Liquid-Measuring Device	SWMA	Southern Weights and Measures Association
LPG	Liquefied Petroleum Gas	WG	Work Group
MDMD	Multiple Dimension Measuring Devices	WMD	NIST Weights and Measures Division
MFM	Mass Flow Meter	WS	NTETC Weighing Sector
MMA	Meter Manufacturers Association	WWMA	Western Weights and Measures Association
MS	NTETC Measuring Sector	USNWG	NIST/OIML U.S. National Working Group
NCWM	National Conference on Weights and Measures, Inc.	VTM	Vehicle-tank Meters
<p>“Handbook 44” (HB 44) means the 2008 Edition of NIST Handbook 44 “Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices”</p> <p>“Handbook 130” (HB 130) means the 2008 Edition of NIST Handbook 130 “Uniform Laws and Regulations in the Areas of Legal Metrology and Fuel Quality”</p> <p><b>Note:</b> NIST does not imply that these acronyms are used solely to identify these organizations or technical topics.</p>			

**Details of All Items**  
**(In Order by Reference Key Number)**

### 310 GENERAL CODE

#### 310-1 G-S.8. Provision for Sealing Electronic Adjustable Components, G-S.8.1. Access to Calibration and Configuration Adjustments, and G-S.8.2. Automatic or Semi-automatic Calibration Mechanism

**Source:** 2008 Carryover Item 310-1. This item originated from the SWMA Committee and first appeared on the Committee’s 2008 agenda.

**Recommendation:** Amend General Code paragraph G-S.8. as follows:

**G-S.8. Provision for Sealing Electronic Adjustable Components.** – *A device shall be designed with provision(s) for applying a security seal that must be broken, or for using other approved means of providing security (e.g., data change audit trail available at the time of inspection), before any change that detrimentally affects the metrological integrity of the device can be made to any electronic mechanism.*  
[Nonretroactive as of January 1, 1990]



~~A device may be fitted with an automatic or a semi-automatic calibration mechanism. This mechanism shall be incorporated inside the device. After sealing, neither the mechanism nor the calibration process shall facilitate fraud.~~

(Added 1985) (Amended 1989 and **2008**)

**G-S.8.1. Access To Calibration and Configuration Adjustments. – A device shall be so designed that:**

**(a) The application of the physical security seal automatically disables the access, including external and remote access, to the calibration and configuration mode, or**

**(b) The calibration and configuration adjustments, including external and remote access, are protected by an approved audit trail, and in addition:**

**- The device shall not provide metrological indications that can be interpreted, or transmitted into memory, or printed while it is in the calibration and/or configuration adjustment mode as a correct measurement value, or**

**- The device shall clearly and continuously indicate that it is in the calibration and/or configuration adjustment mode and record such message if capable of printing in this mode.**

**(Nonretroactive as of January 1, 2009)**

**(Added 200X)**

**G-S.8.12. Multiple Weighing or Measuring Elements that Share a Common Provision for Sealing. – A change to any metrological parameter (calibration or configuration) of any weighing or measuring element shall be individually identified.**

**[Nonretroactive as of January 1, 2010]**

**Note: For devices that utilize an electronic form of sealing, in addition to the requirements in G-S.8.12., any appropriate audit trail requirements in an applicable specific device code also apply. Examples of identification of a change to the metrological parameters of a weighing or measuring element include, but are not limited to:**

- (1) a broken, missing, or replaced physical seal on an individual weighing, measuring, or indicating element or active junction box;
- (2) a change in a calibration factor or configuration setting for each weighing or measuring element;
- (3) a display of the date of calibration or configuration event for each weighing or measuring element; or
- (4) counters indicating the number of calibration and/or configuration events for each weighing or measuring element.

(Added 2007)

**G-S.8.3. Automatic or Semi-automatic Calibration Mechanism. – A device may be fitted with an automatic or a semi-automatic calibration mechanism. This mechanism shall be incorporated inside the device. After sealing, neither the mechanism nor the calibration process shall facilitate fraud.**

(Added 1993)

**Background/Discussion:** At its 2007 Annual Meeting, the SWMA received a proposal to add requirements to G-S.8. to assure that a device could not be sealed in the configuration mode and continue to operate normally. Such a condition could facilitate fraud. The proposal as submitted required that a device continuously indicate when access to the set-up mode was not disabled. The SWMA heard comments that manufacturers can incorporate into a device ways to indicate a device is in the calibration mode other than having an enunciator or other indication. Manufacturers also believe any changes to the requirements need to be nonretroactive. The SWMA S&T Committee agreed and modified the original proposal as shown above. The SWMA agreed to forward the modified

proposal to the NCWM S&T Committee with a recommendation that it be a Voting item on the Committee's agenda.

At the 2008 Interim Meeting, the Committee and the Meter Manufacturers Association (MMA) supported the proposal as presented. The Scale Manufacturers Association (SMA) recommended that, "The device shall provide an indication that it is in the setup mode." The Committee received a comment that as written the requirement that the device automatically exit the configuration mode after 60 minutes would not allow for a shorter timeframe.

The Committee reviewed the comments received during the open hearing and discussed the alternate proposals provided by WMD and SMA. The Committee agreed that if a device designed for commercial applications is capable of being "sealed" with external or remote access to the calibration or configuration mode, it is clearly in violation of the current G-S.8. Provision for Sealing Electronic Adjustable Components and G-S.2. Facilitation of Fraud and, therefore, no change to the existing language is needed. However, because of the ongoing disagreement on the interpretation of G-S.8. among the NTEP Laboratories, the Committee agreed to make changes to the proposal based on the concerns raised during the open hearing. The changes to the original proposal make a distinction between configuring a device to either enable or disable external or remote access to the calibration and configuration modes and taking the device out of a normal mode of operation and putting it into a special mode of operation where adjustments are made to calibration and configuration parameters. In other words, if the internal position of a switch or jumper enables external access to the calibration and configuration modes, the device will operate normally until an operator takes action such as entering a pass code, depressing and holding down a specific key, or uses other means to enter a special operating mode to make adjustments to calibration and configuration parameters. The Committee also believes that an indication for the adjustment mode of operation is only necessary for devices with approved category 1, 2, or 3 audit trails and that it not be operable in normal weighing or measuring operation.

The revised proposal states that:

- In the case of a device with a physical security seal, the application of the seal means that the external or remote access that enables the calibration and configuration modes is automatically disabled.
- In the case where a device has an approved audit trail, the device would be required to clearly and continuously indicate on the display (and printed if equipped with a printer) that it is in a calibration mode and not the normal operating mode.

The Committee did not include the proposed time limits for devices to remain in the calibration/configuration mode because suitable times are different for different types of devices. For example, a 15 kg scale is likely to need less time to adjust than a vehicle scale or wholesale meter. The Committee is also aware of NTEP evaluation procedures that require indications and recorded representations (while in the adjustment mode) be either clearly identified as being in the calibration or configuration adjustment mode by means of words, symbols, codes, or that metrological indications cannot be interpreted as valid measurements. The Committee decided to present the amended proposal as shown in the recommendation for a vote at the Annual Meeting.

The Committee received the report of the SMA's 2008 spring meeting. The SMA supported the need for clarification of G-S.8. and stated that paragraph G-S.8.1. part (a) in the above recommendation changed the original intent of the physical security seal and the wording of part (b) could be accomplished by changing the following wording to replace the current recommendation:

**G-S.8.1 Access To Calibration and Configuration Adjustments. – A device shall be so designed that access to calibration and configuration mode shall be protected by an approved category 1,2, or 3 method of sealing, and shall clearly indicate to the operator when in this mode.**

The Committee agreed with comments from the CWMA, NEWMA, and the NTEP participating laboratories 2008 spring meeting reports to delete the words "category 1, 2, or 3," and add language that the device shall clearly and continuously indicate and print, if equipped with a printer, that the calibration and configuration adjustment mode is enabled or that the device shall not operate while in this mode or shall not display a usable quantity value. NEWMA

recommended that this item be made “Informational” to allow more time for the NCWM and other interested parties to review and analyze the alternate proposals from the CWMA and SMA.

At the 2008 Annual Meeting, the Committee heard comments from WMD which noted that the alternate language submitted by SMA would require that *all* devices provide the operator with indications in the calibration mode. This would encompass mechanical and electronic devices, and devices that use category 1 physical seals. Additionally, WMD believes that a device does not need indications in a calibration or configuration mode if it is incapable of providing indications that can be interpreted, printed, or transmitted to a memory device as a correct measurement value. WMD suggested that the committee amend the recommendation to address some of the concerns noted by the CWMA, NTEP participating laboratories, and WMD since the 2008 Interim Meeting.

The Committee agreed with the comments from the CWMA, and WMD and amended paragraph G-S.8.1. as shown in the recommendations to:

- delete the references to the sealing categories of device,
- clarify printing requirements, and
- include an option that the device not operate or provide metrological indications that can be interpreted, or transmitted into memory or to recording elements while in this mode.

Just prior to the voting session, it was noted that the revised language in G-S.8.1.(a) was inadvertently changed to where it could be literally read that the physical seal itself disabled access to the adjustment mechanisms instead of preventing access to the mechanism. Consequently, the Committee changed the status of the item from Voting to Informational. The Committee believes that the intent of the recommendation is to ensure that the access to the calibration and configuration modes is disabled.

The Committee redrafted the language in paragraph G-S.8.1. and will submit the following revised language for G-S.8.1. to the regional weights and measures associations for further review and consideration.

**G-S.8.1. Access To Calibration and Configuration Adjustments - Electronic Devices. – An electronic device shall be so designed that access to calibration and configuration modes, including external and remote access, are only permitted when:**

- (a) **the application of the physical security seal shall ensure that the access to the calibration and configuration modes is disabled, or**
- (b) **the calibration and configuration adjustments are protected by an approved ~~category 1, 2, or 3~~ audit trail, and the device shall clearly and continuously indicate and print, if equipped with a printer, that the calibration and configuration adjustment modes are enabled.**

**During the calibration and configuration adjustment mode, electronic devices shall either;**

- **not provide metrological indications that can be interpreted, or transmitted into memory, or printed while it is in the calibration and/or configuration adjustment mode as a correct measurement value, or**
- **clearly and continuously indicate that it is in the calibration and/or configuration adjustment mode and record such message if capable of printing in this mode.**

**(Nonretroactive as of January 1, 200X)**

At its 2008 Annual Technical Conference, the WWMA supported the above alternate language for paragraph G-S.8.1. and recommended that this move forward as an Information item to allow further review, comments and recommendations by the NTETC Weighing and Measuring Sectors, the other regional associations, and other interested parties.

At its 2008 fall meeting, the NTETC Weighing Sector did not have sufficient time to review and provide comments on this item.

During its 2008 Interim Meeting, the CWMA and NEWMA supported the proposal as shown in the recommendation.

At its 2008 Annual Meeting, the SWMA heard no specific recommendations for change to the proposal during its open hearings. The Committee heard that the SMA plans to further review the item and may have additional recommendations to propose for consideration. The Committee supports the changes proposed by the NCWM S&T Committee at the July 2008 Annual Meeting, noting that there were some comments regarding portions of the language that may need to be addressed. If an agreement cannot be reached on proposed changes to these paragraphs, the NCWM S&T Committee may wish to consider at least incorporating interpretations and guidelines for the existing language in its reports. The Committee believes that additional work is needed before the item is ready for a vote. Consequently, the Committee is maintaining this as an Information item on its agenda.

### **310-2 Appendix D – Definition of Electronic Devices, Software-Based**

**Source:** 2008 Carryover Item. This item originated from the NTETC Software Sector and first appeared on the Committee's 2007 agenda as Developing Item Part 1, Item 2.

**Recommendation:** Add a new definition and cross-reference term to Appendix D in HB 44 for "Electronic devices, software-based" as follows:

**Electronic devices, software-based. Weighing and measuring devices or systems that use metrological software to facilitate compliance with Handbook 44. This includes:**

**(a) Embedded software devices (Type P), aka built-for-purpose. A device or element with software used in a fixed hardware and software environment that cannot be modified or uploaded via any interface without breaking a security seal or other approved means for providing security, and will be called a "P," or**

**(b) Programmable or loadable metrological software devices (Type U), aka not-built-for-purpose. A personal computer or other device and/or element with PC components with programmable or loadable metrological software, and will be called "U." A "U" is assumed if the conditions for embedded software devices are not met.**

**Software-based devices – See Electronic devices, software-based.**

**Background/Discussion:** During the NTETC Software Sector discussion on marking requirements and G-S.1.1. Location of Identification Information, it was initially suggested that the term "not-built-for-purpose" be removed from the wording in NIST HB 44 paragraph G-S.1.1. since there is no definition for a not-built-for-purpose device in HB 44. After a lengthy discussion related to the terms "built-for-purpose" and "not-built-for-purpose," the Sector agreed these terms were not clear and should be replaced with the terminology proposed above. The proposed definitions are based on the revision of OIML R 76 Non-automatic weighing instruments subsections 5.5.1. (Type P) and 5.5.2. (Type U).

At the 2008 Interim Meeting, the SMA supported the intent of the item, but stated that it is premature to place these definitions in HB 44. The SMA recommended that the status of the item be changed to Developing on the S&T Committee agenda. The Committee agreed to move Item 310-2 of the 2008 S&T Committee Interim Agenda and assign Developing status as 360-2 Part 1, Item 2.

During the NTETC Software Sector discussion on marking requirements and G-S.1.1. Location of Identification Information, it was initially suggested that the term "not-built-for-purpose" be removed from the wording in NIST HB 44 paragraph G-S.1.1. since there is no definition for a not-built-for-purpose device in HB 44. After a lengthy discussion related to the terms "built-for-purpose" and "not-built-for-purpose," the Sector agreed these terms were

not clear and should be replaced with the terminology proposed above. The proposed definitions are based on the revision of OIML R 76 Non-automatic weighing instruments subsections 5.5.1. (Type P) and 5.5.2. (Type U).

At the 2008 Interim Meeting, the SMA supported the intent of the item, but stated that it is premature to place these definitions in HB 44. The SMA recommended that the status of the item be changed to Developing on the S&T Committee agenda. The Committee agreed to move Item 310-2 of the 2008 S&T Committee Interim agenda and assign Developing status as 360-2 Part 1, Item 2.

At the 2008 Annual Meeting, the Committee heard comments from the former NTETC Software Sector Chairman indicating that the Sector had completed its review of this item and could not develop it any further. The Chairman requested that the Committee consider moving the item from the Developmental section of the agenda and at least make it an Information item on the Committee's agenda to facilitate discussion and comment on the proposed language.

The Software Sector has indicated that it has completed its work on the item and noted that sufficient information (including specific proposed language) was included in the submission to enable action by the Committee; consequently, the Committee agreed to change the status of the item from Developmental to Informational and will forward the item to the regional weights and measures associations.

At its 2008 Annual Technical Conference, the WWMA heard comments supporting the items as Informational until other interested parties had the opportunity to provide comments. The WWMA agrees that this item move forward as an Information item.

At its 2008 Interim Meeting, the CWMA heard comments during their open hearings in favor of the item and no comments were made in opposition. The CWMA recommends this item go forward as a Voting item.

At its 2008 Interim Meeting, NEWMA discussed how this item would affect field examination and verification of software. NEWMA recommends this item move forward as Informational.

At its 2008 Annual Meeting, the SWMA heard comments indicating that the Software Sector is seeking additional input on the proposed definitions and views the proposed changes as a first step in developing wider changes to the General Code and Definitions to better accommodate software-based devices. The SWMA agrees that additional review and study is needed before the proposal can be forwarded as a Voting item and, therefore, is maintaining this item as an Information item on its agenda. The SWMA encourages people to review this proposal and the proposal in Item 310-3 and provide input to the NCWM S&T Committee and the Software Sector. The SWMA is interested in comments from other organizations, including SMA. In the meantime, the Committee also offers the following comments for consideration:

- The term "software-based electronic devices" is not currently included in NIST Handbook 44. The Committee acknowledges that this proposal is a step toward a broader proposal; however, it believes it is inappropriate to include a definition for a term that isn't currently used in the handbook.
- There needs to be a definition and/or cross reference for the terms "Type P" and "Type U." A better approach might be to add a reference for "not-built-for-purpose;" include cross references for terms "Type P" and "Type U" to the terms "built-for-purpose" and "not-built-for purpose;" and develop proposed changes to the General Code to incorporate the new terms "Type P" and "Type U." This would ensure references to terminology that is being used in Handbook 44.

**310-3 G-S.1. Identification – (Software)**

**Source:** 2008 Carryover Item. This item originated from the NTETC Software Sector and first appeared on the Committee’s 2007 agenda as Developing Item Part 1, Item 1.

**Recommendation:** Amend G-S.1. and/or G-S.1.1. to include the following:

Method	NTEP CC No.	Make/Model/Serial No.	Software Version/Revision
<b>TYPE P</b> electronic devices shall meet at least one of the methods in each column:			
Hard-Marked	X	X	Not Acceptable <sup>1</sup>
Continuously Displayed	X	X	X
By command or operator action	Not Acceptable	Not Acceptable	X <sup>2</sup>
<sup>1</sup> If the manufacturer declares that the primary sensing element “software” is integral, has no end user interface and no print capability, the version/revision shall be hard marked on the device. Example: Primary sensing element may be Positive Displacement (P.D.) meter with integral correction, digital load cell (only for reference, not limiting).			
<sup>2</sup> Information on how to obtain the Version/Revision shall be included on the NTEP CC.			
Metrologically significant software shall be clearly identified with the software version. The identification may consist of more than one part but one part shall be only dedicated for the metrologically significant portion.			

Method	NTEP CC No.	Make/Model	Software Version/Revision
<b>TYPE U</b> electronic devices shall meet at least one of the methods in each column:			
Hard-Marked	X <sup>3</sup>	X	Not Acceptable
Continuously Displayed	X	X	X
Via Menu (display) or Print Option	Not Acceptable	X <sup>4</sup>	X <sup>4</sup>
<sup>3</sup> Only if no means of displaying this information is available.			
<sup>4</sup> Information on how to obtain Make/Model, Version/Revision shall be included on the NTEP CC.			
Metrologically significant software shall be clearly identified with the software version. The identification may consist of more than one part but one part shall be only dedicated for the metrologically significant portion.			

**Background/Discussion:** In 2005 the Board of Directors established a NTETC Software Sector. The tasks of the Sector are to:

- Develop a clear understanding of the use of software in today’s weighing and measuring instruments.
- Develop NIST HB 44 specifications and requirements, as needed, for software incorporated into weighing and measuring devices. This may include tools for field verification, security requirements, identification, etc.
- Develop NCWM Publication 14 checklist criteria, as needed, for the evaluation of software incorporated into weighing and measuring devices, including marking, security, metrologically significant functions, etc.
- Assist in the development of training guidelines for W&M officials in verifying software as compliant to applicable requirements and traceable to an NTEP Certificate. Training aids to educate manufacturers, designers, service technicians and end users may also be considered.

During their October 2007 meeting, the Sector discussed the value and merits of required markings for software. This included the possible differences in some types of devices and marking requirements. After hearing several proposals, the Sector agreed to the following technical requirements applicable to the marking of software.

1. The NTEP CC Number must be continuously displayed or hard marked,
2. The version must be software-generated and shall not be hard marked,
3. The version is required for embedded (Type P) software,
4. Printing the required identification information can be an option,
5. Command or operator action can be considered as an option in lieu of a continuous display of the required information, and
6. Devices with Type P (embedded) software must display or hard mark make, model, S.N. to comply with G-S.1. Identification.

The Sector recommended that the recommendation to amend G-S.1. and/or G-S.1.1. be given Developmental status since additional work is needed to develop the appropriate language to amend paragraphs G-S.1. and G-S.1.1. The Sector is also interested in receiving input from the weights and measures community about this item. Working with input from the weights and measures community, the Sector plans to introduce proposed modifications to current requirements through the regional weights and measures associations and other technical committees. In the meantime, the Sector welcomes opportunities to discuss this item at regional weights and measures associations to ensure the item is adequately addressed.

At the 2008 NCWM Annual Meeting, the Committee heard comments from the former NTETC Software Sector Chairman indicating that the Sector had completed its review of this item and could not develop it any further. He requested that the Committee consider moving the item from the Developmental section of the agenda and at least make it an Information item on the Committee's agenda to facilitate discussion and comment on the proposed language.

The Sector indicated that it has completed its work on the item and noted that sufficient information (including specific proposed language) was included in the submission to enable action by the Committee; consequently, the Committee agreed to forward the item to the regional weights and measures associations for consideration and will include this item on its 2009 Interim Agenda.

WMD has reviewed that Software Sector proposal and agrees that the proposed language has merit. However, the Software Sector did not include a recommendation on how to incorporate the proposal into existing G-S.1. and G-S.1.1. language. WMD studied the current and proposed language and was not sure how to address the various existing requirements and multiple non-retroactive dates. As a result of the study and analysis, WMD suggests the following changes to the General Code language on Identification be considered in the further review of this item. In brief, it divides the identification and marking location requirements for all devices and separable elements manufactured prior to, and after a date adopted by the Conference. Note that WMD developed two versions of proposed Table G-S.1.a. with the only difference being that the rows and columns are reversed. If the Conference agrees with the WMD-suggested incorporation of the Sector proposal, WMD suggests that the Conference indicate a preference to the formatting of Table G-S.1.a.

**G-S.1. Identification. – For all equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect and manufactured on or after January 1, 200X, shall be clearly marked as specified in Table G-S.1.a. Identification and explained in the accompanying notes in Table G-S.1.b. Notes for Table G-S.1. Identification for the purposes of identification:**

**For ~~a~~All equipment, except weights and separate parts necessary to the measurement process but not having any metrological effect and manufactured prior to January 1, 200X, shall be clearly and permanently marked for the purposes of identification with the following information:**

- (a) the name, initials, or trademark of the manufacturer or distributor;
- (b) a model identifier that positively identifies the pattern or design of the device;

- (1) *The model identifier shall be prefaced by the word “Model,” “Type,” or “Pattern.” These terms may be followed by the word “Number” or an abbreviation of that word. The abbreviation for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., No or No.). The abbreviation for the word “Model” shall be “Mod” or “Mod.” Prefix lettering may be initial capitals, all capitals, or all lowercase.*  
[Nonretroactive as of January 1, 2003]  
(Added 2000) (Amended 2001)
- (c) *a nonrepetitive serial number, except for equipment with no moving or electronic component parts and not-built-for-purpose, software-based devices;*  
[Nonretroactive as of January 1, 1968]  
(Amended 2003)
- (1) *The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number.*  
[Nonretroactive as of January 1, 1986]
- (2) *Abbreviations for the word “Serial” shall, as a minimum, begin with the letter “S,” and abbreviations for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., S/N, SN, Ser. No., and S. No.).*  
[Nonretroactive as of January 1, 2001]
- (d) *the current software version or revision identifier for not-built-for-purpose, software-based devices;*  
[Nonretroactive as of January 1, 2004]  
(Added 2003)
- (1) *The version or revision identifier shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required version or revision.*  
[Nonretroactive as of January 1, 2007]  
(Added 2006)
- (2) *Abbreviations for the word “Version” shall, as a minimum, begin with the letter “V” and may be followed by the word “Number.” Abbreviations for the word “Revision” shall, as a minimum, begin with the letter “R” and may be followed by the word “Number.” The abbreviation for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., No or No.).*  
[Nonretroactive as of January 1, 2007]  
(Added 2006)
- (e) *an NTEP Certificate of Conformance (CC) number or a corresponding CC Addendum Number for devices that have a CC. The CC Number or a corresponding CC Addendum Number shall be prefaced by the terms “NTEP CC,” “CC,” or “Approval.” These terms may be followed by the word “Number” or an abbreviation of that word. The abbreviation for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., No or No.)*  
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.

(Amended 1985, 1991, 1999, 2000, 2001, 2003 and 2006)

**G-S.1.1. Location of Marking Information for Not-Built-For-Purpose, Software-Based Devices.** – For not-built-for-purpose, software-based devices manufactured prior to January 1, 200X either:



(a) *The required information in G-S.1. Identification. (a), (b), (d), and (e) shall be permanently marked or continuously displayed on the device; or*

(b) *The Certificate of Conformance (CC) Number shall be:*

(1) *permanently marked on the device;*

(2) *continuously displayed; or*

(3) *accessible through an easily recognized menu and, if necessary, a submenu. Examples of menu and submenu identification include, but are not limited to, “Help,” “System Identification,” “G-S.1. Identification,” or “Weights and Measures Identification.”*

**Note:** *For (b), clear instructions for accessing the information required in G-S.1. (a), (b), and (d) shall be listed on the CC, including information necessary to identify that the software in the device is the same type that was evaluated.*

*[Nonretroactive as of January 1, 2004]*

(Added 2003) (Amended 2006)

<b>Table G-S.1.a. Identification</b> <b>for Devices Manufactured on or after January 1, 200X</b> (For applicable notes, see Table G-S.1.b.)			
<b>Required Marking</b>	<b>Full Mechanical Devices and Separable Mechanical Elements</b>	<b>Type P Electronic Devices and Separable Elements</b>	<b>Type U Electronic Devices and Separable Elements</b>
Name, initials, or trademark of the manufacturer or CC holder	Hard Marked	Hard Marked or Continuously Displayed	Hard Marked, Continuously Displayed, or Via Menu (display) or Print Option (5)
Model identification information that positively identifies the pattern or design of the device (1)	Hard Marked	Hard Marked or Continuously Displayed	Hard Marked, Continuously Displayed, or Via Menu (display) or Print Option (5)
Non-repetitive serial number (2)	Hard Marked	Hard Marked or Continuously Displayed	Not Acceptable
Software version or revision (3)	Not Applicable	Hard Marked (5), Continuously Displayed, or by Command (operator action) (6)	Continuously Displayed, or Via Menu (display) or Print Option (8)
Certificate of Conformance number or corresponding CC Addendum (4)	Hard Marked	Hard Marked or Continuously Displayed	Hard Marked (7) or Continuously Displayed
The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.			

Alternate Table G-S.1.a. with rows and columns reversed.

<b>Table G-S.1.a. Identification</b> <i>(Note: same as above table with columns and rows reversed)</i> <b>for Devices Manufactured on or after January 1, 200X</b> (For applicable notes, see Table G-S.1.b.)				
<b>Device Type</b>	<b>Name, Initials, or Trademark of the Manufacturer or CC Holder, and Model Identification Information that Positively Identifies the Pattern or Design of the Device (1)</b>	<b>Non-repetitive Serial Number (2)</b>	<b>Software Version or Revision (3)</b>	<b>Certificate of Conformance Number or Corresponding CC Addendum (4)</b>
Type P electronic devices and separable elements	Hard Marked or Continuously Displayed	Hard Marked or Continuously Displayed	Hard Marked (5), Continuously Displayed, or by Command (operator action) (6)	Hard Marked or Continuously Displayed
Type U electronic devices and separable elements	Hard Marked, Continuously Displayed, or Via Menu (display) or Print Option (5)	Not Acceptable	Continuously Displayed, or Via Menu (display) or Print Option (8)	Hard Marked (7) or Continuously Displayed
Full mechanical devices and separable mechanical elements	Hard Marked	Hard Marked	Not Applicable	Hard Marked
The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.				

<b>Table G-S.1.b. Identification</b>	
<b>Notes for Table G-S.1.a. Devices Manufactured on or after January 1, 200X</b>	
1)	The model identifier shall be prefaced by the word “Model,” “Type,” or “Pattern.” These terms may be followed by the word “Number” or an abbreviation of that word. <ul style="list-style-type: none"> <li>- The abbreviation for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., No or No.).</li> <li>- The abbreviation for the word “Model” shall be “Mod” or “Mod.” Prefix lettering may be initial capitals, all capitals, or all lowercase.</li> </ul>
2)	The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number. <ul style="list-style-type: none"> <li>- Abbreviations for the word “Serial” shall, as a minimum, begin with the letter “S,” and abbreviations for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., S/N, SN, Ser. No., and S. No.).</li> </ul>
3)	Metrologically significant software shall be clearly identified with the software version. The identification may consist of more than one part but one part shall be only dedicated for the metrologically significant portion. <ul style="list-style-type: none"> <li>- The version or revision identifier shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required version or revision.</li> <li>- Abbreviations for the word “Version” shall, as a minimum, begin with the letter “V” and may be followed by the word “Number.”</li> <li>- Abbreviations for the word “Revision” shall, as a minimum, begin with the letter “R” and may be followed by the word “Number.”</li> <li>- The abbreviation for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., No or No.).</li> </ul>
4)	An NTEP Certificate of Conformance (CC) number or a corresponding CC Addendum Number for devices that have a CC. The CC Number or a corresponding CC Addendum Number shall be prefaced by the terms “NTEP CC,” “CC,” or “Approval.” <ul style="list-style-type: none"> <li>- These terms may be followed by the word “Number” or an abbreviation of that word.</li> <li>- The abbreviation for the word “Number” shall, as a minimum, begin with the letter “N” (e.g., No or No.).</li> </ul>
5)	If the manufacturer declares that the primary <u>sensing</u> element “software” is integral, has no end user interface and no print capability, the version/revision shall be hard marked on the device. Example: Primary sensing element may be Positive Displacement (P.D.) meter with integral correction, digital load cell (only for reference, not limiting).
6)	Information on how to obtain the Version/Revision shall be included on the NTEP CC.
7)	Only permitted if no means of displaying this information is available.
8)	Information on how to obtain the name, initials, or trademark of the manufacturer or CC holder, model designation, and software version/revision information shall be included on the NTEP CC.

At their September 2008 meetings the WWMA and CWMA reviewed the WMD suggested for G-S.1. and Tables G-S.1.a. and G-S.1.b. and supported the proposal to amend G-S.1. and to include the marking requirements in a table format similar to other specific device codes. The WWMA also expressed a preference for the alternate Table G-S.1.a. and recommends that this item remain Informational for further review and discussion.

NEWMA also recommended this item move forward as Informational at their October 2008 Interim Meeting.

At its 2008 Annual Meeting, the SWMA heard comments during its open hearings from Gordon Johnson, Gilbarco, proposing that the words “not acceptable” in the third column for the entry “By command or operator action” be replaced with an “X” and a reference to footnote 2. Will Wotthlie, MD, stated that he would support the change to an “X,” but that a new footnote should be created; Will noted that, if the information is not going to be marked on a plate, the inspector would need a means to find the information without having to go to a CC to find out how to call it up. The SWMA acknowledged that this variation is already permitted for computer-based systems, but acknowledged that additional review is needed before proposing such a change. The SWMA believes that

additional input is needed on this issue before it is ready to move forward as a Voting item. The Committee is interested in comments from other organizations, including SMA on this issue. Consequently, the SWMA made this an Information item on its agenda.

### 310-4 G-N.3. Verification of Testing Standards

Note: This item was originally addressed under Item 330-2 in the Committee's 2008 Interim agenda. As a result of deliberations (see "Background/Discussion" below) at the 2008 Interim Meeting, the Committee decided to delete Item 330-2 and to address the issue in this new Item 310-4, which proposes adding a paragraph to the General Code to designate general requirements for all field standards. At the 2008 NCWM Annual Meeting, the Committee decided (as a result of comments received following the Interim Meeting) to reinstate Item 330-2 (which proposes an addition to the Liquid-Measuring Devices Code to specify pour and drain times for measuring device test standards) as an "Information" item; the Committee's rationale for this decision is outlined in Item 330-2. Note that the Committee retained Item 310-4 and presented that item as a Voting item at the Annual Meeting; however, the item did not receive sufficient votes to pass or fail and, therefore, was returned to the Committee.

**Source:** 2008 Carryover S&T Item 310-4. This item arose as a result of a proposal submitted by the CWMA. See note above.

**Recommendation:** Add the following paragraph G-N.3. to the General Code:

**G-N.3. Verification (Testing) Standards. – Field standards used in verifying weighing and measuring devices shall comply with the most current requirements of NIST Handbook 105 Series standards (or other suitable and designated standards) or the accuracy requirements expressed in Fundamental Considerations, paragraph 3.2. (i.e., one-third of the smallest tolerance applied).**

**(Added 200X)**

Delete corresponding paragraphs in the Scales Code, Automatic Bulk Weighing Systems Code, and the Automatic Weighing Systems Code as follows:

#### Scales Code:

~~N.2. Verification (Testing) Standards.—Field standard weights used in verifying weighing devices shall comply with requirements of NIST Handbook 105 Series standards (or other suitable and designated standards) or the tolerances expressed in Fundamental Considerations, paragraph 3.2. (i.e., one third of the smallest tolerance applied).~~

~~(Amended 1986)~~

#### Automatic Bulk Weighing Systems Code:

~~N.2. Verification (Testing) Standards.—Standard weights and masses used in verifying weighing devices shall comply with requirements of NIST Handbook 105-1 (Class F) or the tolerances expressed in Appendix A, Fundamental Considerations, paragraph 3.2. (i.e., one third of the smallest tolerance applied).~~

#### Automatic Weighing Systems Code:

~~N.1.3. Verification (Testing) Standards.—Field standard weights shall comply with requirements of NIST Handbook 105-1 (Class F) or the tolerances expressed in Fundamental Considerations, paragraph 3.2. (i.e., one third of the smallest tolerance applied).~~

**Background/Discussion:** This item was originally presented as Item 330-2 on the Committee's 2008 Interim agenda. The item was moved to Item 310-4. The Committee considered the following proposal from the CWMA to add a new paragraph N.4.6.:

**N.4.6. Pour and Drain Times for Hand-held Test Measures – Hand-held test measures require a 30-second ( $\pm$  5 seconds) pour followed by a 10-second drain, with the measure held at a 10- to 15-degree angle from vertical.**

**(Added 200X)**

The CWMA noted that HB 44 does not address pour or drain times for 5 gal test measures used to test retail motor-fuel devices. However, the pour and drain time requirements are in HB 112 Examination Procedure Outline Numbers 21 and 22 for Retail Motor-fuel Dispensers in Test Notes paragraph 2. They are also referenced in NIST HB 105-3 Specifications and Tolerances for Graduated Neck-Type Volumetric Field Standards Section 7. Test Methods and References.

Metrology labs are not routinely requiring that hand-held (5 gal) test measures be labeled with this information when the information is missing. Additionally, many hand-held test measures used by service agents and agencies do not specify drain times. Service agents, as a result, are using incorrect pour and drain times.

At the 2008 Interim Meeting, the Committee agreed that rather than putting a requirement in HB 44 stipulating pour and drain times for provers and test measures, it is preferable to reference the requirements in NIST Handbook 105-3 as follows:

**N.4.6. Verification (Testing) Standards. – Field standard provers and test measures used in verifying measuring devices shall comply with requirements of, and used in accordance with, NIST Handbook 105-3 standards (or other suitable and designated standards) and the tolerances expressed in Fundamental Considerations, paragraph 3.2. (i.e., one-third of the smallest tolerance applied).**

**(Added 200X)**

The Committee noted that the NIST 105 series handbooks are already referenced in Appendix A – Fundamental Considerations of HB 44. The Committee also noted that pour and drain times are referenced in NIST HB 112 EPOs and are referenced in NIST training materials and training presented by NIST. The Committee questioned whether a lack of uniformity in the application of Handbook 105-3 criteria is sufficient technical justification for including requirements in HB 44. However, the Committee acknowledged the concerns raised by some jurisdictions regarding the need for service companies to apply proper drain time and discussed alternative approaches to assist those jurisdictions and to emphasize the need to follow Handbook 105 series criteria.

In its review of the issue, the Committee noted that several of the weighing devices codes in HB 44 already include similar paragraphs referencing requirements for test standards. Since the application of Handbook 105 criteria is universal to all devices covered by HB 44, as referenced in the Fundamental Considerations, the Committee believes that including a paragraph in the Notes section of the General Code to reference the Handbook 105 series is more efficient than including references in each specific code. Consequently, the Committee developed a proposal to add a new paragraph G-N.3. Verification (Testing) Standards to the General Code and delete corresponding Notes paragraphs currently in the Scales Code, Automatic Bulk-Weighing Systems Code, and the Automatic Weighing Systems Code as outlined in the recommendation above. The Committee agreed to present this item for a vote.

In its spring 2008 report, the CWMA S&T Committee indicated that it heard comments that field inspectors may not carry the NIST HB 105 series. Comments were also heard that the proposed item be code specific to eliminate any confusion. The CWMA S&T Committee recommended that the item be included only in specific LMD code and not in the General Code.

In their spring 2008 report, NEWMA stated that some of the 105 series are out of date and that before this item is adopted, the series should be brought up to date. An example was made of 105-1 where OIML class F1/F2 is not recognized even though weights of that class are commonly used to test class II scales in the United States. NEWMA further stated that this should remain a Developing item while the 105 series is being updated by NIST.

The SMA stated that it supported this item at its 2008 spring meeting.

The Committee received comments from WMD indicating that, since pour and drain times are published in the EPOs and taught in WMD training, a reference to the 105 series in the General Code is more appropriate; particularly since NIST Handbook 105-3 Section 4.5.10.1. requires the marking of drain and delivery times on handheld test measures. With regard to concerns about update intervals for a particular 105 series handbook, WMD pointed out that the 105 series are already referenced in the Fundamental Considerations and have been for some time, and periods during which a handbook is being updated have apparently not posed any significant problems in the past. WMD also raised a concern over whether a trend for inclusion of references such as this in many individual codes might ultimately discourage the inspector and service company from referencing the Fundamental Considerations where other important information about necessary equipment and practices are found.

At the 2008 NCWM Annual Meeting, the Committee agreed that the proposed change to the General Code should remain as a Voting item since the language will provide guidance for device codes that do not specify the suitability and use of standards in the specific codes. The Committee also amended the proposal to address the concerns about the term “tolerances” by changing the term to “accuracy requirements” as shown below.

The Committee heard comments during the open hearing that specific hand-held test measure use requirements are still needed in the LMD Code for weights and measures officials and service agents. Therefore, the Committee recommends that language originally submitted by the CWMA be reinstated in the Committee’s report as an Information item on the agenda. The Committee also heard comments that the language in parentheses referring to “suitable and designated standards” is not clear with regard to what criteria are used to determine suitability and what entity “designates” the standards.

At its 2008 Annual Technical Conference, the WWMA heard a comment from one weights and measures jurisdiction during the open hearing that addition of paragraph G-N.3. will not ensure that service agents will following proper test procedures. The SMA supports this item, and recommends removal from the Scales Code, AWS Code and ABWS Code to the General Code. The WWMA recommends this be a Voting item, and also supports the specific requirements as stated in Item 330-2.

At its 2008 Interim Meeting, the CWMA believes other suitable and designated standards as stated in the original item came from Fundamental Considerations, Section 3. Testing Apparatus as referenced below. Therefore the CWMA recommends that the words “*or other suitable and designated standards*” be removed from the current proposal. The CWMA recommends the item move forward for a vote with the following changes.

**G-N.3. Verification (Testing) Standards. – Field standards used in verifying weighing and measuring devices shall comply with the most current requirements of NIST Handbook 105 Series standards (~~or other suitable and designated standards~~) or the accuracy requirements expressed in Appendix A – Fundamental Considerations, Section 3. Testing Apparatus.**  
**(Added 200X)**

At its 2008 Annual Meeting, the SWMA heard no comments on this item during its open hearings. The Committee considered the proposed changes from the CWMA which would strike the words “other suitable standards;” however, the Committee believes this language is necessary since there are not 105 Handbooks for every type of test standard. The Committee also noted that there is similar language in other handbook requirements and that it is generally understood that this refers to the approval authority of the weights and measures jurisdiction. The Committee supports the item as written and recommends that it be forwarded to the NCWM S&T Committee as a Voting item.

At its 2008 Interim Meeting, NEWMA reviewed and discussed the proposal which included comments that this requirement already exists in the Fundamental Considerations of HB 44 and as such may not be necessary. NEWMA does not support this item.

### **310-5 G-T.1. Acceptance Tolerances**

**Source:** Central Weights and Measures Association

**Recommendation:** Amend General Code paragraph G-T.1. Acceptance Tolerances as follows:

**G-T.1. Acceptance Tolerances.** – Acceptance tolerances shall apply to:

- (a) equipment to be put into commercial use for the first time;
- (b) equipment that has been placed in commercial service within the preceding 30 days and is being officially tested for the first time;
- (c) equipment that has been returned to commercial service following official rejection for failure to conform to performance requirements and is being officially tested for the first time within 30 days after corrective service;
- (d) equipment that is being officially tested for the first time within 30 days after **metrological adjustment or major reconditioning or overhaul**; and  
**(Amended 200X)**
- (e) equipment undergoing type evaluation.  
(Amended 1989)

**Background/Discussion:** At its 2008 interim meeting, the CWMA received comments that there are differences in how jurisdictions interpret G-T.1. Acceptance Tolerances. Several jurisdictions feel that when a seal on commercially used equipment is broken by other than a regulatory official, this action constitutes taking the device out of service. Furthermore, if metrological adjustments are made and the equipment was resealed, this would constitute placing the equipment back into service. It is believed that the 30-day window for applying acceptance tolerance would apply to this scenario.

The CWMA also noted that that equipment that “is adjusted” would require the application of acceptance tolerance according to HB 44 Appendix A – Fundamental Considerations in the second paragraph of Section 2.1. Tolerances for Commercial Equipment - Acceptance and Maintenance Tolerances.

## **320 SCALES**

### **320-1 S.2.1.6. Combined Zero-Tare (“0/T”) Key, S.2.3. Value of Tare Indication and Recorded Representations, S.2.4. Preset Tare Mechanism, Appendix D – Definitions for Tare Mechanism, Gross Weight Value, Net Weight, Net Weight Value, Tare, and Tare Weight Value**

**Source:** Carryover Item 320-6. (This item originated from the NTETC WS and first appeared on the Committee’s 2007 agenda.)

**Recommendation:** (NOTE: This item will be considered jointly with Item 324-2.) This recommendation clarifies the requirements for metrological tare (e.g., tare objects weighed or balanced off at the time of the transaction), tare accuracy, operating range, visibility, and preset tares (e.g., manually entered or stored tares for multiple transactions) as outlined in the recommendation below by:

1. Modifying the definition for “tare mechanism” and adding new definitions for “gross weight value,” “net weight,” “net weight value,” “tare,” and “tare weight value” to Appendix D.
2. Modifying paragraphs S.2.3. and S.2.3.1. and adding new paragraphs S.2.3.2. through S.2.3.8. and S.2.4. through S.2.4.3. to provide new requirements for tare accuracy, operating range, and visibility.

Amend the following definition for “tare mechanism:”

**tare mechanism.** A **tare-balancing and tare-weighing** mechanism (including a tare bar) designed for determining or balancing out the weight of packaging material, containers, vehicles, or other materials that are not intended to be included in net weight determinations **and for setting the net indication to zero when the tare object is on the load-receiving element** (See also “preset tare,” “tare-weighing mechanism” and “tare-balancing mechanism”).

**Notes:**

1. **Reducing the weighing range for net loads is known as subtractive tare (e.g.,  $\text{Net Weight} + \text{Tare Weight} \leq \text{Gross Weight Capacity}$ ).**
2. **Increasing the weighing range for gross loads without altering the weighing range for net loads on mechanical scales is known as additive tare (e.g., a tare bar on a mechanical scale with a beam indicator where  $\text{Net Weight} + \text{Tare Weight} \geq \text{Gross Weight Capacity}$ ).**

**The tare mechanism may function as:**

1. **a non-automatic mechanism (load balanced or weighed by an operator),**
2. **a semi-automatic mechanism (load balanced or weighed automatically following a single manual command), or**
3. **an automatic mechanism where the load is balanced or weighed automatically without the intervention of an operator. An automatic tare mechanism is only suitable for indirect sales to the customer (e.g., prepackaging scales).**

[2.20, 2.24]

**(Amended 200X)**

Add the following new definitions to Appendix D:

**gross weight value.** **Indication or recorded representation of the weight of a load on a weighing device, with no tare mechanism in operation.** [2.20, 2.24]

**(Added 200X)**

**net weight (net mass).** **The weight of a commodity excluding any materials, substances, or items not considered to be part of the commodity. Materials, substances, or items not considered to be part of the commodity include, but are not limited to, containers, conveyances, bags, wrappers, packaging materials, labels, individual piece coverings, decorative accompaniments, and coupons, except that, depending on the type of service rendered, packaging materials may be considered to be part of the service. For example, the service of shipping includes the weight of packing materials.** [2.20, 2.24]

**(Added 200X)**

**net weight value.** **Indication or recorded representation of the weight of a load placed on a weighing device after the operation of a tare mechanism.** [2.20, 2.24]

**(Added 200X)**

**preset tare.** **A numerical value, representing a weight that is entered into a weighing device (e.g., keyboard, recalling from stored data, or entered through an interface) and is intended to be applied to weighings without determining individual tares.**

**(Added 200X)**

**preset tare mechanism.** **A part of a weighing system for subtracting a preset tare value from a gross or net weight value and indicating the result of the calculation as a net weight. The weighing range for net loads is reduced accordingly.**



**Types of preset tare mechanisms include:**

- **keyboard tare. The operation of keys on a keyboard with a typical 10-key keyboard with values 0 through 9, by the pushing of a key numbered 5, the value 5 is entered as a tare value. For example, pressing the 0 then 5 key enters 0.05 as the tare value on a scale where  $d = 0.01$ .**
- **digital tare. By the repeated operation of a particular key, tare values are entered in amounts equal to the value of a scale division. For example, on a 25 lb x 0.01 lb scale, each time a specifically marked key is depressed, a tare is entered equal to 0.01 lb. If that key were depressed five times, the tare value would be equal to 0.05 lb.**
- **programmable tare. Preset (predetermined) tare values that are stored in memory for multiple transactions. They may be part of the product information on PLU (product look-up), preset product, or tare keys.**
- **stored tare. Preset (predetermined) tare values that are stored in memory for multiple transactions and are used predominately in vehicle scale applications.**
- **percentage tare. A preset tare value, expressed as a percentage (i.e., 5.6 %), that represents the percentage of tare material compared to the gross or net weight of the commodity. A percentage tare is one form of proportional tare.**
- **proportional tare. A preset tare value, automatically calculated by the scale, proportional to the gross weight indicated by the scale. A proportional tare can be a percentage tare or a fixed tare value relative to a range of gross weights (i.e., a 10 g tare for gross weights between 0 and 2 kg, a 20 g tare for gross weights between 2 and 4 kg, etc.). A proportional tare is, therefore, not limited to being a percentage tare.**

[2.20, 2.24]

(Added 200X)

**tare. The weight of packaging material, containers, vehicles, or other materials that are not intended to be part of the commodity included in net weight determinations. [2.20, 2.24]**

(Added 200X)

**tare-balancing mechanism. A tare mechanism with an indication that tare has been taken either semi-automatically or automatically and without an indication of the tare value (weight) when the instrument is loaded. A negative net weight is assumed to be the tare value when the weighing instrument is unloaded. [2.20, 2.24]**

(Added 200X)

**tare-weighing mechanism. A tare-balancing mechanism that stores the tare value that has been taken either semi-automatically or automatically and is capable of displaying (continuously or upon command) or printing the value whether or not the instrument is loaded. [2.20, 2.24]**

(Added 200X)

**tare weight value. The weight value of a load determined by a tare mechanism. [2.20, 2.24]**

(Added 200X)

Delete paragraph S.2.1.6. as follows (See proposed paragraph S.2.3.6.):

~~**S.2.1.6. Combined Zero-Tare (“0/T”) Key.**— Scales not intended to be used in direct sales applications may be equipped with a combined zero and tare function key, provided that the device is clearly marked as to how the key functions. The device must also be clearly marked on or adjacent to the weight display with the statement “Not for Direct Sales.”~~

~~**(Added 1998)**~~

Amend paragraph S.2.3. and S.2.3.1. as follows:

## **S.2. Design of Balance, Tare, Level, Damping, and Arresting Mechanisms.**

~~**S.2.3. Tare:** *On any scale (except a monorail scale equipped with digital indications, and multi-interval scales and multiple range scales when the value of tare is determined in a lower weighing segment or weighing range), the value of the tare division shall be equal to the value of the scale division.\**—The tare-weighing and tare-balancing mechanism shall operate only in a backward direction (that is, in a direction of underregistration) with respect to the zero-load balance condition of the scale. A device designed to automatically clear any tare value shall also be designed to prevent the automatic clearing of tare until a complete transaction has been indicated.\*~~

~~**(Amended 1985 and 200X)**~~

~~*[Note: On a computing scale, this requires the input of a unit price, the display of the unit price, and a computed positive total price at a readable equilibrium. Other devices require a complete weighing operation, including tare, net, and gross weight determination.]\**~~

~~*[\*Nonretroactive as of January 1, 1983]*~~

~~**S.2.3.1. Scale Interval (Division) and Capacity.** *On any scale (except a monorail scale equipped with digital indications, multi-interval scales and multiple range scales when the value of tare is determined in a lower weighing segment or weighing range), the value of the tare-weighing division shall be equal to the value of the scale division for any given load and shall not be operable above its maximum capacity.*~~

~~*[Nonretroactive as of January 1, 1983]*~~

~~**(Added 200X)**~~

~~**S.2.3.1.1. Monorail Scales Equipped with Digital Indications.** – On a static monorail weighing system equipped with digital indications, means shall be provided for setting any tare value of less than 5 % of the scale capacity to within 0.02 % of scale capacity. On a dynamic monorail weighing system, means shall be provided to automatically maintain this condition.~~

~~**(Amended 1999)**~~

~~**S.2.3.1.2. Multi-interval Scales.** – On multi-interval scales, the tare capacity is limited to the capacity of the first weighing segment and the value of the tare division shall be equal to the value of the scale division from the first weighing segment.~~

~~**(Added 200X)**~~

~~**S.2.3.1.3. Multiple Range Scales.** – On multiple range scales, the tare capacity may be operable in the greater weighing ranges if it is possible to switch to a greater weighing range with a load on the scale. The value of the tare division shall be equal to the value of the scale division from the weighing range where the tare was determined.~~

~~**(Added 200X)**~~

Add new paragraphs S.2.3.2. through S.2.3.8. as follows:

**S.2.3.2. Accuracy. – A tare-weighing or -balancing mechanism shall permit setting the net indication to zero with an accuracy equal to or better than:**

**± 0.25 d for electronic weighing devices and any weighing device with an analog indication, and**

**± 0.5 d for mechanical weighing devices with a digital indication (e.g., weighbeams with only notched poises and no sliding poises).**

**On a multi-interval scale, d shall be replaced by  $d_1$  (division value of the first weighing segment).**

**(Added 200X)**

**S.2.3.3. Visibility of Operation. – Operation of the tare mechanism shall be visibly indicated on the instrument. In the case of instruments with digital indications, this shall be done by marking the indicated net value with the word “NET” or the symbol “N”. “NET” may be displayed as “NET”, “Net” or “net”. If a scale is equipped with an indicator that allows the gross value to be displayed temporarily while a tare mechanism is in operation, the “NET” symbol shall disappear while the gross value is displayed.**

**(Added 200X)**

**S.2.3.4. Subtractive Tare Mechanism. – After any tare operation and while tare is in effect, an indicating or recording element shall not display nor record any values when the gross load (not counting the initial dead load that has been canceled by an initial zero-setting mechanism) is in excess of 105 % of scale capacity after tare has been taken.**

**(Added 200X)**

**S.2.3.5. Semi-automatic or Automatic\* Tare-Balancing or Tare-Weighing Mechanisms. – These mechanisms shall be operable or accessible only by a tool outside of and separate from this mechanism or they shall be enclosed in a cabinet, or they shall be operable only when the indication is stable within:**

**(a) ± 3 scale divisions for scales of more than 2000 kg (5000 lb) capacity in service prior to January 1, 1981, and for all axle-load, railway track, and vehicle scales; or**

**(b) ± 1 scale division for all other scales.**

**\* Automatic tare mechanisms are not permitted for direct sales to the public.**

**(Added 200X)**

**S.2.3.6. Combined Zero-setting and Tare-balancing Mechanisms (0/T Key). – Scales not intended to be used in direct sales to the public may be equipped with a combined zero and tare function key, provided the device is clearly marked as to how the key functions. If the semi-automatic zero-setting mechanism and the semi-automatic tare-balancing mechanism are operated by the same key, the following apply at any load:**

**(a) After zero/tare setting, the effect of accuracy of the zero setting shall be not more than ± 0.25 d.**

**(b) A “center-of-zero” condition shall either automatically be maintained to ± 0.25 scale division or less or have an auxiliary or supplemental “center-of-zero” indicator that defines a zero-balance condition to ± 0.25 scale division or less.**

- (c) A zero-tracking mechanism, if equipped, shall operate only when:
  - the indication is at zero, or at a negative net value equivalent to gross zero, and
  - the weight indication is stable.
- (d) The scale must also be clearly marked on or adjacent to the weight display with the statement “Not for Direct Sales.”

(Added 200X)

S.2.3.7. Consecutive Tare Operations. – Repeated operation of a tare mechanism (including preset tare) is permitted for single transactions with one gross, one net, and multiple tare values. If more than one tare mechanism is operative at the same time, tare weight values shall be clearly designated (identified) with either “T” for tare or “PT” for preset tare as appropriate when indicated or printed.

(Added 200X)

S.2.3.8. Indication and Printing of Weighing Results.

- (a) Gross weight values may be printed without any designation or by using a complete word or symbol. For a designation by a symbol, only uppercase “G” is permitted.
- (b) If only net weight values are printed without corresponding gross or tare values, they may be printed without any designation or by using a complete word or symbol. The complete word “Net” or symbol “N” shall be used to designate a net weight as shown in S.2.3.3. Visibility of Operation. This applies also where semi-automatic zero-setting and semi-automatic tare balancing are initiated by the same key.
- (c) Gross, net, or tare values determined by a multiple range instrument or by a multi-interval instrument need not be marked by a special designation referring to the (partial) weighing range.
- (d) If net weight values are printed together with the corresponding gross and/or tare values, the net and tare values shall be identified at least by the corresponding symbols “N” and “T” or by complete words using all upper-case letters, all lower-case letters, or a combination of upper- and lower-case letters.
- (e) If net weight values and tare values determined by different tare mechanisms are printed separately for single transactions with multiple gross, tare, and net values, they shall be suitably identified (e.g., vehicle sequentially loaded with mixed commodities).

(Added 200X)

Add new paragraphs S.2.4., and S.2.4.1. as follows:

S.2.4. Preset Tare Mechanism, Operation. – In addition to the provisions of paragraphs S.2.3. Tare and S.2.3.1. Scale Interval, a preset tare mechanism may be operated together with one or more tare devices provided:

- (a) the preset tare mechanism complies with paragraph S.2.3.7. Consecutive Tare Operations, and
- (b) the preset tare operation cannot be modified or cancelled as long as any tare mechanism operated after the preset tare operation is still in use,
- (c) the preset tare associated with a price look-up (PLU) shall be automatically cancelled at the same time a PLU is cancelled, and

- (d) the preset tare values are designated by the symbol “PT”; however, it is permitted to replace the symbol “PT” with complete words.**

**A preset tare may operate automatically only if the preset tare value is clearly identified with the load to be measured (e.g., part of the product look-up information).**

**(Added 200X)**

**S.2.4.1. Indication of Operation. – It shall be possible to temporarily indicate the preset tare value (e.g., pressing a tare display button or by indicating a negative net weight with no load on the load-receiving element). In addition to the provisions of paragraph S.2.3.8. Indication and Printing of Weighing Results, the calculated net value is printed and at least the preset tare value is printed, with the exception of:**

- (a) a Class II or a Class III instrument with a maximum capacity not greater than 100 kg (200 lb) used in direct sales to the public,**
- (b) price computing scales, and**
- (c) nonautomatic weigh/price labeling scales.**

**(Added 200X)**

**Background/Discussion:** This WS proposal is one of several proposed modifications to HB 44 requirements intended to clarify the acceptable tare features already recognized for use in commercial applications. Scales Code requirements do not include sufficiently detailed language to identify all types of tare, define how tare features must operate, or specify the net and tare values a scale must indicate and record. Current HB 44 requirements that address tare include paragraphs S.2.1.6. Combined Zero-Tare (“0/T”) Key; S.2.3. Tare; S.2.3.1. Monorail Scales Equipped with Digital Indications; and T.N.2.1. General (Tolerances).

The WS developed criteria used to type evaluate tare features based on General Code paragraph G-S.2. Facilitation of Fraud and other requirements that apply to indicating and recording elements and recorded representations. NTEP laboratories find it has become increasingly difficult to base compliance decisions solely on paragraph G-S.2. because the general nature of the language results in multiple interpretations. Type evaluation criteria are published in NCWM Publication 14; however, this document is not in wide distribution in the weights and measures community. Additionally, only a limited number of weights and measures officials, device manufacturers, and device owners and operators are regular participants in WS meetings where tare evaluation criteria are developed and discussed. It is difficult for parties responsible for the design, use, and test of the tare feature to interpret and apply technical requirements published in Publication 14. This results in differing interpretations of HB 44 requirements.

In 2006 the NTETC WS formed a Tare WG to review existing tare requirements and make recommendations as to how tare should operate on a single range scale, a multiple range scale, and a multi-interval scale. The WG was asked to develop, where necessary, recommendations for changes to Publication 14, HB 44, and HB 130 and to provide guidance to the WS on type evaluation requirements.

The WG developed proposals to amend HB 44 requirements to:

- a. ensure a tare feature operates in a manner that increases the accuracy of net weight determinations,
- b. state clearly what information and values are permitted and required for indicated and recorded representations of net weight and tare weight, and
- c. identify the types (e.g., semiautomatic and stored) of tare weight values determined at the time objects are weighed or tare weight values are determined prior to the time objects are weighed.

At its 2007 Annual Meeting, the WS reviewed the final recommendation of the Tare WG and recommended that the NIST technical advisor submit a number of Tare WG recommendations to the weights and measures regional association and the NCWM S&T Committees.

At that meeting, the WS stated that the Tare WG had completed its work. The Sector agreed that most of the proposed language is currently verified in Publication 14 with G-S.2. Facilitation of Fraud, S.2.1.6. Combined Zero/Tare (0/T) Key, and S.2.3. Tare, listed as the HB 44 code references. The WG did not change any existing HB 44 tare requirements but recommended an amended definition for “tare mechanism.” The Sector agreed with the WG that the proposed items for calculated weights and the identification of preset tare weights go beyond what is currently evaluated by NTEP and recommended these items be split into separate proposals on the NCWM S&T agenda.

At their fall 2007 meetings, the WWMA and SWMA heard support from the NTETC WS and SMA to put forth the new NTETC WS version of the proposal. The WWMA agreed that the additional definitions would clarify tare-related terms. It also agreed that the Tare WG’s suggested changes would further harmonize NIST HB 44 with the latest version of R 76. Therefore, the WWMA and SWMA recommended the proposal, with the additions from the Tare WG, move forward as a Voting item on the NCWM S&T Committee agenda.

At its 2007 Interim Meeting, the CWMA agreed that tare needs to be further defined in HB 44. The CWMA recommended the proposal be broken up into several parts in order to provide better clarification. The CWMA and NEWMA recommended this proposal be moved to Developmental until it can be divided into more manageable sections.

During the 2008 NCWM Interim Meeting, the Committee heard support for the intent of this item. In response to questions from the audience, the Committee clarified the term “additive tare” by providing an example of a mechanical scale with an ungraduated tare bar that does not reduce the net capacity of the scale. Additionally, the NIST Technical Advisor stated that the Tare WG did not believe that a definition for “additive tare” was needed since both subtractive tare and additive tare are described within the proposal to amend the definition of “tare mechanism.” The Committee considered the recommendations from the CWMA and NEWMA to split this item into more manageable sections. However, the Committee could not find a way to effectively split the proposal since the requirements in the proposal are interrelated.

During the Committee discussions on this item, the following clarifications for “consecutive tare operations” and “transactions using different tare mechanisms” were provided by Mettler Toledo.

**“Consecutive tare operations”** in proposed paragraph S.2.3.7. are described as a single transaction with one gross, one net, and multiple tare values. Examples include but are not limited to:

- (1) The sales of wrapped candy sold in bulk where a metrological tare (weighed) for a bag and a preset (percentage) tare for the candy wrappers are used to determine the net weight of the candy.
- (2) The loading of a vehicle with bins of products (where the preset tare weight for the bins were predetermined). If indicated and/or printed, the representation of tare would include the value of the metrological tare (T) and the summed values of the preset tare (PT).

**“Net weight values and tare values determined by different tare mechanisms”** in proposed paragraph 2.3.8.(e) includes single transactions with multiple gross, tare, and net determinations. For example, an unloaded vehicle would first be weighed to determine tare, loaded with a commodity, and reweighed to determine the gross weight and the net weight for that commodity. The vehicle would then be loaded with a different commodity and reweighed to determine a new gross weight. The second gross weight would be used to calculate the net weight of the second commodity by taking the difference between the second “tare” weight (gross weight of the first commodity) and the second gross weight (total weight of unloaded vehicle and both commodities).

Based on the clarifications, the Committee amended proposed paragraphs S.2.3.7. and S.2.3.8.(e) in this item. The Committee also moved the language from the originally proposed paragraph S.2.3. in its Interim agenda to paragraph S.2.3.1. to group together the language referring to scale intervals. The Committee also deleted the originally proposed subparagraphs S.2.3.9.(f) and (g). (Note: S.3.9. was renumbered to S.2.3.8. in the above proposal.) Since the language for “calculated net weights” was not fully developed or understood by the Committee,

the Committee recommended that the subject of calculated net weights be submitted as a separate proposal for future consideration. Additionally, the Committee amended the proposed paragraph S.2.4.2. to remove requirements already stated in paragraph S.2.3.8. and deleted the "Note" since it addresses scales with a "O/T key" that are already marked with the statement "Not for Direct Sales" in the current HB 44 and the above proposed paragraph S.2.3.6.

At their 2008 spring meetings, the SMA, the CWMA and NEWMA, opposed this as a Voting item and recommended that the item be made Informational to allow for further development and evaluation. The rationale for this position was that the proposal was significantly amended from the language in the recommendation appearing in the 2008 Interim agenda and that there were some questions regarding with some of the definitions and how they are intended to be applied.

The CWMA also recommended that this should be split into two sections and that the Weighing Sector should consider doing a practical review of the language using one or more devices.

NEWMA also recommended that this item be posted on the NCWM website and appropriate list servers along with a summary of how this item would appear in HB 44 if adopted.

The Committee agreed with the comments that this item needs additional time for review and analysis and that the item be given Information status. The Committee also recommends that the NIST technical advisor develop a 1 to 2-hour technical presentation on the proposed tare requirements that will be available to the regional weights and measures associations and the NTETC Weighing Sector and posted on the WMD and NCWM websites.

For additional background information, refer to the Committee's 2007 Annual Report.

At its 2008 Annual Technical Conference, the WWMA considered a request from the SMA asking the WWMA to keep this an Information item until it has an opportunity to discuss it and make comments after its fall meeting. The NIST Technical Advisor gave a presentation at the WWMA that provided clarification. The Committee recommends this presentation be made available at the other regional meetings. The Committee recommends this item remain Informational.

At its 2008 Interim Meeting, the CWMA heard comments during discussion that:

- The tare information language should be put in Handbook 44 format for viewing.
- New language is needed for type evaluation and the tare information from Publication 14 might be referenced in Handbook 44.
- More training with detailed examples should be placed in Handbook 44 format.

The CWMA is looking forward to the presentation to be given by NIST advisors in the near future. The CWMA recommends this item remain Informational.

At its 2008 Annual Meeting, the SWMA heard no opposition to this item during its open hearings; however, the Committee believes that, because of the complexity of the issue and the number of new terms involved, the item should remain an Information item. The Committee heard that Steve Cook, NIST WMD, developed and presented an excellent presentation on this issue at the Western Weights and Measures Association Meeting in September 2008. Tina Butcher, NIST WMD, reported that Steve plans to post this presentation on the NIST WMD website in the near future. Steve also prepared two related articles intended to assist the community in its review of these issues. The Committee supported a recommendation to ask that Steve give this presentation at the NCWM Interim and Annual Meetings to help provide additional background to the community on these proposals.

During its 2008 Interim Meeting, NEWMA recommended this item remain Informational.

**320-2 T.N.4.6. Time Dependence (Creep) for Load Cells During Type Evaluation and T.N.4.7. Creep Recovery for Load Cells During Type Evaluation**

**Source:** 2008 S&T Committee

**Recommendation:** The text of the proposal will be presented at the 2008 WWMA Annual Technical Conference and added to subsequent revision of the DRAFT Interim agenda.

**Discussion:** The Committee received a “priority” request to add a proposal as a Voting item to the Committee’s agenda. The request to add the item as a Voting item was not approved according to criteria in HB 44 Introduction Section H (c) Exceptions to Policy for Submission of Items to a Committee Agenda; Submission of Priority Items. However, the Committee agreed to discuss this item during the Annual Meeting. As a result of these discussions, the Committee added this item to its list of carryover items as an Information item and recommended that the NIST Technical Advisor work with the submitter of the item to develop a proposal to amend Table T.N.4.6. and add a table for designating loading and unloading times for consideration by the regional weights and measures associations to the 2009 NCWM Interim Meeting.

During their 2008 fall meetings WWMA, CWMA, SWMA, and NEWMA heard from representatives of the SMA stating that additional load cell manufacturers will discuss this issue at the November 2008 SMA meeting and expects to have a proposal that the NCWM S&T Committee can consider at the 2009 Interim Meeting. Until such time that an alternate proposal is developed for consideration, the regional weights and measures associations recommend maintaining this item as an Information item on its agenda. The regional associations encourage the load cell manufacturers and SMA in their efforts to develop a proposal that can be considered for voting at the 2009 NCWM Annual Meeting.

**320-3 S.1.7. Automatic Zero-Setting Mechanism**

**Source:** 2008 NTETC Weighing Sector

**Recommendation:** Add a new paragraph and definition for Automatic Zero-Setting Mechanism as follows:

**Add the following new paragraph as follows:**

**S.2.1.7. Automatic Zero-Setting Mechanism – If equipped, an automatic zero-setting mechanism shall operate only when the indication has remained;**

**(a) stable according to S.2.5. Damping Means, and**

**(b) below zero for at least 5 seconds.**

**The maximum effect of automatic zero-setting mechanism is limited to 4 % of the nominal capacity of the scale and is a sealable parameter.**

**(Added 200X)**

**Amend paragraph S.2.1.3.3. as follows:**

***S.2.1.3.3. Means to Disable Automatic Zero-Tracking and Automatic Zero-Setting Mechanisms on Class III L Devices. – Class III L devices equipped with ~~an~~ automatic zero-tracking and automatic zero-setting mechanisms shall be designed with a sealable means that would allow automatic zero-tracking and automatic zero-setting to be disabled during the inspection and test of the device.***

***[Nonretroactive as of January 1, 2001]***

**(Amended 200X)**

**Amend HB 44 Appendix D by adding a new definition for automatic zero-setting mechanism and move the current definition for initial zero-setting mechanism as a type of zero mechanism as follows:**



**zero-setting mechanism.** Means provided to attain a zero balance indication with no load on the load-receiving element. ~~Five~~ **Three** types of these mechanisms are: [2.20]

**automatic zero-setting mechanism. Automatic means provided to maintain the zero balance indication without the intervention of an operator. [2.20, 2.22, 2.24]**

**(Added 200X)**

**automatic zero-tracking mechanism.** Automatic means provided to maintain the zero balance indication, within certain limits, without the intervention of an operator. [2.20, 2.22, 2.24]

**initial zero-setting mechanism.** Automatic means provided to set the indication to zero at the time the instrument is switched on and before it is ready for use. [2.20]

(Added 1990)

**manual zero-setting mechanism.** Nonautomatic means provided to attain a zero balance indication by the direct operation of a control. [2.20]

**semiautomatic zero-setting mechanism.** Automatic means provided to attain a direct zero balance indication requiring a single initiation by an operator. [2.20]

**Background/Discussion:** At its 2008 Annual Meeting, the NTETC Weighing Sector discussed an issue on an increasing number of scales submitted for NTEP evaluations that include an “automatic zero-setting” feature not addressed in NIST HB 44. It has been noted that many devices are built for a global marketplace and that the operation of this “automatic zero-setting” device may be functional on the device when installed in the United States. Currently, HB 44 does not define this function. NCWM Pub 14 has no test to determine if the device submitted for evaluation has such a function, or if it is sealable. The automatic zero-setting mechanism on a scanned/scale submitted to NTEP could be enabled and disabled by means of a bar code read by the scanner.

In the past, several of the NTEP labs, when asked about this “feature” have indicated that since it does not meet the definition of “automatic zero-tracking” mechanism, it is not allowed. Additionally, the Sector agreed that HB 44 does not clearly state that this function is not allowed which may lead to inconsistent interpretations of Section 2.20. Scales paragraphs S.1.1.(c) (Zero Indication – “. . . return to a continuous zero indication”) and S.1.1.1.(b) (Digital Indicating Elements – “*a device shall either automatically maintain a “center-of-zero” condition. . .*”) could be interpreted to allow the automatic zero-setting device as described in OIML R 76. That may not be a universal interpretation.

The Sector concluded that:

- (a) There is a problem that needs to be solved, based on the current information or lack of information in HB 44.
- (b) There are no technical reasons why the feature automatic zero-setting as described in OIML R 76 should not be included in NIST Handbook 44.
- (c) The feature may not be suitable for all applications if it is allowed to function with both positive and negative weight indications.
- (d) Language will need to be developed for NCWM Publication 14 to either test for the correct function of “automatic zero-setting” or test to determine that the device does not have “automatic zero-setting” and it is a sealable parameter.

The Sector established a small WG to develop language to be submitted the NCWM S&T Committee and make a recommendation addressing the suitability of scales with the capability to automatically set a positive weight indication to zero. The group, which included Scott Davidson (Mettler-Toledo), Scott Henry (NCR), Steve Cook

(NIST Technical Advisor), and Stephen Patoray (Consultant), volunteered to develop a proposal for the S&T Committee. (Todd Lucas, Ohio NTEP laboratory and Jim Truex, NTEP Administrator also contributed to the discussions and subsequent proposal.) Additionally, the Sector agreed to review the language developed by the WG to confirm its support of the proposed language.

In the process of developing the proposal, the WG recommends the following:

1. Making the proposal to add automatic zero-setting “retroactive” since the group is aware that the feature has been included on several scales for nearly 20 years and may not have been activated. The group considered alternate retroactive dates, but felt that the proposed requirements for the feature should be applicable to all scales incorporating this feature. Additionally, NCWM Publication 14 NTEP technical policies state that only the standard features and options that have been evaluated will be included on the CC. As a result, an NTEP applicant will have to submit an application to NTEP in order to have the automatic zero-setting feature listed on an existing CC.
2. The automatic zero-setting mechanism shall be limited to operating only when the scale indication is below zero. The group discussed allowing the feature to operate in both directions. Although there may be valid reasons for allowing it in the positive direction, the group felt that legitimate objects on a scale could be inadvertently (or intentionally) zeroed without an obvious indication to the customer or operator when the scale was indicating zero at the start of a transaction.
3. The automatic zero-setting mechanism should be considered as a “sealable parameter” since there are applications where it is required to be disabled, and if the time, stability, and capacity parameters can be adjusted beyond the limitations in the proposal.
4. Publication 14 evaluation and field examination procedures should be amended to verify that the automatic zero-setting mechanism cannot set the scale to a zero indication in less than five seconds and it can only operate if it complies with motion detection requirements and its effect is no larger than 4 % on the nominal scale capacity.
5. The automatic zero-setting mechanism should be capable of being disabled for testing purposes for the same reasons that zero-tracking is capable of being disabled for Scales Code Class III L devices.
6. The group noted the current definition for initial zero-setting mechanism as a type of zero mechanism and should be included with the definition on zero-setting mechanism as shown in the recommendation.
7. The Committee is asked to consider recommending changing “automatic zero-tracking” to “zero-tracking” throughout the weighing codes in order to reduce the confusion with the term and definition for “automatic zero-setting” and the word “automatic” is redundant for zero-tracking since it is used in its definition.

The WG did not have sufficient time to both develop the proposal and ballot the Sector prior to the November 1, 2008, cutoff date for submitting new items to the Committee. Therefore, the group agreed to submit the proposal to the Committee and ballot the Sector members. (Note: The ballot will also ask the Sector if it agrees with submitting a recommendation to the NTEP Committee that an existing CC may be amended upon a successful review on an application and documentation to amend an existing CC.) The results of the ballot and all comments will be summarized and forwarded to the Committee prior to the 2009 NCWM Interim Meeting.

## 321 BELT-CONVEYOR SCALE SYSTEMS

### 321-1 UR.3.2.(c) Maintenance; Zero Load Tests

**Source:** 2008 Western Weights and Measures Association (WWMA) (This item last appeared on the 2008 Committee's Developing agenda as item 360-2 Part 3 Item 1.)

**Recommendation:** Modify UR.3.2.(c) as follows:

**UR.3.2. Maintenance.** – Belt-conveyor scales and idlers shall be maintained and serviced in accordance with manufacturer's instructions and the following requirements:

- (c) ~~Zero-load and load (simulated or material) tests, simulated load tests, or material tests, and zero load tests~~ shall be conducted at periodic intervals between official tests in order to provide reasonable assurance that the device is performing correctly. The minimum interval for periodic zero-load tests and simulated load tests shall be established by the official with statutory authority.  
(Amended 200X)

The action to be taken as a result of the zero-load tests is as follows:

- if the change in zero is less than  $\pm 0.25$  %, adjust the belt-conveyor scale system to zero and proceed to a simulated load test or return the conveyor to operation.
- if the change in zero is  ~~$\pm 0.1$  % to  $\pm 0.25$  %~~ to  $\pm 0.5$  %, inspect the conveyor and weighing area for compliance with UR.2. Installation Requirements and repeat the zero-load test.
- if the change in zero is greater than  $\pm 0.5$  %, inspect the conveyor and weighing area for compliance with UR.2. Installation Requirements, repeat the zero-load test, and reduce the interval between zero-load tests.

(Added 200X)

The action to be taken as a result of the simulated load or material tests ~~or simulated load tests~~ is as follows:

(Amended 2002 and 200X)

- if the error is less than 0.25 %, no adjustment is to be made;
- if the error is at least 0.25 % but not more than 0.6 %, inspect the conveyor and weighing area for compliance with UR.2. Installation Requirements and repeat the test~~adjustment may be made if the official with statutory authority is notified;~~  
(Amended 1991 and 200X)
- if the result of tests, after compliance with UR.2. Installation Requirements is verified, remain greater than  $\pm 0.25$  %, a span correction shall be made and the official with statutory authority notified;
- if the error is greater than 0.6 % but does not exceed 0.75 %, inspect the conveyor and weighing area for compliance with UR.2. Installation Requirements, and repeat the test;  
(Amended 1991 and 200X)
- if the result of tests, after UR.2. Installation Requirements compliance is verified, remains greater than  $\pm 0.25$  %, a span correction shall be made, the official with statutory authority shall be notified, and an official test shall be conducted;

- if the error is greater than 0.75 %, an official test is required.  
(Amended 1987 **and 200X**)

**Discussion:** HB 44 gives limited guidance on what to do with zero-load test results. Belt loss is not the only factor which may require the scale operator to make physical adjustments to the belt-conveyor system to correct for deficiencies. For example, a dirty scale structure or a worn belt scraper will increase the zero-reference number and the test results may exceed tolerances.

The scale user/owner has to protect his interest between weighing transactions. At present, some belt-conveyor systems may have errors greater than 0.5 % in zero reference over a 24-hour period. The belt is part of tare (net load) on any empty running system and the system must be maintained to within tolerance at all times.

During its 2006 meeting, the WWMA recommended the alternate industry proposal shown above. The WWMA also recommended the alternate proposal be considered at a future meeting of the USNWG on Belt-Conveyor Scale Systems. The WWMA recommended the alternate proposal remain a Developing item to allow sufficient time for a review by the WG. The CWMA and the SWMA concurred with the WWMA's recommendation.

During the 2007 NCWM Annual Meeting, the Committee heard testimony that a WG of the National Weighing and Sampling Association was working on this item and would have a recommendation for the WWMA prior to its 2007 Annual Meeting.

Participants in the WG include:

Phil Carpentier, PTC Consulting, LLC	ptcarpentier@att.net
Paul Chase, Chase Technology, Inc.	mjc@emily.net
Al Page, Montana Weight and Measures	awp88bb@gmail.com
Peter Sirrico, Thayer Scale	psirrico@thayerscale.com
Bill Ripka, Thermo Ramsey	bill.ripka@thermofisher.com

This WG agrees that there is a need to establish some zero-load test interval for the normal use of a belt-conveyor scale system and that there is also a need to vary that interval (longer interval if the scale is stable; shorter if the zero-load tests require frequent adjustment). The WG has reviewed and discussed this Developing item and submitted a revised proposal to the NIST technical advisor to the S&T Committee.

At its 2007 Annual Meeting, the WWMA heard comments from a BCS manufacturer that the NW&SA WG version was superior to current language. However, the manufacturer stated that this item needed additional development and subsequent review by the entire NW&SA. The WWMA believed this item was not sufficiently developed and did not have a consensus from the NW&SW WG and therefore recommended this remain a Developing item on the NCWM S&T Committee agenda.

At its 2007 Interim Meeting, the CWMA recommended this item be Withdrawn.

During the 2008 NCWM Interim Meeting, the Committee was informed that the USNWG on Belt-Conveyor Scales is going to further develop the proposal during their next meeting on February 27 - 28, 2008, in St. Louis, Missouri. During that meeting, the WG further amended the proposal as shown in the above recommendation and believes that this item is sufficiently developed to be added to the NCWM S&T Committee Agenda as a Voting item.

At its 2008 Annual Technical Conference, the WWMA heard comments from the BCS USNWG that the item is sufficiently developed. The WWMA agreed with the comments and proposed change to add "and after a repair or mechanical adjustment to the conveyor system" in (c) as shown in the above proposal and recommends that this proposal move forward as a Voting item.

**321-2 N.3.1.4. Check for Consistency of the Conveyor Belt Along Its Entire Length**

**Source:** 2008 Western Weights and Measures Association (WWMA) (This item last appeared on the 2008 Committee's Developing agenda as item 360-2 Part 3 Item 2)

**Recommendation:** Amend NIST Handbook 44, Section 2.21. Belt Conveyor Scales (BCS) Systems Code, paragraph N.3.1.4. as follows:

**N.3.1.4. Check for Consistency of the Conveyor Belt Along Its Entire Length. – During a zero-load test, the total change indicated in the totalizer during one revolution of the belt shall not exceed 0.18 % of the load that would be totalized at scale capacity for the duration of the test. The end value of the zero-load test must meet the ± 0.06 % requirement of paragraphs N.3.1.2. Initial Stable Zero and N.3.1.3. Test for Zero Stability. ~~After a zero-load test with flow rate filtering disabled, the totalizer shall not change more than plus or minus (± 3 d) 3.0 scale divisions from its initial indication during one complete belt revolution.~~**

(Added 2002) (Amended 2004 and 200X)

**Discussion:** The BCS WG agrees that the existing language in N.3.1.4. results in an excessive allowance for the variation in a belt. However, for belt-conveyor scales that can benefit from a smaller minimum division, the 3-division requirement can impose an excessively narrow restriction. It should be noted that variations in belt weight tend to be sinusoidal. In other words, the error caused by belt variations would be canceled if the material test were conducted using complete revolutions. The maximum belt variation would occur at 0.5, 1.5., 2.5, etc., revolutions. However, material tests are rarely conducted using complete revolutions of the belt.

The current tolerance of plus or minus 3 divisions can allow belt weight variation to contribute too large a portion to the 0.25 % belt-conveyor scale tolerance. The actual quantity represented by 3 divisions can vary with the belt-conveyor scale application. Paragraph N.2.3. Minimum Totalized Load (b) allows a material test load to be the amount of material to be weighed during one revolution of the belt. If the tolerance for the material test is 0.25 %, then on a root-sum-square basis, the variation in zero resulting from changes in the weight of the belt itself should not exceed 0.18 % (0.25 % times  $\{\sqrt{2}\} / 2$ ).

Some rationale other than root-sum-square could result in a different allowable variation due to belt weight.

The following example illustrates the difference between divisions and percent for this purpose:

Belt length	= 800 ft,
Division size	= 0.1 ton,
Maximum capacity	= 800 tons/hr, and
Belt speed	= 400 ft/min

These minimum totalized load (MTL) values in paragraph N.2.3. are in a feasible range for an actual application.

N.2.3. (a)	800 divisions	= 80.0 tons
N.2.3. (b)	one revolution	= 26.67 tons, which is (66.67 lb/ft * 800 ft)
N.2.3. (c)	ten minutes	= 133.3 tons

The materials test tolerance (T.1.) based on the MTL in N.2.3.(b) = 0.07 tons.

The allowable variation due to belt weight is ± 3 divisions or ± 0.3 tons. Using ± 0.3 ton error in zero allows a total delivery error that can exceed maintenance tolerance in paragraph T.1. Tolerance values because of acceptable belt weight variation of 0.6 tons currently in HB 44 paragraph N.3.1.4. This tolerance exceeds the 0.25 % tolerance of the weighing system without weighing any material. Even for a 10 min MTL (N.3.1.4.(c)), the allowable error is 0.45 % of 133.3 tons.

The proposed language changes the tolerances in N.3.1.4. from  $\pm 3$  divisions to 0.18 %. In the above example, the allowable change in the totalizer readings could be no greater than 0.048 tons [0.18 % x 26.67 tons (MTL)].

NIST HB 44 paragraph N.2. Conditions of Test was amended, and the minimum totalized load (MTL) requirements were amended and renumbered to paragraph N.2.3. Since 10 min of operation in N.3.2.(c) typically results in a test load larger than (a) or (b), the 10 min MTL is used for most BCS installations. Additionally, the words “or a normal weighment” were removed from MTL requirements because, at that time, it was thought the words were no longer needed since language was developed to allow a smaller material test load provided the scale demonstrated compliance with BCS tolerances with the MTL and the smaller test load.

As a result of removing the words “or a normal weighment,” it has been reported that the revised MTL requirements were not suitable for BCS installations that issue individual weights for vehicles and railcars. This is due to limitations of the installation and uncertainties in determining the net weights of several vehicles or railcars to compare material test results of the 10 min MTL with the alternate test load of “2 % of the load totalized in 1 hour.”

The current NIST HB 44 paragraph N.2.3. permits “a smaller minimum totalized load down to 2 % of the load totalized in 1 hour....” In the above example the minimum load would be 16 tons for this criterion so the belt variation is even a larger percentage of the weighed load.

The change to 0.18 % is a better criterion in several ways.

1. It defines the allowable excursion of the totalized value during the zero procedure. Plus or minus requires some reference value and it is not known at the start of a zero test whether that portion of the belt is heavy or light.
2. It is independent of division size. (But the division size must be small enough to resolve the variation.)
3. It is in harmony with OIML R 50.

In the above example 0.18 % of 26.67 tons is 0.048 tons. This is quite different from 3 divisions or  $\pm 3$  divisions.

At its 2007 Annual Meeting, the WWMA heard comments from a device manufacturer who would like to leave the item as either Developing or Withdrawn. The NIST technical advisor agreed the proposal needed additional work. Therefore, the WWMA recommended this proposal be a Developing item to allow the BCS WG additional time to make modifications.

During the 2008 NCWM Interim Meeting, the Committee was informed that the USNWG on Belt-Conveyor Scales is going to further develop the proposal during their next meeting on February 27 - 28, 2008, in St. Louis, Missouri. During that meeting, the WG discussed this item and concluded that the language needs further development before a consensus can be reached and recommends that this item remain as a Developing Item.

At its 2008 Annual Technical Conference, the WWMA heard comments that the item is sufficiently developed and is an improvement over the existing language in HB 44. The Committee agrees and recommends that this proposal move forward as a Voting item.

### **321-3 S.1.3.1. For Scales Installed After January 1, 1986 (Value of the Scale Division)**

**Source:** 2008 Western Weights and Measures Association (WWMA)

**Recommendation:** Amend HB 44 Section 2.21 paragraph S.1.3.1.

*S.1.3.1. For Scales Installed After January 1, 1986. – The value of the scale division shall not be greater than 0.125 % ( $\frac{1}{800}$ ) ~~0.1 % ( $\frac{1}{1000}$ )~~ of the minimum totalized load.*  
~~[Nonretroactive as of January 1, 1986]~~

The USNWG on BCS recommended that the above change be made to reconcile the value of the minimum scale division (0.1 % of the minimum totalized load) with the value of the minimum test load (800 divisions) listed in paragraph N.2.3.(a).

At its 2008 Annual Technical Conference, the WWMA heard support for this item as written in its agenda and recommends that the proposal move forward as a Voting item.

#### 321-4 S.1.6.1 Zero-load Indicator

**Source:** 2008 Western Weights and Measures Association (WWMA)

**Recommendation:** Add new paragraph S.1.6.1. to HB 44 Section 2.21. as shown:

**S.1.6.1. Zero-load indicator. – The integrator shall display an indication that defines a zero-balance condition when the unloaded condition of the belt over a unit revolution or revolutions is within  $\pm 0.12$  % of the rated scale capacity.**

**(Nonretroactive as of January 1, 2011)**

**(Added 200X)**

**Background/Discussion:** It is apparent to owners, manufacturers, and service agents associated with belt-conveyor scale systems that on systems (particularly those equipped with automatic zero mechanisms) running at a “no-load” level of operation, that a zero shift may occur and not be readily observed. At its February 2008 meeting, the USNWG on BCS recommended language that would require an indication be present which indicates a zero condition during these low-flow periods when no material is being totalized by an integrator. The recommended addition of the paragraph S.1.6.1. as shown above would require an indication that would notify an operator of an out-of-zero condition and also define the limit of the width of zero for that device.

At its 2008 Annual Technical Conference, the Committee heard support for this item as written in the agenda along with a request to allow additional time for manufacturers to make necessary changes to hardware or software. The Committee agreed with the comments and request and recommends the proposal be amended and moved forward as a Voting item with a 2011 nonretroactive date as shown in the recommendation (effective 18 months after adoption).

#### 321-5 N.2. Conditions of Tests and N.2.1. Initial Verification

**Source:** 2008 Western Weights and Measures Association (WWMA)

**Recommendation:** Amend NIST HB 44 Section 2.21. paragraph N.2. and N.2.1. as follows:

**N.2. Conditions of Tests.** – A belt-conveyor scale shall be tested after it is installed on the conveyor system with which it is to be used and under such environmental conditions as may normally be expected. Each test shall be conducted with test loads no less than the minimum test load. **Before each test run, check the zero setting, and if necessary perform a zero-load test. Zero adjustment between test runs shall not exceed the tolerance of T.1.1.**

(Amended 1986 and 2004 **and 200X**)

**N.2.1. Initial Verification.** – A belt-conveyor scale system shall be ~~tested~~**verified with pairs of test runs** at the normal use flow rate, 35 % of the maximum rated capacity, and an intermediate flow rate between these two points. **Test runs may also be conducted**~~The system may also be tested~~ at any other rate of flow that may be used at the installation. ~~If the~~**The official with statutory authority may determine that 2 pairs of test runs may be conducted at only one flow rate provided it can be established that the belt-conveyor scale operates at a single flow rate ( $\pm 5$  %).**

(Added 2004) **(Amended 200X)**

**Background/Discussion:** WMD has received inquiries and comments pertaining to whether or not rezeroing of the belt-conveyor scale under evaluation can be done between tests. Additionally, WMD has received requests to provide clarification in a particular test requirement impacts the complete official verification test or individual test runs that performed during the official test. There is inconsistency between jurisdictions in the way that tests are performed regarding these questions. Due to the requirement (HB 44 Section 2.21. paragraph N.2.1.) during an

initial verification, which states that tests (runs) are to be performed at three flow rates and that they must be of 10 minute durations, many hours may be required to complete the testing. This presents a problem with determining if the BCS need to be rezeroed after each test run regardless of the change in zero or if the BCS only needs to be rezeroed if the change exceeds the requirements in paragraph T.1.1. Tolerance Values - Zero Stability.

Paul Chase (member of the USNWG on Belt-Conveyor Scales) has collected some historical data on two belt-conveyor scale systems where temperature and zero information are available that show a clear trend with temperature (See graphs 1 and 2 in the appendix to this document). These data indicate that testing over a period of many hours can be affected by a zero shift that occurs during the testing. This could be a result of day-to-night temperature variation. A belt-conveyor scale that exhibits this property should be re-zeroed during normal operation as required to maintain the belt-conveyor scale within tolerance.

The expectation that a device will maintain a consistent zero under these conditions is considered by manufacturers and the USNWG to be an unfair performance standard. At its February 2008 meeting, USNWG recommended that HB 44 be amended as shown in the recommendation above. In addition the wording recommended as shown above in paragraph N.2.1. serves to clarify the required number of test runs which are to be conducted at various flow rates also bringing HB 44 towards aligning with OIML R 50 Section A.9.3.1.

At its 2008 Annual Technical Conference, the WWMA heard comments supporting this item along with a recommendation from Bill Ripka (Thermo-Ramsey) to clarify when testing only at a single flow rate is permitted. The WWMA noted that the proposed change to the language is consistent with testing at different flow rates in paragraph N.2.2. Subsequent Verification. The WWMA agreed with the comments and recommends that this proposal move forward as a Voting item.

#### **321-6 T.1.1. Tolerance Values - Test of Zero Stability**

**Source: 2008 Western Weights and Measures Association (WWMA)**

**Recommendation:** Amend HB 44 Section 2.21. (Belt Conveyor Scale Systems Code) paragraph T.1.1. to coincide with amendment recommended to paragraphs N.2. and N.2.1. in agenda item 321-5 as follows:

**T.1.1. Tolerance Values - Test of Zero Stability.** – Immediately after material has been weighed over the belt-conveyor scale during the conduct of ~~the a~~ materials test run, the zero-load test shall be repeated. The change in the accumulated or subtracted weight on the Master Weight Totalizer during the zero test shall not exceed 0.12 % of the totalized load at full scale capacity for the duration of the test. **If the total range of zero adjustment during a complete (official) verification test exceeds 0.18 %, the official with statutory authority may establish an interval for zero-load testing during normal operation.**

(Added 2004 **and 200X**)

**Background/Discussion:** The recommendation to amend the paragraphs N.2. and N.2.1. would necessitate the amendments shown above to reflect the consideration of a tolerance associated with a zero shift in the scale. The U.S. National Work Group on BCS recognized the need and recommends the above wording changes.

At its 2008 Annual Technical Conference, the WWMA heard a comment from a jurisdiction that the proposal places an additional burden on the field inspector having to verify compliance with the frequency of zero and accuracy tests between official tests in order to monitor zero references and calibration stability. WMD noted that paragraph UR.4. Compliance already requires the user to retain records of these tests and that the proposal is only intended to give the inspector some guidance on establishing the frequency of these intermediate tests.

The WWMA considered the comments and recommends that this proposal move forward as a Voting item since it provides the official with regulatory authority with guidance in determining the frequency for conducting zero-load tests between official tests.



**321-7 N.3.1.2. Initial Stable Zero, N.3.1.3. Test of Zero Stability and S.3.1.1. Automatic Zero-Setting Mechanism**

**Source:** 2008 Western Weights and Measures Association (WWMA)

**Recommendation:** Combine paragraphs N.3.1.2. and N.3.1.3. in HB 44 Section 2.21. resulting in one paragraph N.3.1.2. Test of Zero Stability.

Amend N.3.1.2. and N.3.1.3. as follows:

~~**N.3.1.2. Initial Stable Zero.** – The conveyor system shall be run to warm up the belt and the belt scale shall be zero adjusted as required. A series of zero load tests shall be carried out until three consecutive zero load tests each indicate an error which does not exceed  $\pm 0.06\%$  of the totalized load at full scale capacity for the duration of the test. No adjustments can be made during the three consecutive zero load test readings.~~

~~(Added 2002) (Amended 2004)~~

**N.3.1.23. Test of Zero Stability.** – The conveyor system shall be run to warm up the belt and the belt scale shall be zero adjusted as required. A series of zero-load tests shall be carried out **before weighing material** immediately before the simulated or materials test until three consecutive zero-load tests each indicate an error which does not exceed  $\pm 0.06\%$  of the totalized load at full scale capacity for the duration of the test. No adjustments can be made during the three consecutive zero-load test readings. **If operable, the automatic zero-setting mechanism shall not obscure any change in zero for integrators manufactured on or after January 1, 200X.**

(Added 2002) (Amended 2004 **and 200X**)

**N.3.1.34. Check For Consistency of the Conveyor Belt Along Its Entire Length.** – After a zero-load test with flow rate filtering disabled, the totalizer shall not change more than plus or minus 3.0 scale divisions ( **$\pm 3 d$** ) from its initial indication during one complete belt revolution.

(Added 2002) (Amended 2004) (**Renumbered 200X**)

Add new paragraph S.3.1.1. as shown below:

**S.3.1.1. Automatic Zero-Setting Mechanism.** – **The automatic zero-setting mechanism shall not obscure any change in zero.**

**(Added 200X)**

**Background/Discussion:** At its 2008 Annual Technical Conference, the WWMA reviewed a proposal from the USNWG on Belt Conveyor Scale Systems recommending that paragraphs N.3.1.2. and N.3.1.3. be combined since they are nearly identical in language and to reduce redundant language and to clarify that any change in zero is to be indicated to verify that the total range of zero adjustment during an official test complied with paragraph T.1.1. This combination would result in one paragraph identified as “N.3.1.2. Test of Zero Stability.” The group also recommends that paragraph S.3.1.1. be added so that specification requirements within the code coincide with the amendments to paragraph N.3.1.2. The WWMA heard support for the item and recommends that the proposal moves forward as a Voting item.

## **322 AUTOMATIC BULK-WEIGHING SYSTEMS**

### **322-1 S.2.1. Zero-Load Adjustment**

**Source:** NTETC Weighing Sector

**Recommendation:** Amend HB 44 Section 2.22. Automatic Bulk-Weighing Systems by amending paragraph S.2.1.3.3. as follows:

**S.2.1. Zero-Load Adjustment.** – The weighing system shall be equipped with manual or semiautomatic means by which the zero-load balance or no-load reference value indication may be adjusted. ~~An automatic zero-tracking~~ **and automatic zero-setting** mechanisms ~~is~~ **are** prohibited.

**(Amended 200X)**

**Background/Discussion:** At its 2008 Annual Meeting, the NTETC Weighing Sector held a discussion about the increasing number of scales submitted for NTEP evaluations that include an “automatic zero-setting” feature, which is not addressed in NIST HB 44. It has been noted that many devices are built for a global marketplace and that the operation of this “automatic zero-setting” device may be functional on the device when installed in the United States. Currently, HB 44 does not define this function. NCWM Pub 14 has no test to determine if the device submitted for evaluation has such a function, or if it is sealable. The automatic zero-setting mechanism on a scanned/scale submitted to NTEP could be enabled and disabled by means of a bar code read by the scanner.

The Sector established a small WG to develop language to be submitted to the NCWM S&T Committee and make recommendations addressing the suitability of scales with the capability to automatically set a positive weight indication to zero. The group, which included Scott Davidson (Mettler-Toledo), Scott Henry (NCR), Steve Cook (NIST Technical Advisor), and Stephen Patoray (Consultant), volunteered to develop a proposal for the S&T Committee. (Todd Lucas, Ohio NTEP laboratory and Jim Truex, NTEP Administrator also contributed to the discussions and subsequent proposal.) Additionally, the Sector agreed to review the language developed by the WG to confirm its support of the proposed language.

In the process of developing the proposal, the WG recommended that the automatic zero-setting mechanism is prohibited for devices covered by Section 2.22. Automatic Bulk-Weighing Systems for the same reasons that zero-tracking is prohibited (incorrect net weight determinations may occur when unintentional and unobserved zeroing or tracking off of material retained in a hopper).

See agenda item 320-3 for additional background information on the development of this proposal.

## **324 AUTOMATIC WEIGHING SYSTEMS**

### **324-1 S.2.1.7. Automatic Zero-Setting Mechanism**

**Source:** 2008 NTETC Weighing Sector

**Recommendation:** Amend HB 44 Section 2.24. Automatic Weighing Systems by adding new paragraph S.2.1.7. as follows:

**S.2.1.7. Automatic Zero-Setting Mechanism – If equipped, an automatic zero-setting mechanism shall operate only when the indication has remained:**

**(a) Stable according to paragraph S.4.2. Damping, and**

**(b) Below zero for at least 5 seconds.**

**The maximum effect of automatic zero-setting mechanism is limited to 4 % of the nominal capacity of the scale and is a sealable parameter.**

**(Added 200X)**

**Background/Discussion:** At its 2008 Annual Meeting, the NTETC Weighing Sector discussed an issue on an increasing number of scales submitted for NTEP evaluations that include an “automatic zero-setting” feature is not addressed in NIST HB 44. It has been noted that many devices are built for a global marketplace and that the operation of this “automatic zero-setting” device may be functional on the device when installed in the United States. Currently, HB 44 does not define this function. NCWM Pub 14 has no test to determine if the device

submitted for evaluation has such a function, or if it is sealable. The automatic zero-setting mechanism on a scanned/scale submitted to NTEP could be enabled and disabled by means of a bar code read by the scanner.

The Sector established a small WG to develop language to be submitted to the NCWM S&T Committee and make recommendations addressing the suitability of scales with the capability to automatically set a positive weight indication to zero. The group included Scott Davidson (Mettler-Toledo), Scott Henry (NCR), Steve Cook (NIST Technical Advisor), and Stephen Patoray (Consultant) volunteered to develop a proposal for the S&T Committee. (Todd Lucas, Ohio NTEP laboratory and Jim Truex, NTEP Administrator also contributed to the discussions and subsequent proposal.) Additionally, the Sector agreed to review the language developed by the WG to confirm its support of the proposed language.

In the process of developing the proposal, the WG recommended that the automatic zero-setting mechanism should be permitted for devices covered by Section 2.24. Automatic Weighing Systems since equivalent requirements can be found in OIML R 51 Recommendation for Automatic Catchweighing Instruments.

See agenda Item 320-3 for additional background information on the development of this proposal.

### **324-2 S.2.2. Value of Tare Indication and Recorded Representations and S.2.3. Preset Tare Mechanism**

**Source:** 2008 Carryover Item 324-2. (This item originated from S&T Committee and first appeared on the Committee's 2007 agenda.)

**Recommendation:** (NOTE: This item will be considered jointly with Item 320-6.) This recommendation clarifies the requirements for tare by modifying paragraph S.2.2. and adding new paragraphs S.2.2.1. through S.2.2.8. and S.2.3. through S.2.3.2. that provide new requirements for metrological tare (e.g., tare objects weighed or balanced off at the time of the transaction), tare accuracy, operating range, visibility, and preset tares (e.g., manually entered or stored tares for multiple transactions).

Amend paragraph S.2.2. as follows:

**S.2.2. Tare.** – The tare-**weighing and tare-balancing** mechanism shall operate only in a backward direction (that is, in a direction of underregistration) with respect to the zero-load balance condition of the scale. A device designed to automatically clear any tare value shall also be designed to prevent the automatic clearing of tare until a complete transaction has been indicated.

[**Note:** On a computing scale, this requires the input of a unit price, the display of the unit price, and a computed positive total price at a readable equilibrium. Other devices require a complete weighing operation, including tare, net, and gross weight determination.]

(Amended 2004 **and 2008**)

Add new paragraphs S.2.2.1. through S.2.2.8. as follows:

**S.2.2.1. Scale Interval (Division) and Capacity.** – **On any scale (except multi-interval scales when the value of tare is determined in the first weighing segment), the value of the tare division shall be equal to the value of the scale division for any given load and shall not operate above its maximum capacity.**

**S.2.2.1.1. Multi-interval Scales.** – **On multi-interval scales, the tare capacity is limited to the capacity of the first weighing segment and the value of the tare division shall be equal to the value of the scale division from the first weighing segment.**

**S.2.2.1.2. Multiple Range Scales.** – **On multiple range scales, the value of the tare division shall be equal to the value of the scale division from the weighing range where the tare was determined.**

(Added 200X)

**S.2.2.2. Accuracy. – A tare-weighing or tare-balancing mechanism shall permit setting the net indication to zero with an accuracy equal to or better than:**

- (a)  $\pm 0.25$  d for electronic weighing devices and any weighing device with an analog indication, and**
- (b)  $\pm 0.5$  d for mechanical weighing devices with a digital indication (e.g., weighbeams with only notched poises and no sliding poises).**

**On a multi-interval scale, d shall be replaced by  $d_1$  (division value of the first weighing segment).**

**(Added 200X)**

**S.2.2.3. Visibility of Operation. – Operation of the tare mechanism shall be visibly indicated on the instrument. In the case of instruments with digital indications, this shall be done by marking the indicated net value with the word “NET” or the symbol “N”. “NET” may be displayed as “NET”, “Net” or “net”. If a scale is equipped with an indicator that allows the gross value to be displayed temporarily while a tare mechanism is in operation, the “NET” symbol shall disappear while the gross value is displayed.**

**(Added 200X)**

**S.2.2.4. Subtractive Tare Mechanism. – After any tare operation and while subtractive tare is in effect, an indicating or recording element shall not display nor record any values when the gross load (not counting the initial dead load that has been canceled by an initial zero-setting mechanism) is in excess of 105 % of scale capacity after tare has been taken.**

**(Added 200X)**

**S.2.2.5. Semi-automatic or Automatic Tare\* Balancing or Weighing Mechanisms. – These mechanisms shall be operable or accessible only by a tool outside of and separate from this mechanism or it shall be enclosed in a cabinet, or it shall be operable only when the indication is stable within:**

- (a)  $\pm 3$  scale divisions for scales of more than 2000 kg (5000 lb) capacity in service prior to January 1, 1981, and for all axle-load, railway track, and vehicle scales; or**
- (b)  $\pm 1$  scale division for all other scales.**

**\* Automatic tare mechanisms are not permitted for direct sales to the public.**

**(Added 200X)**

**S.2.2.6. Combined Zero-setting and Tare-balancing Mechanisms (0/T Key). – Automatic weighing systems may be equipped with a combined zero and tare function key. If the semi-automatic zero-setting mechanism and the semi-automatic tare-balancing mechanism are operated by the same key, the following apply at any load:**

- (a) After zero/tare setting the effect of accuracy of the zero setting shall be not more than  $\pm 0.25$  d.**
- (b) A “center-of-zero” condition shall either automatically be maintained to  $\pm 0.25$  scale division or less, or have an auxiliary or supplemental “center-of-zero” indicator that defines a zero-balance condition to  $\pm 0.25$  scale division or less.**
- (c) A zero-tracking mechanism, if equipped, shall operate only when:**
  - (1) the indication is at zero, or at a negative net value equivalent to gross zero, and**
  - (2) the weight indication is stable.**

- (d) The scale must also be clearly marked on or adjacent to the weight display with the statement “Not for Direct Sales.”

(Added 200X)

S.2.2.7. Consecutive Tare Operations. – Repeated operation of a tare mechanism (including preset tare) is permitted for single transactions with one gross, one net, and multiple tare values. If more than one tare mechanism is operative at the same time, tare weight values shall be clearly designated (identified) with either “T” for tare or “PT” for preset tare as appropriate when indicated or printed.

(Added 200X)

S.2.2.8. Indication and Printing of Weighing Results.

- (a) Gross weight values may be printed without any designation or by using a complete word or symbol. For a designation by a symbol, only uppercase “G” is permitted.
- (b) If only net weight values are printed without corresponding gross or tare values, they may be printed without any designation or by using a complete word or symbol. The complete word (as shown in S.2.2.3. Visibility of Operation) or symbol “N” shall be used to designate a net weight. This applies also where semi-automatic zero-setting and semi-automatic tare balancing are initiated by the same key.
- (c) Gross, net, or tare values determined by a multiple range instrument or by a multi-interval instrument need not be marked by a special designation referring to the (partial) weighing range.
- (d) If net weight values are printed together with the corresponding gross and/or tare values, the net and tare values shall be identified at least by the corresponding symbols “N” and “T” or by complete words using all upper-case letters, all lower-case letters, or a combination of upper- and lower-case letters.
- (e) If net weight values and tare values determined by different tare mechanisms are printed separately for single transactions with multiple gross, tare, and net values, they shall be suitably identified (e.g., vehicle sequentially loaded with mixed commodities).

(Added 200X)

Add new paragraphs S.2.3. and S.2.3.1. as follows:

S.2.3. Preset Tare Mechanism, Operation. – In addition to the provisions of paragraphs S.2.2. Tare and S.2.2.1. Scale Interval, a preset tare may be operated together with one or more tare devices provided:

- (a) the preset tare mechanism complies with paragraph S.2.2.7. Consecutive Tare Operations., and
- (b) the preset tare operation cannot be modified or cancelled as long as any tare mechanism operated after the preset tare operation is still in use,
- (c) the preset tare associated with a price look-up (PLU) shall be automatically cancelled at the same time a PLU is cancelled, and
- (d) the preset tare values are designated by the symbol “PT”; however, it is permitted to replace the symbol “PT” with complete words.

A preset tare may operate automatically only if the preset tare value is clearly identified with the load to be measured (e.g., part of the product look-up information).

**S.2.3.1. Indication of Operation. – It shall be possible to temporarily indicate the preset tare value (e.g., pressing a tare display button or a negative net weight indication with no load on the load-receiving element). Additionally, paragraph S.2.2.8. Indication and Printing of Weighing Results applies accordingly, provided the calculated net value is printed and at least the preset tare value is printed, with the exception of:**

- (a) **a Class II or a Class III automatic weighing system with a maximum capacity not greater than 100 kg (200 lb) used in direct sales to the public, and**
- (b) **automatic weigh/price labeling systems.**

**(Added 200X)**

**Background/Discussion:** At the 2007 Interim Meeting, the Committee agreed that for procedural reasons a separate corresponding proposal should have appeared on its 2007 S&T agenda in Section 324 for Automatic Weighing Systems. Therefore, the Committee developed a separate proposal for automatic weighing systems that now appears in this agenda item. The Committee recommended that new S&T Item 324-2, along with a corresponding proposal to apply these definitions to devices that fall under the Scales Code S&T Item 320-6, be discussed and considered jointly during all deliberations and voting procedures. In the interest of brevity, the Committee placed all recommendations, discussion, and background information for this proposal in S&T Item 320-6 because the proposed definitions apply to both applications; this ensures both proposals are addressed collectively.

At their fall 2007 meetings, the CWMA, NTETC WS, and the WWMA supported this item. See additional comments and recommendations from Agenda Item 320-6.

The Committee did not receive any comments opposing this item and made this a Voting item.

At the 2008 NCWM Annual Meeting, the Committee agreed with the comments that this item needs additional time for review and analysis and that the item be given Information status. The NIST technical advisor will develop a 1 hour to 2 hour technical presentation on the proposed tare requirements that will be available to the regional weights and measures associations, the NTETC Weighing Sector, and posted on the WMD website.

### **330 LIQUID-MEASURING DEVICES**

#### **330-1 Temperature Compensation for Liquid-Measuring Devices Code**

**Source:** 2008 Carryover Item 330-1. This item originated from the NCWM S&T Committee and first appeared on the Committee's 2007 agenda.

**Recommendation:** The Committee is considering a proposal to make the following modifications to Section 3.30. Liquid-Measuring Devices (LMD) Code to recognize temperature compensation for retail devices as follows:

**S.1.6.8. Recorded Representations from Devices with Temperature Compensation. – Receipts issued from devices or systems with automatic temperature compensation must include a statement that the volume of the product has been adjusted to the volume in liters at 15.56 °C for liters or the volume in gallons at 60 °F for gallons.**

**[Nonretroactive as of January 1, 200X]**

**(Added 200X)**

**S.1.6.89. Lubricant Devices, Travel of Indicator. – The indicator shall move at least 2.5 cm (1 in) in relation to the graduations, if provided, for a delivery of 0.5 L (1 pt).**

**S.2.6. Temperature Determination—~~Wholesale Devices~~.** – For test purposes, means shall be provided to determine the temperature of the liquid either:

(a) in the liquid chamber of the meter, or

(b) immediately adjacent to the meter in the meter inlet or discharge line.

[Nonretroactive as of January 1, 1985]

(Added 1984) (Amended 1986 **and 200X**)

**S.2.7. ~~Wholesale Devices~~ Equipped with Automatic Temperature Compensators.**

**S.2.7.1. Automatic Temperature Compensation.** – A device may be equipped with an automatic means for **adjusting conversion of** the indication and registration of the measured volume of product to the volume at 15.56 °C **for liters or (60 °F) for gallons.**

**S.2.7.2. Display of Net and Gross Quantity.** – **A device equipped with active automatic temperature compensation shall indicate or record, both the gross (uncompensated) and net (compensated) volume for testing purposes. It is not necessary that both net and gross volume be displayed simultaneously.**

**[Nonretroactive as of January 1, 200X]**

**S.2.7.3. Display of Temperature.** – **For test purposes, on a device equipped with active automatic temperature compensation, means shall be provided to indicate or record the temperature determined by the system sensor to an accuracy of 0.2 °F.**

**[Nonretroactive as of January 1, 200X]**

**S.2.7.24. Provision for Deactivating.** – On a device **or system** equipped with an automatic temperature-compensating mechanism that will indicate or record only in terms of ~~gallons~~**liters** compensated to 15.56 °C **or gallons compensated to (60 °F)**, provision shall be made for deactivating the automatic temperature-compensating mechanism so that the meter can indicate, ~~and record if it is equipped to~~**record**, in terms of the uncompensated volume.

(Amended 1972 **and 200X**)

**S.2.7.35. Provision for Sealing Automatic Temperature-Compensating Systems.** – Provision shall be made for applying security seals in such a manner that an automatic temperature-compensating system cannot be disconnected and that no adjustment **that detrimentally affects the metrological integrity of the device** may be made to the system without breaking the seal **or automatically providing a record (e.g., audit trail) of the action.**

**(Amended 200X)**

**S.2.7.5.1. Provision for Sealing the Temperature Sensor.** – **Provision shall be made for applying security seals in such a manner that the temperature sensor cannot be removed or disabled without breaking the seal or providing a record (e.g., audit trail) of the action.**

**[Nonretroactive as of January 1, 200X]**

**S.2.7.4.6. Temperature Determination with Automatic Temperature-Compensation.** – For test purposes, means shall be provided (e.g., thermometer well) to determine the temperature of the liquid either:

(a) in the liquid chamber of the meter, or

(b) immediately adjacent to the meter in the meter inlet or discharge line.

(Amended 1987)

**S.4.3.2- Temperature Compensation.** – If a device **or system** is equipped with **active** automatic temperature compensation, the primary indicating elements, recording elements, ~~or~~**and** recorded representation shall be

clearly and conspicuously marked to show that the volume delivered has been adjusted to the volume at 15.56 °C for liters or (60 °F) for gallons.

(Amended 200X)

**S.4.34. Wholesale Devices, Discharge Rates.** – A wholesale device shall be marked to show its designed maximum and minimum discharge rates. However, the minimum discharge rate shall not exceed 20 % of the maximum discharge rate.

**S.4.45. Retail Devices.**

**S.4.45.1. Discharge Rates.** – *On a retail device with a designed maximum discharge rate of 115 L (30 gal) per minute or greater, the maximum and minimum discharge rates shall be marked in accordance with S.4.4.2. The marked minimum discharge rate shall not exceed 20 % of the marked maximum discharge rate.*

*[Nonretroactive as of January 1, 1985]*

(Added 1984) (Amended 2003)

Example: With a marked maximum discharge rate of 230 L/min (60 gal/min), the marked minimum discharge rate shall be 45 L/min (12 gal/min) or less (e.g., 40 L/min (10 gal/min) is acceptable). A marked minimum discharge rate greater than 45 L/min (12 gal/min) (e.g., 60 L/min (15 gal/min) is not acceptable.

**S.4.45.2. Location of Marking Information; Retail Motor-Fuel Dispensers.** – *The marking information required in the General Code, paragraph G-S.1. Identification shall appear as follows:*

**N.4.1.1. ~~Wholesale~~ Devices Equipped with Automatic Temperature-Compensating Systems.** – On ~~wholesale~~ devices equipped with active automatic temperature-compensating-systems, normal tests shall be conducted:

- (a) by comparing the net (compensated) volume indicated or recorded to the actual delivered volume ~~corrected-adjusted~~ to 15.56 °C for liters or (60 °F) for gallons, and
- (b) ~~with the temperature-compensating system deactivated,~~ comparing the gross (uncompensated) volume indicated or recorded to the actual delivered volume. **(For some devices this may require that the temperature compensator be deactivated.)**

The first test shall be performed with the automatic temperature-compensating system operating in the “as found” condition. On devices that indicate or record both the compensated and uncompensated volume for each delivery, the tests in (a) and (b) may be performed as a single test.

(Amended 1987 and 200X)

**N.5. ~~Change in Product Temperature Correction on Wholesale Devices.~~ – ~~Corrections-Adjustments~~** shall be made for any changes in volume resulting from the differences in liquid temperatures between time of passage through the meter and time of volumetric determination in the prover or test measure. When adjustments are necessary, appropriate petroleum measurement tables ~~should~~shall be used.

(Amended 1974 and 200X)

**UR.3.6. Temperature Compensation.**

**UR.3.6.1. Automatic.**

**UR.3.6.1.1. ~~When to be Used of Automatic Temperature Compensation.~~** – If a device is equipped with ~~a mechanical~~ active automatic temperature ~~compensator-compensation~~, it shall be connected, operable, and in use at all times. An electronic or mechanical automatic temperature-compensating system may not be removed, nor may a compensated device be replaced with an uncompensated



device, without the written approval of the ~~responsible~~ weights and measures jurisdiction with statutory authority over the device.

[Note: This requirement does not specify the method of sale for product measured through a meter.]

(Amended 1989 and 200X)

**UR.3.6.1.2. Recorded Representations (Invoices, Receipts, and Bills of Lading).**

- (a) An ~~an written~~-invoice based on a reading of a device or recorded representation issued by a device or system that is equipped with an active automatic temperature compensator shall show that the volume delivered has been adjusted to the volume at 15.56 °C for liters or (60 °F) for gallons and decimal subdivisions or fractional equivalents thereof.
- (b) The invoice issued from an electronic wholesale device equipped with an automatic temperature-compensating system shall also indicate: (1) the API gravity, specific gravity or coefficient of expansion for the product; (2) product temperature; and (3) gross reading.

(Amended 1987 and 200X)

**UR.3.6.1.3. Temperature Determination. – Means for determining the temperature of measured liquid in an automatic temperature-compensating system shall be so designed and located that, in any “usual and customary” use of the system, the resulting indications and/or recorded representations are within applicable tolerances.**

(Added 200X)

**UR.3.6.4. Temperature-Compensated Sale. – All sales of products, when the quantity is determined by an approved measuring system with temperature compensation, shall be in terms of the liter at 15.56 °C or the U.S. gallon of 231 in<sup>3</sup> at 60 °F.**

(Added 200X)

**Background/Discussion:** Prior to the 2007 NCWM Interim Meeting, the Committee recognized, via reports from the regional L&R committees and other sources, that there was increasing support within the weights and measures community to address temperature compensation features for the retail sale of petroleum products in the Liquid-Measuring Devices Code. In response to these concerns and to encourage uniformity in applications where temperature compensation is being used, the Committee developed this proposal to provide design and performance requirements and testing criteria for retail metering systems that incorporate temperature compensation capability. The Committee was also concerned that if the current L&R Committee-proposed language for the Method of Sale of Commodities in NIST HB 130 is adopted, retail motor-fuel devices could be placed in service with no guidelines in NIST HB 44 for type approval and field testing. The L&R-proposed language would permit the temperature-compensated sale of petroleum products at all levels of distribution.

At the 2007 Interim Meeting, the L&R Committee moved forward with a Method of Sale proposal containing permissive language for retail sales of petroleum products using automatic temperature compensation (see L&R Item 232-1). Although the Committee recognized this S&T item was still not fully developed, it felt it could resolve the remaining issues in time for the NCWM Annual Meeting in July 2007; therefore, the Committee unanimously voted to make this item a “priority” Voting item as described in Section H of the Introduction of HB 44. It did this because it felt strongly that, if the L&R item passed, it was very important for there to be a corresponding S&T item that provided HB 44 guidance as described above. Following the Committee vote, the Committee chairman went before the NCWM Board of Directors (BOD) for their input. The BOD instructed the Committee to make this an Information item. Irrespective of the concerns about the timing of adoption of language in HB 130, the Committee, after further deliberation, concurred with the BOD and added the proposal to its agenda as an Information item. The BOD further informed the Committee of its plan to form a steering committee to provide guidance and give support to both the S&T and L&R Committees on temperature compensation issues. The Committee noted that it looked forward to working with the steering committee on this important issue.

This item is still in development. Some of the items the Committee is currently working on are outlined below:

**Recorded Representations (S.1.6.7.):** What, if any, abbreviations are acceptable for devices equipped with ATC (e.g., gal at 60 °F)?

**API Gravity:** How should the API gravity be entered in the device and what API gravity should the inspector use during a test? Should an average API gravity be used (national or state)? The Committee will work on gathering API data in order to resolve this issue.

**Difference between Net and Gross (T.4.):** Is the current tolerance of 0.1 % (electronic) appropriate for field-testing of retail devices with ATC? Will maintaining our current tolerances mean taking extra drafts to obtain a stable temperature? The Committee will work on gathering data concerning temperature measurement.

The Committee will continue work on this item and will seek input from the regions and other interested parties in the weights and measures community.

At its 2007 Annual Meeting, the WWMA did not receive any opposition or comments relating to the technical requirements in this proposal and, therefore, it supported the proposal as a Voting item. However, the WWMA recommended that the NCWM S&T Committee consider adopting the ATC Steering Committee recommendation to use the U.S. reference temperature of 60 °F and direct conversion to SI units (15.56 °C). The WWMA S&T Committee noted that the 15 °C SI equivalent was already used in NIST Handbook 44 and that the reference temperature should be used consistently throughout the HB 44 where appropriate.

At its 2007 Interim Meeting, the CWMA S&T Committee received comments concerning the availability of API tables for SI units. The CWMA recognized that 15.56 °C is the exact conversion for 60 °F. While, the CWMA agreed with the ATC Steering Committee that 60 °F should be the reference temperature in HB 44 for dispensers measuring in gallons, the CWMA believed that 15 °C should be the reference temperature for dispensers measuring in liters since it is the international standard and is referenced in other sections of HB 44.

The CWMA recommended this item remain Informational while further information becomes available from the ATC Steering Committee and L&R Committee.

At its 2007 Interim Meeting, NEWMA received a proposal from the State of New York to add proving equations to Handbook 44 based on equations found in OIML R 120 Section 4.7. Calculation of meter error and forwarded it to the NCWM S&T Committee for consideration.

At its 2007 Annual Meeting, the SWMA received a comment from an official that a dispenser should not print a statement that the volume of the product has been adjusted to the volume in liters at 15 °C or the volume in gallons at 60 °F when ATC is not activated. The official also believed the allowance for a record of action in proposed S.2.7.5. should be performed automatically by the device and recorded in the audit trail. A manufacturer stated that the print statement currently comes from information provided by the inside control console, not from the dispenser. The SWMA S&T Committee agreed to forward the comments to the NCWM S&T Committee for consideration.

At the 2008 Interim Meeting, the Committee received comments that the proposed paragraphs S.2.7.2., S.2.7.3., S.4.3., and UR.3.6.4. should be modified to apply only to devices with an active temperature compensation feature along with a recommendation that the word “should” in the last sentence in N.5. relating to the use of petroleum measurement tables be changed to “shall.” The Committee also heard that based on the recommendation of the Automatic Temperature Compensation Steering Committee, the reference to 15 °C should be change to 15.56 °C where appropriate throughout the proposal. The Committee agreed with all the comments and modified the proposal as shown above.

The Committee further heard that Handbook 44 was not the appropriate place to add the proving equations based on OIML R 120 Section 4.7. as recommended in a proposal submitted by NEWMA. The statement of scope in OIML R 120 states that the document specifies the characteristics of standard capacity measures and describes the methods by which measuring systems for liquids other than water are tested in order to verify that they comply with the relevant metrological requirements in OIML R 117 Measuring systems for liquids other than water. The sections of R 120 relevant to characteristics of standard capacity measures are more similar to the requirements in NIST

Handbook 105-3. The sections of R 120 relating to test methods more resemble the recommendations for various devices in NIST Handbook 112 Examination Procedure Outlines for Commercial Weighing and Measuring Devices. The Committee also agreed that Handbook 44 was not the place to include the proving equations noting that no other metering codes in the handbook had similar equations and they had not been seen as necessary in the past. The committee believes that a more appropriate place for proving equations would be in the appropriate Examination Procedure Outline (EPO) in NIST Handbook 112. If NEWMA believes that proving equations will substantially benefit weights and measures officials it will consider recommending that they be added as an example of one method for determining meter error in the appropriate EPOs. The Committee also heard a request from an official to move the item forward in order to provide a mechanism for evaluation of dispensers with ATC. The official believed that ATC dispensers will be installed in their jurisdiction in the near future.

The Committee acknowledged the need for uniform technical criteria for devices equipped with ATC, particularly in jurisdictions where this equipment is or soon will be installed. With the changes made by the Committee in the recommendation above, the Committee believes the proposal is substantially complete. Consequently, after considerable deliberations at the 2008 Interim Meeting the Committee agreed to designate 310-1 as a Voting item on its agenda for the 2008 Annual Meeting. A key factor in reaching this decision is the Conference policy that allows for an item listed as a Voting item on the agenda in Publication 16 to be changed to a lesser status of Informational, but does not allow an Information item to be moved up to voting status unless the Conference agrees that the item meets the criteria to be considered an emergency issue. The process would still allow minor changes to be made to the recommendation based on input received between the Interim and the Annual Meetings.

In its spring 2008 meeting report, the CWMA S&T Committee stated that it heard comments that this item should not move forward for a vote at this time due to the lack of a method of sale regulation. The report also noted that some jurisdictions adopt NIST HB 44 in its entirety and do not have a law that prohibits ATC, and inclusion of ATC criteria in this case could make ATC permissible.

NEWMA reported discussing this item at length during its spring 2008 meeting. Initially it was suggested that this item go back to Informational status but an attendee suggested that it should either be Withdrawn or put up for a vote. Another attendee suggested making this item Informational until the report on ATC from the California Energy Commission is released. NEWMA submitted the following concerns and recommended that the item remain Informational:

- A statement similar to the one in the VTM code which addresses states that prohibit ATC by state law should appear in the text of this item.
- One member referenced the 1978 S&T Committee report which discussed a cost benefit consideration and the desire that the S&T and L&R move forward in unison. The membership generally agreed with these points.
- NEWMA continues to believe that it is appropriate to place in HB 44 reference calculations for determining volume at 60 °F. It is also appropriate to reference the specific API tables including version and date. Placing this information in publications such as EPO's would have no legal standing if we were challenged in the future.

At the 2008 NCWM Annual Meeting, the Committee heard numerous comments on the proposed changes to include specifications, test procedures, and user requirements for devices equipped with automatic temperature compensation systems.

Comments/questions were raised about specific items in the proposed language, including:

- The term “active” is not used consistently in all references to “automatic temperature compensation.” For example, it appears in paragraph S.2.7.2., but it does not appear in paragraph S.1.6.8.
- There is a reference to the accuracy requirements for the temperature sensor in paragraph S.2.7.3.; however, there is not a requirement specifying the division size of the temperature sensor.

- Should a corresponding reference to the accuracy requirements for the temperature sensor be included in the “Tolerances” section of the code?
- Is there an expectation that there will be a field test of the temperature sensor? If so, there is not a corresponding test note to indicate this, nor is it clear how the test will be done in the field.
- A user requirement is needed to specify that, if a single business offers product for sale on the basis of a temperature compensated volume, all devices in that business shall be equipped with automatic temperature compensating systems. [Note: During the Committee’s work discussions, it was noted that Canada permitted a phase-in period based on product or product grades.]
- There is concern about using 15.56 °C rather than 15 °C. In addition to being different from use in international arenas, including Canada, the bulk of the devices in the field, including the retail motor fuel dispensers and the temperature standards used by field officials, do not have the capability to display temperature to two decimal places.
- Devices currently in the field may not have the capability to automatically sense when the device is or is not in the automatic temperature compensating mode with respect to the requirement to identify volumes as “corrected” volumes on printed indications.
- Although a corresponding paragraph already appears in Section 3.32. LPG and Anhydrous Ammonia Liquid-Measuring Devices Code, the language in paragraph UR.3.6.1.3. needs clarification.

The Committee asks that the NCWM Automatic Temperature Compensation Steering Committee assist in addressing these issues and encourages interested parties to submit comments to the Steering Committee or provide additional comments to the S&T Committee.

The Committee heard numerous comments encouraging the Committee to delay a vote on this issue while the corresponding method of sale and related requirements are being further developed by the Laws and Regulations Committee and while other studies in the community are being completed. Comments were also received that cost-benefit analysis of equipment implementation needs to be considered.

Although the Committee did hear opposition to moving forward on this item, the Committee also heard comments in support of moving the item forward for a vote. Some members commented that, if this proposal were adopted, the proposed specifications, tolerances, notes, and user requirements would be available for use in a timelier manner by jurisdictions that do not specifically prohibit the use of temperature compensation. This would encourage uniformity in the implementation of such requirements among those jurisdictions and prevent inconsistencies for consumers doing business in various jurisdictions.

Based on the many suggestions that it heard between the 2008 Interim and Annual Meetings to allow time for additional study and development of the related method of sale requirements, the Committee decided to change the status of this item from Voting to Information.

During the 2008 WWMA Annual Technical Conference an update on the California Energy Commission (CEC) cost benefit analysis was given. The WWMA was told that the study is being delayed due to difficulty in obtaining device information. The CEC report to the CA legislature due December 2008 was granted an extension until February 2009, after the NCWM Interim Meeting. Several industry members and weights and measures officials stated that the S&T and L&R committees needed to work in concert; therefore, this item should remain Informational until the CEC and GAO report are completed.

One jurisdiction stated during the WWMA meeting that they would like to see technically sound language in HB 44 in the event that temperature compensated devices are installed and activated. No jurisdictions reported ATC devices in operation at this time. However, one jurisdiction stated that CA type approved devices have been installed but the ATC feature has not been activated. Another jurisdiction stated that a company informed them they

were considering ATC but would not take action until after the NCWM had made their decision on the L&R and S&T proposals. For these reasons, the WWMA agreed this item should remain Informational.

At its 2008 Interim Meeting, the CWMA took the position that having guidelines in Handbook 44 does have a value in the event that a model law is passed. However, the CWMA believes that until a model law is passed the guidelines cannot be fully drafted for this item. Therefore, the CWMA recommends this item be a developmental item.

At its 2008 Interim Meeting, NEWMA discussed the following points related to this item: (1) waiting for GAO and California study; (2) financial impact to consumer and retail station owners; (3) extra time for testing and cost of additional equipment; (4) several problems with language of item (e.g., 15.56 °C vs. 15 °C, gravity to be used?); (5) connection to L&R item; and (6) possible perpetuation of fraud. NEWMA recommends this item be made developmental.

The SWMA heard comments during the open hearings at its 2008 Annual Meeting that the item should remain Informational to allow time for additional information to be gathered. The SWMA also heard that there may be additional information provided from the California Energy Commission study (due to be completed in February 2009, with a possible draft available in December 2008) and the GAO study (due to be completed in the fall of 2008). With regard to the proposed changes to the LMD Code, the SWMA heard suggestions that the requirements for indicating temperature compensated deliveries be examined to ensure that existing equipment can meet the requirements, particularly with regard to the service station consoles. The SWMA also heard a suggestion that action on the proposed changes to the LMD Code be held off until the NCWM L&R Committee completes its deliberations on the method of sale issue. The SWMA noted the NCWM S&T Committee raised a number of questions during its deliberations in July and asks that, in addition to the NCWM ATC Steering Committee, people provide input to assist the national S&T Committee in its deliberations on this issue. Because of the comments received and the number of outstanding issues, the SWMA decided to maintain this item as Informational on its agenda.

### **330-2 N.4.6. Pour and Drain Times for Hand-held Test Measures**

Following deliberations at the 2008 NCWM Interim Meeting, Item 330-2 was deleted from the Committee's agenda and the issue addressed under new Item 310-4 as a proposal to add a paragraph to the General Code to designate general requirements for all field standards. At the 2008 NCWM Annual Meeting, the Committee decided (as a result of comments received following the Interim Meeting) to reinstate Item 330-2 (which proposes an addition to the Liquid-Measuring Devices Code to specify pour and drain times for measuring device test standards) as an Information item based upon the rationale described below. Note that the Committee retained Item 310-4 and presented that item as a Voting item at the Annual Meeting. See Item 310-4 for the Committee's original recommendation and background information and the outcome of that discussion.

**Source:** 2008 Carryover Item 330-2. This item originated from the CWMA and first appeared on the Committee's 2008 agenda. See also Note above.

**Recommendation:** The Committee is considering a proposal to add a new paragraph N.4.4. Field Standards to address the selection and use of field standards for inspecting and testing liquid-measuring devices covered under the Liquid-Measuring Devices Code.

#### **N.4.4. Field Standards. – Field standards shall be certified to meet the accuracy requirements of NIST Handbook 105 Specifications and Tolerances for Reference Standards and Field Standard Weights and Measures, 3. Specifications and Tolerances for Graduated Neck Type Volumetric Field Standards.**

##### **N.4.4.1. Pour and Drain Times for Hand-held Test Measures. – Hand-held test measures require a 30-second (± 5 seconds) pour followed by a 10-second drain, with the measure held at a 10 degree to 15-degree angle from vertical during use.**

**N.4.4.2. Drain Times for Bottom Drain Test Measures or Provers. – Bottom drain field standard provers require a 30-second drain time after main flow cessation.**

**(Added 200X)**

**Background/Discussion:** The Committee received comments from the CWMA and heard comments during the 2008 NCWM Annual Meeting open hearing that specific hand-held test measure use requirements are still needed in the LMD Code for weights and measures officials and service agents. Therefore, the Committee agreed that language originally submitted by the CWMA be reinstated in the Committee's report as an Information item for the Liquid-Measuring Devices Code according to the General Conference Information, Item Categories in Publication 16 page Gen-2.

The Committee also heard comments during the 2008 Annual Meeting that key elements for the use of test measures and provers should be included in the Notes section of the LMD Code. In response to the comments, the Committee expanded the proposal to include drain requirements for bottom drain provers and test measures.

The Committee agreed to amend the original proposal to cite the specific document in addition to the test measure use requirements to read as shown in the recommendation above.

At its 2008 Annual Technical Conference, the WWMA supported this companion item to 310-4 and recommended it be a Voting item. To be consistent with other codes in HB 44 and to make the information more prominent, the WWMA believes the item deserves its own paragraph and supports it as a Voting item.

**N.6. Field Standards. – Field standards shall be certified to meet the accuracy requirements of NIST Handbook 105-3, Specifications and Tolerances for Graduated Neck-Type Volumetric Field Standards (or other suitable and designated standards) or the accuracy requirements expressed in Fundamental Considerations, paragraph 3.2. (i.e., one-third of the smallest tolerance applied).**

**N.6.6.1. Pour and Drain Times for Hand-held Test Measures. – Hand-held test measures require a 30-second ( $\pm 5$  seconds) pour followed by a 10-second drain, with the measure held at a 10 degree to 15-degree angle from vertical during use.**

**N.6.6.2. Drain Times for Bottom Drain Test Measures or Provers. – Bottom drain field standard provers require a 30-second drain time after main flow cessation.**

**(Added 200X)**

At its 2008 Interim Meeting, the CWMA recommended this item move forward as a Voting item.

At its 2008 Interim Meeting, NEWMA heard discussion that this item is more suitable for EPO's. Therefore, NEWMA recommends this item be Withdrawn.

The SWMA received no comments on this item during the open hearings at its 2008 Annual Meeting. During its work sessions, the SWMA S&T Committee was unable to reach a consensus on this item. Some committee members questioned the need for the proposal at all given the current references in the Fundamental Considerations and the corresponding proposal to include a reference in the General Code. One committee member questioned whether or not the 30-second drain time for the bottom drain provers was necessary and questioned if any study of the time was being done by any metrology labs. One committee member supported the proposal as written. Some committee members commented that having something specific regarding pour and drain times would be helpful in getting service technicians as well as weights and measures officials to use the proper procedures, whereas other committee members acknowledged that even specifying such procedures would not produce a change in the actual practices in the field.

Because of the range of positions among its members, the SWMA S&T Committee did not believe it would reach a consensus on the item. Rather than holding the item up for those who felt the proposal had benefit, the committee decided to forward the item to the NCWM S&T Committee with a recommendation that it be made a Voting item.

### 330-3 Price Posting and Computing Capability and Requirements for a Retail Motor-Fuel Dispenser (RMFD)

**Source:** 2008 Carryover Item 330-3. This item originated from WMD and the regional associations and first appeared on the Committee's 2007 agenda. This item was previously a Developing item under 360-2, Part 3, Item 2.

**Recommendation:** The Committee is considering a proposal to make the following modifications to Section 3.30. Liquid-Measuring Devices (LMD) Code to address price posting and computing capability for retail motor-fuel dispensers as follows:

#### S.1.6.4. Display of Unit Price and Product Identity.

##### S.1.6.4.1. Unit Price.

**(a) A computing or money-operated device shall be able to display on each face the unit price at which the device is set to compute or to dispense.**

*(b) Whenever a grade, brand, blend, or mixture is offered for sale from a device at more than one unit price, then all of the unit prices at which that product is offered for sale shall be displayed or shall be capable of being displayed on the dispenser using controls available to the customer prior to the delivery of the product. It is not necessary that all of the unit prices for all grades, brands, blends, or mixtures be simultaneously displayed prior to the delivery of the product. This subsection shall not apply to fleet sales, other contract sales, ~~or~~ truck refueling sales, or all purchases of fuel accompanied by an automatically printed receipt of the transaction containing the discount unit price, the total gallons delivered, and total price of the sale.*

*[Effective and nonretroactive as of January 1, 1991]*

*(Amended 1989, ~~and~~ 1997, and 200X)*

***S.1.6.5.4. Selection of Unit Price.*** – Except for dispensers used exclusively for fleet sales, other price contract sales, ~~and~~ truck refueling (e.g., truck stop dispensers used only to refuel trucks), **and purchases where an automatic printed receipt of the transaction containing the discount unit price, the total gallons delivered, and total price of the sale.** when a product or grade is offered for sale at more than one unit price through a computing device, the selection of the unit price shall be made prior to delivery using controls on the device or other customer-activated controls. A system shall not permit a change to the unit price during delivery of product.

*[Nonretroactive as of January 1, 1991]*

*(Added 1989) (Amended 1991, 1992, 1993, ~~and~~ 1996, and 200X)*

***S.1.6.7. Recorded Representations.*** – Except for fleet sales and other price contract sales, a printed receipt providing the following information shall be available through a built-in or separate recording element for all transactions conducted with point-of-sale systems or devices activated by debit cards, credit cards, and/or cash:

*(a) the total volume of the delivery,*

*(b) the unit price,*

*(c) the total computed price, and*

*(d) the product identity by name, symbol, abbreviation, or code number.*

*[Nonretroactive as of January 1, 1986]*

*(Added 1985) (Amended 1997)*

**UR.3. Use of Device.**

**UR.3.2. Unit Price and Product Identity.**

- (a) The following information shall be conspicuously displayed or posted on the face of a retail dispenser used in direct sale:

**(1) except for dispensers used exclusively for fleet sales, other price contract sales, and truck refueling (e.g., truck stop dispensers used only to refuel trucks), all of the unit prices at which the product is offered for sale; and**

**(Added 200X)**

- (2) in the case of a computing type or money-operated type, the unit price at which the dispenser is set to compute.

Provided that the dispenser complies with S.1.6.4.1. Display of Unit Price, it is not necessary that all the unit prices for all grades, brands, blends, or mixtures be simultaneously displayed or posted.

- (b) The following information shall be conspicuously displayed or posted on each side of a retail dispenser used in direct sale:

**(1) the identity of the product in descriptive commercial terms, and**

**(Added 200X)**

**(2) the identity of the grade, brand, blend, or mixture that a multi-product dispenser is set to deliver.**

**(Added 200X)**

(Amended 1972, 1983, 1987, 1989, 1992, ~~and~~ 1993, and 200X)

**UR.3.3. Computing Device.** – Any computing device used in an application where a product or grade is offered for sale at one or more unit prices shall be used only for sales for which the device computes and displays the sales price for the selected transaction.

(Added 1989) (Amended 1992)

The following exceptions apply:

- (a) Fleet sales and other price contract sales are exempt from this requirement.
- (b) A truck stop dispenser used exclusively for refueling trucks is exempt from this requirement provided that:
- (1) all purchases of fuel are accompanied by a printed receipt of the transaction containing the applicable price per gallon, the total gallons delivered, and the total price of the sale; and  
(Added 1993)
- (2) unless a dispenser complies with S.1.6.4.1. Display of Unit Price, the price posted on the dispenser and the price at which the dispenser is set to compute shall be the highest price for any transaction which may be conducted.  
(Added 1993)
- (c) All purchases of fuel accompanied by an automatically printed receipt of the transaction containing the discount unit price, the total gallons delivered, and total price of the sale.**  
**(Added 200X)**



**UR.3.4. Printed Receipt. – Except for \*purchases conducted under UR.3.3 (c) \*see note below, ~~the~~ the total price, the total volume of the delivery, and the price per unit liter or gallon shall be shown, on a receipt by either being automatically printed or printed in clear hand script, ~~on any printed ticket issued by a device and containing any one of these values.~~**

**\*Note: Purchases conducted under UR.3.3 (c), shall only be automatically printed, containing at minimum, the total price, the total volume of the delivery, and the discount price per unit.**

(Amended 2001 **and 200X**)

**Background/Discussion:** In the early 1990s, various sections of the Liquid-Measuring Devices Code in HB 44 (including paragraphs S.1.6.4. Display of Unit Price and Product Identity, S.1.6.5.4. Selection of Unit Price, UR.3.2. Unit Price and Product Identity, and UR.3.3. Computing Device) were modified to address multi-tier pricing applications such as cash-credit. Since that time, marketing practices have evolved to include the addition of new practices such as frequent shopper discounts and club member discounts. Numerous questions have been posed to WMD regarding the requirements for posting unit prices, calculation of total price, customer-operated controls, and other related topics such as the definitions for associated terminology.

It is clear from these questions that changes are needed to HB 44 to ensure the requirements adequately address current marketplace conditions and practices. WMD has raised this issue with the Committee and has also discussed a variety of pricing practices with individual state and local weights and measures jurisdictions.

WMD reviewed the existing requirements and their application to current market practices and collected information on a number of scenarios, including the following:

- |  |  |
|--|--|
| (1) Frequent shopper discounts   | (8) Full service   |
| (2) Club member discounts  | (9) Self service   |
| (3) Discount for prepaying cash (to prevent “drive-offs”)                  | (10) Progressive discounts based on volume of motor-fuel purchased |
| (4) Prepay at the cashier for credit sales                                 | (11) Coupons for discounts on immediate or future purchases        |
| (5) Discounts for purchasing store products                                | (12) Rebates (e.g., use of oil company credit card)                |
| (6) Discounts for purchasing a service (e.g., carwash)                     | (13) Day-of-the-Week discounts                                     |
| (7) Targeted group discounts (e.g., Tuesday-Ladies 5 cents off per gallon) |  |

Note: The conditions under some of these scenarios may not typically fall under the authority of weights and measures jurisdictions.

WMD expressed an interest in receiving input from the weights and measures community about the various practices and pricing structures in use, and indicated it welcomed opportunities to discuss this item at regional weights and measures associations to ensure the item is adequately addressed.

The WWMA acknowledged that marketing practices change on a daily basis and the task to ensure HB 44 codes address each scenario is monumental. However, the WWMA encouraged NIST in its efforts to tackle this ongoing issue. Therefore, the WWMA recommended this item be considered and move forward to the national level as a Developing item as did the SWMA and NEWMA.

At its 2007 Annual Meeting the SWMA was informed that the National Association of Convenience Stores recognized a problem with the current price posting and computing capability requirements in HB 44 and was currently working on information on this item to provide to the NCWM S&T Committee.

At the 2008 Interim Meeting, Ohio Weights and Measures submitted a proposal to the Committee that included specific language for modifying Section 3.30. to address the various pricing and marketing structures being used in retail motor-fuel applications. Based on its review of that proposal, the fact that a specific proposal has now been developed and presented, and the number of jurisdictions reporting a need to move forward with this item, the Committee decided to elevate the status of this item from Developmental to Informational. Consequently, the

Committee is considering the specific language submitted by Ohio and encourages the weights and measures community to review the proposal and submit comments on this item.

At its spring 2008 meeting, the CWMA S&T Committee reported hearing comments that current language does not meet the needs of what is actually happening in the marketplace. Currently, there are economic issues dealing with fair competition and there are numerous marketing techniques that the language in NIST HB 44 cannot address. The CWMA S&T Committee believes the item as proposed is a good start on addressing this issue but it does not entirely provide adequate language to aid in enforcement. The CWMA S&T recommended that a WG be formed to further evaluate this item. Some examples of the panel discussion were, but not limited to:

1. Discounts calculated at the pump and other at the counter.
2. Level of consumer responsibility.
3. Can the dispensers do tier pricing?
4. Competitors complaining about non-uniformity of enforcement.
5. Discounts should be done electronically.
6. All is okay as long as the receipt explains the transaction.

NEWMA's spring 2008 meeting report stated that this is a very important item and NEWMA supports continued work on it as an Informational item. One member suggested that at the next NEWMA Interim Meeting a WG spend some time coming up with suggestions for this item.

At the 2008 Annual Meeting, the Committee heard comments on the proposed changes to the Liquid-Measuring Devices Code. Several weights and measures officials expressed concern about the provision in the proposed language that would allow discounts to be calculated at the console after the customer has dispensed product. These officials felt that devices should be able to compute the total sales price at the unit price at which the product is offered for sale. Several industry members expressed support of the proposed language. One member stated that it is important for retailers with mechanical dispensers to be able to offer their customers a cash discount.

Current NIST Handbook 44 requirements state that the selection of the unit price must be made by the customer using controls on the device or other customer-activated controls. One industry member questioned whether making arrangements for a given method of payment at the console might be considered as satisfying that requirement since the customer is initiating the sale and the conditions of payment prior to the transaction. Weights and measures officials acknowledged the comment, but emphasized the need for the customer to retain control over the selection of the price, preferably by making a selection at the dispenser or using customer controls.

The Committee expressed appreciation for the work that had been done thus far, acknowledging that additional work is needed on this item and noted that a WG is being formed to develop this item further and that WG will meet during the 2008 Annual Meeting. The Committee looks forward to receiving input and suggestions from the WG and encourages interested parties to participate in the WG and/or forward comments to the Committee.

A meeting was held on July 15, 2008, (in conjunction with the NCWM Annual Meeting) of individuals interested in the issue of pricing requirements for retail motor-fuel dispensers. Participants in the meeting included weights and measures officials, gasoline pump manufacturers, and other interested parties. The purpose of the meeting was to establish an informal WG to review the issue of price posting and computing capability for retail motor-fuel dispensers. The WG will focus on the development of proposed changes to NIST Handbook 44 necessary to provide flexibility to marketers while ensuring that the buyer and seller have adequate information about all aspects of the transaction with respect to the pricing and method of payment. The CWMA had suggested the formation of this small WG to study this issue with the idea that the issue could be more thoroughly developed than could be done in the limited time available during the NCWM Interim and Annual Meetings. Note that this work does not replace the discussion of this issue at the NCWM Interim and Annual Meetings, but rather is intended to supplement the work and provide the S&T Committee with some proposals to consider.

Participants at that meeting were asked to indicate their interest in the work as either "work group participants" (expected to regularly participate and contribute to the work) or "observers" (will be kept abreast of WG activities, including meeting agendas and summaries). Because there is no budget to support the cost of regular face-to-face meetings, the WG will attempt to accomplish its objectives through e-mail and other electronic communication.

Anyone interested in the details of this work should contact Tina Butcher (NIST WMD) by e-mail at [tbutcher@nist.gov](mailto:tbutcher@nist.gov) or by telephone at (301) 975-2196.

During the open hearings at its 2008 Annual Technical Conference, the WWMA received comments that the Committee wait until a national WG is established to develop this item further. The WWMA agreed that the item should be Informational.

During its 2008 Interim Meeting, the CWMA heard the following comments during discussions of this item:

- Lighten the rules of dispensing so consumer can see the actual sale – transparency in the marketplace
- Not enough room on marquee or on pump for posting all prices
- What will appear on customer receipt or final receipt

The national work group has not yet met in 2008. The CWMA agrees that the item should be Informational until more information is obtained from the national work group.

At its 2008 Interim Meeting, NEWMA supported work on this item and looks forward to information from the WG.

At its 2008 Annual Meeting, the SWMA acknowledged the need to review and revise the requirements in the Liquid-Measuring Devices Code regarding price posting and computing capability. However, the SWMA does not support the proposed language as written. The SWMA heard comments in opposition to the proposed changes to the LMD Code; the SWMA S&T Committee noted that it is important for consumers to have full information about the purchase price of the product before they dispense the fuel and to be able to follow all aspects of the transaction, and the Committee is concerned that the proposed language does not provide for this.

The SWMA heard from Tina Butcher, NIST, that a WG has been established to study this issue; the group met in conjunction with the NCWM Annual Meeting in July; and anyone interested in participating in the work should contact Tina. The SWMA supports the continued efforts of the WG and encourages interested parties to provide comments to that group. Because of the ongoing efforts to develop this item, the SWMA agrees that this item should remain an Information item and encourages people to study the proposal that has been presented thus far.

### **330-4 T.5. Predominance - Retail Motor-Fuel Devices**

**Source:** Central Weights and Measures Association (CWMA); This item appeared on the Committee's 2008 agenda as Developmental Item Part 4, Item 1.

**Recommendation:** The CWMA recommends the following new proposal developed by the Nebraska Weights and Measures Division to add a new paragraph T.5. to HB 44 Section 3.30. as follows:

**T.5. Predominance - Retail Motor-Fuel Devices. – The retail motor-fuel devices in service at a single place of business shall be considered maintained in proper operating condition when evaluation of normal test results indicate the following parameters are met:**

- (a) The number of meters with minus test errors in excess of one-half maintenance tolerance shall be less than 60 % of the meters at the location, and**
- (b) When there are three or more meters of a single grade or type of fuel, the average error of the meters shall not be a minus value exceeding one-half maintenance tolerance. Meter test results that exceed maintenance tolerance shall not be included in determining the average meter error of a single grade or type of fuel.**

**(Added 200X)**

**Background/Discussion:** In 1991 this same topic was brought before the NCWM as an Information item. The intent of the proposal at that time was to provide guidance to states in the interpretation of General Code paragraph G-UR.4.1. Maintenance of Equipment. In 1993, the State of Wisconsin adopted a policy that defined “predominance” as shown in the proposal. That policy was similar to the one proposed in 1991, except Wisconsin felt that one-third acceptance tolerance was too stringent because there was a need to take into account normal variability in testing procedures, equipment, and environmental conditions found in the field. Wisconsin, therefore, adopted a “greater than one-third” maintenance tolerance guideline. In 2003, the Wisconsin policy was further refined by deleting the language “all devices are found to be in error in a direction favorable to the device user.” The new guideline for permissible errors was “60 % or more of the devices are found to be in error in favor of the device owner/user by more than one-third of the maintenance tolerance.” Both of these criteria were seldom used in the field because they made the policy confusing.

Just prior to 2005, NIST conducted a national survey of retail motor-fuel dispenser testing, and the results pointed to a need to gain more uniformity in the application of tolerances. The CWMA noted there is a wide variation in how different states handle the “predominance” question. Strides should be continually made to gain uniformity. Adoption of the proposed new paragraph G-UR.4.1.1. would be one step toward gaining greater uniformity. With more than five years of history using the proposed criteria, Wisconsin saw a relatively low number of devices rejected on the basis of “predominance,” and most station owners and all service companies have a working understanding of predominance.

In 2005 the CWMA agreed to submit the modified proposal to the NCWM S&T Committee with a recommendation that it be placed on the Committee’s agenda as a Developing item.

At their fall 2006 meetings, NEWMA, the SWMA, and the WWMA considered an earlier CWMA proposal to modify a General Code requirement and set limits on how to determine predominance in favor of the device operator. NEWMA believed the item was addressed adequately in HB 44 and recommended it be withdrawn from the NCWM S&T Committee’s 2007 agenda. The SWMA recommended this item remain Developing as a user requirement in the General Code. The SWMA encouraged the jurisdictions to review the proposed policy and try it out. The WWMA considered the limits in the proposal too stringent given the effects of temperature and other uncertainties. The WWMA was concerned dispensers would be set to the limits in the proposal rather than as close as practical to zero error. Since the current General Code adequately addresses predominance, jurisdictions may establish policy to gain uniformity in determining predominance. Consequently, the WWMA recommended this proposal be Withdrawn from the agenda.

At the 2007 NCWM Interim Meeting, the Committee considered proposals to withdraw this item from its agenda. However, because a jurisdiction involved in developing the current proposal indicated their intention to provide the Committee with considerable data and continue further development of the item, the Committee agreed to keep the item on its agenda as a Developing item through 2007.

At its 2007 Annual Meeting, the WWMA heard comments from state and local jurisdictions that they have been able to enforce G-UR.4.3. Predominance through administrative policies and rules.

The WWMA believed that:

- existing language in NIST Handbook 44 was sufficient,
- the definition of predominance is anything over 50 %,
- a potential conflict exists with paragraph G-UR.4.3. Use of Adjustments,
- the CWMA proposal addressed only retail motor-fuel devices and a review should also be considered for other weighing and measuring devices, e.g., point-of-sale scales and vapor meters,
- the proposed language did not take into account devices that were clearly out of tolerance, and
- the proposed language did not take into account the uncertainty of the test equipment, reading errors, and temperature changes between device calibration and official test.

The WWMA recommended the CWMA proposal to add 3.30. T.5. Predominance be Withdrawn. The WWMA further recommended the following alternate proposal to address some of the WWMA concerns listed above:

**G-UR.4.1. Maintenance of Equipment.** – All weighing and measuring equipment in service and all mechanisms and devices attached thereto or used in connection therewith shall be continuously maintained in proper operating condition throughout the period of such service. Equipment in service, by group or entirety, at a single place of business found to be in error predominantly in a direction favorable to the device owner or user shall not be considered “maintained in a proper operating condition.”

(Amended 1973, ~~and~~ 1991, and 200X)

**For measuring devices, the term “predominantly” applies to any single product, grade, service level, or payment method, with errors in favor of the device owner or user.**

**(Added 200X)**

At its 2007 Interim Meeting, the CWMA heard comments in favor of this item and from state and local jurisdictions that they have been able to enforce G-UR.4.3. Predominance through administrative policies and rules. However, there was some concern that the proposed tolerance was not stringent enough and allowed the meters to be set at acceptance tolerance values. By adding part (c), the concern of misuse of tolerance was adequately addressed.

The CWMA supported the following language as proposed.

**T.5. Predominance - Retail Motor-Fuel Devices. – The retail motor-fuel devices in service at a single place of business shall be considered maintained in proper operating condition when evaluation of normal test results indicate the following parameters are met:**

- (a) **The number of meters with minus test errors in excess of one-half maintenance tolerance shall be less than 60 % of the meters at the location, and**
- (b) **When there are three or more meters of a single grade or type of fuel, the average error of the meters shall not be a minus value exceeding one-half maintenance tolerance. Meter test results that exceed maintenance tolerance shall not be included in determining the average meter error of a single grade or type of fuel.**
- (c) **Upon initial verification or re-inspection of devices rejected for predominance, the criteria for acceptance using paragraphs (a) and (b) shall be based on minus errors greater than 2 in<sup>3</sup> rather than 3 in<sup>3</sup>.**

**(Added 200X)**

**G-UR.4.1. Maintenance of Equipment.** – All weighing and measuring equipment in service and all mechanisms and devices attached thereto or used in connection therewith shall be continuously maintained in proper operating condition throughout the period of such service. Equipment in service, by group or entirety, at a single place of business found to be in error predominantly in a direction favorable to the device owner ~~or~~ user shall not be considered “maintained in a proper operating condition.”

**For measuring devices, the term “predominantly” applies to any single product, grade, service level, or payment method, with errors in favor of the device owner ~~or~~ user.**

At its 2007 Interim Meeting, the NEWMA stated that they continue to oppose this item and recommended it be Withdrawn as it was already adequately addressed in the General Code.

At its 2008 Annual Meeting, the CWMA recommended the item be Withdrawn. At its 2008 Interim Meeting, the CWMA recommended this item go forward as a Voting item.

The WWMA received no comments on this (developmental) issue during its 2008 Annual Technical Conference open hearings. The WWMA made no changes to the proposal and recommends the item remain developmental.

### 331 VEHICLE-TANK METERS

#### 331-1 T.2.1. Automatic Temperature-Compensating Systems

**Source:** 2008 Carryover Item 331-2. This item originated from the Western Weights and Measures Association (WWMA) and first appeared on the Committee's 2008 agenda.

**Recommendation:** Amend paragraph T.2.1. as follows:

**T.2.1. Automatic Temperature-Compensating Systems.** – The difference between the meter error (expressed as a percentage) for results determined with and without the automatic temperature-compensating system activated shall not exceed:

- (a) ~~0.40.2~~ % for mechanical automatic temperature-compensating systems; and
- (b) ~~0.20.1~~ % for electronic automatic temperature-compensating systems.

The delivered quantities for each test shall be approximately the same size. The results of each test shall be within the applicable acceptance or maintenance tolerance.

**(Amended 200X)**

**Background/Discussion:** For more than 13 years, Alaska has been testing mechanical and electronic temperature-compensating vehicle-tank meters ranging in flow rates from 100 gal/min to 300 gal/min. They have applied the tolerances of 0.2 % for mechanical and 0.1 % for electronic wholesale meters as specified in the LMD Code, and have found that the devices are fully capable of meeting these tolerances. When devices are found out of tolerance, it is usually because of a broken cable at the probe for the mechanical devices, an electrical fault at the probe on electronic devices, or an incorrect API setting. By keeping the current tolerances that are double this amount, there is a risk these problems will be missed.

The following example illustrates the point using:

1000 gal prover  
 Diesel #2  
 API 34.5  
 Temperature 60 °F  
 Mechanical compensated VTM

- A net test draw is run and the result is + 2.0 gal or + 0.2 %. This meets the maintenance tolerance of 0.3 % or 3.0 gal.
- A gross draw is run and the result is – 2.0 gal or – 0.2 %. This still meets the tolerance and the difference between the two runs is 0.4 %.
- With the temperature of the fuel at 60 °F, both of these runs should have been equal.
- If an inspector used the system indication of temperature rather than using a certified thermometer in the meter temperature well, calculations show that the current tolerance of 0.4 % for a mechanical automatic temperature-compensating system could allow a system malfunction that provided a temperature error of up to 9 °F difference from the actual temperature taken in the prover and not be recognized as being caused by a faulty system.

At its 2007 Annual Meeting, the WWMA was presented with a letter from a meter manufacturer in support of the proposal based on a request from Alaska Weights and Measures for input from manufacturers of the mechanical and electronic compensators. The letter states that the proposed changes will align the VTM tolerances for the difference between meter error for results determined with and without the automatic temperature-compensating system activated with the LMD Code. Current NIST HB 44 language will require this manufacturer to produce different stationary and vehicle-mounted meters; the proposed change will align the United States with Canada and OIML, who currently do not have different standards for these meters.

The WWMA recommends that this proposal move forward as a Voting item on the NCWM S&T Committee agenda.

At its 2007 Interim Meeting, the CWMA commented that tightening the tolerance was premature without additional input from other jurisdictions and manufacturers to see how or if this would affect devices currently in the field. Therefore, the CWMA requested that data to support or oppose this item be gathered from additional jurisdictions.

At the 2008 Interim Meeting, the MMA and some individual manufacturers opposed this proposal. While they were comfortable with a tighter tolerance being used during type evaluation they were concerned with the impact of a tighter tolerance during routine field examinations. During routine field evaluations it becomes more difficult to control the influence factors that impact the measurement process leading to higher uncertainty in the accuracy of the test results. The Committee agreed that more information is needed before moving the item forward and, consequently, made 331-2 an Information item on its 2008 agenda.

In their spring 2008 meeting reports, CWMA and NEWMA stated that there is not enough data to support the proposed changes in tolerance and recommended that the item remains an Information item. WMD submitted comments supporting the collection of additional data, and also suggested that the tolerances for stationary and vehicle-mounted meters be re-examined and compared to ensure consistency across codes for the same meter type. Additionally, WMD noted that as the use of VTMs with ATC increase, there may be a period of transition as jurisdictions and companies become accustomed to the test procedures and application of tolerances for these systems and that this experience may provide a good indication of how the uncertainties involved in the test process will impact the proposed tolerance change.

At the 2008 NCWM Annual Meeting the Committee reported that it has not received additional data from other jurisdictions on the impact of this proposal to existing devices. The Committee also heard comments that the tolerances in the VTM code need to be less stringent than equivalent tolerances in the LMD code since VTM meters and accessories are mobile devices that are subject to road vibrations and other environmental factors. The Committee does not understand the rationale for the comment since the tolerances for Accuracy Class 0.3 in Table T.1. for VTMs are tighter than Accuracy Class 0.3 devices in the LMD code.

The Committee is interested in receiving compliance data from jurisdictions that are enforcing ATC tolerance requirements on VTMs. If no information is received, the Committee will consider recommending that this item move forward as a Voting item in 2009.

No comments were received during the WWMA 2008 Annual Technical Conference open hearing. The WWMA recommends this item remain Informational pending receipt of data from other jurisdictions. If no additional information is received before the Interim Meeting, the WWMA recommends this item be changed to voting by the NCWM Committee.

At its 2008 Interim Meeting, the CWMA recommended waiting for more information to be submitted before the NCWM Interim Meeting in January 2009. If no more information is received the CWMA recommends the item be moved forward as a Voting item.

At its 2008 Interim Meeting, NEWMA recommended making this item Informational while waiting for more information.

During open hearings at its 2008 Annual Meeting, the SWMA heard concerns about whether or not existing equipment, particularly electronic equipment can meet the proposed smaller tolerances. The Committee heard that the harsher environment of the vehicle-mounted application may make it difficult for devices to meet the tolerances. The SWMA agreed with the NCWM S&T Committee that additional data is needed prior to making a decision about the proposed tolerance change. Consequently, the SWMA maintained this as an Information item on its agenda. The SWMA encourages jurisdictions that have VTMs equipped with automatic temperature compensating systems in their jurisdictions to forward compliance data to the NCWM S&T Committee so that a better assessment can be made about the proposed tolerances.

**331-2 UR.2.5. Automatic Temperature Compensation for Refined Petroleum Products**

**Source:** 2008 Carryover Item 331-3. This item originated from the Southern Weights and Measures Association (SWMA) and first appeared on the Committee's 2008 agenda.

**Recommendation:** Add the following subparagraphs to the Vehicle-Tank Meters Code:

**UR.2.5.2.1. Period of Use. – When fuel is bought or sold on an automatic temperature-compensation basis, it shall be bought or sold using this basis over at least a consecutive 12-month period unless otherwise agreed to by both the buyer and seller in writing.**

**UR.2.5.2.2. Condition of Use. – At a business location which offers fuel products for sale on the basis of a temperature-compensated volume, all vehicle-tank meters shall have active automatic temperature compensation and all fuel products offered for sale shall be dispensed on the basis of temperature-compensated volume.**

**Discussion:** Currently there are no published guidelines for how a company has to use or operate their VTM with or without temperature compensation. They could choose to operate only part of their fleet with ATC or use ATC only part of the year when it is to their benefit. They may choose to use ATC only on certain products such as home heating oil and not use ATC with diesel, kerosene, or gasoline.

These two proposals will help to eliminate the potential for facilitation of fraud with ATC. The proposals also will help to eliminate consumer confusion regarding why certain products are currently sold using ATC and others are not.

At its 2007 Annual Meeting, the SWMA received the proposal shown above and recommended it move forward as a Voting item on the NCWM S&T Committee agenda.

Based on comments received at the 2008 Interim Meeting, that the proposal should only apply to fuel products and to VTMs, the Committee modified the proposal and agreed to present it for a vote at the 2008 NCWM Annual Meeting.

In its spring 2008 meeting report, the CWMA S&T Committee stated that it heard comments that there may be problems with uniformity over buyer and seller agreements at the retail level. The CWMA S&T Committee recommended that the item be moved back to an Informational status for further clarification.

In its spring 2008 meeting report, NEWMA reported that it initially supported this item, but after hearing comments raised by the CWMA regarding written agreements; it re-considered its position and proposed that the item be moved back to an Information item. NEWMA members commented that unscrupulous companies could have customers unwittingly sign contracts agreeing to gross or net deliveries to their disadvantage. Some members suggested that maybe the written agreement language should be removed altogether. NEWMA did not have a solution to this problem but recognized how this could be misused.

NIST WMD noted that the numbering of the proposed paragraphs needs to be reviewed and the paragraphs reorganized within the code before proceeding with this item.

The Committee heard concerns regarding the proposed UR.2.5.2.1. from the CWMA and NEWMA and during its open hearings at the 2008 NCWM Annual Meeting. While an identical paragraph is presently included in the Liquid-Measuring Devices Code, its use has been limited to wholesale applications where the buyer and the seller are well educated regarding the use of temperature compensation. There are concerns that this paragraph is not appropriate for the Vehicle-Tank Meters Code since this applies to retail applications where the buyer may not fully understand or appreciate the significance of temperature compensated deliveries and may not notice references to the basis for the sale in any delivery contract or understand the significance of the references. There is particular concern that a seller could include a time period shorter than a 12-month period in a contract and that the timeframe could include a time period where the use of temperature compensation is most advantageous to the business.



Comments suggested that the Committee delay proposing this item for a vote until the language can be more carefully studied.

Based on the comments received, the Committee decided to change the status of this item from Voting to Informational.

During open hearings at its 2008 Annual Technical Conference, the WWMA heard comments from one jurisdiction questioning why this item is proposed in HB 44 and suggesting that a more appropriate place might be HB 130 since it relates to method of sale. The WWMA noted that similar language exists in another HB 44 Code (LMD Code UR.3.6.1.1.).

The WWMA reviewed the alternative language developed by the National S&T Committee at the 2008 NCWM, and noted that it recommended strikethrough of “unless otherwise agreed to by both the buyer and seller in writing.” This would be inconsistent with LMD Code UR.3.6.1.1., and the WWMA recommended this item remain Informational to allow for further discussion.

During the 2008 CWMA Interim Meetings, one jurisdiction stated they would not support this item with UR.2.5.2.2. Condition of Use. This jurisdiction believes that all vehicle tank meters at a location should not be made to be temperature compensate at a given facility. Other jurisdictions attending the meeting supported the item. For clarification purposes the CWMA recommends the words “through a vehicle tank meter” be inserted after the words “offered for sale...” in UR.2.5.2.2. Condition of Use.

The CWMA recommends this item be moved to a Voting item with the following changes.

**UR.2.5.2.1. Period of Use. – When fuel is bought or sold on an automatic temperature-compensation basis, it shall be bought or sold using this basis over at least a consecutive 12-month period unless otherwise agreed to by both the buyer and seller in writing.**

**UR.2.5.2.2. Condition of Use. – At a business location which offers fuel products for sale on the basis of a temperature-compensated volume, all vehicle-tank meters shall have active automatic temperature compensation and all fuel products offered for sale through a vehicle tank meter shall be dispensed on the basis of temperature-compensated volume.**

At its 2008 Interim Meeting, NEWMA heard discussion that allowing uncompensated sales when agreed to by both parties could result in consumers getting sales contracts that contained this language, and consumers may not understand fully what this means. When the phrase “unless otherwise agreed to by both the buyer and seller in writing” language is removed, it appears that UR.2.5.1. already addresses this issue.

Consequently, NEWMA recommends the following changes:

**UR.2.5.2.1. Period of Use. – When fuel is bought or sold on an automatic temperature-compensation basis, it shall be bought or sold using this basis over at least a consecutive 12-month period unless otherwise agreed to by both the buyer and seller in writing.**

**UR.2.5.2.2. Condition of Use. – At a business location which offers fuel products for sale on the basis of a temperature-compensated volume, all vehicle-tank meters shall have active automatic temperature compensation and all fuel products offered for sale shall be dispensed on the basis of temperature-compensated volume.**

NEWMA recommends this item be made Informational.

At its 2008 Annual Meeting, the SWMA raised the following concerns and questions about the proposal:

- The SWMA questioned the need for the new proposed paragraph UR.2.5.1. since the VTM Code currently includes a paragraph (also numbered UR.2.5.1.) that appears to cover similar criteria.

- The SWMA heard a suggestion to eliminate the phrase “unless otherwise agreed to by both the buyer and the seller” from the proposed UR.2.5.1. The Committee noted that the same language is already included in the Liquid-Measuring Devices Code; however, the references in that code are to wholesale meters and the buyer and seller are fully educated and understand the ramification of a temperature-compensated vs. non-temperature compensated sale.
- The SWMA questioned how the proposed paragraph UR.2.5.2.2. is intended to apply to metering devices at a single location. Does the reference to “all fuel products” in this paragraph refer to all vehicle-tank meters? Or does it refer to vehicle-tank meters as well as RMFDs at a single location?
- The SWMA questions the proposed numbering of the paragraphs and whether or not the proposed paragraphs should be included under the section of “invoices” or in another section.

The SWMA also considered a suggestion to split the item into two parts in order to facilitate addressing these and other concerns. While the SWMA is amenable to this approach, it believes the above concerns and questions should be addressed prior to taking additional action.

The SWMA believes that additional work is needed on this item to resolve the above and other concerns. Consequently, the SWMA maintained this as an Information item on its agenda.

### 336 WATER METERS

#### 336-1 S.1.1.3. Value of Smallest Unit

**Source:** Western Weights and Measures Association (WWMA); This item appeared at Part 5, Item 1 on the Committee’s 2008 agenda as a Developmental item under consideration by the SWMA.

**Proposal:** Harmonize HB 44 value of the smallest unit requirements and indicator specifications with AWWA standards by amending paragraph S.1.1.3. subsection (a) and adding a new paragraph S.1.1.6. Proving Indicator as follows:

**S.1.1.3. Value of Smallest Unit.** – The value of the smallest unit of indicated delivery and recorded delivery, if the device is equipped to record, shall not exceed the equivalent of:

- (a) 50 L (10 gal, 1 ft<sup>3</sup>) on utility type meters, sizes 1 in and smaller, or
- (b) 500 L (100 gal, 10 ft<sup>3</sup>) on utility type meters, sizes 1½ in and 2 in, or
- (c) 0.2 L (<sup>1</sup>/<sub>10</sub> gal, <sup>1</sup>/<sub>100</sub> ft<sup>3</sup>) on batching meters delivering less than 375 L/min (100 gal/min, 13 ft<sup>3</sup>/min),
- (d) 5 L (1 gal, <sup>1</sup>/<sub>10</sub> ft<sup>3</sup>) on batching meters delivering 375 L/min (100 gal/min, 13 ft<sup>3</sup>/min) or more.

Add new paragraph S.1.1.6. as follows:

**S.1.1.6. Proving indicator.** – **Utility type meters shall be equipped with either a mechanical-type proving indicator, or a high-resolution digital proving indication. The individual graduations on a mechanical proving indicator shall indicate volumes no larger than <sup>1</sup>/<sub>100</sub> of the value of the smallest unit of indicated delivery required in S.1.1.3. For digital proving indications, the smallest unit of volume displayed shall be no larger than <sup>1</sup>/<sub>1000</sub> of the value of the smallest unit of indicated delivery required in S.1.1.3.**

**Background/Discussion:** At its 2007 Annual Meeting, the SWMA received a request from a meter manufacturer for clarification of the intent of S.1.1.3. Along with the request, the manufacturer stated that, “our assumption is that this refers to the value of each graduation of the primary indicating element. If this is indeed the intention of S.1.1.3., then the S.1.1.3.(a) requirement of 10 gal would pose no problem for utility type meters. However, this would represent very poor resolution for smaller water meters. Again, if S.1.1. is indeed referring to the values for

individual graduations, values for utility type meters under S.1.1.3. should instead be separated into three categories: 0.1 gal for meters 1 in and smaller, 1.0 gal for meters 1½ in through 3 in and 10 gal for meters 4 in and larger. Similarly, metric “smallest unit” values would also be in three categories: 1 L for meters 1 in and smaller, 10 L for meters 1½ in through 3 in, and 100 L for meters 4 in and larger.

Utility-type water meters 1 in and smaller have 10 gal test circles with 100 graduations (i.e., 0.1 gal increments). Utility meters 1½ in through 3 in have 100 gal test circles with 100 graduations (i.e., 1 gal increments), and utility meters 4 in and larger have 1000 gal test circles with 100 graduations (i.e., 10 gal increments). See comparable registration details for metric offerings (with 0.1 m<sup>3</sup>, 1.0 m<sup>3</sup>, and 10 m<sup>3</sup> test circle offerings for progressively larger meter sizes).”

The SWMA also heard comments from the manufacturer that several other water meter manufacturers were having difficulty meeting HB 44 requirements for repeatability that were added in 2002. Additionally part of the problem was the determination of what constitutes the smallest unit of measure for various sizes of their utility meters. The manufacturer is requesting a change to the test draft requirements and/or smallest unit of measure requirements to be more appropriate for the meters they and others manufacture. The SWMA agreed to forward the proposal to the NCWM S&T Committee for consideration.

Just prior to the 2008 NCWM Annual Meeting, the NCWM S&T Committee received a proposal from Scott Swanson, with Sensus Metering Systems, on behalf of five water meter manufacturers, including Badger Meter, Inc., Elster Metering, Master Meter, Neptune Metering, and Sensus Metering to modify the proposed language as outlined in the recommendation above. During the Committee’s open hearings, the S&T Chairman notified NCWM members that copies of this information were available to interested parties and noted that the above proposal will be included in the Committee’s final report.

The five water meter manufacturers state that the vast majority of utility-type water meters sold in the United States are designed to comply with ANSI/AWWA meter standards. All AWWA utility-type meter designs share a common meter proving resolution of 100 scale divisions per revolution of the pointer to verify meter accuracy. All utilities use the odometer indicating device on the dial face of the meter for billing purposes. These utility-type meter designs are quite different than those used for batching-type meters. HB 44 currently addresses the value of the smallest unit for utility-type meters as being 50 L regardless of the size of the meter. As a result, larger utility-type meters are required to be more sensitive than smaller utility-type meters.

For utility-type meters 1 in and smaller, meter registration test hands (proving indicators) have graduations with resolution down to 0.1 gal or 0.01 ft<sup>3</sup>. For meters 1½ in and 2 in, test hands have graduations with resolution down to 1.0 gal or 0.1 ft<sup>3</sup>. The smallest unit of indicated delivery is then given by one full revolution of the test hand (amounting to 100 graduations).

During open hearings at the WWMA 2008 Annual Technical Conference, the water meter manufacturers gave a presentation on their justification for the proposed changes which included reducing the uncertainty in testing procedures by increasing the test draft size; clarifying the values for the smallest unit of measure based on utility type meter size; and limiting the number of graduations of the sweep hand to ≥100 graduations. Additionally, the proposals are intended to align HB 44 test requirements with AWWA standards and test criteria.

The WWMA discussed the difference between the smallest unit and the value of the proving indication. The intent is that the proving indicator only be used in the verification of the device and the “Value of the Smallest Unit” applies the meter reading for billing purposes (e.g., beginning and ending readings on a utility bill). This would be analogous to Scales Code verification division sizes where d (smallest division that can be indicated) can be different than e (verification scale division by which tolerance values apply). It was noted that similar language and terminology for “Values of the Smallest Unit” and “Proving Indicator” exists in the Vapor Meter Code.

The WWMA recommends that this item be forwarded to the NCWM S&T Committee as a Voting item.

At its 2008 Interim Meeting, NEWMA heard a presentation from Andre Noel, Neptune. NEWMA has limited experience testing water meters but recognizes the logic of this item. NEWMA has no position at this time.

CWMA heard no comments on this item at its 2008 Interim Meeting and took no position on this item.

The SWMA S&T Committee heard no comments on this item. Because the SWMA S&T Committee members have little experience with water meters, the committee took no position on the item and the SWMA agreed the item should remain developmental until additional support is heard.

### 336-2 T.1.1. Repeatability

**Source:** Western Weights and Measures Association (WWMA)

**Recommendation:** Amend T.1.1. Repeatability and Add New Tables T.1.1. and T.1.2. in HB 44 Section 3.36.

**T.1.1. Repeatability.** – When multiple tests are conducted at approximately the same flow rate, the range of the test results shall not exceed 0.6 % for tests performed at the normal and intermediate flow rates, and 1.3 % for tests performed at the minimum flow rate, and each test shall be within the applicable tolerances. **When repeatability tests are performed, test draft sizes shall comply with Tables T.1.1 and T.1.2. Repeatability Testing for Utility Type Water Meters. Repeatability tests shall be conducted during type evaluation testing.**

**(Amended 200X)**

<b>Table T.1.1. Flow Rate and Draft Size for Utility Type Water Meters</b>			
<b>Normal Tests for Repeatability</b>			
<b>Meter Size (inches)</b>	<b>Rate of Flow (gal/min)</b>	<b>Maximum Rate</b>	
		<b>Meter Indication/Test Draft</b>	
		<b>gal</b>	<b>ft<sup>3</sup></b>
<b>Less than <math>\frac{5}{8}</math></b>	<b>8</b>	<b>100</b>	<b>10</b>
<b><math>\frac{5}{8}</math></b>	<b>15</b>	<b>100</b>	<b>10</b>
<b><math>\frac{5}{8} \times \frac{3}{4}</math></b>	<b>15</b>	<b>100</b>	<b>10</b>
<b><math>\frac{3}{4}</math></b>	<b>25</b>	<b>100</b>	<b>10</b>
<b>1</b>	<b>40</b>	<b>100</b>	<b>10</b>
<b>1½</b>	<b>50</b>	<b>400</b>	<b>40</b>
<b>2</b>	<b>100</b>	<b>500</b>	<b>40</b>

**(Table Added 200X)**

<b>Table T.1.2. Flow Rate and Draft Size for Utility Type Water Meters</b>						
<b>Special Tests for Repeatability</b>						
<b>Meter Size (inches)</b>	<b>Intermediate Rate</b>			<b>Minimum Rate</b>		
	<b>Rate of Flow (gal/min)</b>	<b>Meter Indication/Test Draft</b>		<b>Rate of Flow (gal/min)</b>	<b>Meter Indication/Test Draft</b>	
		<b>Gal</b>	<b>ft<sup>3</sup></b>		<b>gal</b>	<b>ft<sup>3</sup></b>
<b>Less than <math>\frac{5}{8}</math></b>	<b>2</b>	<b>40</b>	<b>4</b>	<b><math>\frac{1}{4}</math></b>	<b>20</b>	<b>2</b>
<b><math>\frac{5}{8}</math></b>	<b>2</b>	<b>40</b>	<b>4</b>	<b><math>\frac{1}{4}</math></b>	<b>20</b>	<b>2</b>
<b><math>\frac{5}{8} \times \frac{3}{4}</math></b>	<b>2</b>	<b>40</b>	<b>4</b>	<b><math>\frac{1}{4}</math></b>	<b>20</b>	<b>2</b>
<b><math>\frac{3}{4}</math></b>	<b>3</b>	<b>40</b>	<b>4</b>	<b><math>\frac{1}{2}</math></b>	<b>20</b>	<b>2</b>
<b>1</b>	<b>4</b>	<b>40</b>	<b>4</b>	<b><math>\frac{3}{4}</math></b>	<b>20</b>	<b>2</b>
<b>1½</b>	<b>8</b>	<b>400</b>	<b>40</b>	<b>1½</b>	<b>200</b>	<b>20</b>
<b>2</b>	<b>15</b>	<b>500</b>	<b>40</b>	<b>2</b>	<b>200</b>	<b>20</b>

**(Table Added 200X)**

**Background/Discussion:** This proposal was originally included with Developmental Item Part 4, Item 1, Water Meters. Scott Swanson, with Sensus Metering Systems on behalf of five water meter manufacturers, including Badger Meter, Inc., Elster Metering, Master Meter, Neptune Metering, and Sensus Metering submitted a proposal to the WWMA suggesting that the proposed changes to paragraph T.1.1. Repeatability in that Developmental item be

addressed separately. A copy of this proposal was also provided to the NCWM S&T Committee in July 2008 and appears as an Appendix to the Committee's 2008 Final Report.

Mr. Swanson and the other meter manufacturers provided the following justification for the proposed change to the repeatability requirements:

When agencies use inadequate test draft quantities erroneous test results can be produced. These erroneous test results have and are continuing to have serious financial consequences to manufactures and distributors.

The vast majority of utility-type water meters sold in the United States are designed to comply with ANSI/AWWA meter standards. Coupled with actual utility metering practices in the field, this results in meter designs sharing common meter reading resolution. These designs are quite different than those used for batching-type meters.

For utility-type meters 1 inch and smaller, meter registration test hands (proving indicators) have graduations with resolution down to 0.1 gallon or 0.01 cubic feet. For meters 1½ inch and 2 inch, test hands have graduations with resolution down to 1.0 gallon or 0.1 cubic feet. In visually reading the test hand position relative to these graduations, resolution is limited to a range of roughly ⅓ or ½ of an individual graduation (at both the start of each test and at then at the end of each test).

A test draft equal to only 100 graduations, while adequate for accuracy testing, will be insufficient when testing for repeatability (given the five-fold tighter tolerance for meter repeatability, compared to the tolerance for meter accuracy). For example, an uncertainty of ⅓ graduation at the initial meter reading, and an additional reading uncertainty of ⅓ graduation at the end of the test, would result in a cumulative meter reading uncertainty of 0.67 %, for such a 100-graduation test. Test draft sizes need to be increased, so that meter reading uncertainties do not consume more that ¼ of the total allowable tolerances for this testing. For a repeatability range requirement of 0.6 %, test draft size should equal 400 graduations of the test index, in order to have acceptable meter reading resolution. Similarly, for a repeatability range requirement of 1.3 %, test draft size should be equal to 200 graduations of the test index.

In its review of this issue and Developing item Part 4, Item 1, Water Meters, N.3. Test Drafts and N.4. Testing Procedures at its 2008 Annual Technical Conference, the WWMA agreed to address this issue separately and agreed to forward this item to the NCWM S&T Committee with a proposal that the item be made a Voting item on the Committee's 2009 Interim agenda. The WWMA noted that repeatability tests of utility-type meters are currently being conducted during the type evaluation process, but are seldom performed in field tests.

The SWMA heard no comments on this item at its 2008 Annual Meeting. In its review of the item, the SWMA S&T Committee raised the questions and concerns outlined below.

- The table is specifying test draft criteria rather than tolerances and, consequently, should appear in the Notes section rather than in the Tolerances section.
- The table is confusing as currently presented. Although the table is patterned after similar paragraphs in the Notes section of the water meters code, there is explanatory text in those paragraphs which assists the user in understanding how the table is to be applied. Such text is missing from the proposed changes to paragraph T.1.1.
- The SWMA S&T Committee believes that the option of running the repeatability test in the field should be retained. While the proposed language does not prohibit conducting a repeatability test in the field, a statement should be included to note that it is permissible to conduct a repeatability test in field.
- The SWMA S&T Committee is concerned about the difference in draft sizes for normal and special tests and repeatability tests. If an inspector conducts a normal test and suspects a problem with repeatability, the inspector is forced to obtain a different test measure/prover in order to conduct the repeatability tests. This does not seem technically logical.

Because of these concerns, the SWMA could not support the proposal as written. The SWMA believes that this item should be made a Developmental item until additional input is provided.

See also Developing item Part 4, Item 1 Water Meters, N.3. Test Drafts and N.4. Testing Procedures.

## 360 OTHER ITEMS

### 360-1 International Organization of Legal Metrology (OIML) Report

Many issues before the OIML, the Asian-Pacific Legal Metrology Forum (APLMF), and other international groups are within the purview of the Committee. Additional information on OIML activities will appear in the Board of Directors agenda and Interim and Final Reports and on the OIML website at <http://www.oiml.org>. NIST WMD staff will provide the latest updates on OIML activities during the open hearing sessions at NCWM meetings. For more information on specific OIML-related device activities, contact the WMD staff listed in the table below. The OIML projects listed below represent only currently active projects. For additional information on other OIML device activities that involve WMD staff, please contact WMD using the information listed below:

<b>NIST Weights and Measures Division (WMD) Contact List for International Activities</b>	
<b>Contact Information</b>	<b>Responsibilities</b>
<b>Postal Mail and Fax for All Contacts:</b>	NIST WMD 100 Bureau Drive MS 2600 Gaithersburg, MD 20899-2600 Tel: (301) 975-4004 Fax: (301) 975-8091
Mr. John Barton (LMDG) (301) 975-4002	<ul style="list-style-type: none"> <li>•R 21 “Taximeters”</li> <li>•R 50 “Continuous Totalizing Automatic Weighing Instruments (Belt Weighers)”</li> <li>•R 106 “Automatic Rail-weighbridges”</li> </ul>
Mr. Kenneth Butcher (LMG) (301) 975-4859 kenneth.butcher@nist.gov	<ul style="list-style-type: none"> <li>•D 1 “Elements for a Law on Metrology”</li> <li>•TC 3 “Metrological Control”</li> <li>•TC 3/SC 1 “Pattern Approval and Verification”</li> <li>•TC 3/SC 2 “Metrological Supervision”</li> <li>•TC 6 “Prepackaged Products”</li> </ul>
Mr. Steven Cook (LMDG) (301) 975-4003 steven.cook@nist.gov	<ul style="list-style-type: none"> <li>•R 60 “Metrological Regulations for Load Cells”</li> <li>•R 76 “Non-automatic Weighing Instruments”</li> </ul>
Dr. Charles Ehrlich (ILMG) (301) 975-4834 charles.ehrlich@nist.gov	<ul style="list-style-type: none"> <li>•CIML Member</li> <li>•B3 OIML Certificate System for Measuring Instruments</li> <li>•B 10 “Framework for a Mutual Acceptance Arrangement (MAA) on OIML Type Evaluations”</li> <li>•TC 3/SC 5 “Expression of Uncertainty in Measurement in Legal Metrology Applications,” “Guidelines for the Application of ISO/IEC 17025 to the Assessment of Laboratories Performing Type Evaluation Tests,” &amp; “OIML Procedures for Review of Laboratories to Enable Mutual Acceptance of Test Results and OIML Certificates of Conformity”</li> <li>•TC 3 “Metrological Control”</li> </ul>
Mr. Richard Harshman (LMDG) (301) 975-8107 Richard.harshman@nist.gov	<ul style="list-style-type: none"> <li>•R 51 “Automatic Catchweighing Instruments”</li> <li>•R 61 “Automatic Gravimetric Filling Instruments”</li> <li>•R 107 “Discontinuous Totalizing Automatic Weighing Instruments” (totalizing hopper weighers)</li> <li>•R 134 “Automatic Instruments for Weighing Road Vehicles In-Motion and Measuring Axle Loads”</li> </ul>

<b>NIST Weights and Measures Division (WMD) Contact List for International Activities</b>			
<b>Contact Information</b>		<b>Responsibilities</b>	
Ms. Diane Lee (LMDG) (301) 975-4405 diane.lee@nist.gov		<ul style="list-style-type: none"> <li>•R 59 “Moisture Meters for Cereal Grains and Oilseeds”</li> <li>•R 92 “Wood Moisture Meters - Verification Methods and Equipment”</li> <li>•R 121 “The Scale of Relative Humidity of Air Certified Against Saturated Salt Solution”</li> <li>•TC 17/SC 8 “Measuring Instruments for Protein Determination in Grains”</li> </ul>	
Mr. Ralph Richter (ILMG) (301) 975-3997 ralph.richter@nist.gov		<ul style="list-style-type: none"> <li>•R 35 “Material Measures of Length for General Use”</li> <li>•R 49 “Water Meters” (Cold Potable Water &amp; Hot Water Meters)</li> <li>•R 71 “Fixed Storage Tanks”</li> <li>•R 80 “Road and Rail Tankers”</li> <li>•R 85 “Automatic Level Gauges for Measuring the Level of Liquid in Fixed Storage Tanks”</li> <li>•R 105 &amp; R 117 “Measuring Systems for Liquids Other Than Water” (all measuring technologies)</li> <li>•R 118 “Testing Procedures and Test Report Format for Pattern Examination of Fuel Dispensers for Motor Vehicles”</li> <li>•TC 3/SC 4 “Verification Period of Utility Meters Using Sampling Inspections”</li> <li>•R 137 “Gas Meters” (Diaphragm, Rotary Piston, &amp; Turbine Gas Meters)</li> <li>•R 140 “Measuring Systems for Gaseous Fuel” (i.e., large pipelines)</li> </ul>	
Dr. Ambler Thompson (ILMG) (301) 975-2333 ambler@nist.gov		<ul style="list-style-type: none"> <li>•D 16 “Principles of Assurance of Metrological Control”</li> <li>•D 19 “Pattern Evaluation and Pattern Approval”</li> <li>•D 20 “Initial and Subsequent Verification of Measuring Instruments and Processes”</li> <li>•D 27 “Initial Verification of Measuring Instruments Using the Manufacturer’s Quality Management System”</li> <li>•R 34 “Accuracy Classes of Measuring Instruments”</li> <li>•R 46 “Active Electrical Energy Meters for Direct Connection of Class 2”</li> <li>•TC 5/SC 2 “General Requirements for Software Controlled Measuring Instruments”</li> </ul>	
Ms. Juana Williams (LMDG) (301) 975-3989 juana.williams@nist.gov		<ul style="list-style-type: none"> <li>•R 81 “Dynamic Measuring Devices and Systems for Cryogenic Liquids”</li> <li>•R 139 “Compressed Gaseous Fuels Measuring Systems for Vehicles”</li> </ul>	
<b>LIST OF ACRONYMS</b>			
B	Basic Publication	LMDG	Legal Metrology Devices Group
CIML	International Committee of Legal Metrology	P	Project
D	Document	R	Recommendation
ILMG	International Legal Metrology Group	SC	Subcommittee
LMG	Laws and Metrics Group	TC	Technical Committee

The WWMA and the SWMA support these issues and the related device activities as an Information item.

### 360-2 Developing Items

The NCWM established a category of items called “Developing items” as a mechanism to share information about emerging issues which have merit and are of national interest, but have not received sufficient review by all parties affected by the proposal or that may be insufficiently developed to warrant review by the Committee. The Developing items are currently under review by at least one regional association, technical committee, or organization.

Developing items are listed in Appendix A according to the specific HB 44 code section under which they fall. Periodically, proposals will be removed from the Developing item agenda without further action because it is recommended by the submitter recommends it be Withdrawn. Any remaining proposals will be renumbered accordingly.

The Committee encourages interested parties to examine the proposals included in Appendix A and send their comments to the contact listed in each item. The Committee asks that the regional associations and NTETC sectors continue their work to develop each proposal fully. Should an association or sector decide to discontinue work on an item, the Committee asks that it be notified.

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Todd Lucas, Ohio, Chairman

Brett Saum, San Luis Obispo County, California  
Kristin Macey, California  
Steve Giguere, Maine  
Kenneth Ramsburg, Maryland

Ted Kingsbury, Measurement Canada, Technical Advisor  
Steven Cook, NIST, Technical Advisor  
Tina Butcher, NIST, Technical Advisor



**Specifications and Tolerances Committee**

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## Appendix A

### Item 360-2: Developing Items

**Part 1, Item 1 Scales: S.1.4.6. Height and Definition of Minimum Reading Distance, UR.2.10. Primary Indicating Elements Provided by the User, UR.2.11. Minimum Reading Distance and Definitions of Minimum Reading Distance and Primary Indications**

**Source:** NTETC WS

**Note:** This proposal was Carryover Item 320-2 which first appeared in the Committee's 2006 agenda and again on the Committee's 2007 agenda as Item 320-4. (This item originated from the 2005 NTETC WS.) The Committee believes that although the proposal has merit there does not appear to be a consensus on the size and quality of primary indication information on devices used in direct and indirect sales transactions or an enforcement date for such requirements. Therefore, the Committee removed Item 320-4 from its agenda and made it a Developing item to allow sufficient time for the community to fully develop requirements acceptable to those affected.

**Recommendation:** Add new paragraphs S.1.4.6., UR.2.10., and UR.2.11. to the Scales Code as follows:

#### **S.1.4. Indicators.**

**S.1.4.6. Height. – All primary indications shall be indicated clearly and simultaneously.**

**(a) On digital devices that display primary indications during direct sales to the customer, the numerical figures displayed to the customer shall be at least 9.5 mm (0.4 in) high.**

**(b) The units of mass and other descriptive markings or indications, such as lb, kg, gross, tare, net, etc., shall be clearly and easily read and shall be at least 2 mm (0.08 in) high.**

**[Nonretroactive as of January 1, 200X]**

**(Added 200X)**

#### **UR.2. Installation Requirements.**

**UR.2.10. Primary Indicating Elements Provided by the User. – Primary indicating elements that are not the same as the primary indicating elements provided by the original equipment manufacturer (e.g., video display monitors) shall comply with the following:**

**(a) On digital devices that display primary indications during direct sales to the customer, the numerical figures displayed to the customer shall be at least 9.5 mm (0.4 in) high.**

**(b) The units of mass and other descriptive information, such as gross, tare, net, etc., shall be displayed or marked on the device and shall be at least 2 mm (0.08 in) high.**

**(Added 200X)**

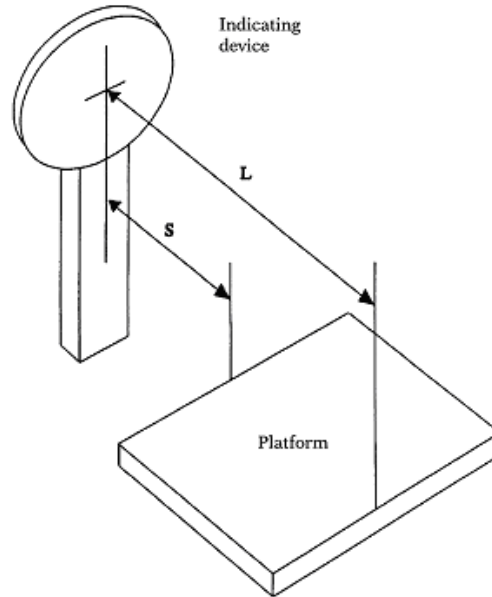
**UR.2.11. Minimum Reading Distance – On digital devices that display primary indications, the height of the numbers expressed in millimeters should be not less than three times the minimum reading distance expressed in meters, without being less than 2 mm (0.08 in). (Example: If the height of the primary indications is 10 mm, then the minimum reading distance should not be greater than 30 m).**

**(Added 200X)**

Add new definitions of “minimum reading distance” and “primary indications” to Appendix D as follows:

**minimum reading distance. The shortest distance that an observer is freely able to approach the indicating device to take a reading under normal conditions of use. This approach is considered to be free for the observer if there is a clear space of at least 0.8 m in front of the indicating device. However, if the minimum reading distance “S” in Figure X below is less than 0.8 m, then the minimum reading distance is “L” in Figure X. [2.20]**

**(Added 200X)**



**Figure X**

**primary indications. Weight or other units of measurement values displayed by a primary indicating element. The primary indications are used as the determining factor in arriving at the sale representation when the device is used commercially. (Examples of primary indications include the measurement value, unit price or count, and total price on instruments capable of price computing. Primary indications do not include indications from auxiliary indicating devices such as totalizing registers and pre-determined stop mechanisms.) [1.10, 2.20]**

**(Added 200X)**

This proposal was developed to address a growing problem with the readability of weight indications and the values that define transaction information. Field and laboratory officials indicate both are becoming increasingly smaller, as demonstrated in the following example of a weight display where the actual size of the weight values are 23 mm in height, but the unit of measurement (g) is 4 mm in height.

The Committee agreed that although the clarity and readability of indications was a growing issue, the current proposal had only limited support from the public and private sectors. The Committee recognized the proposal required a significant amount of work before the language was clear, technically correct, and deemed applicable to the different types of installations and technologies in current use. The Committee had concerns about whether or not the proposed 2 mm height requirements for units of measurement and other markings were adequate. The Committee also questioned the clarity of the proposed user requirements for the minimum reading distance.

The Committee recommended the submitter consider several points in its review of the current proposal such as:

- Any specification and corresponding user requirement should provide laboratory and field officials with uniform guidelines:
  - determine if the required markings on a new equipment design from the manufacturer or a device recently modified by the owner or a service company were suitable for continued use in a particular application; and
  - remove all ambiguity or subjectivity when assessing if primary indications can be observed from a reasonable customer and operator position.
- A size requirement for figures and their corresponding descriptive symbols and characters specified as a percentage might be a good approach.
- Corresponding new language in HB 44 that is similar to that which exists in HB 130 for labels to specify, “all required markings shall be prominent, definite, plain, and conspicuous as to size and style of symbols, letters, and numbers and as to color that is in contrast to the background and presented so that there is adequate free area surrounding those markings.”
- A recognized vision standard such as those used to determine visual acuity (eye exam charts, etc.) might be a good source for establishing specific distance limits.
- When the size of indications becomes a selectable configuration parameter, access to this feature must be sealed.

The NIST technical advisor to the NTETC WS amended the proposal to address the concerns and suggestions from the manufacturers, NTEP labs, and WMD and placed the item on the 2007 WS agenda. The NIST technical advisor did not develop any changes to the proposed definition of “Primary Indications,” the proposed User Requirements, and the associated definition for “Minimum Reading Distance.” The Sector was asked to review the proposed language in its agenda and provide a recommendation that can be forwarded to the regional weights and measures associations. The Sector agreed to submit the following revised language to the regional weights and measures associations and the NCWM S&T Committee. The Sector also recommends deleting the proposed amendment to the definition of primary indications. Additionally, the Sector did not discuss or make any recommendations on the proposed user requirements and definition for “minimum reading distance.”

#### S.1.4. Indicators.

**S.1.4.6. Direct Sale Primary Indications - Size and Character. – Scales designed for direct sale applications with a capacity of 100 kg (200 lb) or less shall comply with the following:**

- a. **All indications shall be indicated clearly and simultaneously.**
- b. **All indications and associated descriptive markings (e.g., lb, kg, gross, tare, net, etc.) shall be presented in such a style of type or lettering as to be boldly, clearly, and conspicuously presented with respect to other type, lettering, or graphics and shall be at least 2 mm (<sup>3</sup>/<sub>32</sub> in) high.**
- c. **All indications and associated descriptive markings shall be in a color or shade that contrasts conspicuously with its background.**
- d. **All primary numeric indications displayed to the customer shall be at least 9.5 mm (0.4 in) high.**
- e. **All units and descriptors shall be at least 2 mm (<sup>3</sup>/<sub>32</sub> in) high.**

**[Nonretroactive as of January 1, 200X]**

**(Added 200X)**

**primary indications. Weight or other units of measurement values displayed by a primary indicating element. The primary indications are used as the determining factor in arriving at the sale representation when the device is used commercially. (Examples of primary indications include the measurement value, unit price or count, and total price on instruments capable of price computing. Primary indications do not include indications from auxiliary indicating devices such as totalizing registers and pre-determined stop mechanisms.) [1.10, 2.20]**

**(Added 200X)**

At its 2007 Annual Meeting, the WWMA heard from one scale manufacturer that his company's devices will pass the 9.5 mm and 2 mm requirements, but not the 21 %.

The WWMA recommended this item remain a Developing item on the NCWM S&T Committee agenda.

At its 2007 Interim Meeting, the CWMA commented that although a specification in HB 44 has merit, the proposed language in Scales Code paragraph S.1.4.6. is not necessary since other requirements already present in HB 44 General Code G-UR.3.3. Position of Equipment states that a device shall be positioned so that its indications may be accurately read from some reasonable "customer" and "operator" position. Additionally, the new language for installation requirements in proposed paragraphs UR.2.10. and UR.2.11. are also addressed in paragraph G-UR.3.3. and, therefore, is not necessary.

The CWMA recommended this item remain a Developing item on the NCWM S&T Committee agenda.

At its 2007 Interim Meeting, NEWMA recommended this item be Withdrawn as it was already covered in HB 44 General Code paragraph G-S.5.1.

At the 2007 SWMA Annual Meeting, a scale manufacturer stated it could support S.1.4. Indicators, but not UR.2. Installation Requirements. The SWMA agreed to forward the comment to the NCWM S&T Committee for consideration.

At its 2008 Annual Technical Conference, the WWMA received no comments during the open hearing. Without further information and discussion, the item cannot move forward. For this reason, the WWMA recommends the item be Withdrawn.

To comment on this proposal, contact Steven Cook, NIST Technical Advisor to the NTETC WS, by e-mail at [steven.cook@nist.gov](mailto:steven.cook@nist.gov), by telephone at (301) 975-4003, by fax at (301) 975-8091, or by postal mail at NIST WMD, 100 Bureau Drive MS 2600, Gaithersburg, MD 20899-2600.

For more background information refer to the Committee's 2006 and 2007 Final Reports.

## **Part 2, Item 1 Belt-Conveyor Scale Systems: UR.3.2.(c) Maintenance; Zero Load Tests**

**Source:** 2005 Western Weights and Measures Association (WWMA)

**Recommendation:** Modify UR.3.2.(c):

During the 2008 NCWM Interim Meeting, the Committee was informed that the USNWG on Belt-Conveyor Scales is going to further develop the proposal during their next meeting on February 27 - 28, 2008, in St. Louis, Missouri. During that meeting, the WG further amended the proposal as shown in the above recommendation and believes that this item is sufficiently developed to be added to the NCWM S&T Committee agenda as a Voting item. At its 2008 meeting WWMA agreed with the WG. The proposal can be found on the Committee's agenda as item 321-1.

**Part 2, Item 2 Belt-Conveyor Scale Systems: N.3.1.4. Check for Consistency of the Conveyor Belt Along Its Entire Length**

**Source:** 2005 Western Weights and Measures Association (WWMA)

**Recommendation:** Amend NIST Handbook 44, Section 2.21. Belt Conveyor Scales (BCS) Systems Code, paragraph N.3.1.4.:

During the 2008 NCWM Interim Meeting, the Committee was informed that the USNWG on Belt-Conveyor Scales is going to further develop the proposal during their next meeting on February 27 - 28, 2008, in St. Louis, Missouri. During that meeting, the WG further amended the proposal as shown in the above recommendation and believes that this item is sufficiently developed to be added to the NCWM S&T Committee agenda as a Voting item. At its 2008 meeting WWMA agreed with the WG. The proposal can be found on the Committee’s agenda as item 321-2.

**Part 3, Item 1 Vehicle-Tank Meters: T.4. Product Depletion Test**

**Source:** Northeast Weights and Measures Association (NEWMA)

**Proposal:** Amend paragraph T.4. as follows:

T.4. Product Depletion Test. – The difference between the test result for any normal test and the product depletion test shall not exceed **one-half (0.5 %) percent of the volume delivered in one minute at the maximum flow rate marked on the meter. Tolerances for typical meters are tolerance** shown in Table T.4. Test drafts shall be of the same size and run at approximately the same flow rate.

[**Note:** The result of the product depletion test may fall outside of the applicable test tolerance as specified in Table 1.]

<b>Table T.4. Tolerances for <u>Typical</u> Vehicle-Tank Meters on Product Depletion Tests, Except Milk Meters <u>Refer to T.4. for meters with maximum flow rates not listed.</u></b>	
<b>Meter-Size-<u>Maximum Flow Rate</u></b>	<b>Maintenance and Acceptance Tolerances</b>
<b><u>Up to, but not including, 50 mm (2 in) 114 LPM (30 GPM)</u></b>	<b><u>1.70 L (104 in<sup>3</sup>)<sup>1</sup> 0.57 L (0.15 gal) (34.6 in<sup>3</sup>)<sup>1</sup></u></b>
<b><u>From 50 mm (2 in) up to, but not including, 75 mm (3 in) 225 LPM (60 GPM)</u></b>	<b><u>2.25 L (137 in<sup>3</sup>)<sup>1</sup> 1.1 L (0.30 gal) (69.3 in<sup>3</sup>)<sup>1</sup></u></b>
<b><u>75 mm (3 in) or larger 378 LPM (100 GPM)</u></b>	<b><u>3.75 L (229 in<sup>3</sup>)<sup>1</sup> 1.9 L (0.5 gal) (115 in<sup>3</sup>)<sup>1</sup></u></b>
<b><u>758 LPM (200 GPM)</u></b>	<b><u>3.8 L (1.0 gal) (231 in<sup>3</sup>)<sup>1</sup></u></b>

<sup>1</sup> Based on a test volume of at least the amount specified in N.3.

(Table Added 2005) (**Amended 200X**)

Alternative Language for T.4. with larger tolerance for smaller meters.

T.4. Product Depletion Test. – The difference between the test result for any normal test and the product depletion test shall not exceed **one-half (0.5 %) percent of the volume delivered in one minute at the maximum flow rate marked on the meter for meters rated higher than 378 LPM (100 GPM), or six-tenths (0.6 %) percent of the volume delivered in one minute at the maximum flow rate marked on the meter for meters rated 378 LPM**

**(100 GPM) or lower. Tolerances for typical meters are tolerance** shown in Table T.4. Test drafts shall be of the same size and run at approximately the same flow rate.

[**Note:** The result of the product depletion test may fall outside of the applicable test tolerance as specified in Table 1.]

<b>Table T.4. Tolerances for <u>Typical</u> Vehicle-Tank Meters on Product Depletion Tests, Except Milk Meters Refer to T.4 for meters with flow rates not listed.</b>	
<b>Meter-Size <u>Maximum Flow Rate</u></b>	<b>Maintenance and Acceptance Tolerances</b>
<b>Up to, but not including, 50 mm (2 in) <u>114 LPM (30 GPM)</u></b>	<b>1.70 L (104 in<sup>3</sup>)<sup>1</sup> <u>0.57 L (0.18 gal) (41.6 in<sup>3</sup>)<sup>1</sup></u></b>
<b>From 50 mm (2 in) up to, but not including, 75 mm (3 in) <u>225 LPM (60 GPM)</u></b>	<b>2.25 L (137 in<sup>3</sup>)<sup>1</sup> <u>1.1 L (0.36 gal) (83.2 in<sup>3</sup>)<sup>1</sup></u></b>
<b>75 mm (3 in) or larger <u>378 LPM (100 GPM)</u></b>	<b>3.75 L (229 in<sup>3</sup>)<sup>1</sup> <u>1.9 L (0.6 gal) (139 in<sup>3</sup>)<sup>1</sup></u></b>
<b><u>758 LPM (200 GPM)</u></b>	<b><u>3.8 L (1.0 gal) (231 in<sup>3</sup>)<sup>1</sup></u></b>

<sup>1</sup> Based on a test volume of at least the amount specified in N.3.

(Table Added 2005) (**Amended 200X**)

**Background/Discussion:** This item was submitted to NEWMA at its 2008 Interim Meeting as an alternative to Item 331-1 (S.5.7. Meter Size) in 2008 publication 16. It would base the tolerances for the product depletion test on a percentage of the maximum flow rate rather than meter size. Justification provided to NEWMA by the submitter is as follows:

The S&T Committee received a proposal to add new marking requirements to provide inspectors with a basis on which to assess tolerances since the meter size in inches is not currently marked on meters used in VTM systems. This solution would add a new marking requirement non-retroactively which will not solve the problem until the entire fleet of meters presently in use are replaced with new meters. This could take a very long time since VTM's can see many years of service. In addition, the compromise made when this item originally passed did not address the possibility that smaller meters, e.g., down to ¼ inch could be mounted on a vehicle and thus subject to these tolerances. Allowing the smallest current tolerance (104 in<sup>3</sup>) on a ¼-inch meter delivering 2 GPM would be 22.5 % relative error for one minute of flow due to air passing through the meter. Even at 20 GPM for a 1-inch meter, the relative error only drops to 2.25 %. That seems unconscionable. New York recommends going back to the 0.5 % of 1 minute of flow at the maximum rated flow rate for the meter that was part of the original proposal. The max flow rate must be marked on every meter under current HB 44 requirements and thus the inspector will have the information necessary to correctly apply the tolerance. We further recommend that the table provide tolerances for the common meter sizes which will handle most cases encountered in the field (i.e., 1¼-, 1½-, 2- and 3-inch meters with 30, 60, 100 and 200 GPM respectively).

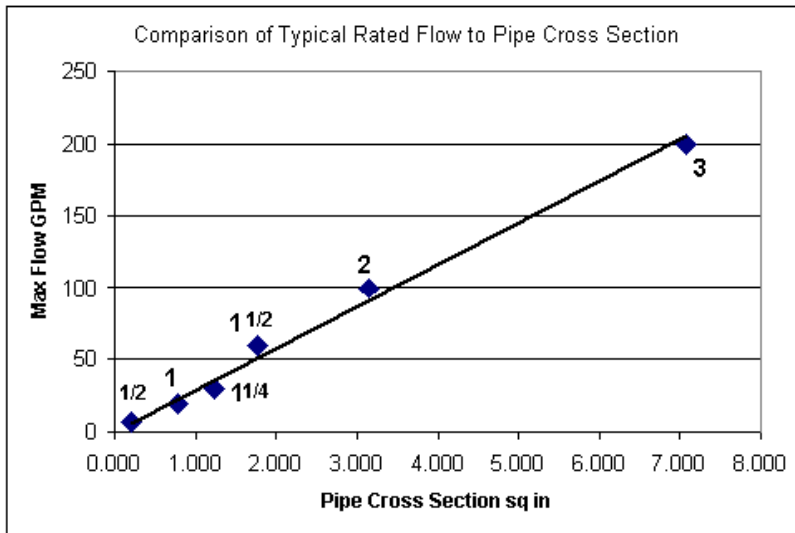
There may be concern that users will move to larger meter sizes to take advantage of the larger tolerances. We do not think that will happen since these systems cannot deliver much over 100 GPM without damaging storage tanks. In fact most systems we have seen delivering heating oil are actually delivering at less than 80 GPM. If they move to a 200 GPM, 3-inch meter, rated at 40 to 200 GPM, they will then have to meet acceptance tolerances all the way down to 60 GPM which we don't think they can do on a consistent basis. We believe the typical 2 in system will remain the mainstay of the industry.

Graphs of the relationship of typical meter ratings to pipe cross section area show that PD flow rates are clearly a function of pipe size. Any tolerance that does not reflect that relationship is fundamentally flawed in our view. For comparison, we have included a graphic comparison of the proposed tolerances.

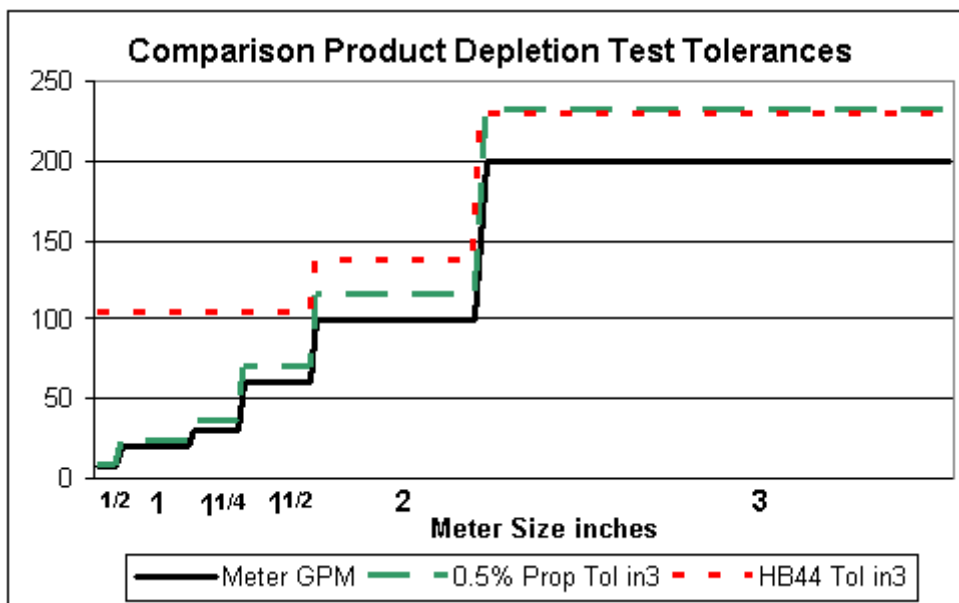
The submitter also noted the following:

We recognize that the tolerances proposed will reduce the tolerances for meter sizes 2 in and under. We could support some compromise to recognize diminishing returns on smaller meters and thus allow a slightly larger tolerance (e.g., 0.6 %) at or below 100 GPM rated flow rate. At 0.6 for a 2 in (100 GPM) meter the tolerance would be 139 in<sup>3</sup>, virtually identical to the existing tolerance.

The submitter also provided the following supporting graphics:

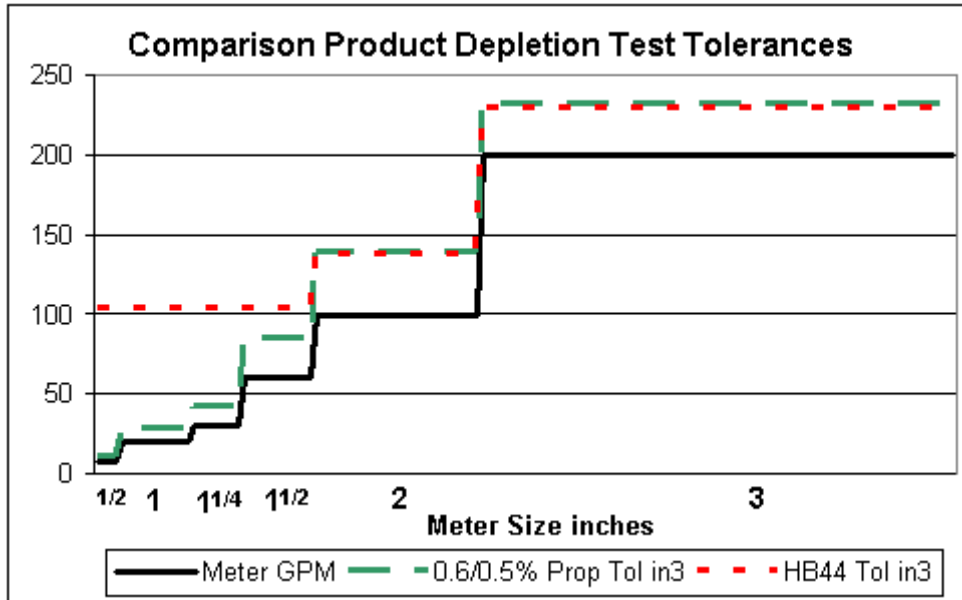


Option 1 – 0.5 % across the board:





Option 2 – 0.6 % up to and including 100 gpm and 0.5 % thereafter:



In reviewing this item at its 2008 Interim Meeting, some NEWMA members felt that what is currently in HB 44 is sufficient and did not feel there was a problem determining meter size. Until NEWMA hears further about problems determining meter size from other states it recommends this item be made Informational.

**Part 4, Item 1 Water Meters: N.3. Test Drafts and N.4. Testing Procedures**

**Source:** Southern and Western Weights and Measures Associations (SWMA and WWMA)

**Proposal:** Amend requirements in paragraphs N.3. Test Drafts and N.4. Testing Procedures Section 3.36. Water Meters as follows by changing the test draft quantities of Tables N.4.1. and N.4.2. of HB 44 as follows:

**N.3. Test Drafts.** – ~~The normal test of a meter shall be made at the maximum discharge rate developed by the installation. Meters with maximum gallon per minute ratings higher than the values specified in Table N.4.1. Flow Rate and Draft Size for Water Meters Normal Tests may be tested up to the meter rating, with meter indications no less than those shown.~~

~~(Amended 1990, 2002, and 2003)~~

- (a) Non-Utility Type Water Meters. – Test drafts should be equal to at least the amount delivered by the device in 2 minutes and in no case less than the amount delivered by the device in 1 minute at the actual maximum flow rate developed by the installation. The test draft sizes shown in Table N.4.1. Flow Rate and Draft Size for Non-Utility Type Water Meters Normal Tests, and in Table N.4.2. Flow Rate and Draft Size for Non-Utility Type Water Meters Special Tests, shall be followed as closely as possible.
- (b) Utility Type Water Meters. – The test draft sizes shown in Table N.4.X. and N.4.Y. shall be followed as closely as possible. Testing shall be done in like volumes (meters with gallon registration tested in gallon volumes, meters with cubic feet registration tested in cubic feet volumes).

<b>Table N.4.1. Flow Rate and Draft Size for <u>Non-Utility Type</u> Water Meters</b>			
<b><u>Normal Tests</u></b>			
<b>Meter Size (inches)</b>	<b>Rate of Flow (gal/min)</b>	<b>Maximum Rate</b>	
		<b>Meter Indication/Test Draft</b>	
		<b>gal</b>	<b>ft<sup>3</sup></b>
Less than $\frac{5}{8}$	8	50	5
$\frac{5}{8}$	15	50	5
$\frac{3}{4}$	25	50	5
1	40	100	10
1½	80	300	40
2	120	500	40
3	250	500	50
4	350	1 000	100
6	700	1 000	100

(Table Added 2003) **(Amended 200X)**

<b>Table N.4.X. Flow Rate and Draft Size for <u>Utility Type</u> Water Meters</b>			
<b><u>Normal Tests</u></b>			
<b><u>Meter Size (inches)</u></b>	<b><u>Rate of Flow (gal/min)</u></b>	<b><u>Maximum Rate</u></b>	
		<b><u>Meter Indication/Test Draft</u></b>	
		<b><u>gal</u></b>	<b><u>ft<sup>3</sup></u></b>
<b><u>Less than <math>\frac{5}{8}</math></u></b>	<b><u>8</u></b>	<b><u>100</u></b>	<b><u>10</u></b>
<b><u><math>\frac{5}{8}</math></u></b>	<b><u>15</u></b>	<b><u>100</u></b>	<b><u>10</u></b>
<b><u><math>\frac{5}{8} \times \frac{3}{4}</math></u></b>	<b><u>15</u></b>	<b><u>100</u></b>	<b><u>10</u></b>
<b><u><math>\frac{3}{4}</math></u></b>	<b><u>25</u></b>	<b><u>100</u></b>	<b><u>10</u></b>
<b><u>1</u></b>	<b><u>40</u></b>	<b><u>100</u></b>	<b><u>10</u></b>
<b><u>1½</u></b>	<b><u>50</u></b>	<b><u>300</u></b>	<b><u>40</u></b>
<b><u>2</u></b>	<b><u>100</u></b>	<b><u>500</u></b>	<b><u>40</u></b>

**(Table Added 200X)**

<b>Table N.4.2. Flow Rate and Draft Size for <u>Non-Utility Type</u> Water Meters</b>						
<b><u>Special Tests</u></b>						
<b>Meter Size (inches)</b>	<b>Intermediate Rate</b>			<b>Minimum Rate</b>		
	<b>Rate of Flow (gal/min)</b>	<b>Meter Indication/Test Draft</b>		<b>Rate of Flow (gal/min)</b>	<b>Meter Indication/Test Draft</b>	
		<b>gal</b>	<b>ft<sup>3</sup></b>		<b>gal</b>	<b>ft<sup>3</sup></b>
Less than or equal to $\frac{5}{8}$	2	10	1	1/4	5	1
$\frac{3}{4}$	3	10	1	1/2	5	1
1	4	10	1	3/4	5	1
1½	8	50	5	1½	10	1
2	15	50	5	2	10	1
3	20	50	5	4	10	1
4	40	100	10	7	50	5
6	60	100	10	12	50	5

(Table Added 2003) **(Amended 200X)**

<b>Table N.4.Y. Flow Rate and Draft Size for Utility Type Water Meters Special Tests</b>						
<b>Meter Size (inches)</b>	<b>Intermediate Rate</b>			<b>Minimum Rate</b>		
	<b>Rate of Flow (gal/min)</b>	<b>Meter Indication/Test Draft</b>		<b>Rate of Flow (gal/min)</b>	<b>Meter Indication/Test Draft</b>	
		<b>gal</b>	<b>ft<sup>3</sup></b>		<b>gal</b>	<b>ft<sup>3</sup></b>
<b>Less than <math>\frac{5}{8}</math></b>	<b>2</b>	<b>10</b>	<b>1</b>	<b><math>\frac{1}{4}</math></b>	<b>10</b>	<b>1</b>
<b><math>\frac{5}{8}</math></b>	<b>2</b>	<b>10</b>	<b>1</b>	<b><math>\frac{1}{4}</math></b>	<b>10</b>	<b>1</b>
<b><math>\frac{5}{8} \times \frac{3}{4}</math></b>	<b>2</b>	<b>10</b>	<b>1</b>	<b><math>\frac{1}{4}</math></b>	<b>10</b>	<b>1</b>
<b><math>\frac{3}{4}</math></b>	<b>3</b>	<b>10</b>	<b>1</b>	<b><math>\frac{1}{2}</math></b>	<b>10</b>	<b>1</b>
<b>1</b>	<b>4</b>	<b>10</b>	<b>1</b>	<b><math>\frac{3}{4}</math></b>	<b>10</b>	<b>1</b>
<b><math>1\frac{1}{2}</math></b>	<b>8</b>	<b>100</b>	<b>10</b>	<b><math>1\frac{1}{2}</math></b>	<b>100</b>	<b>10</b>
<b>2</b>	<b>15</b>	<b>100</b>	<b>10</b>	<b>2</b>	<b>100</b>	<b>10</b>

**(Table Added 200X)**

**Background/Discussion:** At its 2007 Annual Meeting, the SWMA received a proposal from a meter manufacturer with two options for modifying Section 3.36. as shown above. The manufacturer provided the following justification for the modification:

For proposal A: Water meter “transaction” volumes are based on billing cycles of monthly or quarterly “reads.” As such, each transaction for a residential meter may be on the order of 3000 gal to 30 000 gal. Commercial/industrial accounts with larger meters may have transaction volumes that are one or two orders-of-magnitude larger than this. Meter repeatability over the course of a pattern approval test volume (currently as little as 5 gal for a residential meter, for example) is, therefore, not relevant. Utility water meters are not designed to provide the resolution required to meet the Section 3.36. repeatability requirements under typical test drafts.

For Proposal B: The graduations on the primary indicating element for the meter under test can normally be read within an uncertainty of roughly  $\frac{1}{3}$  of a graduation. This is the result of limits in optical discernment, minor parallax, minor asymmetries in mechanical gear trains, minor asymmetries in graduation printing, etc.. Combining the meter’s reading uncertainty at the start of any single test run with the uncertainty at the end of this same test run, total meter reading uncertainty is, therefore, roughly  $\frac{2}{3}$  of a graduation. Keeping in mind there are other resolution/repeatability concerns for any given test series (resolution in reading the reference volume/mass, ability to duplicate parameters such as flow rate, water temperature, water pressure, evaporative losses, etc.), the uncertainty limitations for reading the meter under test should not “consume” more than  $\frac{1}{4}$  of the total repeatability requirement. For the 1.3 % repeatability requirement at the minimum flow rate, this corresponds to a test draft equal to roughly 200 graduations of the primary element. For the 0.6 % repeatability requirement at the intermediate rate, this corresponds to a test draft equal to roughly 400 or 450 graduations of the primary element. Test draft volumes for the maximum flow rate must be even larger since these drafts must address other sources of error unique to testing at higher flow rates (for example, errors due to ramping up and ramping down the flow rates at the beginning and end of the test, which must be done slowly enough so as to not cause water hammer, or mechanical impulse loading of the meter registration device).

The SWMA also heard comments from the manufacturer that several other water meter manufacturers were having difficulty meeting HB 44 requirements for repeatability that were added in 2002. Additionally part of the problem was the determination of what constituted the smallest unit of measure for various sizes of their utility meters. The manufacturer is requesting a change to the test draft requirements and/or smallest unit of measure requirements to be more appropriate for the meters they and others manufacture. The SWMA agreed to forward the proposal to the NCWM S&T Committee for consideration.

Just prior to the 2008 NCWM Annual Meeting, the Committee received a proposal for changes to this item from Scott Swanson, with Sensus Metering Systems on behalf of five water meter manufacturers, including Badger Meter, Inc., Elster Metering, Master Meter, Neptune Metering, and Sensus Metering. During the Committee’s open

hearings, the S&T Chairman notified NCWM members that copies of this information were available to interested parties and noted that a copy of the following three proposals will be included in the Committee's final report.

The five water meter manufacturers recommend that paragraph N.4. Testing Procedures be amended (as outlined in the recommendation above) to address specific issues related to utility-type water meters. The three related proposals are to add subsections under paragraph N.3., change the title of tables N.4.1. and N.4.2., and to incorporate two new tables to N.4. that speak directly to utility-type water meters.

1. The first part of this proposal is to amend paragraph N.3.
2. The second part of this proposal is to amend the title of Table N.4.1. and Table N.4.2., changing the words "for Water Meters" to read "for Non-Utility Type Water Meters."
3. The third part of this proposal is to include in Sections N.4.1. and N.4.2. two new tables that harmonize test flow rates and draft sizes listed in Section 3.36. with that of the AWWA specification found in the AWWA M6 Manual, Table 5.3.

Note that Mr. Swanson, on behalf of the five water meter manufacturers, further suggested that the proposed changes to T.1.1. Repeatability and its associated tables that were outlined in the original recommendation be separated from this item and addressed as a separate issue. A separate proposal was submitted to reflect this suggestion.

The submitter provided the following justification for the proposed changes to paragraphs N.3., N.4., and associated tables:

Erroneous test results can be produced when agencies use inadequate test draft quantities. These erroneous test results have and are continuing to have serious financial consequences to manufactures and distributors.

The vast majority of utility-type water meters sold in the United States are designed to comply with ANSI/AWWA meter standards. All AWWA utility-type meter designs share a common meter proving resolution of 100 scale divisions per revolution of the pointer to verify meter accuracy. All utilities use the odometer indicating device on the dial face of the meter for billing purposes. These utility-type meter designs are quite different than those used for batching-type meters.

For utility-type meters 1 in and smaller, meter registration test hands (proving indicators) have graduations with resolution down to 0.1 gal or 0.01 ft<sup>3</sup>. For meters 1½ in and 2 in, test hands have graduations with resolution down to 1.0 gal or 0.1 ft<sup>3</sup>. In visually reading the test hand position relative to these graduations, resolution is limited to a range of roughly ⅓ or ½ of an individual graduation (at both the start of each test and at then at the end of each test).

As a result, a test draft equal to only 50 graduations will result in large meter reading uncertainties (cumulative uncertainty range on the order of 1.2 % or worse). Compared to the accuracy tolerances for water meters, this level of reading uncertainty is unacceptable, and larger test drafts must be used. See AWWA M6 for examples of the larger test drafts that are required, given these reading resolution limitations.

During the Committee's open hearings, Jeff Humphreys, Los Angeles County, provided some additional data to consider in conjunction with this item. This information was included in the Committee's final report and is also included in Appendix 1 to Developing Items in this agenda. Additionally, concerns were expressed regarding whether or not the size of the test draft for larger meters is realistic. A manufacturer of test equipment noted that the largest prover being manufactured at present is 2000 gallons.

During the open hearings at the 2008 WWMA Annual Technical Conference, water meter manufacturers gave a presentation on the justification for the proposed changes which included reducing the uncertainty in testing procedures by increasing the test draft size, clarifying the values for the smallest unit of measure based on utility-type meter size, and limiting the number of graduations of the sweep hand to 100 graduations or more. Additionally, the manufacturers reiterated that the proposals are intended to align HB 44 test requirements with AWWA standards and test criteria.

The WWMA S&T Committee also reviewed the a letter and test data submitted by Los Angeles County Weights and Measures about the comparison of failure rates for utility-type meters between current test of 5-gallon draft size and a test draft of 20 gallons for  $\frac{5}{8}$  inch utility-type meters. They summarized their results as follows:

“The enclosed information also shows that very few positive displacement meters fail tolerance tests at any of the current HB 44 flow rates. The claim has been made that the tests as currently being conducted have seriously impacted meter sales for several water meter manufacturers. Our tests show that manufacturers of positive displacement meters should not be negatively impacted by being tested at the current established flow rates.”

According to the data from Los Angeles County, the average error for the 28 new meters that failed the test using the 5-gallon test draft was -4.45 %, and -4.32 % for the 10-gallon test draft. There was no data for repeatability in this series of data.

The WWMA S&T Committee also received two letters from water manufacturers supporting the items that were not in attendance at the WWMA.

The WWMA acknowledges that there is an increased potential for the uncertainty with the current test draft. Manufacturers state that the test should include at least one complete revolution of the dial indicator. However, the data submitted by Los Angeles County suggested that the increase in the test draft size is not justified.

One meter manufacturer submitted test data for five new  $\frac{5}{8}$  in positive displacement meters to the Committee. Results showed that three tests out of fifteen failed the accuracy test with a 5 gal test draft size for low flow. When draft size was increased to 10 gal, all meters passed and the range of results decreased by a factor of two. When testing repeatability at low flow, two out of five failed with a 5 gal draft; none failed with a 10 gal draft. At intermediate flow, fifteen out of fifteen passed at 10 gal draft size for accuracy, and four out of five meters failed repeatability at the current 10 gal draft size.

Another meter manufacturer submitted test data for four new  $\frac{5}{8}$  in positive displacement meters. Results showed that three out of eight failed the accuracy test with a 5 gal test draft size for low flow. When draft size was increased to 10 gal, all meters passed and the range of results decreased dramatically. When testing repeatability at low flow, four out of four failed with a 5 gal draft; zero failed with a 10 gal draft. At intermediate flow, eight out of eight passed at 10 gal draft size for accuracy, and one out of four meters failed repeatability at the current 10 gal draft size.

The WWMA recommends renaming the item to “N.4. Testing Procedures”. It further recommends the item be given developmental status and requests additional data from industry, California DMS and other jurisdictions comparing test results between the current and proposed test draft sizes. Data submitted should include information on the proving methods (e.g., narrow neck prover, gravimetric, etc). Additionally, the Committee is interested in the requirements and test methods used by Measurement Canada and additional information on International Activities. It should be noted that the AWWA M-6 Manual has guidelines for accuracy testing but no guidance on repeatability.

The Committee also recommends that the proposed language for paragraph N.3. and Tables N.4.1., N.4.X., and N.4.Y. should remain developmental due to insufficient test data that justifies the proposed change. Additionally, the Committee recommends that the repeatability and test draft sizes in tolerance paragraph in T.1.1. and Tables T.1.1. and T.1.2. be separated as a separate item (see Committee agenda Item 336-2) since the data submitted by the California CTEP lab indicates a high failure rate with the current tests for repeatability.

At its 2008 Interim Meeting, NEWMA heard a presentation from Andre Noel, Neptune. NEWMA has limited experience testing water meters but recognizes the logic of this item. NEWMA has no position at this time.

At their fall 2008 meetings, the CWMA and SWMA heard no comments and took no position on this item.

**Part 5, Item 1 Farm Milk Tanks: N.5.1. Verification of Master Metering Systems**

**Source:** Central Weights and Measures Association (CWMA)

**Recommendation:** Amend paragraph N.5.1. as follows:

**N.5.1. Verification of Master Metering Systems.** – A master metering system used to gauge a milk tank shall be verified before and after the gauging process. A master metering system used to calibrate a milk tank shall be verified before starting the calibration and reverified every quarter of the tank capacity or every 2000 L (500 gal), whichever is greater. **A master metering system capable of operating within 25 % of the applicable tolerance in T.3. Basic Tolerance Values needs only be verified before and after the gauging process.**

**(Added 200X)**

**Background/Discussion:** The CWMA received a proposal at its 2008 Interim Meeting to modify paragraph N.5.1. Verification of Master Metering Systems in NIST Handbook 44 Section 4.42. Farm Milk Tanks. USDA provided data suggesting that mass flow meters currently used to test milk tanks would not have to be verified every quarter of the tank capacity, or every 2000 L (500 gal), whichever is greater. The CWMA does not have data that supports that all mass flow meters will perform to the same standard. Based on this information the CWMA recommends this proposal be Informational and is considering the proposal outlined in the recommendation above.

At its 2008 Interim Meeting, NEWMA recommended this proposal be Informational. NEWMA forwarded the following additional justification for the proposed change from Mr. Richard Koeberle, Federal Milk Market Administrator:

The use of a mass flow meter has eliminated the variations seen in other type of meters used to calibrate or check farm bulk milk tanks. The reverification of the meter at every quarter of tank capacity adds time and potentially introduces errors by requiring the hose or valves to be moved before the tank is totally filled. This proposal originated by Tom MacNish from the Cleveland Market Administrator and was presented to the CWMA in September. Mass flow meters have been used extensively in their market with excellent results.

Data submitted with this item is posted on the S&T Committee's web page at [www.ncwm.net](http://www.ncwm.net).

**Part 6, Item 1 Hydrogen: New Code: 3.3X. Draft Hydrogen Gas-Measuring Devices**

**Source:** U.S. National Work Group for the Development of Commercial Hydrogen Measurement Standards

**Recommendation:** Review and comment on a DRAFT Hydrogen Gas Measuring Devices Code and modifications to relevant Appendix D – Definitions in NIST Handbook 44 (HB 44) (as outlined in Appendix 2 to Developing Items in this report) to address gaseous hydrogen refueling applications.

**Discussion:** Currently, the U.S. National Work Group (USNWG) for the Development of Commercial Hydrogen Measurement Standards is working to draft a new Hydrogen Gas-Measuring Devices Code and add new and modify existing definitions in Appendix D of NIST Handbook 44. The work to develop the code is an ongoing effort and the USNWG will submit a final draft of the code as soon as its work is complete. The draft code and definitions address legal metrology requirements for the newly emerging hydrogen refueling technology. The USNWG believes the code has merit and wants to provide the weights and measures community with this information since 18 states now have hydrogen refueling stations in operation. The weights and measures community must have time to consider requirements for hydrogen-refueling dispensers before this application is available for public access at corner service stations. The USNWG began work on this project in October 2007, although a draft code was distributed to the community in February 2005. Version 3.1 is provided with this proposal and will receive further review at the August 2008 USNWG meeting. The USNWG is also submitting a corresponding proposal to the L&R Committee that addresses method of sale and engine fuel quality requirements for hydrogen in NIST Handbook 130 (HB 130).

S&T Committee 2009 Interim Agenda  
Appendix A – Item 360-2: Developing Items

More information on the work by the USNWG is available on the NIST WMD website at [www.nist.gov/owm](http://www.nist.gov/owm) under the W&M Resources link to “Developing Commercial Hydrogen Measurement Standards.” To comment on this proposal, contact Juana Williams, NIST WMD, at [juana.williams@nist.gov](mailto:juana.williams@nist.gov), by telephone at (301) 975-3989, by fax at (301) 975-8091 or by postal mail at NIST WMD, 100 Bureau Drive, MS 2600, Gaithersburg, MD 20899-2600.

At its 2008 Annual Technical Conference, the WWMA heard comments supporting the work of the USNWG. The WWMA also heard from Kristin Macey (CA DMS) that the draft code has been further amended at the recent meeting of the USNWG. The WWMA agrees that the item remain developmental.

Appendix 1 to Developing Items: Jeff Humphrey's Letter and Comments on  
Developing Item Part 4, Item 1 Water Meters

September 2, 2008

TO: Steven Cook, NIST, Technical Advisor  
Specifications and Tolerances Committee  
National Conference on Weights and Measures

FROM: Jeff Humphreys  
Deputy Director – Weights and Measures Bureau

SUBJECT: S&T Committee 2008 Report, Specifically Item 360-2, Part 5, Item 3: Water Meters

This letter is intended to clarify comments made concerning water meter tolerances during the NCWM 2008 meeting open hearing regarding a proposal to amend HB 44 Section 3.36. T.1. Appendix A, Part 5, Item 3, in the S&T Committee report describes a Developing Item proposal to either eliminate HB 44 repeatability requirements, or amend HB 44 Section 3.36., Tables N.4.1. and N.4.2. by increasing test draft sizes. We believe that the results of numerous water meter tolerance tests conducted on this Department's test bench at our South Gate facility will show that the proposed increases in test draft sizes are unnecessary, and could result in substantial increases in costs to jurisdictions performing these tests.

In the "Background/Discussion" section, the proponents argue that due to uncertainties associated with reading individual graduations, additional water volume is required to be run through the meters in order to obtain a fair test of their accuracy. In order to determine the truth to this claim, especially to the tests conducted at the minimum flow rate, the Department conducted tests at both the 5 gallon test draft size, and at the 10 gallon draft size for those 5/8" meters that failed to meet tolerance at 5 gallons. The accompanying chart summarizing our tests show that substantial numbers of multi-jet water meters that failed their 5 gallon slow-flow tests continued to fail the 3 % tolerance requirement when tested again at 10 gallons.

The enclosed information also shows that very few positive displacement meters fail tolerance tests at any of the current HB 44 flow rates. The claim has been made that the tests as currently being conducted have seriously impacted meter sales for several water meter manufacturers. Our tests show that manufacturers of positive displacement meters should not be negatively impacted by being tested at the current established flow rates.

The Department has received a large number of 5/8" meters for testing over the last several years. The proposed requirement to increase test draft sizes would substantially increase the amount of time necessary to test these meters at the three flow rates (from approx. 30 minutes to approx. 90 minutes). If evidence supported the necessity to conduct these tests, the Department would certainly adopt these larger draft sizes. We believe however, that the evidence shows that larger draft sizes are unnecessary. Such tests would increase costs to the Department, and these increased costs would ultimately have to be borne by all owners of water sub-meters.

The proposal appears to be advanced by a manufacturer of multi-jet meters. Our suggestion to that manufacturer of these meters would be to look to improve the quality of their product.

KEF:RKI:JNH:jh  
Enclosure



## Water Meter Test Results

### January 2008 - June 2008

Minimum Flow Rate (¼ GPM) – 5 Gallon vs. 10 Gallon

#### 5/8 in Positive Displacement Meters

Minimum Rate Tolerances: 1.5 % Overregistration, 5 % Underregistration

Failure Percentages		
	5 Gallon	10 Gallon
Meter #1	-13.0 %	-13.0 %
Meter #2	-6.6 %	-7.1 %
Meter #3	-83.6 %	-87.7 %

("-" indicates underregistration, "+" indicates overregistration)

\*All three meters failed by underregistration on both 5 gallon and 10 gallon tests.

## Water Meter Test Results

### January 2008 - July 2008

Minimum Flow Rate (¼ GPM) – 5 Gallon vs. 10 Gallon

#### 5/8 in Multi-Jet Meters

Minimum Flow Rate Tolerances: 3 % Overregistration, 3 % Underregistration

\*Meters #3, #9, #10, #19, #21, #22, #23, #26, and #27 failed on the 5 gallon test and **passed** on the 10 gallon test.

The rest of the meters failed both 5 gallon and 10 gallon tests. All meters except two (#21 and #27) were underregistering.

<b>Failure Percentages</b>			
“-” indicates underregistration, “+” indicates overregistration			
	<b>Error 5 gal</b>	<b>Error 10 gal</b>	<b>% Difference</b>
Meter #1	-3.78 %	-3.38 %	-0.40 %
Meter #2	-3.92 %	-3.30 %	-0.62 %
Meter #3	-3.06 %	-2.98 %	-0.08 %
Meter #4	-3.80 %	-3.71 %	-0.09 %
Meter #5	-3.44 %	-3.47 %	0.03 %
Meter #6	-4.28 %	-3.73 %	-0.55 %
Meter #7	-4.80 %	-4.28 %	-0.52 %
Meter #8	-5.20 %	-4.60 %	-0.60 %
Meter #9	-3.54 %	-3.00 %	-0.54 %
Meter #10	-3.30 %	-2.49 %	-0.81 %
Meter #11	-4.48 %	-3.49 %	-0.99 %
Meter #12	-3.88 %	-4.08 %	0.20 %
Meter #13	-3.32 %	-3.26 %	-0.06 %
Meter #14	-7.34 %	-5.87 %	-1.47 %
Meter #15	-4.10 %	-3.13 %	-0.97 %
Meter #16	-4.38 %	-3.61 %	-0.77 %
Meter #17	-6.34 %	-5.57 %	-0.77 %
Meter #18	-4.78 %	-4.05 %	-0.73 %
Meter #19	-3.50 %	-2.73 %	-0.77 %
Meter #20	-4.34 %	-3.65 %	-0.69 %
Meter #21	3.20 %	0.82 %	2.38 %
Meter #22	-17.40 %	-1.78 %	-15.62 %
Meter #23	-3.80 %	-2.20 %	-1.60 %
Meter #24	-10.20 %	-26.68 %	16.48 %
Meter #25	-3.68 %	-3.54 %	-0.14 %
Meter #26	-3.12 %	-0.92 %	-2.20 %
Meter #27	3.60 %	0.81 %	2.79 %
Meter #28	-7.68 %	-12.95 %	5.27 %
<i>Average</i>	<i>-4.45 %</i>	<i>-4.32 %</i>	<i>-0.14 %</i>
<i>Std Dev</i>	<i>0.036461744</i>	<i>0.049867807</i>	<i>0.0460693</i>

WATER METER TEST RESULTS: JANUARY >08 - JULY >08															
Make	Model	Size	Lots	Meters Tested	Meters Passed	Meters Failing Tolerances within Passed Lots				Misc. Fails	Meters Failing Tolerances within Failed Lots				Misc Fails
						Min. Flow	Int. Flow	Max. Flow	Total Fails		Min. Flow	Int. Flow	Max. Flow	Total Fails	
Arad		5/8 in	1	2	0									2	2
Amco	C-700	5/8 in	16	183	174	9			9						
Amco	C-700	3/4 in	3	22	22										
Amco	C-700	1 in	3	42	42										
Badger	RCDL 25	5/8 in	21	171	165	6			6						
Kent	C-700	5/8 in	1	2	1		1		1						
Neptune	T-10	5/8 in	65	749	655	26	9	1	42	6 mech fails		4		52	34 mech fails
Master Meter	USA 140_F	5/8 in USG HOT	51	875	765	5	4	8	19	2		11	37	91	7 NoS/N
Master Meter	MM3C	5/8 in	3	39	26									13	
Master Meter	MM4	3/4 in	3	28	23				1					4	
Master Meter	MM5C	1 in USG COLD	12	337	262	5		6	53			1	21	22	
Master Meter	FAM	5/8 in USG COLD	29	575	466	3	15		21			17	1	88	
Master Meter	FAM	3/4 in	1	14	3							11		11	
Performance	PPD	5/8 in	1	1	1										

<b>PASSING RATES FOR METERS TESTED: JANUARY &gt;08 - JULY &gt;08</b>														
	<b>Arad</b>	<b>Amco C-700 5/8 in</b>	<b>Amco C-700 3/4 in</b>	<b>Amco C-700 1 in</b>	<b>Badger RCDL25 5/8 in</b>	<b>Kent C-700 5/8 in</b>	<b>Neptune T-10 5/8 in</b>	<b>USA 140 F 5/8 in</b>	<b>Master Meter MM3C 5/8 in</b>	<b>Master Meter MM4 3/4 in</b>	<b>Master Meter MM5 C 1 in USG</b>	<b>Master Meter FAM 5/8 in USG</b>	<b>Master Meter FAM 3/4 in</b>	<b>Perfor- mance PPD 5/8 in</b>
% passed of total tested for each model	0	95	100	100	96	50	87	87	67	82	78	81	21	100
Lots passed	0	13	3	3	21	1	59	27	0	2	7	14	0	1
Lots failed	1	3	0	0	0	0	6	24	3	1	5	15	1	0

Appendix 2 to Developing Items, Item Part 6, Item 1:  
Draft Hydrogen Gas-Measuring Devices Code and Definitions

**Section 3.3X. Hydrogen Gas - Measuring Devices**

**A.1. This code applies to devices that are designed to dynamically measure the mass of hydrogen gas in the vapor state used as a vehicle fuel.**

**A.2. This code does not apply to devices used solely for dispensing a product in connection with operations in which the amount dispensed does not affect customer charges.**

**A.3. Type Evaluation. – The National Type Evaluation Program will accept for type evaluation only those devices that comply with all requirements of this code.**

**A.4. In addition to the requirements of this code, hydrogen gas meters shall meet the requirements of Section 1.10. General Code.**

**S. Specifications**

**S.1. Indicating and Recording Elements.**

**S.1.1. Indicating Elements. – A measuring assembly shall include an indicating element that continuously displays measurement results relative to quantity and total price. Indications shall be clear, definite, accurate, and easily read under normal conditions of operation of the instrument.**

**S.1.2. Vehicle Dispensers. – A hydrogen gas dispenser used to fuel vehicles shall be of the computing type and shall indicate the mass, the unit price, and the total price of each delivery.**

**S.1.3. Units.**

**S.1.3.1. Units of Measurement. – Deliveries shall be indicated and recorded in kilograms and decimal subdivisions thereof.**

**S.1.3.2. Numerical Value of Quantity-Value Divisions. – The value of a scale interval shall be equal to:**

**- 1, 2, or 5, or**

**- a decimal multiple or submultiple of 1, 2, or 5.**

**Examples: quantity-value divisions may be 10, 20, 50, 100; or 0.01, 0.02, 0.05; or 0.1, 0.2, or 0.5 etc.**

**S.1.3.3. Maximum Value of Quantity-Value Divisions. – The maximum value of the quantity-value division shall be not greater than 1.0 % of the minimum measured quantity.**

**S.1.3.4. Values Defined. – Indicated values shall be adequately defined by a sufficient number of figures, words, symbols, or combinations thereof. A display of “zero” shall be a zero digit for all displayed digits to the right of the decimal mark and at least one to the left.**

## S.2. Operating Requirements.

### S.2.1. Return to Zero.

- (a) One indicator and the primary recording elements, if the device is equipped to record, shall be provided with a means for readily returning the indication to zero either automatically or manually.
- (b) It shall not be possible to return primary indicating elements, or primary recording elements, beyond the correct zero position.

S.2.2. Indicator Reset Mechanism. – The reset mechanism for the indicating element shall not be operable during a delivery. Once the zeroing operation has begun, it shall not be possible to indicate a value other than the latest measurement, or “zeros” when the zeroing operation has been completed.

S.2.3. Nonresettable Indicator. – An instrument may also be equipped with a nonresettable indicator if the indicated values cannot be construed to be the indicated values of the resettable indicator for a delivered quantity.

### S.2.4. Provisions for Power Loss.

S.2.4.1. Transaction Information. – In the event of a power loss, the information needed to complete any transaction in progress at the time of the power loss (such as the quantity and unit price, or sales price) shall be determinable for at least 15 minutes at the dispenser or at the console if the console is accessible to the customer.

S.2.4.2. User Information. – The device memory shall retain information on the quantity of fuel dispensed and the sales price totals during power loss.

### S.2.5. Display of Unit Price and Product Identity.

S.2.5.1. Unit Price. – A computing or money-operated device shall be able to display on each face the unit price at which the device is set to compute or to dispense.

S.2.5.2. Product Identity. – A device shall be able to conspicuously display on each side the identity of the product being dispensed.

S.2.5.3. Selection of Unit Price. – When a product is offered for sale at more than one unit price through a computing device, the selection of the unit price shall be made prior to delivery using controls on the device or other customer-activated controls. A system shall not permit a change to the unit price during delivery of a product.

S.2.5.4. Agreement Between Indications. – All quantity, unit price, and total price indications within a measuring system shall agree for each transaction.

S.2.6. Money-Value Computations. – A computing device shall compute the total sales price at any single-purchase unit price for which the product being measured is offered for sale at any delivery possible within either the measurement range of the device or the range of the computing elements, whichever is less.

S.2.6.1. Auxiliary Elements. – If a system is equipped with auxiliary indications, all indicated money value and quantity divisions of the auxiliary element shall be identical with those of the primary element.

**S.2.6.2. Display of Quantity and Total Price. – When a delivery is completed, the total price and quantity for that transaction shall be displayed on the face of the dispenser for at least 5 minutes or until the next transaction is initiated by using controls on the device or other user-activated controls.**

**S.2.7. Recorded Representations, Point of Sale Systems. – A printed receipt shall be available through a built-in or separate recording element for transactions conducted with point-of-sale systems or devices activated by debit cards, credit cards, and/or cash. The printed receipt shall contain the following information for products delivered by the dispenser:**

- (a) the total mass of the delivery,**
- (b) the unit price,**
- (c) the total computed price, and**
- (d) the product identity by name, symbol, abbreviation, or code number.**

**S.2.8. Indication of Delivery. – The device shall automatically show on its face the initial zero condition and the quantity delivered (up to the nominal capacity).**

**S.3. Design of Measuring Elements and Measuring Systems.**

**S.3.1. Maximum and Minimum Flow-Rates. – The ratio of the maximum to minimum flow-rates specified by the manufacturer for devices measuring gases shall be 10:1 or greater.**

**S.3.2. Adjustment Means. – An assembly shall be provided with means to change the ratio between the indicated quantity and the quantity of gas measured by the assembly. A bypass on the measuring assembly shall not be used for these means.**

**S.3.2.1. Discontinuous Adjusting Means. – When the adjusting means changes ratio between the indicated quantity and the quantity of measured gas in a discontinuous manner, the consecutive values of the ratio shall not differ by more than 0.1 %.**

**S.3.3. Provision for Sealing. – Adequate provision shall be made for an approved means of security (e.g., data change audit trail) or physically applying security seals in such a manner that no adjustment may be made of:**

- (a) each individual measurement element,**
- (b) any adjustable element for controlling delivery rate when such rate tends to affect the accuracy of deliveries,**
- (c) the zero adjustment mechanism, and**
- (d) any metrological parameter that detrimentally affects the metrological integrity of the device or system.**

**When applicable, the adjusting mechanism shall be readily accessible for purposes of affixing a security seal. Audit trails shall use the format set forth in Table S.3.3.**

<b><u>Table S.3.3. Categories of Device and Methods of Sealing</u></b>	
<b><u>Categories of Device</u></b>	<b><u>Method of Sealing</u></b>
<b><u>Category 1: No remote configuration capability.</u></b>	<b><u>Seal by physical seal or two event counters: one for calibration parameters and one for configuration parameters.</u></b>
<b><u>Category 2: Remote configuration capability, but access is controlled by physical hardware.</u></b>  <b><u>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</u></b>	<b><u>The hardware enabling access for remote communication must be on-site. The hardware must be sealed using a physical seal or an event counter for calibration parameters and an event counter for configuration parameters. The event counters may be located either at the individual measuring device or at the system controller; however, an adequate number of counters must be provided to monitor the calibration and configuration parameters of the individual devices at a location. If the counters are located in the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.</u></b>
<b><u>Category 3: Remote configuration capability access may be unlimited or controlled through a software switch (e.g., password).</u></b>  <b><u>The device shall clearly indicate that it is in the remote configuration mode and record such message if capable of printing in this mode or shall not operate while in this mode.</u></b>	<b><u>An event logger is required in the device; it must include an event counter (000 to 999), the parameter ID, the date and time of the change, and the new value of the parameter. A printed copy of the information must be available through the device or through another on-site device. The event logger shall have a capacity to retain records equal to ten times the number of sealable parameters in the device, but not more than 1000 records are required. (Note: Does not require 1000 changes to be stored for each parameter.)</u></b>

**S.3.4. Automatic Density Correction. – An automatic means to determine and correct for changes in product density shall be incorporated in any hydrogen gas metering system where measurements are affected by changes in the density (e.g., the effects of temperature, pressure, or variations in composition due to feedstock, processing, storage, or the environment) of the product being measured.**

**S.3.5. Pressurizing the Discharge Hose. – The discharge hose for hydrogen gas shall automatically pressurize to a pressure equal to or greater than the receiving vessel prior to the device beginning to register the delivery. Neither initial hose pressurization or purging/bleeding of the discharge hose shall not advance the indications.**

**S.3.6. Zero-Set-Back Interlock, Retail Vehicle Fuel Devices. – A device shall be constructed so that:**

- (a) **when the device is shut-off at the end of a delivery an automatic interlock prevents a subsequent delivery until the indicating elements, and recording elements if the device is equipped and activated to record, have been returned to their zero positions;**
- (b) **it shall not be possible to return the discharge nozzle to its start position unless the zero set-back interlock is engaged or becomes engaged and**



- (c) in a system with more than one dispenser supplied by a single source, an effective automatic control valve in each dispenser prevents product from being delivered until the indicating elements on that dispenser are in a correct zero position.

**S.4. Discharge Lines and Valves.**

S.4.1. Diversion of Measured Product. – No means shall be provided by which any measured product can be diverted from the measuring instrument.

S.4.2. Directional Flow Valves. – If a reversal of flow could result in errors that exceed the tolerance for the minimum measured quantity, a valve or valves or other effective means, automatic in operation (and equipped with a pressure limiting device, if necessary) to prevent the reversal of flow shall be properly installed in the system. (See N.1.)

S.4.3. Other Valves. – Check valves and closing mechanisms that are not used to define the measured quantity shall have relief valves (if necessary) to dissipate any abnormally high pressure that may arise in the measuring assembly.

**S.5. Markings. – A measuring system shall be conspicuously, legibly, and indelibly marked with the following information:**

- (a) pattern approval mark (i.e., type approval number);
- (b) name and address of the manufacturer or his trademark and, if required by the weights and measures authority, the manufacturer's identification mark in addition to the trademark;
- (c) model designation or product name selected by the manufacturer;
- (d) nonrepetitive serial number;
- (e) the accuracy class of the meter as specified by the manufacturer consistent with Table T.2.;
- (f) maximum and minimum flow rates in kilograms per unit of time;
- (g) maximum working pressure;
- (h) applicable range of ambient temperature if other than -10 °C to +50 °C;
- (i) minimum measured quantity; and
- (j) product limitations, if applicable.

**S.6. Printer. – When an assembly is equipped with means for printing the measured quantity, the printed information must agree with the indications on the dispenser for the transaction and the printed values shall be clearly defined.**

S.6.1. Printed Receipt. – Any delivered, printed quantity shall include an identification number, the time and date, and the name of the seller. This information may be printed by the device or pre-printed on the ticket.

**S.7. Totalizers for Retail Motor-Fuel Devices. – Retail motor-fuel dispensers shall be equipped with a nonresettable totalizer for the quantity delivered through each separate metering device.**

N. Notes

N.1. Minimum Measured Quantity. – The minimum measured quantity shall be specified by the manufacturer.

N.2. Test Medium. – The device shall be tested with hydrogen gas as defined by... (NOT YET PUBLISHED).

N.3. Test Drafts. – The minimum test shall be one test draft at the maximum flow rate of the installation and one test draft at the minimum flow rate. More tests may be performed at these or other flow rates. (See T.3.)

N.4. Tests.

N.4.1. Transfer Standard Test. – When comparing a meter with a calibrated transfer standard, the test draft shall be equal to at least the amount delivered by the device in two minutes at its maximum discharge rate.

N.4.2. Gravimetric Test. – The weight of the test drafts shall be equal to at least the amount delivered by the device in two minutes at its maximum discharge rate.

N.5. Minimum Measured Quantity. – The device shall be tested for a delivery equal to the declared minimum measured quantity when the device is likely to be used to make deliveries on the order of the declared minimum measured quantity. Any minimum measured quantity test shall be made at the minimum flow rate of the installation.

N.6. Motor Fuel Dispenser. – When a device is intended for use as a fuel dispenser, the type evaluation test shall include a test for accuracy using five starts and stops during a delivery to simulate the operation of the automatic shut-off nozzle. This test may be conducted as part of the normal inspection and test of the meter.

N.7. Testing Procedures.

N.7.1. Normal Tests. – The normal test of a meter shall be made at the maximum discharge rate developed by the installation. Any additional tests conducted at flow rates down to and including the rated minimum discharge flow rate shall be considered normal tests.

N.7.1.1. Repeatability Tests. – Tests for repeatability should include a minimum of three consecutive test drafts of approximately the same size and be conducted under controlled conditions where variations in factors, such as, temperature, pressure, and flow rate are reduced to the extent that they will not affect the results obtained.

N.8. Density. – Temperature and pressure of metered hydrogen gas shall be measured during the test for the determination of density or volume correction factors when applicable. For the thermophysical properties of hydrogen the following publications shall apply: for density calculations at temperatures above 220 K and pressures up to 120 MPa, a simple relationship may be used that is given in the publication of Lemmon et al., J. Res. NIST, 2008. Calculations for a wider range of conditions and additional thermophysical properties of hydrogen are available free of charge online at the “NIST Chemistry WebBook” <http://webbook.nist.gov/chemistry>, or available for purchase from NIST as the computer program NIST Standard Reference Database 23 “NIST Reference Fluid Thermodynamic and Transport Properties Database (REFPROP): Version 8.0” <http://www.nist.gov/srd/nist23.htm>. These calculations are based on the reference Leachman, J.W., Jacobsen, R.T, Lemmon, E.W., and Penoncello, S.G. “Fundamental Equations of State for Parahydrogen, Normal Hydrogen, and Orthohydrogen” to be published in the Journal of Physical and Chemical Reference Data. More information may be obtained from NIST online at <http://www.boulder.nist.gov/div838/Hydrogen/Index.htm>.

## T. Tolerances

### T.1. Tolerances, General.

- (a) The tolerances apply equally to errors of underregistration and errors of overregistration.
- (b) The tolerances apply to all products at all temperatures measured at any flow rate within the rated measuring range of the meter.

### T.2. Tolerances. – The tolerances for hydrogen gas meters are listed in Table T.2.

<u>Table T.2. Accuracy Classes for Hydrogen Gas Meter Applications</u>			
<u>Accuracy Class</u>	<u>Application or Commodity Being Measured</u>	<u>Acceptance Tolerance</u>	<u>Maintenance Tolerance</u>
<u>2.0</u>	<u>Hydrogen gas as a motor fuel</u>	<u>1.5 %</u> <u>(STAY OPEN FOR DISCUSSION)</u>	<u>2.0 %</u>

T.3. Repeatability. – When multiple tests are conducted at approximately the same flow rate and draft size, the range of the test results for the flow rate shall not exceed 40 % of the absolute value of the maintenance tolerance and the results of each test shall be within the applicable tolerance. See also N.6.1.1.

### T.4. Tolerance Application.

T.4.1. Type Evaluation Examinations for Devices. – For type evaluation examinations, the tolerance values shall apply under the following conditions:

- (a) at any temperature and pressure within the operating range of the meter, and
- (b) at all flow rates within the range of flow rates.

T.4.2. To the basic tolerance values that would otherwise be applied, there shall be added an amount equal to two times the standard deviation of the applicable transfer standard when compared to a basic reference standard.

## UR. User Requirements

### UR.1. Selection Requirements.

UR.1.1. Computing-Type Device. – A hydrogen gas dispenser used to refuel vehicles shall be of the computing type and shall indicate the mass, the unit price, and the total price of each delivery.

UR.1.2. Discharge Hose-Length. – The length of the discharge hose on a retail motor-fuel device shall not exceed 4.6 m (15 ft) unless it can be demonstrated that a longer hose is essential to permit deliveries to be made to receiving vehicles or vessels.

### UR.1.3. Minimum Measured Quantity.

- (a) The minimum measured quantity shall be specified by the manufacturer.

- (b) The minimum measured quantity appropriate for a transaction may be specified by the weights and measures authority. A device may have a declared minimum measured quantity smaller than that specified by the weights and measures authority; however, the device must perform within the performance requirements for the declared or specified minimum measured quantity up to deliveries at the maximum measurement range.

UR.2. Installation Requirements.

UR.2.1. Manufacturer's Instructions. – A device shall be installed in accordance with the manufacturer's instructions, and the installation shall be sufficiently secure and rigid to maintain this condition.

UR.2.2. Discharge Rate. – A device shall be installed so that after initial equalization the actual maximum discharge rate will not exceed the rated maximum discharge rate. Automatic means of flow regulation shall be incorporated in the installation if necessary.

UR.2.3. Low-Flow Cut-Off Valve. – If a metering system is equipped with a programmable or adjustable "low-flow cut-off" feature:

- (a) the low-flow cut-off value shall not be set at flow rates lower than the minimum operating flow rate specified by the manufacturer on the meter; and
- (b) the system shall be equipped with flow control valves which prevent the flow of product and stop the indicator from registering product flow whenever the product flow rate is less than the low-flow cut-off value.

UR.3. Use of Device.

UR.3.1. Unit Price and Product Identity for Retail Dispensers. – The unit price at which the dispenser is set to compute shall be conspicuously displayed or posted on the face of a retail dispenser used in direct sale.

UR.3.2. Ticket Printer; Customer Ticket. – Vehicle-mounted metering systems shall be equipped with a ticket printer which shall be used for all sales where product is delivered through the meter. A copy of the ticket issued by the device shall be left with the customer at the time of delivery or as otherwise specified by the customer.

UR.3.3. Printed Ticket. – The total price, the total quantity of the delivery, and the price per unit shall be printed on any ticket issued by a device of the computing type and containing any one of these values.

UR.3.4. Ticket in Printing Device. – A ticket shall not be inserted into a device equipped with a ticket printer until immediately before a delivery is begun, and in no case shall a ticket be in the device when the vehicle is in motion while on a public street, highway, or thoroughfare.

UR.3.5. Steps After Dispensing. – After delivery to a customer from a retail motor-fuel device:

- (a) the device shall be shut-off at the end of a delivery, through an automatic interlock that prevents a subsequent delivery until the indicating elements and recording elements, if the device is equipped and activated to record, have been returned to their zero positions; and
- (b) the discharge nozzle shall not be returned to its start position unless the zero set-back interlock is engaged or becomes engaged by act of returning the discharge nozzle.

UR.3.6. Return of Indicating and Recording Elements to Zero. – The primary indicating elements (visual), and the primary recording elements when these are returnable to zero, shall be returned to zero immediately before each delivery. Exceptions to this requirement are totalizers on key-lock-operated or other self-operated dispensers and the primary recording element if the device is equipped to record.

**UR.3.7. Return of Product to Storage, Retail Hydrogen Gas Dispensers. – Provisions at the site shall be made for returning product to storage or disposing of the product in a safe and timely manner during or following testing operations. Such provisions may include return lines, or cylinders adequate in size and number to permit this procedure.**

**UR.3.8. Conversion Factors. – Established conversion values (see references in N.8.) shall be used whenever metered hydrogen gas is billed. All sales shall be based on kilograms.**

Modify current NIST Handbook 44 definitions to apply and correspond with the proposed new code for hydrogen gas measuring devices.

#### Appendix D – Definitions

The specific code to which the definition applies is shown in [brackets] at the end of the definition. Definitions for the General Code [1.10] apply to all codes in Handbook 44.

##### A

**audit trail.** An electronic count and/or information record of the changes to the values of the calibration or configuration parameters of a device. [1.10, 2.20, 2.21, 2.24, 3.30, 3.37, **3.3X**, 5.56(a)]

**automatic temperature or density compensation.** The use of integrated or ancillary equipment to obtain from the output of a volumetric meter an equivalent mass, or an equivalent liquid volume at the assigned reference temperature below and a pressure of 14.696 lb/in<sup>2</sup> absolute.

Cryogenic liquids – 21 °C (70 °F) [3.34,]

Hydrocarbon gas vapor – 15 °C (60 °F) [3.33]

Hydrogen gas – 21 °C (70 °F) [3.3X]

Liquid carbon dioxide – 21 °C (70 °F) [3.38]

Liquefied petroleum gas (LPG) and Anhydrous ammonia – 15 °C (60 °F) [3.32]

Petroleum liquid fuels and lubricants – 15 °C (60 °F) [3.30]

##### C

**calibration parameter.** Any adjustable parameter that can affect measurement or performance accuracy and, due to its nature, needs to be updated on an ongoing basis to maintain device accuracy, e.g., span adjustments, linearization factors, and coarse zero adjustments. [2.20, 2.21, 2.24, 3.30, 3.37, **3.3X**, 5.56(a)]

##### D

**discharge hose.** A flexible hose connected to the discharge outlet of a measuring device or its discharge line. [3.30, 3.31, 3.32, 3.34, 3.37, 3.38, **3.3X**]

**discharge line.** A rigid pipe connected to the outlet of a measuring device. [3.30, 3.31, 3.32, 3.34, 3.37, **3.3X**]

##### E

**event counter.** A nonresettable counter that increments once each time the mode that permits changes to sealable parameters is entered and one or more changes are made to sealable calibration or configuration parameters of a device. [2.20, 2.21, 3.30, 3.37, **3.3X**, 5.54, 5.56(a), 5.56(b), 5.57]

**event logger.** A form of audit trail containing a series of records where each record contains the number from the event counter corresponding to the change to a sealable parameter, the identification of the parameter that was

changed, the time and date when the parameter was changed, and the new value of the parameter. [2.20, 2.21, 3.30, 3.37, **3.3X**, 5.54, 5.56(a), 5.56(b), 5.57]

## I

**indicating element.** An element incorporated in a weighing or measuring device by means of which its performance relative to quantity or money value is “read” from the device itself as, for example, an index-and-graduated-scale combination, a weighbeam-and-poise combination, a digital indicator, and the like. (Also see “primary indicating or recording element.”) [1.10]

## M

**minimum measured quantity (mmq).** **The smallest quantity delivered for which the measurement is accurate for that system . . . [3.37, 3.3X]**

**motor-fuel device** or **motor-fuel dispenser** or **retail motor-fuel device.** A device designed for the measurement and delivery of ~~liquids~~ **products** used as fuel for internal-combustion engines. The term “motor-fuel dispenser” means the same as “motor-fuel device”; the term “retail motor-fuel device” applies to a unique category of device (see definition of “retail device”). [3.30, 3.32, 3.37, **3.3X**]

## N

**nonresettable totalizer.** **An element interfaced with the measuring or weighing element that indicates the cumulative registration of the measured quantity with no means to return to zero. [3.30, 3.37, 3.3X]**

## P

**point-of-sale system.** An assembly of elements including a weighing or measuring element, an indicating element, and a recording element (and may also be equipped with a “scanner”) used to complete a direct sales transaction. [2.20, 3.30, 3.32, 3.37, **3.3X**]

## R

**remote configuration capability.** The ability to adjust a weighing or measuring device or change its sealable parameters from or through some other device that is not itself necessary to the operation of the weighing or measuring device or is not a permanent part of that device. [2.20, 2.21, 2.24, 3.30, 3.37, **3.3X**, 5.56(a)]

**retail device.** A measuring device primarily used to measure product for the purpose of sale to the end user. [3.30, 3.32, 3.37, **3.3X**]

## W

**wet hose.** A discharge hose intended to be full of product at all times. (See “wet-hose type.”) [3.30, 3.31, 3.38, **3.3X**]

**wet-hose type.** A type of device designed to be operated with the discharge hose full of product at all times. (See “wet hose.”) [3.30, 3.32, 3.34, 3.37, 3.38, **3.3X**]

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