

CWMA Laws and Regulations (L&R) Committee Annual Report

Mr. Tim White, Chair
Michigan

200 INTRODUCTION

The L&R Committee (hereinafter referred to as the “Committee”) submits this Committee Interim Report for consideration by National Conference on Weights and Measures (NCWM). This report contains the items discussed and actions proposed by the Committee during its Interim Meeting in Daytona Beach, Florida, January 18-21, 2015. The report will address the following items in Table A during the Annual Meeting. Table A identifies the agenda items by reference key, title of item, page number and the appendices by appendix designations. The acronyms for organizations and technical terms used throughout the report are identified in Table B. The headings and subjects apply to NIST Handbook 130, “Uniform Laws and Regulations in the Areas of Legal Metrology and Engine Fuel Quality (2015),” and NIST Handbook 133, “Checking the Net Contents of Packaged Goods (2015).” The first three digits of an item’s reference key are assigned from the Subject Series List. The status of each item contained in the report is designated as one of the following: **(D) Developing Item:** the Committee determined the item has merit; however, the item was returned to the submitter or other designated party for further development before any action can be taken at the national level; **(I) Informational Item:** the item is under consideration by the Committee but not proposed for Voting; **(V) Voting Item:** the Committee is making recommendations requiring a vote by the active members of NCWM; **(W) Withdrawn Item:** the item has been removed from consideration by the Committee.

Some Voting Items are considered individually, others may be grouped in a consent calendar. Consent calendar items are Voting Items that the Committee has assembled as a single Voting Item during their deliberation after the Open Hearings on the assumption that the items are without opposition and will not require discussion. The Voting Items that have been grouped into consent calendar items will be listed on the addendum sheets. Prior to adoption of the consent calendar, the Committee will remove specific items from the consent calendar upon request to be discussed and voted upon individually.

Committees may change the status designation of agenda items (Developing, Informational, Voting, and Withdrawn) up until the report is adopted, except that items which are marked Developing, Informational or Withdrawn cannot be changed to Voting Status. Any change from the Committee Interim Report (as contained in this publication) or from what appears on the addendum sheets will be explained to the attendees prior to a motion and will be acted upon by the active members of NCWM prior to calling for the vote.

An “Item Under Consideration” is a statement of proposal and not necessarily a recommendation of the Committee. Suggested revisions 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***. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents.

Note: The policy is to use metric units of measurement in all of its publications; however, recommendations received by NCWM technical committees and regional weights and measures associations have been printed in this publication as submitted. Therefore, the report may contain references to inch-pound units.

Subject Series List

Introduction	200 Series
NIST Handbook 130 – General	210 Series
Uniform Laws.....	220 Series
Uniform Weights and Measures Law	221 Series
Uniform Weighmaster Law.....	222 Series
Uniform Engine Fuels and Automotive Lubricants Inspection Law	223 Series
Uniform Regulations	230 Series
Uniform Packaging and Labeling Regulation	231 Series
Uniform Regulation for the Method of Sale of Commodities	232 Series
Uniform Unit Pricing Regulation	233 Series
Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies for Commercial Weighing and Measuring Devices	234 Series
Uniform Open Dating Regulation	235 Series
Uniform Regulation for National Type Evaluation.....	236 Series
Uniform Engine Fuels and Automotive Lubricants Regulation	237 Series
Examination Procedure for Price Verification.....	240 Series
NCWM Policy, Interpretations, and Guidelines, Section 2.....	250 Series
NIST Handbook 133.....	260 Series
Other Items – Developing Items.....	270 Series

Table A
Table of Contents

Reference Key	Title of Item	L&R Page
200	INTRODUCTION.....	1
221	NIST HANDBOOK 130 – UNIFORM WEIGHTS AND MEASURES LAW.....	5
221-1	W Section 1.8. Net “Mass” or Net “Weight.”	5
231	NIST HANDBOOK 130 – UNIFORM PACKAGING AND LABELING REGULATION	8
231-1	V Sections 6.4., 6.5., and 6.7. Addition of Tables	8
232	NIST HANDBOOK 130 – UNIFORM REGULATION FOR THE METHOD OF SALE COMMODITIES	17
232-1	I Section 1.5. Meat, Poultry, Fish, and Seafood	17
232-2	W Section 2.20.3. Street Sign Prices and Advertising.....	21
232-3	V Section 2.23. Animal Bedding.....	23
232-4	V Section 2.27. Retail Sales of Natural Gas Sold as a Vehicle Fuel	26
237	NIST HANDBOOK 130 – UNIFORM ENGINE FUELS AND AUTOMOTIVE LUBRICANTS REGULATION	32
237-1	V Section 1. 1.36. Liquefied Natural Gas (LNG) and Section 3.11. Compressed Natural Gas (CNG).....	32
237-2	I Sections 2.1.3. Minimum Antiknock Index (AKI), Section 2.1.4. Minimum Motor Octane Number, and Section 3.2.5. Prohibition of Terms – Table 1.	42
237-3	V Section 4.3. Dispenser Filters	45
260	HANDBOOK 133.....	48
260-1	V Section 2.7. Chitterling Test Procedure (and beef tripe).....	48
260-2	V Section 3.9. Dimensional Test Procedure for Verifying the Compressed Quantity Declaration on Packages of Peat Moss.	55
260-3	V Section 3.15. Test Procedure for Verifying the Expanded Volume Declaration on Packages of Animal Bedding	65
270	OTHER ITEMS	81
270-1	D Fuels and Lubricants Subcommittee.....	81
270-2	D Packaging and Labeling Subcommittee.....	83
270-3	D Moisture Allowance Task Group (MATG)	85
NEW PROPOSALS.....		86
PROPOSAL 1	HANDBOOK 133: Chapter 1, paragraphs 1.2.1 & 1.3.1 and Chapter 3, paragraphs 3.10.1 & 3.10.2 NEW	86
PROPOSAL 2	HANDBOOK 133: HANDBOOK 133, section 2.4 Borax (NEW)	93
PROPOSAL 3	HANDBOOK 130: Section: Uniform Regulation for the Method of Sale of Commodities Paragraph: 2.10 NEW	95

Appendices

A	Items 232-4 and 237-1: Background and Justification for Handbook 130 Definition for “Diesel Gallon Equivalent (DGE)” of Natural Gas as a Vehicular Fuel.....	A1
B	Item 260-1: Handbook 133, Section 2.7. Chitterling Test Procedures	B1
C	Items 232-3, 260-2, and 260-3: Animal Bedding.....	C1

Table B
Glossary of Acronyms and Terms

Acronym	Term	Acronym	Term
AAP	Average Adjusted Purge	IRS	Internal Revenue Service
AKI	Minimum Antiknock Index	LNG	Liquefied Natural Gas
ASTM	ASTM International	MATG	Moisture Allowance Task Group
ATC	Automatic Temperature Compensation	MON	Motor Octane Number
BTU	British Thermal Unit	MAV	Maximum Allowable Variation
CFR	Code of Federal Regulations	NFPA	National Fire Protection Association
CNG	Compressed Natural Gas	NGSC	Natural Gas Steering Committee
CRC	Coordinating Research Council	OIML	International Organization of Legal Metrology
CVEF	Clean Vehicle Education Foundation	NCWM	National Conference on Weights and Measures
CWMA	Central Weights and Measures Association	NEWMA	Northeastern Weights and Measures Association
DEF	Diesel Exhaust Fluid	NIST	National Institute of Standards and Technology
DGE	Diesel Gallon Equivalent	OEM	Original Equipment Manufacturer
DLE	Diesel Liter Equivalent	OWM	Office of Weights and Measures
DOE	Department of Energy	PALS	Packaging and Labeling Subcommittee
EPA	Environmental Protection Agency	RMFD	Retail Motor Fuel Dispenser
FALS	Fuels and Lubricants Subcommittee	RON	Research Octane Number
FDA	Food and Drug Administration	S&T	Specifications and Tolerances
FPLA	Fair Packaging and Labeling Act	SCF	Sample Correction Factor
FSIS	Food Safety and Inspection Service	SEL	Sample Error Limit
FTC	Federal Trade Commission	SP	Special Publication
GGE	Gasoline Gallon Equivalent	SWMA	Southern Weights and Measures
GLE	Gasoline Liter Equivalent	TG	Task Group
GM	General Motors	UPLR	Uniform Packaging and Labeling Regulation
L&R	Laws and Regulations	USNWG	U.S. National Work Group
HB 133	NIST Handbook 133, <i>Checking the Net Contents of Packaged Goods</i>	WWMA	Western Weights and Measures Association
HB 44	NIST Handbook 44, <i>Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices</i>		

Details of All Items
(In order by Reference Key)

221 NIST HANDBOOK 130 – UNIFORM WEIGHTS AND MEASURES LAW**221-1 W Section 1.8. Net “Mass” or Net “Weight.”****Source:**

The Kind Group (2015)

Purpose:

Amend the definition of “net weight” to include the normally/easily deliverable quantity.

Item Under Consideration:

Amend NIST Handbook 130, Uniform Weights and Measures Law as follows:

1.8. Net “Mass” or Net “Weight.” – The term “net mass” or “net weight” means the weight ^[NOTE 1, page 21] of a commodity excluding any materials, substances, or items not considered to be part of the commodity **and is limited to the amount easily (normally) available to the consumer**. 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. **Materials or substances, whose evacuation is substantially constrained by platforms, tube limitations or other elements, are not considered to be part of the commodity.**
(Added 1988) (Amended 1989, 1991, ~~and~~ 1993, and 20XX)

Background/Discussion:

For a number of products, such as toothpaste, makeup and certain lip balms, the easily (normally) available quantity is less than the net weight; sometimes significantly so. As a result, consumers lose untold commodities that are largely inaccessible in these products.

The following are Committee Reports from 1990 and 1993 on a similar item.

1990 L&R Committee Report:**10.X Mechanical Pump Dispensers**

(This item was Informational)

Sealed mechanical pumps are a relatively new dispensing mechanism for toothpaste. They dispense dentifrice through a sealed mechanism that will always retain a minimum amount of product. Only on aerosol containers must the net contents declaration be the amount that is delivered to the purchaser (see Section 10.3 of the UPLR). The Western Weights and Measures Association recommended that a new section be added to the UPLR requiring these new types of packages to declare on their labels the total weight of product that will be delivered. The proposal was:

10.X. Mechanical Pump Dispensers. -- The declaration of quantity on packages that deliver product through a nonremovable mechanical pump shall disclose the net quantity of the commodity that will be expelled when the instructions for

use, as shown on the container, are followed.

At the present time, two problems are associated with this type of container:

- (1) The dispensing head will always retain a certain amount of product in it, which cannot be obtained using normal dispensing methods. However, the package label declares the contained net weight, not the delivered net weight.
- (2) Compliance testing officials are not sure what method to use to determine the amount of product contained (as opposed to the amount delivered). Unlike aerosol packages, there are no warning statements on the package prohibiting the opening of the package. However, if emptied in the manner simulating use, the net weight will be less than the net weight determined by means which bypass the mechanical pump head.

The Cosmetics, Toiletries, and Fragrance Association (CTFA) met with the Committee and outlined how the mechanical pumps could be tested by regulatory officials to determine the amount of product contained. They also pointed out that studies showed mechanical pumps delivered comparable amounts of product as compared with tubes or other dispensing mechanisms, such as plastic squeeze bottles or hand pumps. (CTFA member firms found that other types of containers retain from 4.2 to 10.1% of labeled amounts without resorting to such extraordinary measures as cutting the containers apart, disassembling them, or waiting excessive periods of time for them to empty.) Another study showed that when consumers were asked to return tubes and mechanical pumps of toothpaste that they thought were "empty," pumps retained 4 to 5 percent of the labeled contents, while tubes retained 8 to 9 percent. Even though aggressive consumers *can* cut into a tube (but cannot do that to a pump), this study showed that they did not cut into the tube.

CTFA expressed concern that another declaration indicating the amount delivered in addition to the declaration presently on the packages (the amount contained) would be confusing. The Committee had not intended to require two declarations, but had interpreted the proposal as changing the net contents declaration, rather than adding one. Since such a requirement would be at variance with the traditional interpretation of the required net contents declaration (except for aerosols), the Committee is aware that the proposed section might be a solution that might require changes or additions to FDA regulations. However, it should be pointed out that certain segments of industry already provide a net contents statement that is the delivered amount; for example, many stick deodorant packages are labeled on the back declaring "(so many) ounces plus enough extra to secure the product to the base (of the dispenser)." The Committee will be carrying this item over for further study. See also Item 232-18 for further discussion.

Data collected in California indicated that mechanical pumps delivered from 89.5 to 100 percent of their declared net weights. The CTFA acknowledged that the various pumps now on the market have somewhat different dispensing characteristics. Mr. Ken Appell, Colgate-Palmolive Co., presented information concerning the possible causes of difference between California's and CTFA's data. They included the temperature at the time of measurement, the age of the product, the rate of use (fast, total dispensing vs. normal unit daily dosing), and container size (the size of the reservoir on the mechanical pump head compared with the size of the container, as well as the particular mechanical pump design). Other jurisdictions are urged to test both mechanical pumps and tubes and report their findings to the Committee. Data should include lot code information, temperature of test, and method of emptying the container, as well as container and package information, such as brand, product, and container net contents. It would be useful for the jurisdiction to test two samples of the same product, one to determine the delivered contents and one to determine the contained contents. Please contact the Office of Weights and Measures, Ms. Carroll Brickenkamp, 301-975-4005, for information on determining the contained net contents.

**1993 L&R Committee Report:
Mechanical Pump Dispensers**
(This item was withdrawn.)

Background: This was Item 231-13 in the Report of the 75th NCWM, 1990, pages 89-90, Item 231-6 in the Report of the 76th NCWM, 1991, page 200; and Item 231-3 in the Report of the 77th NCWM, 1992, page 135. See these reports for a full discussion of the issue. The Committee considered submitting a petition to the Food and Drug Administration (FDA) and the Federal Trade Commission (FTC) to request changes in Federal regulations to require mechanical pump package systems to dispense the labeled weight. Prior to the 77th NCWM Annual Meeting, the Committee received comments from industry and weights and measures officials expressing concern over the possible impact of a "to deliver" requirement on other types of packaging, including toothpaste tubes and hand-pump dispensers (such as those used for hand lotions) that are currently only required to contain the labeled quantity. Several people questioned how far the requirement would reach and whether the economic impact would benefit consumers or lessen the competitive position of manufacturers who use this type of packaging. The Committee did not hear any comments on this item *at* the Interim Meeting that indicated a significant problem with this type of packaging or that there is national support for further action on the issue. The Committee sought industry participation in further studies due to its concern about product retained by the package delivery system of mechanical pump dispensers, but only one firm expressed concern about the issue. Therefore, the Committee is withdrawing this item from its agenda. The Committee would welcome information on this item in the future. Such information could include the results of investigations into consumer complaints or results of actual product testing or recent net content studies on a wide variety of consumer products that use this type of container.

For additional information, contact Jonathan Teller, The Kind Group via email: Jonathon@thekindgroup.com or Mr. Mike Sikula, New York State Weights and Measures at (518) 457-3452.

At the 2015 NCWM Interim Meeting a comment was made that this item was addressed by the Conference in the 1990's and packaged commodities have not changed in how they are packaged or dispensed. Adoption of this proposal would create confusion in the marketplace for consumers. If accepted the Conference would need to consult with other federal agencies to see if it conflicts with their regulations. There is not enough data or support to move this item forward. The Committee agrees that, if adopted, defining the term "to deliver" would be difficult. This would also impact the current test procedures in HB 133. The L&R Committee believes that packaging has not changed since this was reviewed by the Conference in the 1990's. There was also no evidence or data from other manufacturers that this is an issue. Two Regional Associations did not forward this item to the Conference for consideration. For these reasons the Committee Withdrew this Item.

Regional Association Comments:

CWMA discussed the meaning of "normally/easily". It is an ambiguous term and can be interpreted differently by individuals. CWMA requested clarification on whether the residual contents would be considered as tare. Individuals from both the regulatory community and industry expressed some concern about the concept of "normally/easily deliverable." One suggestion by a regulator was to amend the language from "contains" net weight to "delivered" net weight. Several examples of residual substances were discussed. One regulator suggested leaving the proposal as a developing item as referenced in the proposal from 1993. One regulator said it would be overwhelming to try to determine what the "cling" or residual would be on all package checking. CWMA forwarded the item to NCWM recommending it as a Developing Item.

WWMA noted that adoption of this item would necessitate changes to NIST Handbook 133. A manufacturer stated that if this proposal is adopted, manufacturers would have difficulty complying with the standard created by the new definition. A regulator stated that the proposed change is not necessary and that it would be difficult for regulators to enforce. One regulator agreed with the concept of net weight being defined "to deliver" but that this would create difficulty with test procedures currently documented, and that this is similar to the discussion about the difference between wet and used dry tare.

A similar item was considered by the NCWM in the early 1990's and ultimately withdrawn due to enforcement difficulty for regulators and difficulty of compliance by manufacturers. Since then, packaging technology has not changed significantly and the WWMA wondered what new problem it is that needs to be addressed. Currently there is only one manufacturer seeking this change. It was also noted that NCWM and NIST would have to consult with other federal agencies, e.g., FTC, FDA, and EPA to ensure this change would not conflict with other agencies' definitions. WWMA did not forward this item to NCWM.

NEWMA received an explanation from the submitter of this item justifying the need for this proposal. He explained that the product in question has content weight that is not intended for consumption. The submitter is asking to change the definition of net weight to include only the consumable contents of the product. The Committee Chair cited the federal regulation that lists the definition for net content, and asked how the submitter would reconcile this proposal with the federal regulation. The submitter indicated he did not believe there was a conflict with federal regulation. The submitter said that the upper half of the container is for packaging purposes, not for consumption purposes, so it should not be included in the weight. A regulator asked if other manufacturers were looking at this issue differently than the submitter. The submitter stated that there is confusion, but no manufacturer opposes the idea to his knowledge. The regulator feels that it is a legitimate issue and merits further consideration. The Chairman commented that two other regions withdrew the item, and one made it informational. A regulator stated that as a consumer, she would want to know what content is in the dispenser that is usable. Two additional regulators believed it should go forward as an informational item for further consideration which was the overall consensus at the NEWMA 2014 Interim Meeting. NEWMA forwarded the item to the NCWM and recommended that it be an Informational Item.

At the 2014 SWMA Meeting, the Committee heard comments from industry that they believed this was a step backwards and would require multiple changes in test procedures. Comments were heard that multiple test procedures would have to be drafted to test many different items. The SWMA did not forward this item to NCWM.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents.

231 NIST HANDBOOK 130 – UNIFORM PACKAGING AND LABELING REGULATION

231-1 V Sections 6.4., 6.5., and 6.7. Addition of Tables

Source:

NCWM Packaging and Labeling Subcommittee (2014)

Purpose:

Add tables to Handbook 130, Uniform Packaging and Labeling Regulation to help clarify requirements.

Item Under Consideration:

Amend NIST Handbook 130, Uniform Packaging and Labeling Regulation as follows:

NOTE 3: Packages subject to this Section and/or the Federal Fair Packaging and Labeling Act shall be labeled in units of the International System of Units (SI) and the U.S. customary system of measure effective February 14, 1994, [except for seed (see Section 10.10. Packaged Seed) and camera film and recording tape (see Section 11.22. Camera Film, Video Recording Tape, Audio Recording Tape and Other Image and Audio Recording Media Intended for Retail Sale and Consumer Use), and as specified in Section 11.32. SI Units, Exemptions - Consumer Commodities]. SI units may appear first.

(Added 1982) (Amended 1990 and 1993)

6.4. Terms: Weight, Measure, Volume, or Count. – The declaration of the quantity ~~of a particular commodity~~ shall be expressed in terms of **Table 6.4.**

- ~~(a) weight if the commodity is solid, semisolid, viscous, or a mixture of solid and liquid;~~
- ~~(b) volume measure if the commodity is liquid or dry, if the commodity is dry;~~
- ~~(c) linear measure or area; or~~
- ~~(d) numerical count.~~

<u>Table 6.4.</u> <u>Weight, Measure, Volume, or Count</u>	
<u>If the commodity is:</u>	<u>The declaration of the quantity of a particular commodity shall be expressed in terms of:</u>
(a) <u>solid, semisolid, viscous, or a mixture of solid and liquid</u>	<u>weight or mass</u>
(b) <u>liquid</u>	<u>fluid volume measure</u>
(c) <u>dry</u>	<u>dry measure</u>
(d) <u>or labeled by linear measure or area</u>	<u>linear measure or area</u>
(e) <u>or labeled by numerical units (count)</u>	<u>numerical count</u>

However, if there exists a firmly established general consumer usage and trade custom with respect to the terms used in expressing a declaration of quantity of a particular commodity, such a declaration of quantity may be expressed in its traditional terms, provided such traditional declaration gives accurate and adequate information as to the quantity of the commodity. Any net content statement that does not permit price and quantity comparisons is forbidden. (Amended 1989 **and 20XX**)

6.5. SI Units: Mass, Measure. ^[NOTE 3, page 64] – A declaration of quantity **shall be expressed in terms of Table 6.5. and the requirements in 6.5.(f), 6.5.(g), and 6.5.(h):**

Table 6.5. SI Units: Mass, Measure	
<u>If a declaration of quantity is in units of:</u>	<u>The units shall be in:</u>
(a) <u>mass</u>	<u>kilogram, gram or milligram</u>
(b) <u>liquid measure</u>	<p><u>liter or milliliter and shall express the volume at 20 °C, except for:</u></p> <p><u>petroleum products or distilled spirits for which the declaration shall express the volume at 15.6 °C, and</u></p> <p><u>a commodity that is normally sold and consumed while frozen for which the declaration shall express the volume at the frozen temperature, and</u></p> <p><u>malt beverages or a commodity that must be maintained in the refrigerated state, for which the declaration shall express the volume at 4 °C.</u></p>
(c) <u>linear measure</u>	<u>meter, centimeter, or millimeter</u>
(d) <u>area measure</u>	<u>square meter, square decimeter, square centimeter, or square millimeter</u>
(e) <u>volume other than liquid measure</u>	<u>liter or milliliter, except that units cubic meter and cubic centimeter shall be used only when specifically designated as a method of sale</u>

(Amended 1985, 1990, and 20XX)

- (a) ~~in units of mass shall be the kilogram, gram, or milligram;~~
- (b) ~~in units of liquid measure shall be the liter or milliliter and shall express the volume at 20 °C, except in the case of petroleum products or distilled spirits, for which the declaration shall express the volume at 15.6 °C, and except also in the case of a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature, and except also in the case of malt beverages or a commodity that must be maintained in the refrigerated state, for which the declaration shall express the volume at 4 °C;~~
 (Amended 1985 and 1990)
- (c) ~~in units of linear measure shall be the meter, centimeter, or millimeter;~~
- (d) ~~in units of area measure shall be the square meter, square decimeters, square centimeter, or square millimeter;~~
- (e) ~~in units of volume other than liquid measure shall be the liter and milliliter, except that the units cubic meter and cubic centimeter shall be used only when specifically designated as a method of sale;~~
- (f) Rule of 1000. – The selected multiple or submultiple prefixes for SI units shall result in numerical values between 1 and 1000. This rule allows centimeters or millimeters to be used where a length declaration is less than 100 centimeters.

Examples:

- 500 g, not 0.5 kg;
- 1.96 kg, not 1960 g;
- 750 mL, not 0.75 L; or
- 750 mm or 75 cm, not 0.75 m

(Added 1993)

- (g) SI declarations should be shown in three digits except where the quantity is below 100 grams, milliliters, centimeters, square centimeters, or cubic centimeters, where it may be shown in two digits. In either case, any final zero appearing to the right of the decimal point need not be shown; and

(Added 1993)

- (h) the declaration of net quantity of contents shall not be expressed in mixed units.

Example:

- 1.5 kg, not 1 kg 500 g.

(Added 1993)

6.7.U.S. Customary Units: Weight, Measure. – A declaration of quantity shall be expressed in terms of Table 6.7.:

- ~~(a) in units of weight shall be in terms of the avoirdupois pound or ounce;~~

- ~~(b) in units of liquid measure shall be in terms of the United States gallon of 231 in³ or liquid quart, liquid pint, or fluid ounce subdivisions of the gallon and shall express the volume at 68 °F, except in the case of petroleum products and distilled spirits, for which the declaration shall express the volume at 60 °F, and except also in the case of a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature, and except also in the case of a commodity that must be maintained in the refrigerated state, for which the declaration shall express the volume at 40 °F, and except also in the case of malt beverages, for which the declaration shall express the volume at 39.1 °F;~~

~~(Amended 1985 and 1990)~~

- ~~(c) _____ in units of linear measure shall be in terms of the yard, foot, or inch;~~

- ~~(d) _____ in units of area measure shall be in terms of the square yard, square foot, or square inch;~~

- ~~(e) _____ in units of volume measure shall be in terms of the cubic yard, cubic foot, or cubic inch; and~~

- ~~(f) in units of dry measure shall be in terms of the United States bushel of 2150.42 in³, or peck, dry quart, and dry pint subdivisions of the bushel.~~

Table 6.7. U.S. Customary Units: Weight, Measure	
<u>If a declaration of quantity is in units of:</u>	<u>The units shall be in:</u>
(a) <u>weight</u>	<u>avoirdupois pound or ounce</u>
(b) <u>liquid measure</u>	<p><u>U.S . gallon of 231 in³ or liquid quart, liquid pint or fluid-ounce subdivisions of the gallon and shall express the volume at 68 °F, except in cases of:</u></p> <p style="padding-left: 40px;"><u>petroleum products or distilled spirits for which the declaration shall express the volume at 60 °F;</u></p> <p style="padding-left: 40px;"><u>a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature;</u></p> <p style="padding-left: 40px;"><u>a commodity that must be maintained in the refrigerated state, for which the declaration shall express the volume at 40 °F; and</u></p> <p style="padding-left: 40px;"><u>malt beverages for which the declaration shall express the volume at 39.1 °F.</u></p>
(c) <u>linear measure</u>	<u>yard, foot, or inch</u>
(d) <u>area measure</u>	<u>square yard, square foot, or square inch</u>
(e) <u>volume measure</u>	<u>cubic yard, cubic foot, or cubic inch</u>
(f) <u>dry measure</u>	<u>U.S. bushel of 2150.42 in³, or peck, dry quart, and dry pint subdivisions of the bushel</u>

(Amended 1985, 1990, and 20XX)

Background/Discussion:

These tables were developed from a PowerPoint presentation provided at a NIST Packaging & Labeling Seminar for industry and regulators. Attendees found the tables to be an excellent reference material as they were challenged to evaluate various packaged commodities for compliance with the Uniform Packaging and Labeling Regulation (UPLR). These individuals represented a wide range of businesses, and could be considered a good representation of industry in general.

The addition of tables to Handbook 130, UPLR would be useful to industry and regulators in interpreting requirements. No revisions of current requirements would be necessary. Marketing and art departments, amongst others, are challenged with developing the packaging and labeling for products being distributed by their companies or clients, and individuals in those professions would find it helpful to have the additional examples provided in the tables for reference.

Several other tables are already provided in HB 130, and these new tables are viewed as being equally helpful. For example, in HB 130 (2014), UPLR, Table 1. "Rounding Rules" describes rounding rules and Table 2. "Examples" provides conversions tables.

At the 2014 NCWM Interim Meeting it was mentioned that there are numerous technical and typographical errors within the submitted charts. The subsections in the tables do not coincide with the language printed within HB 130, UPLR. During Committee work session it was mentioned that developing tables for items within the NIST

handbooks could set a precedence for all items to have a table. NIST commented that they do provide a publication, SP 1020 Series, *Consumer Packaging Labeling Guides*. The SP 1020 Guides are quite popular and extremely user friendly. The Committee would like to have feedback from the Regions on this item. They also requested that the PALS (original submitter) correct the tables to align with the language as it appears with the handbook.

At the 2015 NCWM Interim Meeting the PALS Chair submitted modifications to the Item Under Consideration. PALS removed the modifications to add tables for Sections 6.8.1., 6.8.2., and 6.9. The PALS Chair remarked that the subcommittee will not develop any additional tables in this section of the handbook. The NIST Technical Advisor will review for technical and editorial clarity, so that members will have a finalized version for the NCWM Annual Meeting. The Committee encourages NIST, OWM to proceed with updating the SP 1020 Series, “*Consumer Packaging and Labeling Guides*.” The 2015 L&R Committee is designating this item as a Voting Item.

Regional Association Comments:

CWMA reported that the item has been fully developed and two other regions have recommended that the item be a Voting Item. There were no additional comments from the Central region.

WWMA noted that replacing text with tables in NIST Handbook 130, UPLR has merit, but the tables should be vetted for technical accuracy and consistency with the language and intent of the FTC’s FPLA.

WWMA recommended this item be Informational and encouraged the PALS to finish its amendments to the UPLR and submit one complete package; this would prevent the NCWM and regional committees from having to consider similar proposals over multiple years. WWMA also encouraged NIST to market its SP-1020 series publications (guidebooks based upon the UPLR) to weights and measures stakeholders.

At the 2014 SWMA meeting, the PALS Chair commented that he submitted a modification that differs from language that appears in the agenda as Item Under Consideration. SWMA recommended that the item be a Voting Item as amended below.

At the 2014 NEWMA Interim Meeting the amended language from PALS was considered and the proposal was considered fully developed. NEWMA recommended that this item be a Voting Item as amended below:

6.4. Terms: Weight, Measure, Volume, or Count. – The declaration of the quantity ~~of a particular commodity shall be expressed in terms of:~~ **shall be in terms of Table 6.4:**

<u>Table 6.4.</u> <u>Weight, Measure, Volume, or Count</u>	
<u>If the commodity is:</u>	<u>The declaration of the quantity of a particular commodity shall be expressed in terms of:</u>
<u>solid, semisolid, viscous or a mixture of solid and liquid</u>	<u>weight or mass</u>
<u>liquid</u>	<u>fluid volume measure</u>
<u>dry</u>	<u>dry measure</u>
<u>linear measure or area</u>	<u>linear measure or area</u>
<u>numerical units</u>	<u>numerical count</u>

6.5. SI Units: Mass, Measure. ^[NOTE 3, page xx] – A declaration of quantity **shall be in terms of Table 6.5 and the requirements below:**

Table 6.5 SI Units: Mass, Measure	
<u>If a declaration of quantity is in units of:</u>	<u>The units shall be in:</u>
<u>Mass</u>	<u>kilogram, gram or milligram</u>
<u>liquid measure</u>	<u>liter or milliliter and shall express the volume at 20 °C, except for :</u> <u>petroleum products or distilled spirits for which the declaration shall express the volume at 15.6 °C, and</u> <u>a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature, and</u> <u>malt beverages or a commodity that must be maintained in the refrigerated state, for which the declaration shall express the volume at 4 °C.</u> <u>(Amended 1985, 1990)</u>
<u>linear measure</u>	<u>meter, centimeter, or millimeter</u>
<u>area measure</u>	<u>square meter, square decimeter, square centimeter, or square millimeter</u>
<u>volume other than liquid measure</u>	<u>liter or milliliter, except that units cubic meter and cubic centimeter shall be used only when specifically designated as a method of sale</u>

- (a) ~~in units of mass shall be the kilogram, gram, or milligram;~~
- (b) ~~in units of liquid measure shall be the liter or milliliter and shall express the volume at 20 °C, except in the case of petroleum products or distilled spirits, for which the declaration shall express the volume at 15.6 °C, and except also in the case of a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature, and except also in the case of malt beverages or a commodity that must be maintained in the refrigerated state, for which the declaration shall express the volume at 4 °C;~~
~~(Amended 1985 and 1990)~~
- (c) ~~in units of linear measure shall be the meter, centimeter, or millimeter;~~
- (d) ~~in units of area measure shall be the square meter, square decimeters, square centimeter, or square millimeter;~~
- (e) ~~in units of volume other than liquid measure shall be the liter and milliliter, except that the units cubic meter and cubic centimeter shall be used only when specifically designated as a method of sale;~~
- (f) (a) Rule of 1000. – The selected multiple or submultiple prefixes for SI units shall result in numerical values between 1 and 1000. This rule allows centimeters or millimeters to be used where a length declaration is less than 100 centimeters.

Examples:

500 g, not 0.5 kg;
 1.96 kg, not 1960 g;
 750 mL, not 0.75 L; or
 750 mm or 75 cm, not 0.75 m

(Added 1993)

- (i) **(b)** SI declarations should be shown in three digits except where the quantity is below 100 grams, milliliters, centimeters, square centimeters, or cubic centimeters, where it may be shown in two digits. In either case, any final zero appearing to the right of the decimal point need not be shown; and

(Added 1993)

- (j) **(c)** the declaration of net quantity of contents shall not be expressed in mixed units.

Example:

1.5 kg, not 1 kg 500 g.

(Added 1993)

6.7. ~~Inch-Pound~~ United States (U.S.) Customary Units: Weight, Measure. – A declaration of quantity shall be in terms of Table 6.7:

~~(g) in units of weight shall be in terms of the avoirdupois pound or ounce;~~

~~(h) in units of liquid measure shall be in terms of the United States gallon of 231 in³ or liquid quart, liquid pint, or fluid ounce subdivisions of the gallon and shall express the volume at 68 °F, except in the case of petroleum products and distilled spirits, for which the declaration shall express the volume at 60 °F, and except also in the case of a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature, and except also in the case of a commodity that must be maintained in the refrigerated state, for which the declaration shall express the volume at 40 °F, and except also in the case of malt beverages, for which the declaration shall express the volume at 39.1 °F;~~

~~(Amended 1985 and 1990)~~

~~(i) _____ in units of linear measure shall be in terms of the yard, foot, or inch;~~

~~(j) _____ in units of area measure shall be in terms of the square yard, square foot, or square inch;~~

~~(k) _____ in units of volume measure shall be in terms of the cubic yard, cubic foot, or cubic inch; and in units of dry measure shall be in terms of the United States bushel of 2150.42 in³, or peck, dry quart, and dry pint subdivisions of the bushel.~~

Table 6.7. U.S. Customary Units: Weight, Measure	
<u>If a declaration of quantity is in units of:</u>	<u>The units shall be in:</u>
<u>Weight</u>	<u>avoirdupois pound or ounce</u>
<u>liquid measure</u>	<u>U.S. Customary gallon of 231 cubic inches or liquid-quart, liquid-pint or fluid ounce subdivisions of the gallon and shall express the volume at 68 °F except for:</u> <u>petroleum products or distilled spirits for which the declaration shall express the volume at 60 °F, and</u> <u>a commodity that is normally sold and consumed while frozen, for which the declaration shall express the volume at the frozen temperature, and</u> <u>a commodity that must be maintained in the refrigerated state, for which the declaration shall express the volume at 40 °F, and</u> <u>malt beverages for which the declaration shall express the volume at 39.1 °F.</u> <u>(Amended 1985, 1990)</u>
<u>linear measure</u>	<u>yard, foot, or inch</u>
<u>area measure</u>	<u>square yard, square foot, or square inch</u>
<u>volume measure</u>	<u>cubic yard, cubic foot, cubic inch</u>
<u>dry measure</u>	<u>U.S. Customary bushel of 2,150.42 cubic inches or peck, dry-quart, and dry-pint subdivisions of U.S. bushel</u>

CWMA Action - Item 231-1	
Summary of comments considered by the regional committee (in writing or during the open hearings):	
An industry representative commented that he supports this item, as it clarifies language and procedures already in Handbook 130.	
Item as proposed by the regional committee: (If different than agenda item)	
Committee recommendation to the region:	
<input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)	
Reasons for the committee recommendation:	
The item has been sufficiently developed and is ready for voting status.	
COMPLETE SECTION BELOW FOLLOWING VOTING SESSION	
Final updated or revised proposal from the region: (If different than regional committee recommendation)	

<p>Regional recommendation to NCWM for item status:</p> <p><input checked="" type="checkbox"/> Voting Item on the NCWM Agenda</p> <p><input type="checkbox"/> Information Item on the NCWM Agenda</p> <p><input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>)</p> <p><input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)</p> <p><input type="checkbox"/> Unable to consider at this time (<i>Provide explanation in the "Additional Comments" section below</i>)</p>
<p>Regional Report to NCWM:</p> <p>The item has been sufficiently developed and is ready for voting status.</p>

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents.

232 NIST HANDBOOK 130 – UNIFORM REGULATION FOR THE METHOD OF SALE COMMODITIES

232-1 I Section 1.5. Meat, Poultry, Fish, and Seafood.

Source:

Massachusetts Division of Standards (2015)

Purpose:

To allow the retail sale of meat, poultry and fish by count with adequate consumer information.

Item Under Consideration:

Amend NIST Handbook 130 Uniform Regulation for the Method of Sale of Commodities as follows:

1.5. Meat, Poultry, Fish, and Seafood. ^[NOTE 3, page 110] – Shall be sold by weight **or count**, except that whole shellfish in the shell may **also** be sold by ~~weight, measure, and/or count~~. Shellfish are aquatic animals having a shell, such as mollusks (for example, scallops) or crustaceans (for example, lobster or shrimp). **If sold by count, the net weight and the corresponding unit price shall be displayed on the principal display panel of the product. The unit price when sold by count shall also be advertised or displayed in terms of whole weight units of kilograms, pounds or ounces only, not in common or decimal fractions.**

Background/Discussion:

Several jurisdictions have reported that meat and meat products are routinely being sold by count both with and without a net weight declaration or unit price, many times alongside meat products that are being sold by weight. This approach does not give the consumer enough information to make value comparisons and may be misleading; however it is believed this amendment will remedy this. Retailers will benefit from this amendment by having more options for the method of sale of these products; consumers will benefit from this amendment because they will be able to make informed value comparisons; and weights and measures officials will be able to ensure accuracy of net weight declarations and unit price calculations.

At the 2015 NCWM Interim Meeting a regulator remarked that the regulations are clearly defined in the handbook and any changes would cause confusion. Several states opposed this item as written. The NIST Technical Advisor remarked that this item was posted on the NIST State Director List Server and several states expressed concern on labeling issues in the marketplace. The state of Florida commented that they had an issue in their marketplace but worked directly with the grocers to clarify. The NIST Technical Advisor presented the following to the Committee for review:

1.5. Meat, Poultry, Fish, and Seafood. ^[NOTE 3, page 110] – Shall be sold by weight, except that whole shellfish in the shell may be sold by weight, measure, and/or count. Shellfish are aquatic animals having a shell, such as mollusks (for example, scallops) or crustaceans (for example, lobster or shrimp). **The net weight declaration for meat, poultry, fish and seafood shall be by the kilogram, gram or pound and not by portion or piece except as permitted below:**

- (a) **If meat, poultry, fish, and seafood is kept, offered or exposed for sale or sold at the retail store level in standard weight packages (refer to the Uniform Packaging and Labeling Regulation (UPLR), Section 6.16., Random Packages) the net weight, total price and unit price must appear on the principal display panel of each package and must conform to all of the applicable requirements of the UPLR. This section does not apply to packages of meat or poultry that bear a USDA Inspection Seal and plant identity and a label that conform to the net weight labeling requirements of the USDA Food Safety and Inspection Service (FSIS).**
- (b) **If meat, poultry, fish, and seafood is kept, offered or exposed for sale from bulk (e.g., direct service counters) by the portion or piece the product identity and net weight shall be displayed along with the unit price at which it is offered for sale. This information shall appear on a label or sign adjacent to the meat, poultry, fish or seafood and must be presented in an easy-to-read type style and color and must appear on a single-color contrasting background.**
- (c) **The unit prices required under sections 1.5.a. and 1.5.b. shall be in terms of the unit price-per-kilogram; or unit price-per-100 grams; or unit price-per-pound, and not in any other unit or denomination or in common or decimal fractions of the permitted units.**

The traditional method of sale for meat and poultry at retail has been to sell by the pound in decimal units (i.e., 1.59 lbs). In NIST HB 44, S.1.8.4., Customer Indications in the scale code it requires the display of the whole units of weight but permits unit pricing for metric units to appear as price per kilogram or price per 100 grams. Any proposal in the method of sale should be consistent with the scale code or retailers will not have the equipment they need to do the job.

NIST, OWM understands the problem trying to be solved, is that retailers are attempting to shift from the traditional method of sale of decimal pounds over to the sale of meat by the piece, but still by weight (but in ounces). This is currently acceptable, however as this practice is emerging in many states it appears to hinder or frustrate the consumer ability to make value comparisons between packaged meat and sales from bulk.

At least one state has obtained a court ruling that prohibits the sale of the same product by different methods of sale within the same retail location, specifically because it hinders value comparison.

In the example given below the consumer will have to divide the price by ounces to obtain a price per ounce and multiply that value by 16 to obtain a price per pound, to compare the unit price offered in the bulk sales counter to the unit price of the same identical type of meat offered for sale in a random weight prepackage by the decimal pound.

$$\text{For example: } \$5.99 \div 5 = \$1.198 \text{ per ounce} \times 16 = \$19.16 \text{ per pound}$$

It appears that to maintain the traditional method of sale and pricing (i.e., offered by sale by decimal pounds and unit pricing by the pound) the Method of Sale Regulation (and, because not all states adopt the method of sale regulation, perhaps the UPLR should be amended to limit the unit pricing to the same units) should be revised to only permit sales by the decimal pound or kilogram, and unit prices be revised to only appear in terms of price per pound or kilogram (or price per 100 grams [per HB 44]). For sales of food from bulk unit price advertising by the ounce should be prohibited in Section 1.9.2. and include that prohibition to Section 1.9.1.

Another suggestion provided by NIST, OWM is to change the title of Section 1.9., Advertising and Price Computing of Bulk Food Commodities to read:

1.9. Advertising and Price Computing of Bulk Food and Prepackaged Food Commodities

1.9.1. Total Price Computing. – The **total** price of food commodities sold from bulk **and in packages shall be** by weight **and the total price** shall be computed in terms of whole units of weight (i.e., **price per 100** grams, **or price per** kilogram, **or price per** pound, ~~ounces~~, etc.) and not in common or decimal fractions.

1.9.2. Unit Price Advertising. – The **unit** price of food commodities sold from bulk **and in packages** shall be advertised or displayed in terms of whole **units of** weight of kilograms, (**or price per 100 grams**) or pounds only, not in common or decimal fractions. ~~or in ounces~~. A supplemental declaration is permitted in print no larger than the whole unit price. This supplemental declaration may be expressed in common or decimal fractions. ~~or in ounces~~.

1.9.3. Individual Piece Advertising. – **The unit price and net weight of food commodities offered or exposed for sale by the each from bulk shall include a declaration of the individual item price, a unit price in terms of decimal kilograms or pounds or price per 100 grams and net weight in terms of decimal kilograms or pounds. The net weight and unit price declaration shall be presented adjacent to the item price in type size no less than one-half the height of the item price and shall be displayed as clear and conspicuous as the item price.**

For example: **TUNA STEAKS**
 \$5.99 EACH

NET WT 0.31 LB
 \$19.16 PER LB

Various pricing schemes found in the marketplace by the States:



Being sold by each



Identifier on the label states “5 oz bnl's pork chops”. The random pack label has a net weight that differs from package to package

The Committee heard comments to withdraw this item, the Committee would like to receive additional feedback from all the Regional Associations on the item for consideration and the information submitted by NIST, OWM. For these reasons, the 2015 L&R Committee is recommending this as an Informational.

Regional Associations Comments:

During the 2014 NEWMA Interim Meeting the submitter of this item commented that cuts of meat, poultry and fish are being sold by count rather than the weight. He believes the pound comparison should be required so consumers can make educated price comparisons. Another regulator agreed. An industry representative from a Supermarket asked if cuts could still be sold individually for a fixed amount if both the cost per pound and the cost per item are posted. The submitter explained that in his state, the price per pound should be the primary price listing. However, a supplemental statement would not be prohibited. The Chairman proposed alternative language to avoid a conflict with the Federal Packaging and Labeling Act (FPLA). The submitter asked the Chairman to confirm whether or not the new language would be in violation. An industry representative asked what the package labeling had to contain. The submitter answered that all packaging for meat, poultry, fish and seafood in his state has to include the net weight, total price and price per pound. NEWMA forwarded the item as submitted to NCWM and recommended that this be an Informational Item.

CWMA Action - Item 232-2	
Summary of comments considered by the regional committee (in writing or during the open hearings):	
<p>A NIST representative asked if state inspectors were seeing products being sold by the “each” in their states. A regulator from Ohio commented that she is seeing products like this, and they are acceptable for sale as long as it has not been processed in any way (including cutting). So, for example, a whole lobster is acceptable, but a piece or cut of salmon cannot be sold per “each.” A regulator from Iowa commented that his state is similar. A regulator from Missouri commented that they are also seeing products sold by “each,” and they require the weight to be posted on the item, similar to the other two states. A regulator from Nebraska commented that products can be sold by “each,” but also have to include weight somewhere on the package. A regulator for Minnesota commented they are seeing this practice in meat sales, and they also require a disclosure of mass weight. A regulator from Wisconsin said they were also seeing the same, and also require weight of the “each” item posted on the package. A NIST representative rose to provide clarification on the item. Currently retailers are selling product by random weight,</p>	

standard pack, and by bulk as count alone or fixed weight. A NIST technical advisor recommended language submitted at the 2015 NCWM Interim Meeting be considered. This item should be considered if states believe there is a need for a consistent pricing method. (sold by the pound only).
Item as proposed by the regional committee: (If different than agenda item)
Committee recommendation to the region: <input type="checkbox"/> Voting Item on the NCWM Agenda <input checked="" type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)
Reasons for the committee recommendation: This item has merit, and should be kept as informational; the Conference should incorporate the NIST recommended language as proposed at the 2015 NCWM Interim Meeting.
COMPLETE SECTION BELOW FOLLOWING VOTING SESSION
Final updated or revised proposal from the region: (If different than regional committee recommendation)
Regional recommendation to NCWM for item status: <input type="checkbox"/> Voting Item on the NCWM Agenda <input checked="" type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>) <input type="checkbox"/> Unable to consider at this time (<i>Provide explanation in the "Additional Comments" section below</i>)
Regional Report to NCWM: This item has merit, and should be kept as informational; the Conference should incorporate the NIST recommended language as proposed at the 2015 NCWM Interim Meeting.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents.

232-2 W Section 2.20.3. Street Sign Prices and Advertising

Source:

Retail Motor Fuel Dispenser Price Posting and Computing Capabilities Task Group (2014)

Purpose:

Ensure that consumers are not charged a higher price per gallon for motor fuel than what it advertised on a street sign.

Item Under Consideration:

Amend Handbook 130, Uniform Regulation for the Method of Sale of Commodities as follows:

2.20. Gasoline-Oxygenate Blends.

2.20.1. Method of Retail Sale. – Type of Oxygenate must be Disclosed – All automotive gasoline or automotive gasoline-oxygenate blends kept, offered, or exposed for sale, or sold at retail containing at least 1.5 mass percent oxygen shall be identified as “with” or “containing” (or similar wording) the predominant oxygenate in the engine fuel. For example, the label may read “contains ethanol” or “with MTBE.” The

oxygenate contributing the largest mass percent oxygen to the blend shall be considered the predominant oxygenate. Where mixtures of only ethers are present, the retailer may post the predominant oxygenate followed by the phrase “or other ethers” or alternatively post the phrase “contains MTBE or other ethers.” In addition, gasoline-methanol blend fuels containing more than 0.15 mass percent oxygen from methanol shall be identified as “with” or “containing” methanol. This information shall be posted on the upper 50 % of the dispenser front panel in a position clear and conspicuous from the driver’s position in a type at least 12.7 mm (½ in) in height, 1.5 mm (¹/₁₆ in) stroke (width of type).

(Amended 1996)

2.20.2. Documentation for Dispenser Labeling Purposes. – At the time of delivery of the fuel, the retailer shall be provided, on an invoice, bill of lading, shipping paper, or other documentation a declaration of the predominant oxygenate or combination of oxygenates present in concentrations sufficient to yield an oxygen content of at least 1.5 mass percent in the fuel. Where mixtures of only ethers are present, the fuel supplier may identify either the predominant oxygenate in the fuel (i.e., the oxygenate contributing the largest mass percent oxygen) or, alternatively, use the phrase “contains MTBE or other ethers.” In addition, any gasoline containing more than 0.15 mass percent oxygen from methanol shall be identified as “with” or “containing” methanol. This documentation is only for dispenser labeling purposes; it is the responsibility of any potential blender to determine the total oxygen content of the engine fuel before blending.

(Added 1984) (Amended 1985, 1986, 1991, and 1996)

2.20.3. Street Sign Prices and Advertising

(a) The unit price must be in terms of price per gallon in ¹/₁₀ cents.

(b) When the price of fuel increases, the street sign must be changed before or simultaneous when the price at the pump is changed. When the price of fuel decreases, the price at the pump must be changed before or simultaneous when the street sign price is changed.

(Added 20XX)

Background/Discussion:

The consumer should never pay more for fuel than the advertised price. A street sign price posting that is lower than the price at the pump, could unfairly draw business from a competitor.

At the 2014 NCWM Interim Meeting the Committee heard from Mr. Hornbach (Chevron) who spoke in regards to electronic price signs that have the capability to change pumps and signs simultaneously. He recommends that the word “simultaneous” be added into the proposal. Ms. Elson-Houston (Chair of the Retail Motor Fuel Dispenser Price Posting and Computing Capabilities Task Group) concurs with this change. The Committee does not feel this item is developed enough and request that the Task Group ensure that all sections of the method of sale are addressed in regards to price posting, multi-tier and dual pricing with fuels. The Committee would like the regions to review and comment on this item. Ms. Elson-Houston informed the Committee that the Price Posting TG will be disbanding in July 2014. At the 2014 NCWM Annual Meeting the Committee agreed this Item had merit and recommended that the submitter continue to develop.

At the 2015 NCWM Interim Meeting the Chair of the Retail Motor Fuel Dispenser Price Posting and Computing Capabilities TG recommended to the Committee that this item be Withdrawn. Many regulators and state directors concurred with the decision of the TG Chair. The 2015 L&R Committee is designating this as a Withdrawn Item.

Regional Associations Comments:

This item was submitted directly to the Standing Committee from the NCWM Price Posting Task Group after the deadlines for submitting to the regional associations.

During the 2014 NEWMA Interim Meeting a regulator had concern with this proposal because it could be conflicting with state and local language. Two other regulators stated that it is of ultimate importance to disclose

non-confusing pricing including advertising signs, but had also concerns that it would conflict with local consumer protection ordinances. NEWMA recommended that this item be Withdrawn.

CWMA reported that a Missouri regulator suggested eliminating the words, “in $\frac{1}{10}$ cents” in Section 2.20.3. A Minnesota regulator supported the suggestion to eliminate the wording, and explained that this would allow some retailers in Minnesota who are selling specialty fuels being sold in small locations with older equipment to move the decimal point on that equipment. There was discussion that NCWM has never required this language for fuel sales. Ms. Fran Elson-Houston, Chair of the RMFD Price Posting and Computing Capabilities TG, stated that while the TG completed their work, more development should be done on this item. An industry representative stated that the main focus of this item has been the issue of posted pricing on advertising signs never being lower than the pump price. A Minnesota regulator also suggested that the wording “unit price per gallon or per liter” be considered. An Illinois regulator asked if there was clarification needed for the requirement of street signs. The group agreed clarification was needed. The Committee recommends the changes below and believes that with these changes, the item is fully developed and recommends that it be a Voting Item.

2.20.3. Street Sign Prices and Advertising

- (a) The unit price must be in terms of price per gallon **or liter**.
- (b) **In the event a street sign is used**, ~~When~~ the price of fuel increases, the street sign must be changed before or simultaneously when the price at the pump is changed. When the price of fuel decreases, the price at the pump must be changed before simultaneously ly when the street sign price is changed.

WWMA received questions from industry and regulators about the need to have $\frac{1}{10}$ cent pricing and advertising. One regulator said that many states already have their own laws to address street sign pricing and advertising. Several other regulators agreed and said it is not necessary to include in the Method of Sale Regulation in NIST Handbook 130. There was consensus among all stakeholders attending the 2014 WWMA meeting that this section is not needed in the NIST Handbook 130, Method of Sale Regulation. WWMA recommended that this Item be Withdrawn.

At the 2014 SWMA, the Committee heard from an industry representative that this proposal would codify that pricing will be required in $\frac{1}{10}$ cents and that making signage and dispensers agree simultaneously would be impossible in some instances. The SWMA recommended this Item be Withdrawn.

Additional letters, presentations and data may have been part of the committee’s consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents.

232-3 V Section 2.23. Animal Bedding

Source:

NIST Office of Weights and Measures (2015)

Purpose:

Provide a uniform method of sale for animal bedding that will enhance the ability of consumers to make value comparisons and will ensure fair competition.

Item Under Consideration:

Amend the NIST Handbook 130, Method of Sale Regulation as follows:

2.23. Animal Bedding. —~~Packaged animal bedding of all kinds, except for baled straw, shall be sold by volume, that is, by the cubic meter, liter, or milliliter and by the cubic yard, cubic foot, or cubic inch. If the commodity is packaged in a compressed state, the quantity declaration shall include both the quantity~~

~~in the compressed state and the usable quantity that can be recovered. Compressed animal bedding packages shall not include pre-compression volume statements.~~

Example:

~~250 mL expands to 500 mL (500 in³ expands to 1000 in³).~~

2.23.1. Definitions.

- (a) Animal Bedding – any material, except for baled straw, kept, offered or exposed for sale or sold for primary use as a medium for any companion or livestock animal to nest or eliminate waste.
- (b) Expanded Volume – the volume of the product that can be recovered from the package by the consumer after it is unwrapped and uncompressed.

2.23.2. Method of Sale.

- (a) Packaged animal bedding shall be advertised, labeled, offered and exposed for sale and sold on the basis of the expanded volume. If unit pricing is offered to retail consumers, it shall be in terms of the price per liter.
- (b) The quantity declaration shall include the terms “Expanded Volume” or wording of similar import that expresses the facts, and shall be in terms of the largest whole unit of the milliliter, liter or cubic meter. A declaration may also include the quantity in terms of largest whole unit of cubic inches, cubic foot, or cubic yard only.
- (c) The display of pre-compression volume, compressed volume or supplementary dry measure units (e.g., dry quart, bushel) anywhere on the package is prohibited.

Examples:

Expanded Volume 41 Liters (1.4 Cubic Feet)

Expanded Volume 1.4 Cubic Feet (41 Liters)

Expanded Volume 27.9 Liters (1700 Cubic Inches)

Expanded Volume 113 L (4 Cubic Feet)

Expanded Volume 8 Cubic Feet (226 L)

2.23.1.3. Exemption - Non-Consumer Packages of Animal Bedding Sold to Laboratory Animal Research Industry. – Packaged Animal Bedding consisting of granular corncobs and other dry (8 % or less moisture), pelleted, and/or non-compressible Bedding materials that are sold to commercial (non-retail) end users in the laboratory animal research industry (government, medical, university, preclinical, pharmaceutical, research, biotech, and research institutions) may be sold on the basis of weight.

(Added 1990) (Amended 2012 and 20XX)

Background/Discussion:

This proposal provides amendments to NIST HB130, Uniform Method of Sale, Section 2.23. Animal Bedding. These changes were determined when a proposal was drafted to revise the test procedures within NIST HB 133, Chapter 3. Section 3.9. Dimensional Test Procedure for Verifying the Compressed Quantity Declaration on

Packages of Peat Moss and Animal Bedding and a new proposal was created to add **Section 3.15. Test Procedure for Verifying the Expanded Volume Declaration on Packages of Animal Bedding** (refer to Items 260-2 and 260-3).

At the 2015 NCWM Interim Meeting support was heard in favor for this proposal. It was agreed that the compressed statement is meaningless to the end users. The NIST Technical Advisor noted that if this Item moved forward to remove the term compressed it would impact the language in Item 260-2, NIST HB 133, Chapter 3, Section 3.9. **Dimensional Test Procedure for Verifying the Compressed Quantity Declaration on Packages of Peat Moss and Animal Bedding.** The NIST Technical Advisor remarked that the background information is being reviewed formatting by the office publication coordinator and advised that no technical changes were being made and would be resubmit with Publication 16 (2015). The 2015 L&R Committee agreed that to move this forward as a Voting Item.

Refer to Appendix C., “Testing Packages of Animal Bedding and Peat Moss with Compressed and Expanded Volume Declarations” for the Executive Summary, additional background and supporting information.

Regional Association Comments:

During the 2014 NEWMA Interim Meeting, the L&R Chairman stated that NIST, OWM had submitted considerable information to the region for review. This is one of a number of proposals that represents a large amount of work done by NIST to provide consistent standards. An industry representative commented that he participated in the development of this proposal, and said industry has had a long-term struggle with various standards for both compressed and non-compressed packaging. He said these new procedures would allow for accurate and easier testing in the field. He indicated that removal of the term “compressed” as a descriptor is important, because a consumer needs to know the usable amount of volume inside the package. These new procedures will minimize destructive testing, and will cover testing of new products in the marketplace. He strongly supports the proposal. A regulator asked if this procedure would include pelletized product. The industry representative indicated it would cover those products. Another regulator asked if compressed product would be broken up or crushed in the compressing process, and would therefore settle out to net a different volume. The industry representative explained that there is a certain amount of destruction, so the usable volume will generally be slightly less than the volume statement. A regulator expressed support for this item to allow for clear and easy understanding by the consumer. Another regulator asked a question about the chute design, use, and handling of various types of products during the test procedure. The industry representative explained that one of the challenges in testing volume is the amount of variability, depending on the raw material you are starting with. He further explained that the chute allowed for consistency among and between products and repeatability when testing. NEWMA forwarded the item to NCWM and recommended that it be a Voting Item.

At the 2014 SWMA Annual Meeting, the Committee heard an overview of the changes being suggested from NIST. The Committee also heard that the requirement to put a compressed statement on a package was unnecessary and not very useful to the end user. The recoverable volume was what the customer uses. The changes also further define animal bedding. SWMA forwarded the item to NCWM and recommended that it be a Voting item.

Item 232-3
Summary of comments considered by the regional committee (in writing or during the open hearings):
An industry representative from American Wood Fibers rose in support of all recommendations made in the proposal. The definition change within the proposal is much more inclusive and provides better clarification. Cat litter, which has traditionally been sold by weight in the past, would be sold by volume as a quantity declaration if it is not declared an exception. As included in the proposal, the method of sale should include the word “usable” volume. The industry representative also supports the disallowance of the word “compressed.” The reduction in the number of tests involved is also an improvement. Expanded vessel sizes will increase the accuracy of results, even though it will be a bit more onerous for inspectors. Comparison labels at retail listed in liters is also an item this representative supports. With regard to the MAV of these products, if this proposal is adopted, the MAV is reasonable. If the proposal is not accepted, a more generous MAV will be necessary because of the lack of consistency and repeatability of the current testing methods. A NIST representative recommends considering this item with 260-3, so as not to have duplicative testimony. She also commented that those who have received training with this new procedure feel it is a much better method. A state regulator from Ohio asked if the cat litter industry

<p>had been contacted about the change from weight to volume. She expressed concern that it could have a significant impact on them. Also the chutes seem to be fairly large. Are they heavy and hard to handle, and will one be sufficient for testing everything. How costly will the chutes be? She asked one of her staff to elaborate on his experience. The second Ohio regulator commented that during his training, NIST used a prototype made from plywood and tried to test the largest package they could find, which was 8-9 cubic feet of animal bedding. It took two people to administer the test. He felt it would take time to get accustomed to the procedure, but was pleased with the results. He is not sure on cost. A regulator from Iowa asked if this was the only test method we could come up with. A NIST representative commented that the 8-foot vessel was the procedure that yielded defensible results. A regulator from Minnesota rose to express gratitude for the development of this procedure. She commented that if the inspectors in her state were using this method regularly, she might have concerns related to safety and practicality. She commented that the optional audit method for spot package checking would be valuable. The industry representative from American Wood Fibers also expressed appreciation for the development of this test method. He commented that during their quality analysis testing, they found no correlation between weight and volume, so having a method that is repeatable is reassuring to the industry.</p>
<p>Item as proposed by the regional committee: (If different than agenda item)</p>
<p>Committee recommendation to the region:</p> <p><input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)</p>
<p>Reasons for the committee recommendation:</p> <p>Provided clarification is made as to whether or not cat litter is exempted, this item should move forward as a voting item.</p>
<p>COMPLETE SECTION BELOW FOLLOWING VOTING SESSION</p>
<p>Final updated or revised proposal from the region: (If different than regional committee recommendation)</p>
<p>Regional recommendation to NCWM for item status:</p> <p><input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>) <input type="checkbox"/> Unable to consider at this time (<i>Provide explanation in the "Additional Comments" section below</i>)</p>
<p>Regional Report to NCWM:</p> <p>An industry representative from American Wood Fibers supports the proposal. A regulator from Ohio expressed concern as to whether the cat litter industry had been notified that the method of sale would change from weight to volume. Provided clarification is made as to whether or not cat litter is exempted, this item should move forward as a voting item.</p>

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents.

232-4 V Section 2.27. Retail Sales of Natural Gas Sold as a Vehicle Fuel

Source:
 Clean Vehicle Education Foundation (2014)

Purpose:

Since natural gas is sold in the retail market place as compressed natural gas (CNG) to be an alternative fuel to gasoline and diesel fuel and as liquefied natural gas (LNG) to be an alternative fuel to diesel, the proposed additions and edits to Handbook 130 will provide definitions for natural gas equivalents for diesel liters and diesel gallons so that end users can readily compare cost and fuel economy. At present only CNG equivalents for gasoline are included in the handbooks.

Item Under Consideration:

Amend the NIST Handbook 130, Method of Sale Regulation as follows:

2.27. Retail Sales of Natural Gas Sold as a Vehicle Fuel.**2.27.1. Definitions.**

2.27.1.1. Compressed Natural Gas (CNG). – A gaseous fuel composed primarily of methane that is suitable for compression and dispensing into a fuel storage container(s) for use as an engine fuel.

2.27.1.2. Gasoline Liter Equivalent (GLE). – Gasoline liter equivalent (GLE) means 0.678 kg (1.495 lb) of compressed natural gas.

2.27.1.3. Gasoline Gallon Equivalent (GGE). – Gasoline gallon equivalent (GGE) means 2.567 kg (5.660 lb) of compressed natural gas.

2.27.1.4. Diesel Liter Equivalent (DLE). - Diesel liter equivalent means 0.765 kg of compressed natural gas or 0.726 kg of liquefied natural gas.

2.27.1.5. Diesel Gallon Equivalent (DGE). - Diesel gallon equivalent means 6.384 lb of compressed natural gas or 6.059 lb of liquefied natural gas.

2.27.1.6. Liquefied Natural Gas (LNG). – Natural gas which is predominantly methane that has been – 162 °C (– 260 °F) at 14.696 psia and stored in insulated cryogenic fuel storage tanks for use as an engine fuel.

2.27.2. Method of Retail Sale and Dispenser Labeling.

2.27.2.1. Method of Retail Sale. – All compressed natural gas kept, offered, or exposed for sale and sold at retail as a vehicle fuel shall be measured in terms of mass, and indicated in the gasoline liter equivalent (GLE), ~~or~~ gasoline gallon equivalent (GGE), diesel liter equivalent (DLE), diesel gallon equivalent (DGE) units or mass.

2.27.2.2. Dispenser Labeling Compressed Natural Gas. – All retail compressed natural gas dispensers shall be labeled with the equivalent conversion factor in terms of kilograms or pounds. The label shall be permanently and conspicuously displayed on the face of the dispenser and shall have either the statement “1 Gasoline Liter Equivalent (GLE) is equal to 0.678 kg of Natural Gas” **and “1 Diesel Liter Equivalent (DLE) is equal to 0.765 kg of Compressed Natural Gas”** or **the statement** “1 Gasoline Gallon Equivalent (GGE) is equal to 5.660 lb of Compressed Natural Gas” **and “1 Diesel Gallon Equivalent (DGE) is Equal to 6.384 lb of Compressed Natural Gas”** consistent with the method of sale used.

2.27.2.3. Method of Retail Sale. –All liquefied natural gas kept, offered, or exposed for sale and sold at retail as a vehicle fuel shall be measured in mass, and indicated in diesel liter equivalent (DLE), diesel gallon equivalent (DGE) units, or mass.

2.27.2.4. Dispenser Labeling of Retail Liquefied Natural Gas. – All retail liquefied natural gas dispensers shall be labeled with the equivalent conversion factor in terms of kilograms (kg) or pounds (lb). The label shall be permanently and conspicuously displayed on the face of the dispenser and shall have either the statement “1 Diesel Liter Equivalent (DLE) is equal to 0.726 kg of Liquefied Natural Gas” or “1 Diesel Gallon Equivalent (DGE) is equal to 6.059 lb of Liquefied Natural Gas” consistent with the method of sale used.

Background/Discussion:

The gasoline gallon equivalent (GGE) unit was defined by NCWM in 1994 (refer to Appendix A) to allow users of compressed natural gas (CNG) vehicles to readily compare costs and fuel economy of light-duty natural gas vehicles with equivalent gasoline powered vehicles. For the medium and heavy duty natural gas vehicles in widespread use today, there is a need to officially define a unit for both Compressed Natural Gas (CNG) and Liquefied Natural Gas (LNG) (already in widespread use) allowing a comparison of cost and fuel economy with diesel powered vehicles. Natural gas is sold as a vehicle fuel as either Compressed Natural Gas (CNG) or Liquefied Natural Gas (LNG) and each method of sale is measured in mass. The submitter stated that the official definition of a DLE and a DGE will likely provide justification for California, Wisconsin and many other states to permit retail sales of LNG for heavy-duty vehicles in these convenient units. (The mathematics justifying the specific quantity (mass) of natural gas in a DLE and DGE is included in Appendix A.)

At the 2014 NCWM Interim Meeting Mr. Mahesh Albuquerque (Chair, National Gas Steering Committee) notified the Committee that this item is being developed by the Natural Gas Steering Committee. The Committee noted that the factor in 2.27.1.6. Liquefied Natural Gas should not read – 126.1 °C but rather – 162 °C.

The L&R Committee in responding to the NGSC’s June 10, 2014 request to change the NGSC’s March 2014 recommendation for DGE units. The L&R Committee has agreed that the CNG and LNG conversion factors proposed for use in converting these gases to DGE units should be revised in the 2014 Interim Report so that their numerical values are expressed to three decimal places rather than two decimal places. These changes are reflected in the following proposed modifications within Section 2.27. Retail Sales of Natural Gas Sold as Vehicle Fuel to read: 1 Diesel Gallon Equivalent (DGE) is ~~6.380~~ 6.384 pounds of Compressed Natural Gas and 1 Diesel Gallon Equivalent of Liquefied Natural Gas is ~~6.060~~ 6.059 pounds.

At the 2014 NCWM Annual Meeting a joint session was held with L&R and S&T to hear this Item. It was noted that if the L&R did not move forward the Item 232-3 then there would be no reason to proceed with Item 237-2 and S&T Item 337-2 as it appeared in the Report of the 98th National Conference on Weights and Measures. There was discussion regarding the term “approximately equal” in Sections 2.27.2.2. and 2.27.2.4. It was noted this term was not a measurement equivalency but equal to in energy content. It was recommended that the Committee give consideration to amend the definition and clarify the meaning. Some spoke in opposition that this Item would cause consumer confusion in the marketplace, if adopted. Several members questioned where IRS obtained the numbers that are used the IRS tax form. NIST provided an alternative proposal and several members believed this proposal should be taken into consideration. Since the proposal from the NGSC was not released until June 10, 2014, members felt they did not have enough time to vet the modification or the NIST proposal. The Committee reviewed numerous letters in support of all the Items that reflect this issue.

Ethan Bogren, NGSC Chair provided the following write up from their NGSC’s meeting on January 14, 2015.

Natural Gas Steering Committee Update Report – January 14, 2015

The NGSC has been working diligently at achieving a compromise proposal regarding the sale of CNG/LNG as an alternative motor fuel. While the group has found success in establishing a consensus opinion in many aspects of the regulations, the group remains divided as to what unit of measure should be used for primary method of sale.

As you all know there has been a proposal submitted urging NCWM to adopt gallon equivalent units (GGE/DGE) as the primary method of sale for natural gas products to be used as an alternative motor fuel. There has been a feeling by many members of NCWM that this would be considered a diversion from the customary units in which commodities are sold in the United States causing concern.

Since a consensus regarding the units used for the primary method of sale for natural gas products was unable to be achieved the NGSC is prepared to submit 2 proposals to the L&R and S&T committees for comment and review. It was agreed by NGSC members that this was the only fair way to represent the group as a whole.

While both proposals have many similarities I would like to summarize the major differences regarding the method of sale as it pertains to each document.

Volume Equivalent Compromise Version: CNG/LNG shall be measured in mass and indicated in gallon equivalent units unless the weights & measures official having jurisdiction mandates otherwise through local regulation. This would make GGE/DGE units the only unit of quantity required to be displayed on the dispenser during a retail transaction.

Mass Compromise Version: CNG/LNG shall be measured in mass and indicated in mass. The display of supplemental information would also be permitted on the dispenser. This would allow GGE/DGE units to be indicated on the dispenser display face as long as it is stated the GGE/DGE units are for value comparison purposes only.

There is a willingness to accept equivalent units for advertising purposes such as street signs.

The NGSC is confident that a compromise will be found with the guidance of the S&T and L&R committees. Along with input coming from the floor during open hearings during the NCWM Interim Meeting a sense of which proposal best represents the body of the National Conference of Weights & Measures may be determined.

At the 2015 NCWM Interim Meeting a joint session was held with the L&R and S&T Committees to hear this Item along with Item 237-1 of the L&R report. Documentation for the S&T Item 337-1 can be found within the S&T report. Two proposals were addressed. Proposal One, titled “the Volume Equivalent Compromise” requires natural gas to be measured in mass and indicated in equivalent gallon units or mass. Proposal Two titled, “The Mass Compromise” would require natural gas to be measured and indicated in mass with supplemental equivalent information to be displayed on the dispenser for value comparison.

Proposal One, Volume Equivalent Compromise Version was supported by industry representatives and several weights and measures officials. Some reasons for supporting Proposal One is it will cause less consumer confusion. Having one method of sale that consumers are currently familiar with allows them to make value comparisons at the pump and quickly compare street signage with various stations. It would be costly to manufacturer dispensers that can indicate in both mass and equivalent gallons.

Proposal Two, Mass Compromise Version was supported by numerous weights and measures officials who favor a traceable unit. Equivalent values are not NIST traceable units of measurement. The equipment currently is able to indicate in mass units. Currently there are several products that allow for supplemental information to be posted (e.g., paint and fertilizer.) Natural gas composition fluctuates and the equivalent values have not been validated. With new fuels being developed the correct decision needs to be made on this matter because it may affect future proposals brought before the conference. The NIST S&T Technical Advisor requested that the FALS review the references and data that was used determine the values on the equivalent units. The FALS has agreed to put together a work group and provide addition feedback on this area.

The L&R Committee agreed to move Proposal One, “Volume Equivalent Compromise” version with revisions as addressed during the NGSC work session and open hearings. The Committee modified the language in Section 2.27.2.1. and 2.27.2.3. to add the language “or mass” to the last sentence in each section and moved this forward as a Voting Item.

2.27.2.1. Method of Retail Sale. – All **compressed** natural gas kept, offered, or exposed for sale and sold at retail as a vehicle fuel shall be **measured** in terms of **mass, and indicated in** the gasoline liter equivalent (GLE), ~~or~~ gasoline gallon equivalent (GGE), **diesel liter equivalent (DLE), or diesel gallon equivalent (DGE) units, or mass.**

2.27.2.3. Method of Retail Sale. –All liquefied natural gas kept, offered, or exposed for sale and sold at retail as a vehicle fuel shall be measured in mass, and indicated in diesel liter equivalent (DLE), ~~or~~ diesel gallon equivalent (DGE) units, or mass.

Regional Association Comments:

CWMA received numerous comments from both industry representatives and regulators. No new issues surfaced, and based on the number of comments heard, most of the comments pointed toward the need to keep the method of sale in mass, and that continued utilization of equivalencies is not in keeping with appropriate metrological practices. However, a supplemental marketing statement similar to the proposal developed by NIST would be useful to consumers. Mr. Ronald Hayes, who serves on the NGSC, indicated that the group met via teleconference in the week previous to the CWMA meeting and continues to work through this issue. Constantine Cotsoradis, Flint Hills Resources, presented an amendment to the Method of Sale section, which was forwarded to the steering committee for their consideration. Due to the contentious nature of this issue, further work is merited by the metrological community and industry. The Committee believes there is no evidence that suggests equivalency measures are appropriate for a method of sale. The Committee believes there is merit for consideration in the newly proposed verbiage because retail sales occur in other locations other than a retail dispenser. The Committee also recognizes the importance of consumer understanding and acceptance, and believes this issue needs to continue development through the NGSC.

WWMA heard from Mr. Mahesh Albuquerque, Chairman of the NGSC, provided an update from the NGSC September 4, 2014 meeting. The NGSC is reviewing: natural gas dispenser labeling requirements; refining the current proposal based upon feedback including data from the CRC regarding sampling to determine the average natural gas BTU content and data from the American Transportation Research Institute regarding the average BTU content of diesel fuel; and drafting an alternative proposal for the 2015 Interim Meeting.

WWMA recommended that NCWM consider all alternatives, including the NIST alternate proposal. However, if the NCWM determines that DGE/DLE is an appropriate method of sale for natural gas, the WWMA recommended that the sale of CNG at high-flow retail motor fuel dispensers be in units of DGE/DLE only, and at low-flow CNG retail motor fuel dispensers, allow GGE/GLE only. WWMA believed it would be confusing for drivers of light duty CNG vehicles to see prices expressed in both GGE and DGE. Also, WWMA suggested the NCWM consider a customer activated selectable display for indication at the dispenser (GGE/DGE/lb or GLE/DLE/kg). WWMA recommended striking the word “approximately” from Sections 2.27.2.2. and 2.27.2.4. because an approximate amount cannot be conclusively verified.

Several regulators offered comments, both in support and in opposition, similar to those received at previous meetings. Five regulators supported the NIST alternative. One regulator commented that other fuel marketers may seek a gallon-equivalent for their fuels, e.g., electricity.

During the WWMA voting session, one regulator noted that the WWMA had previously recommended withdrawing all agenda items relating to DGE/DLE, and requested the L&R Committee poll the voting members to see how many are in support of the continued use of equivalent units. The voting results were 23 in opposition to the use of equivalent units, and 12 in support of using equivalent units “going forward”. WWMA recommended this remain an Informational item.

The 2014 NEWMA Interim Meeting recommended that the NGSC consider that the Method of Sale be changed to mass and that the NIST proposal to modify Section 3.37, Mass Flow Meters in Handbook 44 (2014 edition) be considered. (The draft NIST proposal is on the NEWMA web site as a supporting document.) NEWMA recommended that this item, 237-1 and 337-1 from the S&T agenda be an Informational Item pending final language from the NGSC at the NCWM 2015 Interim Meeting.

At the 2014 SWMA Meeting, the Committee heard from Dr. Matthew Curran with the Natural Gas Steering Committee that they were working on the issue. The SWMA recommended this be an Informational item.

CWMA Action - Item 232-4**Summary of comments considered by the regional committee (in writing or during the open hearings):**

It was recommended that comments for this item along with items L & R 237-1 and S & T 337-1 be heard together. A state regulator from Missouri commented that item 237-1 should be considered separately. Item 237-1 focuses on language relevant to the Method of Sale section, so it should be removed from the bundle of three items and considered separately. An industry representative from National Association of Convenience Stores and the Society of Independent Gasoline Marketers of America (NACS-SIGMA) rises in support of marketing and selling natural gas as a road fuel by equivalency, but be measured for accuracy by mass which would be posted on the dispenser along with a voluntary marketing statement that includes the equivalency price. He commented that the objective of the Conference is equity in the market, which fundamentally means consumers get what they bargain for in a transaction. He also believes it is essential that we get products to the market in terms that people understand. Retailers stock and sell what consumers want to buy – not the other way around. So, customers for compressed natural gas have approached the fuel retailers and have expressed a desire to purchase their product in diesel gallon equivalencies. He commented that no one wants to buy “pounds” of natural gas. He believes that some fleets prefer purchasing in diesel gallon equivalencies. He asked why we should we sell a product in a language that consumers don’t understand, even if over time they will understand it. He encourages the conference to consider allowing diesel gallon equivalency as a method of sale for both compressed and liquid natural gas. He is concerned that our inability to come up with a preferred method of sale is an obstacle to selling this fuel. He further commented that in actual terms, all weights and measures are arbitrary. By not adopting this proposal, regulators will fail in their objective to provide equity in the market. If they do not pass it, a different body will set standards. A regulator from Missouri and also a member of the natural gas steering committee commented that the committee proposed two items – one was to sell natural gas on a volumetric method; the second – considered a compromise, is to market or advertise the products in equivalency values, but measure for compliance using mass, and display that value on dispensers. Nothing would preclude a retailer from displaying a gallon equivalency value on an advertising sign as long as the mass weight is posted on the dispenser, along with that equivalency value. He further commented that he is opposed to selling in diesel gallon equivalents. He said that natural gas equivalencies will vary so much for every diesel vehicle that the equivalency information will be more misleading than informative. He provided several examples of this. He concluded his comments by saying the Conference made a mistake by establishing the gasoline gallon equivalent method of sale twenty years ago, but that should not be a precedent to make another mistake by passing an equivalency value again. The industry representative commented that all states should check in with their state attorneys general, because he believes that if an advertising sign posts an equivalency amount, it has to be posted that way on the dispenser – otherwise it is a deceptive practice. An industry representative from Flint Hills Resources commented that they sell LNG in bulk to the end user, so it is considered a retail sale. He supports the compromise the Natural Gas Steering Committee came up with, which would allow for the posting of an equivalency value, but would also require the product be measured by mass. With the compromise, jurisdictions can decide for themselves if they want to post equivalencies or if they want to sell by mass. A regulator from Minnesota has changed her mind from supporting sales strictly in mass to support sales by equivalence.

Primarily for taxing considerations, state officials and policy makers in her state want the Conference to provide a measurement in mass, pick an equivalency number for diesel gallons, and standardize the process. A second regulator from Missouri commented that a taxing unit is different from weights and measures work. He believes that the science of weights and measures is absolute, and there should be no exceptions. The NACS-SIGMA representative again commented that states are currently developing a patchwork of policies addressing this issue because there is no standard in place today, and if the Conference does not pass a standard, Congress will take the decision out of the hands of the Conference, because people who market natural gas nationally won’t want to deal with a patchwork of varying policies and procedures. A regulator from Kansas expressed a concern that a DGE and a GGE price per gallon equivalency at the same station could result in a different price per pound, which would result in confusion for the consumer. The first Missouri regulator rose to remind the Conference that if this proposal fails, GGE does not go away. Currently, LNG is being taxed at the diesel rate calculated on a mass basis. A state regulator from Iowa asked for clarity as to whether there was a method of sale in Handbook 130 based on weight for compressed natural gas. There is a method of sale for GGE based on mass. A NIST representative commented that she thought this proposal addresses a method of sale for LNG. An industry representative from Gilbarco indicated their natural gas customers are requesting GGE’s and DGE’s. They already measure in mass and make the conversion. However, Gilbarco cannot serve the needs of their customers because they cannot sell an NTEP certified device reflecting these equivalency values. He commented that no one is asking for a display in mass, nor for a dual

<p>display. He supports the diesel gallon equivalency method for natural gas sales. The Minnesota regulator commented that they have a current scenario where a retailer in their state needs an NTEP certified device, and they are not yet available. A Missouri regulator asked if Gilbarco were displaying the sale price of natural gas in pounds, and their customers made a request to see it in an equivalency mode, would they respond to their customer's request. The Gilbarco individual answered that if their customer wants supplemental labeling, that would be possible. Beyond that, he cannot predict what is possible or likely, but there currently are no plans to develop dual-display devices to his knowledge. The NACS-SIGMA representative commented again that dispenser manufacturers are working on other issues beyond this one.</p>
<p>Item as proposed by the regional committee: (If different than agenda item)</p>
<p>Committee recommendation to the region:</p> <p><input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)</p>
<p>Reasons for the committee recommendation:</p> <p>The item has been fully developed and is ready for voting status.</p>
<p>COMPLETE SECTION BELOW FOLLOWING VOTING SESSION</p>
<p>Final updated or revised proposal from the region: (If different than regional committee recommendation)</p>
<p>Regional recommendation to NCWM for item status:</p> <p><input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>) <input type="checkbox"/> Unable to consider at this time (<i>Provide explanation in the "Additional Comments" section below</i>)</p>
<p>Regional Report to NCWM:</p> <p>Discussions were robust and reflected the same positions and information as prior meetings and dialogue. The Committee believes the item is fully developed. At the CWMA voting session, a vote of acclamation was too close to determine, so the Chair opted for a show of hands, followed by a standing vote. The item passed with a vote of 18 for, 17 opposed.</p>

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents.

237 NIST HANDBOOK 130 – UNIFORM ENGINE FUELS AND AUTOMOTIVE LUBRICANTS REGULATION

237-1 V Section 1. 1.36. Liquefied Natural Gas (LNG) and Section 3.11. Compressed Natural Gas (CNG)

Source:
 Clean Vehicle Education Foundation (2013)

Purpose:

Enable consumers to make cost and fuel economy comparisons between diesel fuel and natural gas.

Item Under Consideration: Amend NIST Handbook 130, Uniform Engine Fuels and Automotive Lubricants Regulation as follows:

Section 1. Definitions

1.36. Liquefied Natural Gas (LNG). – Natural gas that has been liquefied at – 162 °C (– ~~259~~260 °F) and stored in insulated cryogenic tanks for use as an engine fuel.

Section 3. Classification and Method of Sale of Petroleum Products**3.11. Compressed Natural Gas (CNG).**

3.11.1. How Compressed Natural Gas is to be Identified. – For the purposes of this regulation, compressed natural gas shall be identified by the term “Compressed Natural Gas” or “CNG.”

3.11.2. Retail Sales of Compressed Natural Gas Sold as a Vehicle Fuel.

~~**3.11.2.1. Method of Retail Sale.** – All CNG kept, offered, or exposed for sale or sold at retail as a vehicle fuel shall be in terms of the gasoline liter equivalent (GLE) gasoline gallon equivalent (GGE).~~

3.11.2.21. Retail Dispenser Labeling.

3.11.2.21.1 Identification of Product. – Each retail dispenser of CNG shall be labeled as “Compressed Natural Gas.”

~~**3.11.2.2.2. Conversion Factor.** – All retail CNG dispensers shall be labeled with the conversion factor in terms of kilograms or pounds. The label shall be permanently and conspicuously displayed on the face of the dispenser and shall have either the statements “1 Gasoline Liter Equivalent (GLE) is equal to 0.678 kg of Natural Gas” “1 Gasoline Gallon Equivalent (GGE) is equal to 5.660 lb of Natural Gas consistent with the method of sale used.~~

3.11.2.21.32. Pressure. – CNG is dispensed into vehicle fuel containers with working pressures of ~~16 574 kPa~~, 20 684 kPa (3000 psi), or 24 821 kPa (3600 psi). The dispenser shall be labeled ~~16 574 kPa~~, 20 684 kPa (3000 psi), or 24 821 kPa (3600 psi) corresponding to the pressure of the CNG dispensed by each fueling hose.

3.11.2.21.43. NFPA Labeling. – NFPA Labeling requirements also apply. (Refer to NFPA 52.)

3.11.3. Nozzle Requirements for CNG. – CNG fueling nozzles shall comply with ANSI/AGA/CGA NGV 1.

Background/Discussion:

The gasoline gallon equivalent (GGE) unit was defined by NCWM in 1994 to allow users of natural gas vehicles to readily compare costs and fuel economy of light-duty compressed natural gas vehicles with equivalent gasoline powered vehicles. For the medium and heavy duty natural gas vehicles in widespread use today, there is a need to officially define a unit (already in widespread use) allowing a comparison of cost and fuel economy with diesel powered vehicles. The submitter stated that the official definition of a DLE and a DGE will likely provide justification for California, Wisconsin and many other states to permit retail sales of CNG for heavy-duty vehicles in these convenient units. The mathematics justifying the specific quantity (mass) of compressed natural gas in a DLE and DGE is included in the Appendix.

At the 2014 NCWM Interim Meeting Mr. Albuquerque (Chair, National Gas Steering Committee) notified the Committee that this item was actively being developed by the National Gas Steering Committee.

The L&R Committee is responded to the NGSC's June 10, 2014 request to change the NGSC's March 2014 recommendation for DGE units. The L&R Committee agreed that the CNG and LNG conversion factors proposed for use in converting these gases to DGE units should be revised in the 2014 Interim Report so that their numerical values are expressed to three decimal places rather than two decimal places. These changes are reflected in the following proposed modifications to Section 1. Definitions 1.XX, and to the proposed new definition for "diesel gallon equivalent" to read: 1 Diesel Gallon Equivalent (DGE) is ~~6.380~~ 6.384 pounds of Compressed Natural Gas and 1 Diesel Gallon Equivalent of Liquefied Natural Gas is ~~6.060~~ 6.059 pounds.

At the 2014 NCWM Annual Meeting a joint session was held with L&R and S&T to hear this Item. It was noted that if the L&R did not move forward the Item 232-3 then there would be no reason to proceed with Item 237-2 and S&T Item 337-2 as it appeared in the Report of the 98th National Conference on Weights and Measures. There was discussion regarding the term "approximately equal" in Sections 2.27.2.2. and 2.27.2.4. It was noted this term was not a measurement equivalency but equal to in energy content. It was recommended that the Committee give consideration to amend the definition and clarify the meaning. Some spoke in opposition that this Item would cause consumer confusion in the marketplace, if adopted. Several members questioned where IRS obtained the numbers that are used the IRS tax form. NIST provided an alternative proposal and several members believed this proposal should be taken into consideration. Since the proposal from the NGSC was not released until June 10, 2014, members felt they did not have enough time to vet the modification or the NIST proposal. The Committee reviewed numerous letters in support of all the Items that reflect this issue

March 2014 Natural Gas Steering Committee Report to the L&R and S&T Committees

The Natural Gas Steering Committee (NGSC) was formed in July 2013 to help understand and educate the NCWM membership regarding the technical issues surrounding the proposed changes to Handbook 44 and Handbook 130 submitted by the Clean Vehicle Education Foundation (CVEF), the anticipated impact of the proposed changes, and issues related to implementation requirements when compressed natural gas (CNG) and liquefied natural gas (LNG) are dispensed and sold as a retail engine fuel in gallon equivalent units.

At the NCWM Interim Meeting in January 2014, Mahesh Albuquerque, Chair of the NGSC provided the S&T and L&R Committees with an update from the NGSC, including proposed revisions to the proposals submitted by the CVEF. The NGSC heard comments from the floor related to the proposed revisions and requested additional time to further develop its recommendations. The S&T and L&R Committees agreed to allow the NGSC additional time to meet and develop alternative proposals to those on the S&T and L&R Committees January 2014 agendas, with the expectation that the NGSC recommendations would be ready for inclusion in Publication 16, and moved forward as a Voting Item at the July 2014 NCWM Annual Meeting.

Summary of NGSC Meeting Discussions

The NGSC met weekly following the January 2014 Interim Meeting, and focused on modifying the Clean Vehicle Education Foundation (CVEF) 2013 proposals for the recognition of diesel gallon equivalent (DGE) units for CNG/LNG dispenser indications and the method of sale for these two natural gas alternative engine fuels. The NGSC reviewed multiple modifications to those proposals including:

- limiting sales to a single unit of mass measurement enforceable by 2016;
- requiring indications in mass and gasoline and diesel gallon equivalents, while phasing in mass only units;
- require sale by mass as the primary means, but allow for the simultaneous display of volume equivalent units, so long as the purchaser always had access to the mass (traceable) measurement; and
- a proposal from NIST, OWM which would allow the posting of supplemental information to assist consumers in making value comparisons and for use by taxation/other agencies, but requiring the phase in of indications in mass

The NGSC received:

- input from Department of Energy (DOE) on the latest edition of the DOE TRANSPORTATION ENERGY DATA BOOK: EDITION 32 July 2013 available on the Oak Ridge National Laboratory website at: <http://cta.ornl.gov/data/index.shtml>;
- updates from CNG (3) and LNG (1) dispenser manufacturers indicating their dispensing systems comply with the requirements in the handbooks, and have the capability to indicate a sale in a single unit of measurement, and any further input on adding displays to the cabinet for additional units would require further cost analysis; while one original equipment manufacturer indicated use of their LNG RMFD in a fleet operation where indications are only in the DGE; and
- feedback from committee members related to the pros and cons of requiring the indication of sale in mass or gallon equivalent units, including traceability, equipment capabilities, marketplace considerations, and units used by state and federal agencies.

Also noted in the NGSC discussions were:

- how a gallon equivalent unit is derived using energy content, and that the gallon equivalent is defined and measured in terms of mass, not volume;
- for the last 20 years, Handbook 44 and Handbook 130 have required all dispensing equipment to indicate deliveries of natural gas in GGE units to consumers, and in mass units for inspection and testing purposes. CNG RMFD equipment in the most states comply with the requirements in the handbooks;
- international practices for indicating CNG and LNG engine fuel deliveries are predominantly mass; Canada requires LNG indications in the kilogram and the corresponding OIML R 139 “Compressed gaseous fuel measuring systems for vehicles” standard requires indication of the measured gas in mass;
- the variations in engine efficiency relative to a single conversion factor based on an averaged energy content for LNG and the primary focus of the driving public and fleets on mileage rather than petroleum products no longer used to fuel their vehicles;
- the work ahead over the next year by ASTM committees to develop current CNG and LNG fuel quality standards which will need to be referenced in Handbook 130;
- differences in the measurement of the gallon and kilogram -- since the gallon is a volume measurement and not an energy measurement, and the Handbook 44 Mass Flow Meters Code includes a requirement for volume-measuring devices with ATC used in natural gas applications to be equipped with an automatic means to make corrections, if the devices is affected by changes in the properties of the product; it was also noted that U.S. gasoline and diesel dispensers are not required to have ATC; whereas ATC does occur in sales at the wholesale level;
- how traceability applies to the measurement results at each level of the custody chain (to include the determination of the uncertainty of all calibrations and use of an appropriate unit of measurement); and
- the capabilities of equipment in the marketplace.

A DOE representative supported the use of gallon equivalents, and pointed out that they are used in the DOE Transportation Energy Data Book. The DOE representative also pointed out that other federal agencies including the IRS were requiring use of gallon equivalent units for reporting.

Industry representatives on the NGSC indicated that they are actively campaigning to their state and federal offices, encouraging each government branch to recognize sales of CNG and LNG in gasoline and diesel volume equivalent units. Industry sectors represented on the NGSC indicated that their customers are satisfied with the averaged fuel energy values that correspond to the conversion factors for CNG and LNG, with only one exception. The exception was a truck stop chain indicating their customers would be amenable to a single conversion factor for both fuels. The CVEF also provided a comparison of GTI’s 1992 study results and preliminary data from a 2013 study. The CVEF reported the constituents in natural gas as basically unchanged over 21 years since the NCWM first recognized the GGE. Industry unanimously opposed a recommendation for phasing in mass as the only unit of measurement, noting also that U.S. drivers would be confused by SI units while acknowledging that the U.S. is in the minority of countries whereby delivery and sales are by equivalent units. At the conclusion of the NGSC deliberations NGV America provided the following statement:

“One of the major advantages of the proposal as currently drafted with inclusion of the DGE and GGE units for natural gas is that this is a proposal that the natural gas industry can support. It further recognizes what is already the preferred practice for how natural gas is measured and dispensed. The latest proposal with DGE and GGE units provides a pathway forward toward a national consensus approach. If the proposal were to instead require use of kilograms or even pounds as the primary method of sale, industry would not support that proposal and likely would strongly oppose it this summer if NCWM were to consider it as a voting issue. Also, if NCWM finalizes on a standard that does not include DGE or GGE, industry is committed to pursuing adoption of an alternative standard on a state by state basis, which could lead to different treatment across the country. Several states have already introduced legislation to recognize the DGE standard (CA, IL, MO, and VA) and I expect more will do so later this year. And you know Colorado and Arkansas already have put in place standards that recognize the DGE units.”

NGSC Recommendations:

After consideration of all of the above, the NGSC recommends alternate proposals to the L&R and S&T Committee Agenda Items which further modify and consolidate the Clean Vehicle Education Foundation 2013 proposals to include:

- 1) requirements for measurement in mass and indication in gallon equivalent units (Handbook 44 paragraphs S.1.3.1.1. and S.1.3.1.2.; and Handbook 130 paragraphs 3.11.2.1. and 3.12.2.1.);
- 2) posting of a label that has both the GGE and DGE or the GLE and DLE for CNG applications (Handbook 44 paragraphs S.5.2., S.5.3., UR.3.1.1., and UR.3.1.2; and Handbook 130 paragraphs 3.11.2.2.2. and 3.12.2.2.2.);
- 3) expression of all equivalent conversion factors expressed in mass units to 3 significant places beyond the decimal point for consistency (Handbook 44 paragraphs S.5.2., S.5.3., UR.3.1.1., and UR.3.1.2 and Appendix D and Handbook 130 Section 1, paragraphs 3.11.2.2.2. and 3.12.2.2.2.);
- 4) correction of the temperatures in the LNG definition (Handbook 130 Section 1);
- 5) addition of 16 CFR Part 309 for CNG automotive fuel rating (Handbook 130 paragraph 3.11.2.2.5.); and
- 6) reference to NFPA 52 (Handbook 130 paragraph 3.12.2.2.4.)

With regards to Handbook 44 the NGSC recommends withdrawing S&T Agenda Items 337-1 and 337-4 and the consolidation of Agenda Items 337-2, 337-3, and 337-5 into a newly revised single Voting Item designated as Item 337-2 as it appeared in the Report of the 98th National Conference on Weights and Measures. The NGSC also recommends further modifications to corresponding Handbook 130 proposals to align the definitions of related terms and method of sale with definitions, indicated delivery and dispenser labeling requirements being proposed for Handbook 44.

With regards to Handbook 44, the NGSC also recommends consideration of new a Developing Item addressing proposed changes to paragraph S.3.6 Automatic Density Correction designated as Item 360-4. This new proposal is consistent with the NGSC decision to encourage further work beyond the current scope of their work on the CVEF's proposals to fully address all LNG applications.

Representatives of the NGSC and the S&T and L&R Committees met in March 2014, all agreed on the course of action outlined above.

Additional Contacts: Clean Energy, Seal Beach, CA, NGVAmerica, Washington, DC, Clean Vehicle Education Foundation, Acworth, GA. Regional Association Comments: (Fall 2013 Input on the Committee's 2014 Interim Agenda Items 337-1 through 337-5)

With regards to Handbook 130 the NGSC recommends withdrawing L&R Agenda Items 237-1 and the consolidation of Agenda Items 237-2, 237-3, and 237-5 into newly revised single Voting Item designated as 237-1 in the Report of the 98th National Conference on Weights and Measures.

At the 2015 NCWM Interim Meeting a joint session was held with the L&R and S&T Committees to discuss this Item 232-4 of the L&R report. Documentation for the S&T Item 337-1 can be found within the S&T report. Two proposals were addressed. Proposal One, titled “the Volume Equivalent Compromise” requires natural gas to be measured in mass and indicated in equivalent gallon units or mass. The second proposal titled, “The Mass Compromise” would require natural gas to be measured and indicated in mass with supplemental equivalent information to be displayed on the dispenser for value comparison.

Proposal One was supported by industry representatives and several weights and measures officials. Some reasons for supporting Proposal One is it will cause less consumer confusion. Having one method of sale that consumers are currently familiar with allows them to make value comparisons at the pump and quickly compare street signage with various stations. It would be costly to manufacturer dispensers that can indicate in both mass and equivalent gallons.

The second proposal was supported by numerous weights and measures officials who favor a traceable unit. Equivalent values are not NIST traceable units of measurement. The equipment currently is able to indicate in mass units. Currently there are several products that allow for supplemental information to be posted (ex. paint and fertilizer.) Natural gas composition fluctuates and the equivalent values have not been validated. With new fuels being developed the correct decision needs to be made on this matter because it may affect future proposals bought before the conference. The NIST Technical Advisor requested that the FALS review the references and data that is used for the values on the equivalent units. The FALS has agreed to put together a work group and provide addition feedback on this area. After solicitation for volunteers a mixed workgroup comprised of FALS and NGSC members was formed and is currently functioning under the NGSC. However, should the NGSC dissolve prior to completion of this review, the workgroup would move under FALS.

Ethan Bogren, NGSC Chair provided the following write up from their NGSC’s meeting on January 14, 2015.

Natural Gas Steering Committee Update Report – January 14, 2015

The NGSC has been working diligently at achieving a compromise proposal regarding the sale of CNG/LNG as an alternative motor fuel. While the group has found success in establishing a consensus opinion in many aspects of the regulations, the group remains divided as to what unit of measure should be used for primary method of sale.

As you all know there has been a proposal submitted urging NCWM to adopt gallon equivalent units (GGE/DGE) as the primary method of sale for natural gas products to be used as an alternative motor fuel. There has been a feeling by many members of NCWM that this would be considered a diversion from the customary units in which commodities are sold in the United States causing concern.

Since a consensus regarding the units used for the primary method of sale for natural gas products was unable to be achieved the NGSC is prepared to submit 2 proposals to the L&R and S&T committees for comment and review. It was agreed by NGSC members that this was the only fair way to represent the group as a whole.

While both proposals have many similarities I would like to summarize the major differences regarding the method of sale as it pertains to each document.

Volume Equivalent Compromise Version: CNG/LNG shall be measured in mass and indicated in gallon equivalent units unless the weights & measures official having jurisdiction mandates otherwise through local regulation. This would make GGE/DGE units the only unit of quantity required to be displayed on the dispenser during t a retail transaction.

Mass Compromise Version: CNG/LNG shall be measured in mass and indicated in mass. The display of supplemental information would also be permitted on the dispenser. This would allow GGE/DGE units to be indicated on the dispenser display face as long as it is stated the GGE/DGE units are for value comparison purposes only.

There is a willingness to accept equivalent units for advertising purposes such as street signs.

The NGSC is confident that a compromise will be found with the guidance of the S&T and L&R committees. Along with input coming from the floor during open hearings during the NCWM Interim Meeting a sense of which proposal best represents the body of the National Conference of Weights & Measures may be determined.

At the 2015 NCWM Interim Meeting a joint session was held with the L&R and S&T Committees to hear this Item along with Item 232-4 of the L&R report. Documentation for the S&T Item 337-1 can be found within the S&T report. Proposal One, titled “The Volume Equivalent Compromise” requires natural gas to be measured in mass and indicated in equivalent gallon units or mass. Proposal One was supported by industry representatives and several weights and measures officials. Reasons for supporting Proposal One is it will cause less consumer confusion. Having one method of sale that consumers are currently familiar with allows them to make value comparisons at the pump and quickly compare street signage with various stations. It would be costly to manufacturer dispensers that can indicate in both mass and equivalent gallons.

Proposal Two titled, “The Mass Compromise” would require natural gas to be measured and indicated in mass with supplemental equivalent information to be displayed on the dispenser for value comparison. Proposal Two was supported by numerous weights and measures officials who favor a traceable unit. Equivalent values are not NIST traceable units of measurement. The equipment currently is able to indicate in mass units. Currently there are several products that allow for supplemental information to be posted (ex. paint and fertilizer.) Natural gas composition fluctuates and the equivalent values have not been validated. With new fuels being developed the correct decision needs to be made on this matter because it may affect future proposals brought before the conference. A NIST S&T Technical Advisor requested that the FALS review the references and data that is used for the values on the equivalent units. The FALS has agreed to put together a work group and provide addition feedback on this area.

Proposal Two, “The Mass Compromise” recommended the following:

1.XX. Diesel Gallon Equivalent (DGE). – Diesel Gallon Equivalent (DGE) means 6.384 pounds of compressed natural gas or 6.059 pounds of liquefied natural gas.

1.25. Gasoline Gallon Equivalent (GGE). – Gasoline Gallon Equivalent (GGE) means ~~to 2.567 kg~~ (5.660 lb) of compressed natural gas.

~~**1.26. Gasoline Liter Equivalent (GLE).** – Equivalent to 0.678 kg (1.495 lb) of natural gas.~~

1.35. Liquefied Natural Gas (LNG). – Natural gas that has been liquefied at – ~~126.1~~ 162 °C (– ~~259~~ 260 °F) and stored in insulated cryogenic tanks for use as an engine fuel.

3.11. Compressed Natural Gas (CNG).

3.11.1. How Compressed Natural Gas is to be Identified. – For the purposes of this regulation, compressed natural gas shall be identified by the term “Compressed Natural Gas” or “CNG.”

3.11.2. Retail Sales of Compressed Natural Gas Sold as a Vehicle Fuel.

3.11.2.1. Method of Retail Sale. – All CNG kept, offered, or exposed for sale or sold at retail as a vehicle fuel shall be either in terms of the gasoline ~~liter equivalent (GLE) or gasoline~~ gallon equivalent (GGE), the diesel gallon equivalent (DGE), or in mass if required by the weights and measures authority having jurisdiction.

3.11.2.2. Retail Dispenser Labeling.

3.11.2.2.1. Identification of Product. – Each retail dispenser of CNG shall be labeled as “Compressed Natural Gas.”

3.11.2.2.2. Conversion Factor. – All retail CNG dispensers shall be labeled with the conversion factor in terms of ~~kilograms or~~ pounds. The label shall be permanently and conspicuously displayed on the face of the dispenser and shall have either the statement ~~“1 Gasoline Liter Equivalent (GLE) is equal to 0.678 kg of Natural Gas” or “1 Gasoline Gallon Equivalent (GGE) is equal to means 5.660 lb of Compressed Natural Gas”, or “1 Diesel Gallon Equivalent (DGE) means 6.384 lb of Compressed Natural Gas”~~, consistent with the method of sale used.

3.11.2.2.3. Pressure. – CNG is dispensed into vehicle fuel containers with working pressures of ~~16 574 kPa~~, 20 684 kPa (**3,000 psig**), or 24 821 kPa (**3,600 psig**). The dispenser shall be labeled ~~16 574 kPa~~, 20 684 kPa (**3,000 psig**), or 24 821 kPa (**3,600 psig**) corresponding to the pressure of the CNG dispensed by each fueling hose.

3.11.2.2.4. NFPA Labeling. – NFPA Labeling requirements also apply. (Refer to NFPA 52.)

3.11.3. Nozzle Requirements for CNG. – CNG fueling nozzles shall comply with ANSI/AGA/CGA NGV 1.

3.12. Liquefied Natural Gas (LNG).

3.12.1. How Liquefied Natural Gas is to be Identified. – For the purposes of this regulation, liquefied natural gas shall be identified by the term “Liquefied Natural Gas” or “LNG.”

3.12.2. Retail Sales of Liquefied Natural Gas Sold as a Vehicle Fuel.

3.12.2.1. Method of Retail Sale. – All LNG kept, offered, or exposed for sale or sold at retail as a vehicle fuel shall be in terms of the diesel gallon equivalent (DGE), or in mass if required by the weights and measures authority having jurisdiction.

3.12.2.3. Labeling of Retail Dispensers of Liquefied Natural Gas Sold as a Vehicle Fuel Labeling.

3.12.2.3.1. Identification of Product. – Each retail dispenser of LNG shall be labeled as “Liquefied Natural Gas.”

3.12.2.3.2. Conversion Factor. – All retail LNG dispensers shall be labeled with the conversion factor in terms of pounds. The label shall be permanently and conspicuously displayed on the face of the dispenser and shall have the statement “1 Diesel Gallon Equivalent (DGE) means 6.059 lb of Liquefied Natural Gas”.

3.12.2.3.3. Automotive Fuel Rating. – LNG automotive fuel shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 306.

3.12.2.3.4. NFPA Labeling. – NFPA Labeling requirements also apply. (Refer to NFPA ~~57~~52.)

Based upon information from the NGSC and information in Proposal One “Volume Equivalent Compromise Version” the Committee removed the following language that appeared in NCWM Publication 15 (2015) from the Item for Consideration:

Section 1. Definitions

1.XX. Diesel Gallon Equivalent (DGE). – means 6.384 lb of compressed natural gas or 6.059 lb of liquefied natural gas.

1.XX. Diesel Liter Equivalent (DLE). – means 0.765 kg of compressed natural gas or 0.726 kg of liquefied natural gas.

1.26. Gasoline Gallon Equivalent (GGE). – **means** 2.567 kg (5.660 lb) of **compressed** natural gas.

1.27. Gasoline Liter Equivalent (GLE). – **means** 0.678 kg (1.495 lb) of **compressed** natural gas.

Based upon information from the NGSC the Committee deleted Section 3.11.2.1. Method of Retail Sale and Section 3.11.2.2.2. Conversion Factor, and the entire Section for 3.12. Liquefied Natural Gas (LNG) from the Item Under Consideration in the 2015 NCWM Interim Report. The Committee is recommending it move forward as a Voting Item.

Section 3. Classification and Method of Sale of Petroleum Products

3.11.2.1. Method of Retail Sale. – All CNG kept, offered, or exposed for sale or sold at retail as a vehicle fuel shall be **measured** in terms of **mass, and indicated in** the gasoline liter equivalent (GLE), gasoline gallon equivalent (GGE), **diesel liter equivalent (DLE), or diesel gallon equivalent (DGE) units.**

3.11.2.2.2. Conversion Factor. – All retail CNG dispensers shall be labeled with the **equivalent** conversion factor in terms of kilograms or pounds. The label shall be permanently and conspicuously displayed on the face of the dispenser and shall have either the statements “1 Gasoline Liter Equivalent (GLE) is **Approximately Equal to 0.678 kg of Natural Gas**” **and “1 Diesel Liter Equivalent (DLE) is Approximately Equal to 0.765 kg of Compressed Natural Gas**” or **the statements “1 Gasoline Gallon Equivalent (GGE) is Approximately Equal to 5.660 lb of Compressed Natural Gas” and “1 Diesel Gallon Equivalent (DGE) is Approximately Equal to 6.384 lb of Compressed Natural Gas”** consistent with the method of sale used.

3.11.2.2.5. Automotive Fuel Rating. – CNG automotive fuel shall be labeled with its automotive fuel rating in accordance with 16 CFR Part 309.

Regional Association Comments:

CWMA received numerous comments from both industry representatives and regulators. No new issues surfaced, and based on the number of comments heard, most of the comments pointed toward the need to keep the method of sale in mass, and that continued utilization of equivalencies is not in keeping with appropriate metrological practices. However, a supplemental marketing statement similar to the proposal developed by NIST would be useful to consumers. Mr. Ronald Hayes, who serves on the Natural Gas Steering Committee, indicated that the group met via teleconference in the week previous to the CWMA meeting and continues to work through this issue. Constantine Cotsoradis, Flint Hills Resources, presented an amendment to the Method of Sale section, which was forwarded to the steering committee for their consideration. Due to the contentious nature of this issue, further work is merited by the metrological community and industry. The Committee believes there is no evidence that suggests equivalency measures are appropriate for a method of sale. The Committee believes there is merit for consideration in the newly proposed verbiage because retail sales occur in other locations other than a retail dispenser. The Committee also recognizes the importance of consumer understanding and acceptance, and believes this issue needs to continue development through the Natural Gas Steering Committee.

WWMA heard that the Natural Gas Steering Committee (NGSC) is reviewing: natural gas dispenser labeling requirements; refining the current proposal based upon feedback including data from the CRC regarding sampling to determine the average natural gas BTU content and data from the American Transportation Research Institute regarding the average BTU content of diesel fuel; and drafting an alternative proposal for the 2015 NCWM Interim Meeting.

WWMA recommended that NCWM consider all alternatives, including the NIST alternate proposal. However, if the NCWM determines that DGE/DLE is an appropriate method of sale for natural gas, the WWMA recommended that the sale of CNG at high-flow retail motor fuel dispensers be in units of DGE/DLE only, and at low-flow CNG

retail motor fuel dispensers, allow GGE/GLE only. WWMA felt it would be confusing for drivers of light duty CNG vehicles to see prices expressed in both GGE and DGE. Also, WWMA suggested the NCWM consider a customer activated selectable display for indication at the dispenser (GGE/DGE/lb or GLE/DLE/kg). WWMA recommended striking the word “approximately” from Sections 3.11.2.2.2. and 3.12.2.2.2. because an approximate amount cannot be conclusively verified.

Several regulators offered comments, both in support and in opposition, similar to those received at previous meetings. Five regulators supported the NIST alternative. One regulator commented that other fuel marketers may seek a gallon-equivalent for their fuels, e.g., electricity.

During the WWMA voting session, one regulator noted that the WWMA had previously recommended withdrawing all agenda items relating to DGE/DLE, and requested the L&R Committee poll the voting members to see how many are in support the continued use of equivalent units. The voting results were 23 in opposition to the use of equivalent units, and 12 in support of using equivalent units “going forward”. WWMA recommended this remain an Information item.

The 2014 NEWMA Interim meeting recommended that the NGSC consider that the Method of Sale be changed to mass and that the NIST proposal to modify Section 3.37, Mass Flow Meters in Handbook 44 (2014 Edition) be considered. (The draft NIST proposal is on the NEWMA web site as a supporting document <http://www.newma.us/meetings/interim/meeting-documents>.) NEWMA recommended that this item, 237-1 and 337-1 from the S&T agenda be Information Items pending final language from the NGSC at the 2015 NCWM 2015 Interim Meeting.

At the 2014 SWMA Meeting, the Committee heard from Dr. Matthew Curran, Florida that the NGSC was working on the item and that FALS had deferred the work to the NGSC. SWMA recommended that the item be an Informational Item.

CWMA Action - Item 237-1
Summary of comments considered by the regional committee (in writing or during the open hearings):
An industry representative from Gilbarco asked a question regarding terminology discrepancy between 3.11.1 and 3.11.2.1 – one lists “Compressed Natural Gas or CNG.” The second lists only “Compressed Natural Gas.” He had concerns about dispenser space. A Missouri regulator commented that NFPA Labeling referenced later in that section also references that Compressed Natural Gas be identified on dispensers in words, not an acronym.
Item as proposed by the regional committee: (If different than agenda item)
Committee recommendation to the region: <input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)
Reasons for the committee recommendation:
Pending alignment between wording in this provision and the National Fire Protection Act (NFPA) Section 52 (Vehicular Gaseous Fuel Systems Code), as well as consistency throughout the language of this proposal in the use of product identification of “CNG” or Compressed Natural Gas, the Committee feels this item is fully developed and is ready for voting status.
COMPLETE SECTION BELOW FOLLOWING VOTING SESSION
Final updated or revised proposal from the region: (If different than regional committee recommendation)

Regional recommendation to NCWM for item status:

- Voting Item on the NCWM Agenda
- Information Item on the NCWM Agenda
- Withdraw the Item from the NCWM Agenda (*In the case of new items, do not forward to NCWM*)
- Developing Item on the NCWM Agenda (*To be developed by source*)
- Unable to consider at this time (*Provide explanation in the "Additional Comments" section below*)

Regional Report to NCWM:

An industry representative from Gilbarco asked a question regarding terminology discrepancy between 3.11.1 and 3.11.2.1 – one lists “Compressed Natural Gas or CNG.” The second lists only “Compressed Natural Gas.” He had concerns about dispenser space. A Missouri regulator commented that NFPA Labeling referenced later in that section also references that Compressed Natural Gas be identified on dispensers in words, not an acronym. Pending alignment between wording in this provision and the National Fire Protection Act (NFPA) Section 52 (Vehicular Gaseous Fuel Systems Code), as well as consistency throughout the language of this proposal in the use of product identification of “CNG” or Compressed Natural Gas, the Committee feels this item is fully developed and is ready for voting status.

Additional letters, presentations and data may have been part of the committee’s consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents.

237-2 I Sections 2.1.3. Minimum Antiknock Index (AKI), Section 2.1.4. Minimum Motor Octane Number, and Section 3.2.5. Prohibition of Terms – Table 1.

Source:

General Motors (2013)

Purpose:

Remove obsolete Altitude De-rating of Octane practice, establish a National Octane Baseline, and harmonize Octane Labeling from state to state.

Item Under Consideration:

Amend the NIST Handbook 130, Engine Fuels and Automotive Lubricants Regulation as follows:

Section 2. Standard Fuel Specification

2.1.3. Minimum Antiknock Index (AKI). – The AKI of gasoline and gasoline-oxygenate blends shall not be less than 87. The AKI shall not be less than the AKI posted on the product dispenser or as certified on the invoice, bill of lading, shipping paper, or other documentation;
(Amended 20XX)

2.1.4. Minimum Motor Octane Number. – The minimum motor octane number shall not be less than 82. ~~for gasoline with an AKI of 87 or greater;~~
(Amended 20XX)

Section 3. Classification and Method of Sale of Petroleum Products

3.2. Automotive Gasoline and Automotive Gasoline-Oxygenate Blends

3.2.5. Prohibition of Terms. – It is prohibited to use specific terms to describe a grade of gasoline or gasoline-oxygenate blend unless it meets the minimum antiknock index requirement shown in Table 1. Minimum Antiknock Index Requirements.

Table 1. Minimum Antiknock Index Requirements		
Term	Minimum Antiknock Index	
	ASTM D4814 Altitude Reduction Areas IV and V	All Other ASTM D4814 Areas
Premium, Super, Supreme, High Test	90	91
Midgrade, Plus	87	89
Regular Leaded	86	88
Regular, Unleaded (alone)	85	87
Economy	--	86

(Table 1. Amended 1997 and **20XX**)**Background/Discussion:**

These NIST Handbook 130 octane changes will harmonize with an effort underway in the ASTM International (ASTM) Gasoline and Oxygenates Subcommittee to include a minimum motor octane number (MON) performance limit in gasoline. The naming of the various octanes is a function for weights and measures.

Nominally, vehicles manufactured after 1984 include engine computer controls maintaining optimal performance while using gasoline octane of 87-AKI or higher. The practice of altitude de-rating of octane, resulting in octanes below 87-AKI, reduces a vehicle's efficiency and fuel economy. Increasingly, more vehicles are boosted (turbocharged/supercharged) eliminating altitude intake air effects. Additionally, consumers using gasoline with an octane AKI below 87 will void their vehicle owner's warranty. The Coordinating Research Council (CRC) Report No. 660, "*Fuel Anti-knock Quality – Engine Response to RON (Research Octane Number) versus MON*," May 2011 demonstrates the continued need for gasoline MON octane for the large bored, naturally aspirated U.S. engines. Setting an 82-MON minimum maintains the current MON level for today's 87-AKI Regular Unleaded gasoline. A common U.S. octane specification between ASTM, NCWM, and Vehicle Owners Manuals will give states clear direction on how best to enforce proper fuel pump octane labeling and quality levels on behalf of vehicle consumers.

Leaded gasoline is not available at retail and therefore labeling guidance is not needed.

2013 NCWM Interim Meeting: The FALS could not reach agreement on this item during their Sunday work session. The Committee received and reviewed several letters in support of this proposal. During open hearings Mr. Bill Studzinski (General Motors) provided a presentation. The Committee also received comments in opposition to the proposal citing the lack of consumer complaints with suboctane and it was requested that the Committee wait until the CRC study provides data that can be used by ASTM and NCWM to determine whether or not a change is necessary. The Committee recommends this to be an Informational Item.

During the 2013 NCWM Annual Meeting Mr. Ronald Hayes, FALS Chair provided a presentation and stated that the CRC study has been expanded and finalized data is expected by year end. It was also noted the ASTM ballot failed. The Committee concurs to await a recommendation from FALS once they have considered all the data. Additional letters, presentations and data may have been part of the Committee's consideration.

At the 2014 NCWM Interim Meeting Mr. Bill Studzinski (General Motors) provided an update that the CRC study is almost finalized and then a ballot will be prepared for ASTM. Mr. Studzinski will have additional information for the 2015 NCWM Interim.

At the 2014 NCWM Annual Meeting Dr. Matthew Curran, FALS Chair remarked that the FALS is recommending this as an Informational item until the CRC study results are in. Mr. Bill Studzinski provided a briefing that a report should be issued in the fall 2014.

At the 2015 NCWM Interim Meetings the FALS Chair notified the Committee that the CRC study is still being addressed. The 2015 L&R Committee is designating this as an Informational Item.

Regional Association Comments:

CWMA reported that a Missouri regulator commented that Mr. Bill Studzinski (General Motors) presented an update at the 2014 NCWM Annual Meeting which is posted on the NCWM website. Mr. Studzinski indicated that this item is waiting on the CRC study final report which is anticipated before the 2015 NCWM Interim Meeting. The CRC study results will provide additional information to determine the future path of this item.

WWMA heard opposition from two regulators. There was support from one regulator, who said that in his state, competing stations in the same city sell regular gas at two different octane levels. Two state directors recommended removing the word “leaded” from Table 1. WWMA recommended that the NCWM consider the data in the CRC study before determining the appropriate status for this item.

During the 2014 NWMA Interim Meeting the L&R chairman commented that the CRC study related to this item has not yet been released, but should be by the 2015 NCWM Interim meeting. An industry representative who is a member of the FALS commented that the study will be published before the Interim meeting, and FALS will be in a position by January to give L&R a recommendation as to how this item should move forward. NEWMA recommended that item remain an Information Item.

At the 2014 SWMA meeting, the Committee heard that CRC had finished the study and was evaluating the results. A report should be issued by the end of the year. The Committee was also made aware that FALS was working on the issue. SWMA recommended that the item be an Informational item.

Item 237-2
Summary of comments considered by the regional committee (in writing or during the open hearings):
An industry representative from Marathon indicated there is an ASTM ballot that closes June 12 that requires a minimum 87.0 octane and 82.0 Minimum Octane Number (MON). This issue will be further discussed at the June ASTM meeting. An industry representative from BP commented that negative ballots would be adjudicated in June, and the decision will be made whether or not to move forward to the main D02 Committee at the December meeting.
Item as proposed by the regional committee: (If different than agenda item)
Committee recommendation to the region: <input type="checkbox"/> Voting Item on the NCWM Agenda <input checked="" type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)
Reasons for the committee recommendation:
The item is awaiting data and results through the ASTM process.
COMPLETE SECTION BELOW FOLLOWING VOTING SESSION
Final updated or revised proposal from the region: (If different than regional committee recommendation)
Regional recommendation to NCWM for item status: <input type="checkbox"/> Voting Item on the NCWM Agenda <input checked="" type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>) <input type="checkbox"/> Unable to consider at this time (<i>Provide explanation in the “Additional Comments” section below</i>)
Regional Report to NCWM:
An industry representative from Marathon indicated there is an ASTM ballot that closes June 12 that requires a minimum 87.0 octane and 82.0 Minimum Octane Number (MON). This issue will be further discussed at the June

ASTM meeting. An industry representative from BP commented that negative ballots would be adjudicated in June, and the decision will be made whether or not to move forward to the main D02 Committee at the December meeting.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents.

237-3 V Section 4.3. Dispenser Filters

Source:

Missouri Department of Agriculture (2012)

Purpose:

Recognize the need for 10-micron or smaller nominal pore-sized filters for today's diesel engines.

Item Under Consideration:

Amend the NIST Handbook 130, Engine Fuels and Automotive Lubricants Regulation as follows:

4.3. Dispenser Filters.

4.3.1. Engine Fuel Dispensers.

All gasoline, gasoline-alcohol blends, gasoline-ether blends, ethanol flex fuel, and M85 methanol dispensers shall have a 10 micron or smaller nominal pore-sized filter.

All biodiesel, biodiesel blends, diesel, and kerosene dispensers shall have a ~~30~~ **10** micron or smaller nominal pore-sized filter **except for dispensers with flow rates greater than 15 gallons per minute which shall have a 30 micron or smaller nominal pore size filter.**

Background/Discussion:

Abnormal dispenser filter plugging at retail will alert the retailer of potential storage tank problems. Requiring 10 micron filters for all products will reduce the inventory and the potential of installing the wrong filter for all products at the same site.

2012 NCWM Interim Meeting: Mr. Ronald Hayes, FALS Chair, informed the Committee that FALS recommended that this item be Informational because of industry concerns that 10 micron filters would be too restrictive of flow in high-flow systems. One industry representative expressed opposition for the use of 10 micron filters and recommends this item to be Withdrawn. A representative of an automobile manufacturer claimed diesel passenger vehicles do not have the sophisticated filtration systems commonly found on commercial duty vehicles and 10 micron filters on dispensers are needed for protection from particulate contamination. As proposed, this item could cause clogging of diesel dispenser filters in colder climates. The Committee believes this item has merit but lacks a consensus and also believes that FALS needs to address these concerns. The 2012 L&R Committee designated this item as an Informational Item and assigned it to FALS for further development.

2012 NCWM Interim Meeting: It was apparent to the Committee that that there are many unresolved issues related to passenger vehicles. The Committee encourages the FALS to continue developing this item.

2012 NCWM Annual Meeting: Several stakeholders spoke in opposition on this item. Mr. Ronald Hayes, FALS Chair remarked that the FALS worked on this item in 2007 and believes FALS needs to continue to work on this item. The NCWM L&R Committee agreed that this item is not ready and supports the continued development by FALS.

2013 NCWM Interim Meeting: Mr. Ronald Hayes, FALS Chairperson, remarked that a similar item was bought before the Committee in 2007. FALS did not have enough time in their work session to work on this item. There are several stakeholders and states that are having issues with the terminology and would like it removed from the agenda. Mr. Ronald Hayes (Missouri) remarked that they supported this item because contamination is an issue with cars that do not have filtering systems. The Committee reviewed comments from the Regional Associations however; FALS did not have sufficient time review and consider recommendation to the Committee. The Committee would like for FALS to continue to work on this item and is proposing this as an Informational item.

2013 NCWM Annual Meeting: Mr. Ronald Hayes, FALS Chair requested that the Committee allow them to continue to work on a recommendation for this item. There was opposition on moving this item forward. In less than two years since this proposal came forward there has been no data developed. The Committee reviewed Regional Association reports, open hearing comments and letters received changed the status of this item to Developing.

2014 NCWM Interim Meeting: Mr. Ronald Hayes (Missouri) who submitted the proposal offered modified language and supporting data to support the flow rate on 10 micron diesel filters. There was considerable discussion in regards to the fill time reduction, burdensome cost for station owners, and equipment and filter maintenance. It was noted that there is work being done within ASTM but at this time that information cannot be shared. The Committee reviewed the Item Under Consideration within NCWM Interim Publication 15 (2014). The Committee moved forward the modified language provided by Mr. Hayes for consideration as a Voting Item.

2014 NCWM Annual Meeting: The Committee reviewed several letters and additional data submitted by the Petroleum Marketers Association of American (PMAA). The FALS recommended this Item move forward for a Vote. During the open hearing there were mixed concerns in regards to this this Item. Numerous were concerns were expressed concerning the data from PMAA. Several comments were heard that ASTM should be allowed to develop a standard.

2015 NCWM Interim Meeting: The FALS Chair notified the Committee that this proposal was discussed in their work session and the FALS group is divided on a recommendation. Russ Lewis (Marathon Petroleum Co.) submitted the CRC Report "Diesel Fuel Storage and Handling guide. In addition Prentiss Searles (API) provided the Committee with a listing of the various studies and the findings that support moving this Item forward. The Committee reviewed additional letters and Regional Association recommendations. During open hearing testimony there was discussion as to whether this is a weights and measures issue or a housekeeping issue for the stations. There was lengthy discussion was at length as to the type of particulates and contaminates that a 10 micron could filter. Cost effectiveness was a concern as to who would bear the burden of the cost. With the extensive discussion on this subject matter and new information received the 2015 L&R Committee is designating this item as a Voting Item.

Regional Association Comments:

CWMA received comment from a Missouri state regulator who stated that engine manufacturers have supported this item for years as they are pushing for fuel cleanliness. A Minnesota regulator expressed concern that the requirement of 10 micron filters at the end point was not a comprehensive system to ensure cleanliness. All parties along the distribution chain should be held to the same standard. The Missouri regulator indicated that a new more stringent requirement is being considered at ASTM for particulate measurement. CWMA believes the item has been fully developed recommended that it be a Voting Item.

WWMA heard opposition to this item from two regulators. Mr. Ronald Hayes, Missouri, spoke in favor of the item, saying that it would help protect high-pressure fuel rails in today's diesel engines and that the auto manufacturers and Engine Manufacturers Association (EMA) want this amendment. Mr. Hayes stated that additional data (subsequent to the Petroleum Marketers Association of America study) will be posted on the NCWM website under Publication 15 documents prior to the 2015 Interim Meeting. WWMA recommended this remain an Information Item and that NCWM wait until they receive new additional data and can determine the appropriate status.

At the 2014 NEWMA Interim Meeting a regulator commented that the item should be withdrawn from the agenda because weights and measures should not legislate a filter size. Another regulator stated that it was the responsibility

of ASTM to provide a standard that yields fuel fit for purpose fuel. An industry representative from petroleum marketers opposes this item. NEWMA recommended that this Item be Withdrawn.

At the 2014 SWMA Meeting, the Committee was given a copy of the CRC Report No. 667, Diesel Fuel and Handling Guide. The Committee heard that a study had been completed on low temperature flow rates and that information was on the FALS section of the NCWM website. The CRC report is available at www.crcao.org. SWMA recommended that the item be Informational.

CWMA Action - Item 237-3
Summary of comments considered by the regional committee (in writing or during the open hearings):
Mr. Russ Lewis with Marathon Oil gave a presentation related to this project. He spoke in favor of the proposal. A representative from BP commented that when they owned retail stations, they required 10 micron filters on diesel dispensers. Currently, when they work with jobbers, they still recommend it. He spoke in favor of the proposal. A regulator from Minnesota commented that if a filter is the last line of defense, it is a positive step for consumers, and spoke in favor of the proposal. A regulator from Missouri commented that any state with a fuel quality program should have a dispenser filter requirement of 10 microns. It is even more critical in diesel engines today for the fuel to be as clean as possible due to the high pressure technology in the engines.
Item as proposed by the regional committee: (If different than agenda item)
Committee recommendation to the region:
<input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)
Reasons for the committee recommendation:
The item is fully developed and ready for voting status.
COMPLETE SECTION BELOW FOLLOWING VOTING SESSION
Final updated or revised proposal from the region: (If different than regional committee recommendation)
Regional recommendation to NCWM for item status:
<input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>) <input type="checkbox"/> Unable to consider at this time (<i>Provide explanation in the "Additional Comments" section below</i>)
Regional Report to NCWM:
Mr. Russ Lewis with Marathon Oil gave a presentation related to this project. He spoke in favor of the proposal. A representative from BP commented that when they owned retail stations, they required 10 micron filters on diesel dispensers. Currently, when they work with jobbers, they still recommend it. He spoke in favor of the proposal. A regulator from Minnesota commented that if a filter is the last line of defense, it is a positive step for consumers, and spoke in favor of the proposal. A regulator from Missouri commented that any state with a fuel quality program should have a dispenser filter requirement of 10 microns. It is even more critical in diesel engines today for the fuel to be as clean as possible due to the high pressure technology in the engines.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents.

260 HANDBOOK 133

260-1 V Section 2.7. Chitterling Test Procedure (and beef tripe).

Source:

NIST Office of Weights and Measures (2015)

Purpose:

Provide inspectors and packers with uniform test methods and include a specific purge requirement in HB 133.

Item Under Consideration:

Amend NIST Handbook 133 as follows:

2.7. Determining the Net Weight and Percent of Purge in Packages of Fresh and Frozen Chitterlings (and beef tripe)

2.7.1. Test Equipment

- Scale or balance and mass standards (the standards are used to verify the accuracy and repeatability of the weighing device).
- Partial immersion thermometer or equivalent with 1 °C (2 °F) graduations and a range of - 35 °C to + 50 °C (- 30 °F to + 120 °F) accurate to ± 1 °C (± 2 °F).
- Sink (e.g., water bath, ice chest) or other receptacle of suitable size to hold the packages for thawing and water source and hose with fresh water that can be maintained at a temperature between 23 °C to 29 °C (75 °F to 85 °F) (for thawing plastic bags or buckets of chitterlings).
- An alternative thawing procedure for packages requires access to a refrigerator that must be available for storing sample packages for several days to thaw.
- Stainless Steel Sieve(s) and Drain Pan(s) – No. 8 mesh, 203 mm (8 in) or 304 mm (12 in). Use is based on the labeled net weight of the package under inspection.
- Stopwatch (to measure drain periods).
- Knife or box cutter (to open packages).
- Waterproof marking pen (for numbering the packages).
- Disposable (non-latex) gloves.
- Paper towels (drying sieve drain pan, packages and work area).
- Large plastic bags (to hold product emptied from packages).
- Plastic rod (to insert into buckets of chitterlings to determine if the product is thawed and to ensure there are no chunks of ice remaining).

2.7.2. Test Procedure for Net Weight and Purge Determination for Fresh and Frozen Chitterlings (and beef tripe).

This procedure is used to determine (1) the net weight and (2) the purge in packages of fresh and frozen chitterlings. The purge determination procedure requires the destructive testing of all of the sample packages.

1. **Follow Sections 2.3.1. “Define the Inspection Lot”, 2.3.2. “Select Sampling Plans.” Use Appendix A, Table 2-1. “Sampling Plans For Category A,” if the testing is outside of a USDA inspected packing facility or use Table 2-2. “Sampling Plans for Category B,” if the testing is inside a USDA inspected packing facility, 2.3.3. “Record Inspection Data”, and 2.3.4. “Random Sample Selection”.**

- **Select the random sample of packages.**
- **Dry the sample packages and number each (e.g., 1-12) using a waterproof marker.**
- **On the worksheet record the inspector name, product brand, packer identity, labeled net weight (Block a), lot code, number of unreasonable errors, MAV (use Appendix A, Table 2-9. “Department of Agriculture, Meat and Poultry Groups and Lower Limits for Individual Packages,” and the unit of measure of the scale used for weight determinations. The appropriate information can be transferred to an official inspection report at the conclusion of the inspection. The worksheet should be added to the official record of the inspection.**

2.7.2.1. Net Weight and Purge Determinations

Follow these procedures to determine the net weight and amount of purge from chitterlings.

2.7.2.1.1. Test Procedure for Determining the Net Weight and Purge from Fresh and Frozen Chitterlings (and beef tripe).

1. **Determine the gross weight of each sample package and record in Column C, “Package Gross Weight.”**
2. **Determine the tare weight of the sieve drain pan and record in the block “Drain Pan Tare.”**

Frozen Chitterlings

3. **Fully immerse the unopened package of frozen chitterlings in a water bath maintained at a temperature between 23 °C to 29 °C (75 °F to 85 °F).**

Note: An alternative approach to thawing large frozen packages (e.g., 5 kg [10 lb] plastic pails) is to randomly select [mark them to be held for inspection] the sample packages and place them in a refrigerator for partial thawing over several days and then carrying out the final thawing using the water bath technique.

Note: If the products are to be placed in refrigerated storage for several days for partial thawing, segregate them from other product inventory and mark each container with an identifier to allow the inspector to ensure that they were the samples selected for testing (mark both lid and container on buckets) when the inspection is resumed after the thawing process. Also, mark the packages with a conspicuous notice that they are being held for inspection.

4. **Maintain a continuous flow of water into the bath to keep the temperature within the specified range until the chitterlings are thawed. The chitterlings are thawed**

when it is determined by touch that they are not rigid and no ice crystals are observed or felt within or on their outside surface.

Note: for buckets insert a plastic rod into the chitterlings to determine if the product is thawed and to ensure there are no chunks of ice remaining.

Fresh and Frozen Chitterlings

- 5. Draining the Chitterlings: Depending on the availability of a sink and work space and the inspector’s preference, use the procedures in either Method A. or Method B. to drain the chitterlings.¹ Refer to Table 1 for the appropriate size sieve to use based on the labeled net weight on the package.**

<u>Table 1.</u>			
<u>Labeled Net Weight</u>	<u>Sieve Diameter</u>	<u>30 Degree Tilt from Horizontal</u>	<u>Incline Height</u>
<u>If more than 453 g (1 lb) use:</u>	<u>300 mm</u> <u>(12 in)</u>		<u>175 mm</u> <u>(6.9 in)</u>
<u>If less than 453 g (1 lb) use:</u>	<u>203 mm</u> <u>(8 in)</u>		<u>116.8 mm</u> <u>(4.6 in)</u>
<p><u>This procedure requires that the sieve and drain pan be cleaned and dried after each use. It is a good measurement practice to obtain the dry weights of both the sieve and pan and recheck those weights periodically during the test to make sure the cleaning and drying procedures are efficient.</u></p> <p><u>If the amount of chitterlings in the package exceeds the capacity of the sieve, divide the solids evenly among two or more sieves of the same dimensions or make multiple determinations using a single sieve. Exercise care when transferring the chitterlings into the sieves to avoid spilling liquid which can void the test.</u></p>			

Method A. Place a sieve over a sink or waste collection container.⁹ Pour the chitterlings into the sieve and distribute them over the surface of the sieve with a minimum of handling. Hold the sieve firmly and incline it 30 degrees (see Figure 1 for an example of a tilt block for use with a sink drain set at 30 degrees) to facilitate drainage, then start the stop watch and drain for exactly two-minutes. At the end of the drain time immediately transfer the chitterlings to a drain pan for weighing. Determine the Purged Net Weight of the chitterlings using the following formula and record in Column F, “Purged Net Wt.”

$$\textit{Drained Chitterlings and Drain Pan} - \textit{Drain Pan Tare} = \textit{Purged Net Weight}$$

¹ If carried out with proficiency, which comes with practical experience, the procedures in Method a. and Method b. will provide identical results. The procedure in Method b requires additional steps to calculate the Purged Net Weight but some inspectors have indicated that they prefer Method b. because the drain time and product is easier to control (because the chitterlings in the sieve may continue to drain). Regardless of the method used the inspector must handle the product carefully but quickly to avoid errors that may void the test. Also, some inspectors often use a waste container to collect the package liquids so that all of the product can be returned the package for subsequent return to the packer. Other inspectors report that some retailers do not want the product repackaged so the liquids are drained into a sink, the solids discarded, and the disposition reported on the inspection report.

Method B. Place a sieve on its drain pan. Pour the chitterlings into the sieve and distribute them over the surface of the sieve with a minimum of handling. Hold the sieve firmly and incline it 30 degrees to facilitate drainage, then start the stop watch and drain for exactly two-minutes. At the end of the drain time immediately transfer the drain pan with the purged liquid to the scale for weighing. Dry the empty package to determine its tare weight and enter it in Column C, “Package Tare Weight.” Determine the purged net weight of the chitterlings using the following formula and record in Column F, “Purged Net Wt.”.

$$\frac{(Gross\ Weight\ of\ Package - Package\ Tare\ Weight) - (Weight\ of\ Purged\ Liquid\ \&\ Drain\ Pan - Drain\ Pan\ Tare)}{= Purged\ Net\ Weight}$$

$$(Column\ B - Column\ C) - (Weight\ of\ Purged\ Liquid\ \&\ Drain\ Pan - Drain\ Pan\ Tare) = Purged\ Net\ Weight$$

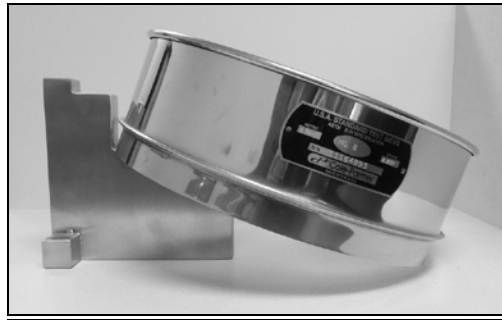


Figure 1. Tilt Block set at 30 degrees

6. **Calculate purge using the formula shown below (use the labeled net weight in Column A, “Labeled Net Weight” and NOT the gross weight of the package in Column B, “Package Gross Weight”) and record the result in Column G, “Purge %.”**

$$Purge\ in\ \% = (Labeled\ Weight - Purged\ Net\ Weight) \div Labeled\ Weight \times 100$$

$$Purge\ in\ \% = Column\ A - Column\ F \div Column\ A \times 100$$

Example: The labeled net weight is 5 lb and the Purged Net Weight is 4.19 lb

$$5\ lb - 4.19\ lb = 0.81\ lb \div 5\ lb = 0.162 \times 100\ \% = 16.2\ \% \text{ purge}$$

7. **Dry the empty package and determine its tare weight and record the result in Column C, “Package Tare Weight.”**
8. **Subtract the individual package tare weight from the individual package gross weight to obtain the actual Package net weight and record in Column D, “Actual Package Net Weight.” Do not use an Average Tare Weight. Use the formula:**

$$Actual\ Package\ Net\ Weight = Gross\ Weight - Tare\ Weight$$

$$Actual\ Package\ Net\ Weight = Column\ B - Column\ C$$

9. **Subtract the Actual Package Net Weight from the Labeled Net Weight (record in Column E of worksheet). Use the formula:**

$$\text{Package Error} = \text{Labeled Net Weight} - \text{Actual Package Net Weight}$$

$$\text{Package Error} = \text{Column A} - \text{Column D}$$

Repeat for all packages in the sample.

Note: The determination of compliance with the net weight and purge requirements are carried out concurrently. The calculation of the average net weight and average purge is completed after all of the packages are opened and all purge amounts are obtained. The sample must pass both the net weight and purge tests to comply with this section.

2.7.3. Evaluations of Results – Compliance Determinations

1. Net Weight

- a. Individual Package Requirement: If there are negative package errors, determine if any of the values exceed the Maximum Allowable Variation (MAV) for the packaged quantity as specified in Appendix A, Table 2-9. “U.S. Department of Agriculture, Meat and Poultry Groups and Lower Limits for Individual Packages” (i.e., if the labeled net weight is more than 3 lb up to 10 lb then the MAV = 42.5 g (0.094 lb) 1.5 oz).

- If a package error exceeds the MAV, mark it as “Failed” in the MAV Fail column.
- Count the number of packages that exceed the MAV. If the number of packages that exceed the MAV is greater than the number allowed as specified in Appendix A, Tables 2-1. “Category A” or Table 2-2. “Category B”, the sample fails. Mark the sample as “Failed” in the box “Net Weight Compliance.”
- If the sample passes the Individual Package Requirement, apply the Average Error Requirement.

- b. Average Error Requirement: Sum the package errors in Column E “Package Error” and enter the value in Box E1, “Total Error.” Divide the value in Box E1, “Total Error” by the Sample Size (n) to obtain an Average Error and enter the value in Box E2, “Average Error”. If Box E2, “Average Error” is a positive number, the sample passes. Mark the Box “Net Weight Compliance” and mark the sample as “Passed.”

- If the Box E2, “Average Error” is a negative number, calculate the sample standard deviation of the package errors (Column E. “Package Error”) and enter it in the block “Net Weight Compliance.”
- Use the Sample Correction Factor (SCF) to calculate the Sample Error Limit (SEL).

$$\text{Sample Error Limit (SEL)} = \text{Sample Standard Deviation} \times \text{Sample Correction Factor}$$

- Disregarding the signs,
 - if Box E2 “Average Error” is larger than the SEL, the sample fails. Mark it “Failed” in the Box “Net Weight Compliance”,
- or
- if the Average Error is less than the SEL, the sample passes. Mark the sample as passed in the Box “Net Weight Compliance.”

2. Purge

Follow these procedures to determine the amount of purge from the chitterlings. Apply the Average Requirement in accordance to Section 2.3.7.2., “Average Requirement” to the purge to determine if the sample passes or fails the requirement. The Average Adjusted Purge (AAP) for the sample shall not exceed 20 % of the labeled weight. The Maximum Allowable Variations (MAV) (as specified in Appendix A, Table 2-9. “U.S. Department of Agriculture, Meat and Poultry Groups and Lower Limits for Individual Packages (Maximum Allowable Variations) are not applied in the purge test.

- **Sum the purge values in Column G, “Purge %” and enter the value in Box G1, “Total Purge.” Divide the value in Box G1, “Total Purge” by the Sample Size (n) to obtain an Average Purge and record the value in Box G2, “Average Purge.” If Box G2, “Average Purge” is less than or equal to 20 %, the sample passes. Go to the Box “Purge Compliance” record the sample as “Passed.”**
- **If Box G2, “Average Purge” is greater than 20 %, calculate the Sample Standard Deviation of the values in Column G., “Purge %” and enter it in the block “Purge Compliance”.**
- **Use the Sample Correction Factor (SCF) to calculate the Purge Sample Error Limit (PSEL) in percent.**
- **Subtract the Purge Sample Error Limit (PSEL) from the Box G2, “Average Purge” to obtain an Adjusted Average Purge (AAP) and record the value in Box G3, “Adjusted Average Purge).**
- **Pass or Fail**
 - **If Box G3, “Adjusted Average Purge” is greater than 20 %, the sample fails. Enter the Box G3, “Purge Value” in the Box “Purge Compliance” and record the sample as “Failed.”**
 - or**
 - **If Box G3, “Adjusted Average Purge” is 20 % or less, the sample passes. Enter the Box G3, “Purge Value” in the Box “Purge Compliance” and record the sample as “Passed.”**

Background/Discussion:

There are no test procedure or purge requirements for chitterlings and beef tripe in NIST HB 133. Currently the states must adapt the drained weight test procedures to test these products and then rely on purge allowances published on USDA websites to test these products. Adoption of the test procedures and inspection forms will ensure that inspectors and packers have recognized test procedure to use that is uniform and will allow for the collection of test data that can then be used in affirming or modifying the current 20 % limit on purge that the USDA websites cite. These commodities are typically tested on a complaint only basis. Over the past several years several states and packers have requested guidance both on the test procedure and have questioned the reasonableness of the current allowances. The NIST, OWM has worked with several packers and states to develop and test the attached procedures with the goal of having the proposal submitted for consideration by the NCWM for possible adoption.

It will provide states with ready access to a test procedure for these unique products should they receive a consumer complaint. Currently when officials receive complaints on these products the inspector must carry out extensive research to find the necessary information for conducting tests of these products and they may not find out about the USDA information till after they complete the inspection. In 2013 this difficulty may have led one state to test these products without making any allowance for the purge as USDA specifies.

At the 2015 Interim Meeting a comment was made by a county in California as to whether this item is ready to be adopted as a test procedure due to the issue on the potential of excessive purge. The background information has different purge limits. If adopted it should be done on an interim approach so that data can be used to validate the information. The Committee believes that this item is fully developed with all the information received. If the manufacturers are concerned the L&R Committee would like to receive feedback. The 2015 L&R Committee is moving this forward as a Voting Item.

Refer to Appendix B for Executive Summary, additional background, initial proposal for Section 2.7. Chitterling Test Procedure and sample test reports.

Regional Association Comments:

CWMA received comment from a Missouri regulator who asked if this issue was similar to seafood. An Illinois regulator indicated that the “purge” from the items would be different due to the cell structure of the differing proteins. The Committee concurs with NIST, OWM that a work group should continue to review and further evaluate the test procedure and existing purge limit. CWMA forwarded the item to NCWM, recommending it as a Developing Item.

WWMA heard from one regulator who stated that this item is not ready for inclusion into NIST Handbook 133 because of the USDA FSIS response to the question about when to measure purge. The FSIS stated that “historically, FSIS has not objected to chitterlings having a 20% purge due to the washing and preparation with water. Net weight should be verified after packaging and prior to freezing.”

WWMA suggested that NIST establish a voluntary work group to validate the draft testing procedures and verify the 20 % purge allowance. WWMA suggested that data be collected on water absorption prior to freezing *and* water purge after thawing frozen product. The Committee encouraged regulators with processing facilities in their jurisdictions to contact NIST to volunteer for this study; study results should not be based on data from frozen product only. WWMA recommended that this item be a Developing Item.

At the 2014 NEWMA Interim Meeting the L&R Chair commented that the testing of this type of product is problematic in that there is no established test procedure to incorporate the unique content of this product after it has thawed. A state regulator suggested it be considered a developing item. Another regulator suggested that NEWMA follow the lead of the Southern Region and recommend the item move forward with voting status since there were NIST representatives at the Southern meeting to more fully explain the proposal. NEWMA forwarded the item to NCWM and recommended it as a Developing Item to allow NIST to fully refine the testing procedures.

At the 2014 SWMA Meeting, the Committee heard comments from NIST that the changes were needed as a result of testing issues in some states. The Committee was also provided with a copy of an executive summary report by NIST. SWMA forwarded the item to NCWM and recommended it as a Voting Item.

CWMA Action - Item 260-1
Summary of comments considered by the regional committee (in writing or during the open hearings):
An industry representative from Smithfield Foods commented that the test procedure is a positive measure, but there is concern with the proposed limits. There is a tremendous amount of water used for cleaning, and some of that water gets retained in folds, as well as in the soft tissue. The super clean version increases the amount of moisture lost after it is thawed. If purge of water can be 30-50%, as mentioned in the proposal, the purge obviously exceeds the 20% limit. According to the industry representative, FSIS has a 20% purge rate for fresh, so it is virtually impossible to meet a post-frozen tolerance of 20%. While they have concerns regarding proposed limits, they support the methodology of testing being proposed. A NIST representative concurred that further study validation needs to be done. However, USDA’s guidance is 20% purge. They worked with Dr. Doug Sutton at Smithfield for testing. He commented that there is no option regarding the limitation since it is USDA’s recommendation and that there is no other data to support a change otherwise. He suggests that we consider moving forward with the testing procedure, collect data and reevaluate the tolerance level once there is additional data collected. The industry representative commented that the proposal states that 20% is a pass-fail parameter, and that poses concern to the industry. The NIST representative commented again that the only recommendation they have is that of USDA, and

the proposal should either go forward and be amended later if data suggests it, or the conference could wait until more data is collected, which could take years.
Item as proposed by the regional committee: (If different than agenda item)
Committee recommendation to the region: <input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)
Reasons for the committee recommendation: The proposal has been fully developed and is ready for voting status.
COMPLETE SECTION BELOW FOLLOWING VOTING SESSION
Final updated or revised proposal from the region: (If different than regional committee recommendation)
Regional recommendation to NCWM for item status: <input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>) <input type="checkbox"/> Unable to consider at this time (<i>Provide explanation in the "Additional Comments" section below</i>)
Regional Report to NCWM: An industry representative from Smithfield Foods commented that the test procedure is a positive measure, but there is concern with the proposed limits. A NIST representative concurred that further study validation needs to be done. However, USDA's guidance is 20% purge. He suggests that we consider moving forward with the testing procedure, collect data and reevaluate the tolerance level once there is additional data collected. The industry representative commented that the proposal states that 20% is a pass-fail parameter, and that poses concern to the industry. The NIST representative commented again that the only recommendation they have is that of USDA, and the proposal should either go forward and be amended later if data suggests it, or the conference could wait until more data is collected, which could take years.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents

260-2 V Section 3.9. Dimensional Test Procedure for Verifying the Compressed Quantity Declaration on Packages of Peat Moss.

Source:

NIST Office of Weights and Measures (2015)

Purpose:

Provide improved dimensional test procedures for the verification of the compressed volume of peat moss and animal bedding.

Item Under Consideration:

Amend NIST Handbook 133 by replacing section 3.9 Peat Moss in its entirety with the following:

3.9. Peat Moss

3.9.1. Dimensional Test Procedure for Verifying the Compressed Quantity

3.9.1.1. Test Equipment

- Tape measure

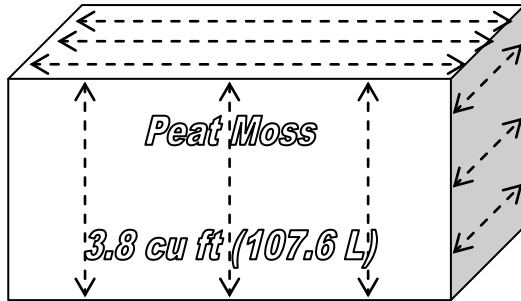


Figure 3-1. Peat Moss

3.9.1.2. Test Procedure

1. ~~Follow Section 2.3.1. "Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample.~~
2. ~~For each dimension (length, width, and height) take three equidistant measurements.~~
3. ~~Calculate the average of each dimension.~~
4. ~~Multiply the averages to obtain the compressed cubic volume as follows:~~
$$\text{average height} \times \text{average width} \times \text{average length} = \text{cubic measurement}$$
5. ~~Subtract the labeled volume from the measured volume to determine package error.~~

(Amended 2010)

3.9.11. Test Equipment

- Calculator or Spreadsheet Software (programmed to make volume calculations)
- Volumetric Package Worksheet (Appendix C at end of this report)
- Non-permanent marking pen.
- Knife or Razor Cutter (for use in opening packages and unwrapping shrink-wrapped pallets in warehouses)
- Cellophane or Duct Tape (for use in securing packaging tails)
- Dimensional Measuring frame (drawings are located at www.nist.gov/owm)



Exhibit 1. Picture of a Dimensional Measuring Frame.

- **Rigid Rulers – Starrett² or equal with 1.0 mm graduations. The edges of a ruler used with a measuring frame must be straight and the edges must be the zero point (see Exhibit 2).**
- **300 mm (12 in)**
- **500 mm (19.5 in)**
- **1 m (39 inch)**
- **Carpenter Squares**
- **300 mm (12 in)**
- **600 mm (24 in)**

3.9.1.2. Test Procedure

Note: Test Notes

Rounding: When a package measurement falls between graduations on a ruler, round the value up. This practice eliminates the issue of rounding from the volume determination and provides the packager the benefit of the doubt. If a ruler with a graduation of 1.0 mm is used, the rounding error will be limited to 0.5 mm or less. It is good practice to circle a measurement that has been rounded up or make a statement to such effect so that it becomes a part of the record.

² Notice: The mention of trade or brand names does not imply endorsement or recommendation by the U.S. Department of Commerce over similar products available from other manufacturers.

Dimension Identification: The following package nomenclature is used to identify the dimensions measured in this test procedure.

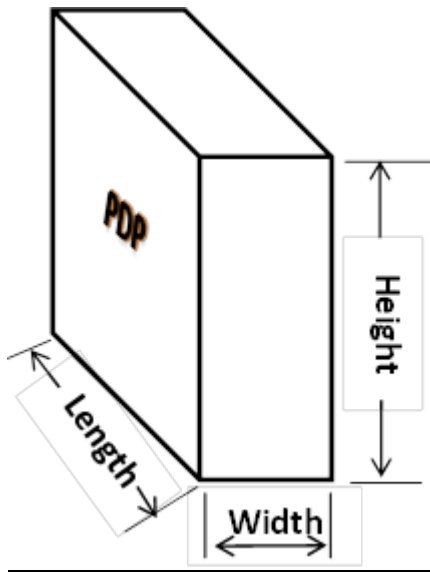


Figure 3-2. Dimension Identification.

Note: Packages of compressed peat moss do not have declaration of expanded volume.
Safety



This procedure does not address all of the safety issues that users need to be aware of in order to carry out the following tasks. Users are sometimes required to conduct tests in warehouse spaces or retail stores where fork-trucks are in motion – care must be taken to warn others to avoid or exercise care around the test site. The procedure requires users to lift heavy objects including large bulky packages and test measures and includes the use of sharp instruments to obtain packages from shrink-wrapped pallets. Users may be required to climb ladders or work platforms to obtain sample packages. When opening and emptying packages, dust, or other particles may be present or escape from the packages, which may cause eye injuries and respiratory or other health problems. Users must utilize appropriate safety equipment and exercise good safety practices. If safe working conditions cannot be ensured, suspend testing until the situation is corrected.

- 1. Follow the Section 2.3.1. “Define the Inspection Lot.” Use a “Category A” Sampling Plan for the inspection. Collect the sample packages from the Inspection Lot using random sampling. If the packages are not randomly selected, the sample will not be representative of the lot and the test results will not be valid for use in enforcement action. Place the sample packages in a location where there is adequate lighting and ample space for the packages and test equipment.**
- 2. Examine the package for excess packaging material (i.e., packaging tails). Fold the packaging material consistent with design of the packaging and tape the material securely to the package so that its effect on the dimensional measurement is minimized. If the thickness of packaging tail appears excessive, it is appropriate to determine its average thickness by making at least three measurements along its length using a dead weight dial micrometer specified in Section 4.5. “Polyethylene Sheeting” and subtract the thickness from the measurement of length, width or height. Any deduction from a measurement should be noted on the inspection report.**

3. If a Dimensional Measuring Frame is used, place it on a solid support. If a table is used, select one of sufficient load capacity to hold the weight of the frame and the heaviest package to be tested.
4. Position the frame so that the zero end of the ruler can be placed squarely and firmly against a surface of the frame and so that the ruler graduations can be read. Position yourself so that you can read both the ruler and the edge of the carpenter square in Exhibit 2.
5. Place the package against two sides of the frame without compressing the package. Place a carpenter square against the package at the point of measurement and align the ruler perpendicular to the edge of the carpenter square as shown in Exhibit 3 where the package length and Exhibit 4 where the package height are being determined.

Using a Measuring Frame for Dimensional Testing
Ruler and Carpenter Square define Zero Reference and Measurement Point



Exhibit 2. The rigid frame allows the observer to hold the zero reference point firmly in place.



Exhibit 3. Length Measurement



Exhibit 4. Height Measurement – A packaging tail on the end of the package can affect this measurement



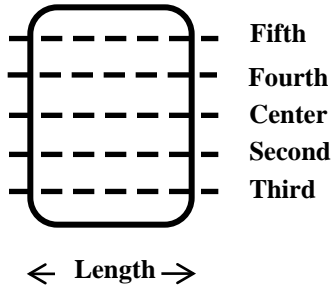
Exhibit 5. Width Measurement – the frame is rotated on its end to vertical so

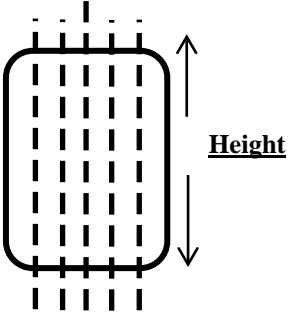
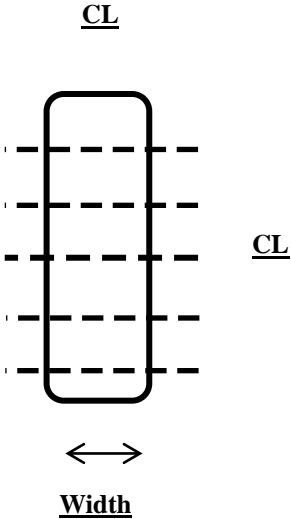
so it has been folded over and taped against the end of the package.

that the carpenter square does not compress the product.

6. Measurements – take at least five measurements* of each of the dimensions as follows:

***On small packages (height or length dimensions of 152 mm [6 in] or less) at least three measurements are taken using the following the instructions).**

<u>Inspect the package for shape and place the flattest surfaces against the measuring frame.</u>	
i.	<p><u>Length (see Exhibit 3):</u></p> <ul style="list-style-type: none"><u>a. take the first measurement across the center line of the Length axis of package.</u><u>b. take the second measurement at half the distance between the center Line and either of the package edges.</u><u>c. take the third measurement half the distance between the second measurement and the package edge.</u><u>d. take the fourth measurement on the opposite end of the package at half of the distance between the center line and the package edge.</u><u>e. take the fifth measurement at half of the distance between the fourth measurement and the package edge.</u> 

<p>ii.</p>	<p>Height: (see Exhibit 4):</p> <ol style="list-style-type: none"> take the first measurement across the center line of the Height axis of the package. take the second measurement at half the distance between the center line and the package edge. take the third measurement half the distance between the second measurement and the package edge. take the fourth measurement on the opposite end of the package at half of the distance between the center line and the package edge. take the fifth measurement at half of the distance between the fourth measurement and the package edge. 	
<p>iii.</p>	<p>Width: (see Exhibit 5): If using one, turn the measuring frame on end and place the package on its bottom and against the frame as shown in the picture and on the right where the package width is being measured.</p> <ol style="list-style-type: none"> take the first measurement across the center line of Width axis of the package. take the second measurement at half the distance between the center line and the package edge. take the third measurement half the distance between the second measurement and the package edge. take the fourth measurement on the opposite end of the package at half of the distance between the center line and the package edge. take the fifth measurement at half of the distance between the fourth measurement and the package edge. 	

- Record the dimensions of each package in millimeters in a software program or inspection form that includes the information shown in the sample worksheet “Calculate the Compressed Volume of the Package in Liters” (below). Enter the measurements in the appropriate spaces and calculate the volume in liters. Calculate the package error by following the steps listed in the table and then calculate the average error for the sample.

Note: The following table is an example of the information from an actual test that is included in a worksheet for verifying the compressed volume on packages of peat moss. The Inspection Worksheet for Dimensional Testing (see Appendix C) has space for a sample of 12 packages and includes the steps for calculating the Average Package Error. Here, the package error in the dimensional volume was + 6.8 L (+ 0.24 ft³). Apply a tentative MAV of 5 % to a dimensional measured volume.

SAMPLE WORKSHEET			
Calculate the Compressed Volume of the Package in Liters			
Unit of Measure = 1.0 mm	Length (L)	Width (W)	Height (H)

<u>SAMPLE WORKSHEET</u>				
<u>Calculate the Compressed Volume of the Package in Liters</u>				
	<u>Unit of Measure = 1.0 mm</u>	<u>Length (L)</u>	<u>Width (W)</u>	<u>Height (H)</u>
	<u>1.</u>	<u>482</u>	<u>282</u>	<u>690</u>
	<u>2.</u>	<u>490</u>	<u>278</u>	<u>690</u>
	<u>3. (Center Line)</u>	<u>493</u>	<u>276</u>	<u>681</u>
	<u>4.</u>	<u>499</u>	<u>272</u>	<u>677</u>
	<u>5.</u>	<u>493</u>	<u>269</u>	<u>657</u>
<u>a.</u>	<u>Average:</u>	<u>491</u>	<u>275.4</u>	<u>679</u>
<u>b.</u>	<u>L × W × H = Volume/1 000 000</u>	<u>91.8 L</u>		
<u>c.</u>	<u>Labeled Compressed Quantities:</u>	<u>85 L</u>	<u>NA cu in</u>	<u>3.0 cu ft</u>
<u>d.</u>	<u>Conversion Factors</u>	<u>NA</u>	<u>(b) × 61.02374</u>	<u>(b) × 0.03531467</u>
<u>e.</u>	<u>Converted Volume</u>	<u>85 L</u>	<u>NA cu in</u>	<u>3.24 cu ft</u>
<u>f.</u>	<u>Package Error = (b – c)</u>	<u>6.8 L</u>	<u>NA cu in</u>	<u>0.24 cu ft</u>

3.9.2. Uncompressed Volume Packages

Use the following method to test peat moss sold using an uncompressed volume as the declaration of content. The procedure as defined by the latest version of ASTM D2978-03, “Standard Test Method for Volume of Processed Peat Materials.”

3.9.2.1. Test Equipment

- 12.7 mm (or ½ in) sieve
- Use **a** ~~one of the following~~ test measure appropriate for the package size. (Refer to Table 3-4. “Specifications for Test Measures for Mulch and Soils” for additional information on test measure **size and** construction.)
 - ~~28.3 L (1 ft³) measure with inside dimensions of 30.4 cm (12 in) by 30.4 cm (12 in) by 30.4 cm (12 in). Mark the inside of the measure with horizontal lines every 1.2 cm (½ in) so that package errors can be directly determined~~
 - ~~100 L (3.5 ft³) measure with inside dimensions of 50 cm (19.68 in) by 50 cm (19.68 in) by 40 cm (15.74 in). The inside of the measure should be marked with horizontal lines every 1.2 cm (½ in) so that package errors can be directly determine~~
- Straight edge, 50.8 cm (20 in) in length
- Sheet for catching overflow of material
- Level (at least 15.24 cm (6 in) in length)

3.9.2.2. Test Procedure

1. Follow Section 2.3.1. “Define the Inspection Lot.” Use a “Category A” sampling plan in the inspection; select a random sample.
2. Open each package in turn, remove the contents, and pass them through the sieve directly into the measuring container (overfilling it). Use this method for particulate solids (such as soils or other garden materials) labeled in cubic dimensions or dry volume. Some materials may not pass through the sieve for peat moss; in these instances, separate the materials by hand (to compensate for packing and settling of the product after packaging) before filling the measure.

Note: Separated material (product not passing through the sieve) must be included in the product volume.

3. Shake the measuring container with a rotary motion at one rotation per second for 5 seconds. Do not lift the measuring container when rotating it. If the package contents are greater than the measuring container capacity, level the measuring container contents with a straightedge using a zigzag motion across the top of the container.
4. Empty the container. Repeat the filling operations as many times as necessary, noting the partial fill of the container for the last quantity delivered using the interior horizontal markings as a guide.
5. Record the total volume.
6. To compute each package error, subtract the labeled quantity from the total volume and record it.

3.9.3. Evaluation of Results

Follow the procedures in Section 2.3.7. “Evaluate for Compliance” to determine lot conformance for either procedure.

Note: To determine the value of the MAV look up the labeled quantity in Appendix A, Table 2-6. Maximum Allowable Variations for Packages Labeled by Liquid and Dry Volume.

Background/Discussion:

This proposal will provide a standardized test method that will improve measurement accuracy at the point of pack and in testing at other locations. The test procedure recommends the use of a gravimetric audit procedure that may reduce destructive testing and reduce inspection time.

Even though some existing test measures may still be used this proposal encourages users to purchase the prescribed volumetric test measures, chutes and measuring instruments.

The OWM will develop and provide technical training on this subject matter and develop detailed equipment designs and drawings which will be made available on the NIST, OWM website. The OWM will assist the animal bedding industry in implementing the proposed method of sale as well as developing and incorporating good manufacturing practices to ensure that the requirements of NIST Handbook 133 are met.

At the 2015 NCWM Interim Meeting the Committee agreed that Sections 3.9.1.and 3.9.1.a. needs to be removed from the language. The Committee agreed that any term related to “animal bedding” should also be removed to align with Item 232-3. The NIST Technical Advisor remarked that the background information is being reviewed formatting by the office publication coordinator and advised that no technical changes were being made and would be resubmit with Publication 16 (2015). The 2015 L&R Committee agreed to move this forward as a Voting Item.

Refer to Appendix C., “Testing Packages of Animal Bedding and Peat Moss with Compressed and Expanded Volume Declarations” for the Executive Summary, additional background, forms and supporting information.

Regional Association Comments:

During the 2014 NEWMA Interim Meeting, the L&R Chairman stated that NIST, OWM had submitted considerable information sent to the region for review. This is one of a number of proposals that represents a large amount of work done at NIST to provide more consistent standards. An industry representative commented that he participated in the development of this proposal, and said industry has had a long-term struggle with various standards for both compressed and non-compressed packaging. He said these new procedures would allow for more accurate and easier testing in the field. He indicated that removal of the “compressed” description is important, because a consumer needs to know the usable amount of volume inside the package. These new procedures will minimize destructive testing, and will cover testing of new products in the market place. He strongly supports the proposal. A regulator asked if this procedure would include pelletized product. The industry representative indicated it would cover those products. Another regulator asked if compressed product would be broken up or crushed in the compressing process, and would therefore settle out to net a different volume. The industry representative explained that there is a certain amount of destruction, so the usable volume will generally be slightly less than the volume statement. A regulator expressed support for this item to allow for clear and easy understanding by the consumer. Another regulator asked a question about the chute design during the test procedure. The industry representative explained that one of the challenges in testing volume is the amount of variability, depending on the raw material you are starting with. He further explained that the chute allowed for more consistency among and between products and repeated testing. NEWMA forwarded the item to NCWM and recommended that this be a Voting Item.

At the 2014 SWMA Meeting, the Committee heard an overview of the changes being suggested from NIST. The Committee also heard that the requirement to put a compressed statement on a package was unnecessary and not very useful to the end user. The recoverable volume is what the customer uses. This would remove animal bedding from the test method in its entirety. The Committee heard that the test procedures are ready. It was also noted that the illustrations be changed to depict peat moss. SWMA forwarded the item to NCWM, recommending it as a Voting Item.

CWMA Action - Item 260-2
Summary of comments considered by the regional committee (in writing or during the open hearings):
A NIST representative commented that this is a proposal for an improved dimensional test procedure that came out of the research for animal bedding testing.
Item as proposed by the regional committee: (If different than agenda item)
Committee recommendation to the region:
<input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)
Reasons for the committee recommendation:
The proposal has been fully developed and is ready for voting status.
COMPLETE SECTION BELOW FOLLOWING VOTING SESSION
Final updated or revised proposal from the region: (If different than regional committee recommendation)

Regional recommendation to NCWM for item status:

- Voting Item on the NCWM Agenda
 Information Item on the NCWM Agenda
 Withdraw the Item from the NCWM Agenda (*In the case of new items, do not forward to NCWM*)
 Developing Item on the NCWM Agenda (*To be developed by source*)
 Unable to consider at this time (*Provide explanation in the "Additional Comments" section below*)

Regional Report to NCWM:

A NIST representative commented that this is a proposal for an improved dimensional test procedure that came out of the research for animal bedding testing. The Committee feels the proposal has been fully developed and is ready for voting status.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents.

260-3 V Section 3.15. Test Procedure for Verifying the Expanded Volume Declaration on Packages of Animal Bedding

Source:

NIST Office of Weights and Measures (2015)

Purpose:

Add a test procedure in HB133, Section 3.15. Test Procedure for Verifying the Expanded Volume Declaration on Packages on Animal Bedding. This test procedure will be used for verifying the compressed volume and expanded (uncompressed) volume on packages of animal bedding.

Item Under Consideration:

Amend NIST Handbook 133 as follows:

Section 3.15. Test Procedure for Verifying the Expanded Volume Declaration on Packages of Animal Bedding

3.15.1. Test Equipment

- **Calculator or Spreadsheet Software**
- **Modified Standard Package Report Form – Appendix D (at end of report).**
- **Package Inspection Worksheet Appropriate for Test Measure:**
 - **Appendix A – 26 Point Measurement Grid and Package Error Worksheet for Cylindrical Test Measures (at the end of the report)**
 - **Appendix B – 25 Point Measurement Grid and Package Error Worksheet for Square or Rectangular Test Measures (at the end of the report)**
- **Permanent Ink - Marking Pen.**
- **Knife or Razor Cutter (for use in opening packages and unwrapping shrink-wrapped pallets in warehouses)**
- **Cellophane Tape, Duct Tape (for repairing chutes and sealing packages)**

- **Polyethylene Bags (49 L to 113.5 L [13 gal to 30 gal]) (to hold product once it is uncompressed)**
- **Rigid Rulers – Starrett³ or equal with 1.0 mm graduations. The edges of a ruler used with a measuring frame must be straight and the edges must be the zero point (see Exhibit 2).**
 - **300 mm (12 in)**
 - **500 mm (19.5 in)**
 - **1 m (39 in)**
- **Tarp - Canvas 3 m × 3 m (10 ft × 10 ft)**
- **Broom and Dust Pan**
- **Levels – for verifying the level of the test measure and taking headspace readings.**
 - **152 mm (6 in) Bubble Level**
 - **1 m (40 in) Carpenter Level**
- **Scale 15 kg (30 lb) (only used if the audit procedure is utilized.)**
- **Chutes for Uncompressing and Pouring the Bedding into a Test Measure**

³ Notice: The mention of trade or brand names does not imply endorsement or recommendation by the U.S. Department of Commerce over similar products available from other manufacturers.

Table 1. Recommended Chute Dimensions

<u>Nominal Capacity</u>	<u>Height</u>	<u>Width</u>	<u>Length</u>
<u>70 L (2.5 ft³)</u>	<u>254 mm (10 in)</u>	<u>228 mm (9 in)</u>	<u>1219 mm (48 in)</u>
<u>100 L (3.5 ft³)</u>	<u>254 mm (10 in)</u>	<u>279 mm (11 in)</u>	<u>1397 mm (55 in)</u>
<u>170 L (6 ft³)</u>	<u>279 mm (11 in)</u>	<u>355 mm (14 in)</u>	<u>1727 mm (68 in)</u>
<u>240 L (8.5 ft³)</u>	<u>304 mm (12 in)</u>	<u>406 mm (16 in)</u>	<u>2006 mm (79 in)</u>
<u>283 L (10 ft³)</u>	<u>304 mm (12 in)</u>	<u>406 mm (16 in)</u>	<u>2286 mm (90 in)</u>

NOTE: Chutes (see examples below) may be constructed using hinges and pins so that they lie flat for transporting. They can be constructed of sheet metal or with other slick surface material which enable the bedding to flow easily. The construction of the chutes used in this study allows the sides to move in or out slightly so that the bedding does not become clogged at the outlet. The heights and lengths may be adjusted slightly to fit into vehicles for transport but the widths should not be reduced because narrowing the opening can restrict material flow and result in “bridging” where the bedding collects and creates a block. Also, the width should be kept smaller than the opening of the test measure so that spillage does not occur during pouring.

**Figure 2. Testing Chutes.**

- **Test Measures (see Table 2. “Test Measures for Animal Bedding”)**

Table 2. Test Measures for Animal Bedding NOTES: a, b, c, and d

**Only Interior Dimensions are Used for Volume Calculations
Must Be Calibrated with Traceable Measurement Standards Prior to Use**

Rectangular & Square Test Measures

<u>Actual Volume of the Measure</u> ^{b & d}	<u>Interior Wall Dimensions</u>			<u>Surface Area</u>	<u>Marked Increments on Ruler</u>	<u>Increment Volume</u>
	<u>Length</u>	<u>Width</u>	<u>Height</u> ^d			
<u>31.9 L</u> <u>1.13 ft³</u>	<u>213.4 mm</u> <u>(8.4 in)</u>	<u>203.2 mm</u> <u>(8 in)</u>	<u>736.6 mm</u> <u>(29 in)</u>	<u>43 362 mm²</u> <u>(67.2 in²)</u>	<u>12.7 mm</u> <u>(0.5 in)</u>	<u>550.6 mL*</u> <u>0.55 L</u> <u>(33.6 in³)</u>
<u>28.3 L</u> <u>1 ft³</u>	<u>304.8 mm</u> <u>(12 in)</u>	<u>304.8 mm</u> <u>(12 in)</u>	<u>304.8 mm</u> <u>(12 in)</u>	<u>92 903 mm²</u> <u>(144 in²)</u>		<u>1.18 L**</u> <u>(72 in³)</u>
<u>63.7 L</u> <u>2.25 ft³</u>	<u>304.8 mm</u> <u>(12 in)</u>	<u>304.8 mm</u> <u>(12 in)</u>	<u>685.8 mm</u> <u>(27 in)</u>			
	<u>406.4 mm</u> <u>(16 in)</u>	<u>228.6 mm</u> <u>(9 in)</u>	<u>685.8 mm</u> <u>(27 in)</u>			
<u>92 L</u> <u>3.25 ft³</u>	<u>304.8 mm</u> <u>(12 in)</u>	<u>304.8 mm</u> <u>(12 in)</u>	<u>990.6 mm</u> <u>(39 in)</u>	<u>990.6 mm</u> <u>(39 in)</u>		
	<u>406.4 mm</u> <u>(16 in)</u>	<u>228.6 mm</u> <u>(9 in)</u>	<u>990.6 mm</u> <u>(39 in)</u>			

***1.0 mm = 43 mL (2.6 cu in) ** 1.0 mm = 92 mL or 0.09 L (5.6 cu in)**

Square Test Measures

<u>Actual Volume of the Measure</u> ^{b & d}	<u>Interior Wall Dimensions</u>			<u>Surface Area</u>	<u>Marked Increments On Ruler</u>	<u>Increment Volume</u>
	<u>Length</u>	<u>Width</u>	<u>Height</u> ^d			
<u>77.4 L</u> <u>(2.73 ft³)</u>	<u>381 mm</u> <u>(15 in)</u>	<u>381 mm</u> <u>(15 in)</u>	<u>533.4 mm</u> <u>(21 in)</u>	<u>145 161 mm²</u> <u>(225 in²)</u>	<u>1.0 mm</u> <u>(0.03937 in)</u>	<u>0.14 L</u> <u>(8.5 in³)</u>
<u>144 L</u> <u>(5.09 ft³)</u>	<u>508 mm</u> <u>(20 in)</u>	<u>508 mm</u> <u>(20 in)</u>	<u>558.8 mm</u> <u>(22 in)</u>	<u>258 064 mm²</u> <u>(400 in²)</u>		<u>0.25 L</u> <u>(15.2 in³)</u>
<u>283 L</u> <u>(10 ft³)</u>	<u>609.6 mm</u> <u>(24 in)</u>	<u>609.6 mm</u> <u>(24 in)</u>	<u>762 mm</u> <u>(30 in)</u>	<u>371 612 mm²</u> <u>(576 in²)</u>		<u>0.37 L</u> <u>(22.5 in³)</u>

Table 2. Test Measures for Animal Bedding NOTES: a, b, c, and d

Only Interior Dimensions are Used for Volume Calculations
Must Be Calibrated with Traceable Measurement Standards Prior to Use

Cylindrical Test Measures

These dimensions are based on the tube having a ¼ inch wall thickness. Other tube thicknesses may be used.

<u>Actual Volume</u> <u>Volume = $\pi r^2 h$</u>	<u>Interior Diameter</u> <u>(Outside Diameter)</u>	<u>Height</u>	<u>Surface Area</u> <u>Area = πr^2</u>	<u>Increment</u>	<u>Increment</u> <u>Volume</u>
<u>52 L</u> <u>(1.8 ft³)</u>	<u>292.1 mm (304.8 mm)</u> <u>11.5 in (12 in)</u>	<u>780 mm</u> <u>(30.70 in)</u>	<u>67 012 mm²</u> <u>(103.8 in²)</u>	<u>1.0 mm</u> <u>(0.03937</u> <u>in)</u>	<u>0.06 L</u> <u>(4 in³)</u>
<u>124 L</u> <u>(4.3 ft³)</u>	<u>444.5 mm (457.2 mm)</u> <u>17.5 in (18 in)</u>	<u>800 mm</u> <u>(31.49 in)</u>	<u>155 179 mm²</u> <u>(240.52 in²)</u>		<u>0.15 L</u> <u>(9.4 in³)</u>
<u>279 L</u> <u>(9.8 ft³)</u>	<u>596.9 mm (609.6 mm)</u> <u>23.5 in (24 in)</u>	<u>1000 mm</u> <u>(39.37 in)</u>	<u>279 829 mm²</u> <u>(433.76 in²)</u>		<u>0.27 L</u> <u>(16.4 in³)</u>

Notes for Table 2:

- a. **Rectangular and Square Based Dry Measures are typically constructed of 12.7 mm to 19.05 mm (0.5 in to 0.75 in) Marine Plywood. A 4.76 mm (³/₁₆ in) transparent sidewall is useful for determining the level of fill, but must be reinforced or be made of thicker material if it distorts when the measure is filled. If the measure has a clear front, place the level gage at the back (inside) of the measure so that the markings are read over the top of the mulch. Any of these measures may be made without an attached bottom for ease of emptying if they are placed on a solid level base during filling and measurement.**
- b. **Other size measures may be used if calibrated and the volume equivalence of the increment of 1.0 mm is no greater than 1/6 the MAV. Widening the base of a measure reduces the column height of the product and will reduce compression but the trade-off is that the larger surface area increases the volume so the potential for measurement errors increase. One of the benefits of the cylindrical design is that, in addition to eliminating the 90 degree angles of the corners where gaps in fill frequently occur, the surface area of a cylinder is less than an equal volume square measure and that results in better resolution in the volume measurements (i.e., compare the readability of a 24 in sq box which has a surface area of 576 in², to the 24 in cylinder which has a surface area of 433 in²). The height of the test measure may be reduced, but this will limit the volume of the package that can be tested.**
- c. **If lines are marked in any test measures, they should extend around all sides of the measure if possible to improve readability. It is recommended that a line indicating the MAV level also be marked to reduce the possibility of reading errors when the level of the product is at or near the MAV.**
- d. **If the measures are built to the dimensions shown above, the actual volume of most of the measures will be larger than the nominal volume so that plus errors (overfill) can be measured accurately.**

3.15.2. Test Procedure

Test Notes:

Rounding: When a volume measurement falls between graduations on a ruler, round the value in the direction that favors the packer. This practice eliminates the issue of rounding from the volume determination and provides packagers the benefit of the doubt. The ruler graduation is 1.0 mm so the rounding error will be limited to 0.5 mm or less. It is good practice to circle a

measurement that has been rounded up or make a statement to such effect so that it becomes a part of the inspection record.

Safety:



This procedure does not address all of the safety issues that users need to be aware of in order to carry out the following tasks. Users are sometimes required to conduct test in warehouse spaces or retail stores where fork-trucks are in motion – care must be taken to warn others to avoid or exercise care around the test site. The procedure requires users to lift heavy objects including large bulky packages and test measures and includes the use of sharp instruments to obtain packages from shrink-wrapped pallets. Users may be required to climb ladders or work platforms to obtain packages. When opening and emptying packages, dust, and other particles may be present or escape from the packages which may cause eye injuries and respiratory or other health problems. Users must utilize appropriate safety equipment and exercise good safety practice. If safe working conditions cannot be ensured, suspend testing until the situation is corrected.

1. Follow the Section 2.3.1. “Define the Inspection Lot” select “Category A, Sampling Plan” in this inspection. Determine the Sample Size based on the size of the Inspection Lot using Category A. Collect the sample packages from the Inspection Lot using Section 2.3.4. “Random Sampling Selection.”

Test Note: Place the test equipment and sample packages in a location where there is adequate lighting and ample space around the packages and equipment so the packages can be opened and the chutes and test measures used safely.

Optional – Audit Screening by Weight

The full test procedure requires that all of the packages be opened for testing. Regardless of the type of bedding, the product cannot be returned to the original package. An alternative gravimetric auditing procedure may be used to reduce the amount of destructive testing and conserve inspection resources.

Audit Procedure: After randomly selecting the sample packages from the Inspection Lot, obtain the gross weight for each package. Select the lightest and heaviest packages and conduct an expanded volumetric test these two packages. If the lightest and heaviest packages pass (i.e., each contains at least the expanded volume declared on the label), it is highly likely that the remaining packages in the sample will also pass. Accept these two package samples as an AUDIT TEST and move on to inspect other types of bedding or Inspection Lots of other types or brands of bedding. If either of the two packages is found to have a minus error that exceeds the Maximum Allowable Variation, the sample fails. No further testing is required (i.e., assuming no MAV is allowed for the sample size (see Appendix A, Table 2-1. “Sampling Plans for Category A”).) If either of the packages is found to have a minus error that does not exceed the MAV, continue to test all of the packages and take action based on the final results from the complete sample.

Test Note: If the gravimetric audit procedure is used, ensure that the scale is placed on a solid level support and that its accuracy has been verified to a test load that is at least 10 percent more than the gross weight of the packages (e.g., to estimate that load, place one of the packages on the scale and then test the scale with a load above the package’s gross weight). See Section 2.2. “Measurement Standards and Test Equipment” for additional information.

- 2. Select the appropriate test measure for the package size.**
 - **Spread a tarp large enough to hold a chute and test measure.**
 - **Place the chute and test measure on the tarp. Verify that the test measure is level.**
- 3. Select a chute of appropriate capacity (see Table 1) for the package size and position it on the tarp.**
- 4. Open the Packaging, Uncompressing and Pouring the Bedding into the Test Measure Twice.**
 - **Open Package: Place the package in the chute and use a knife or box cutter to open and remove the wrapper. Spread the bedding uniformly along the length of the chute. The bedding is uncompressed in two steps. The first step is to loosen the clumps of bedding by gently pulling them apart (do not tear the fibers of cellulose bedding or “grind” any bedding between your hands because these practices break the material down). Spread your fingers and pick the material up using your hands from beneath to loosen it up. There should be no clumps of bedding in the chute. If any bedding has fallen out of the chute onto the tarp, collect it and return it to the chute. The following pictures illustrate this step of the procedure. The second step of the expanded volume recovery process is to pour the bedding into a test measure as described in Step 2.**

Exhibit 1.



Exhibit 2.



Exhibit 3. First pour into the test measures.



- **First Pour: The first pour into the test measure is only used to further un-compress the bedding so no measurements are taken. Hold the chute above the test measure and tilt it so that you pour the bedding into the center of the test measure. The bedding should be poured slowly into the test measure in one continuous stream and not “dumped” (if it is “dumped” or poured too quickly some of the bedding will blow out of the measure or the bedding will be packed down and its volume reduced). The flow rate should be controlled by the tilt angle of the chute. The chute itself can be shaken but DO NOT HIT OR SHAKE THE TEST MEASURE. (Do not adjust the flow by closing the opening of the chute as that may cause the bedding to heap up and then fall into the measure in clumps which may result in impact compression). Empty the bedding back into the chute and spread it out evenly along its length.**



Exhibit 4. Showing how to hold a chute for the pour.



Exhibit 6. Showing how to cradle the chute on one arm and holding it with one hand while tilting it with the other hand.

- **Second Pour: The second pour into the test measure is used to make the volume determination. Hold the chute above the test measure and tilt it so that you pour the bedding into the center of the test measure. The bedding should be poured slowly into the test measure in one continuous stream and not “dumped.” The flow rate should be**

controlled by the tilt angle of the chute. The chute can be shaken but DO NOT HIT OR SHAKE THE TEST MEASURE.

Test Note: Stop filling the measure if it appears that the test measure will overflow. The overflow product should be measured separately (use a smaller test measure of adequate size and capacity if one is available) and the multiple measurement volumes are added. If pouring into a square test measure, pour at an angle to two corners for the widest opening (see Exhibit 12).



Exhibit 6. Filling a 44 L Test Measure.



Exhibit 7. Filling a Square Test Measure at an Angle to use the Larger Opening.

5. Volume Determination.

DO NOT HAND LEVEL THE SURFACE OF THE BEDDING AS MANUAL LEVELING “PACKS” THE BEDDING AND REDUCES ITS VOLUME. DO NOT JAR OR SHAKE THE TEST MEASURE

Test Note: Before using a test measure for volume determinations, place a level of adequate length on top of the test measure at five approximately equal measuring points across the top. A permanent marking pen can be used to evenly space the marks across the top edge of the test measure so that it can be positioned to take the measurements (see Exhibit 13).



Exhibit 7. Marking the evenly spaced measuring points across the top of the test measure.

- **Place a rigid level or straight edge of adequate size on top the test measure and select a ruler of adequate length to reach to the lowest level of the top surface of the bedding. Start at the measuring points to your left or right, place the ruler against the side of the level, and hold it with either hand. The zero graduation is pointed down so the ruler can be lowered into the test measure for measurement. Lower the ruler into the test measure slowly until its end is at the surface level of the bedding (see Exhibits 14 and 15).**



Exhibit 8. Placing ruler into the test measure with zero end down.



Exhibit 10. Ruler shown with zero end at surface of the bedding.

- **Determine the depth of each measurement point from the surface of the bedding to the bottom edge of the straight edge and record the value in the appropriate space on the worksheet. Take a minimum of 25 measurements (at least 26 for cylindrical measures) across the top of the test measure in a grid pattern. Read the graduations on the ruler from a position that minimizes errors caused by parallax.**

Table 2. Illustrations of Depth Determinations with Cylindrical Test Measures



Figure 1. Shows how to read the depth of container.

The picture on the left (Figure1) shows how to read the depth from the bottom of the straightedge (top edge of measure) down to the bedding in a 44 L test measure from a position that reduces parallax. The graphic below (Figure 2) illustrates the actual worksheet with the headspace procedure on the 44 L cylinder test measure (its internal radius is 151 mm and its height is 610 mm). The bedding was poured into the test measure but not leveled. Then 26 measurements were made at the locations shown on the grid to determine the depth of the product from the top edge of the measure. The average of the 26 values was 500.7 mm which was subtracted from the height of the test measure to obtain 109.26 mm for the average height of the column of bedding in the measure.

The volume was calculated using: $Volume\ in\ liters = \pi r^2 h$ Pi) $3.14159265 \times 23035.69 \times 109.26\ mm = 7.90\ L^*$

***After the calculation was completed the result was divided by 1 000 000 to obtain the volume in liters.**

Figure 2 Illustration of Worksheet.

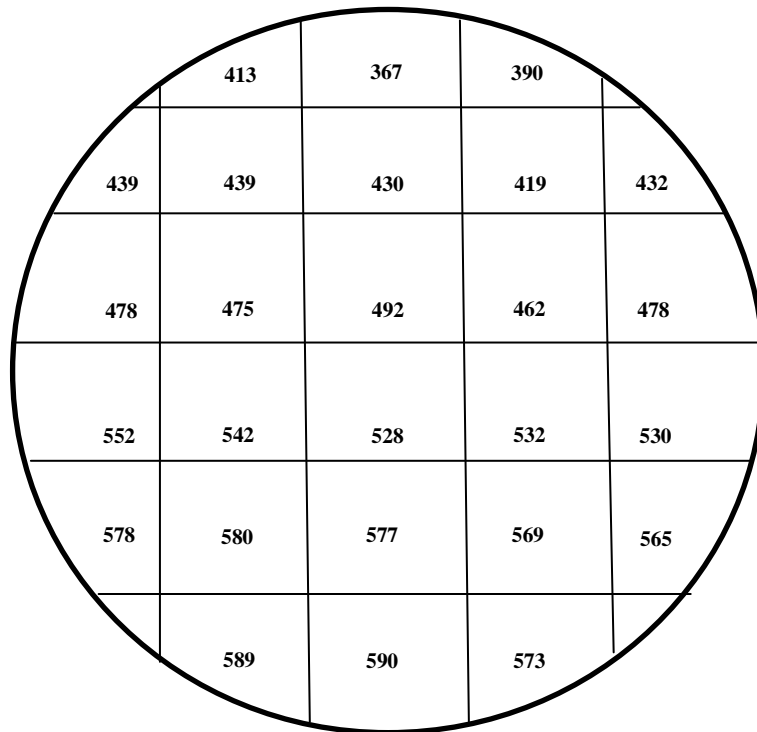


Table 2. Illustrations of Depth Determinations with Cylindrical Test Measures



Figure 3. Using the headspace measurement on a 279 L test measure. The ruler is read from the bottom edge of a straight edge or level from a position that reduces parallax.



Figure 4. Illustrating how the ruler is placed on the bedding with the headspace method. The ruler is read from the bottom edge of a straight edge or level from a position that reduces parallax.

Table 3. Illustrations of Depth Determinations with Square Test Measures



Figure 1.

<u>246</u>	<u>162</u>	<u>81</u>	<u>132</u>	<u>177</u>
<u>195</u>	<u>115</u>	<u>43</u>	<u>46</u>	<u>112</u>
<u>111</u>	<u>77</u>	<u>51</u>	<u>95</u>	<u>146</u>
<u>220</u>	<u>138</u>	<u>46</u>	<u>98</u>	<u>131</u>
<u>264</u>	<u>193</u>	<u>118</u>	<u>148</u>	<u>180</u>

Figure 2.

The picture on the left (Figure 1) shows how to read the depth from the bottom of the straightedge (top edge of measure) down to the bedding in a 283 L square test measure from a position that reduces parallax. The graphic on the right (Figure 2) illustrates the actual worksheet with the headspace procedure on the square test measure (its internal dimensions are 609.6 mm × 609.6 mm × 762 mm (24 in × 24 in × 30 in). The bedding was poured into the test measure but not leveled. Then 25 measurements were made at the locations shown on the grid to determine the depth of the product from the top edge of the measure. The average of the 25 values was 133 mm that was subtracted from the height of the test measure to obtain 629 mm for the average height of the column of bedding in the measure.

The volume was calculated using: Volume in liters = lwh 609.6 mm × 609.6 mm × 629 mm = 233.74 L*

***After the calculation was completed, the result was divided by 1 000 000 to obtain the volume in liters.**



Figure 3. Using the headspace measurement on 56.6 L (2 cu ft) test measure. The ruler is read from the bottom edge of a straight edge or level from a position that reduces parallax.

Table 3. Illustrations of Depth Determinations with Square Test Measures

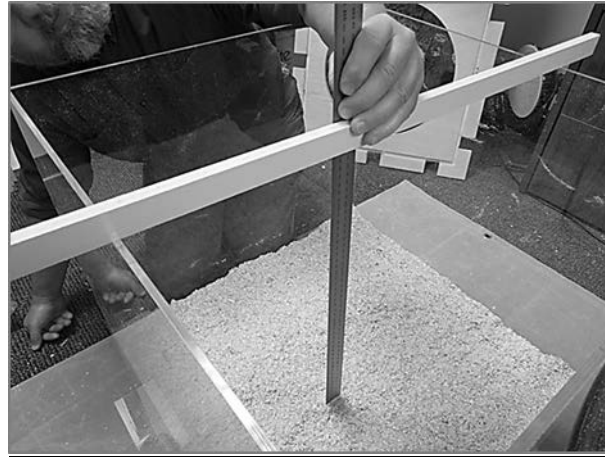


Figure 4. Showing how the ruler is placed on the bedding with the headspace method. The ruler is read from the bottom edge of a straight edge or level from a position that reduces parallax.

6. Using a Worksheet for Volume Calculation

- **Enter the sample number of the package on the worksheet along with its labeled expanded volume.**
- **Test Measure Information**
 - **For a cylindrical test measure, enter its interior height and radius in the spaces labeled A and B.**
 - **For a square or rectangular test measure enter its interior height and the area of its base (i.e., length × width) in spaces labeled A and B.**
- **Sum the measurements in the grid, divide the value by the number of measurements (i.e., 25 or 26), and enter this value in the space labeled C, Average Depth.**
- **Calculate the Average Height of the Bedding (subtract C [Average Depth] from A [Interior Height of Test Measure]) and enter this value in the space labeled D.**
- **Calculate the Volume of Bedding in the Package:**
 - **For a cylindrical test measure, the formula ($Volume\ in\ Liters = \pi r^2 h$) is shown in E on the worksheet. It is $Volume\ (Liters) = 3.14159265 \times r^2 (B^2) \times Average\ Height\ (D) \div 1\ 000\ 000$. Enter the package volume in the space provided for this value in E.**
 - **For a square or rectangular test measure the formula ($Volume\ in\ Liters = LWH$) is shown in E on the worksheet. It is $Volume\ (Liters) = B\ (Area\ of\ Test\ Measure\ Base) \times D\ (Average\ Height) \div 1\ 000\ 000$. Enter the package volume in the space provided for this value in E.**
- **Calculate the Package Error using the following formula:**
 - **Package Error = Labeled Expanded Volume (Liters) – E Package Volume (Liters)**

$$\text{Package Error (Liters)} = \text{Labeled Expanded Volume} - \text{Package Volume}$$

- Transfer the individual package errors (verify whether they are positive or negative) to the “Modified Standard Package Report for Animal Bedding” in Appendix D. Fill in the required header information. For Box 7, “Number of Unreasonable Package Errors Allowed for Sample Size, use Appendix A, to Table 2-1. “Sampling Plans for Category A, Column 4.”, Based on the sample size, determine how many packages may have minus package errors that exceed the MAV (i.e., unreasonable package error).

Then:

- Calculate the Total Error (Enter in Box 8. “Total Error”).

7. Evaluation of the Test Results and Determination of Pass or Fail

- Determine if any of the minus package errors exceeds the MAV. Apply a tentative MAV value of 5 % ($0.05 \times$ labeled expanded volume) to single measurement volume determinations and a tentative MAV value of 10 % ($0.10 \times$ labeled expanded volume) on multiple-measurement volume determinations (enter in Box 4 “MAV”). If none of the minus package errors exceeds the MAV, go to Step 3. If any of the minus package errors exceed the MAV, enter the number of packages in Box 9 “Number of Unreasonable Minus Errors”. Go to Box 10 “Is Box 9 Greater than Box 7?” and determine if the value exceeds the number in Box 7 “Number of Unreasonable Package Errors Allowed for Sample Size”. If the number of packages with unreasonable errors exceeds the number permitted in Box 7 “Number of Unreasonable Package Errors Allowed for Sample Size,” the sample fails. Go to Box 17 “Disposition of the Inspection Lot” and reject the Inspection Lot.
- Calculate the Average Error for the sample by dividing Box 8 “Total Error,” by Box 6 “Sample Size” and enter the value in Box 11 “Calculate Average Error,” then go Box 12 “Does Box 11 equal Zero or Plus?” If the Average Error is zero or a positive number the sample passes, go to Box 17 “Disposition of the Inspection Lot” and approve the inspection lot. If the Average Error is a negative value go to Step 4.
- Calculate the Sample Standard Deviation and enter in Box 13. 13 “Compute Sample Standard Deviation.” To obtain the Sample Correction Factor for the sample size use Appendix A, Table 2-1. “Sampling Plans for Category A,” Column 3 “Sample Correction Factor” and enter that in Box 14 “Sample Correction Factor.” Then calculate the Sample Error Limit by multiplying Box 13 “Compute Sample Standard Deviation” and Box 14 “Sample Correction Factor.” Enter the value in Box 15 “Compute Sample Error Limit.”
 - Disregarding the signs, determine if the minus in Box 11 “Calculate Average Error” is larger than the value in Box 15 “Compute Sample Error Limit.”
 - If yes, the sample fails, go to Box 17 “Disposition of Inspection” and reject the Inspection Lot.
 - If no, the sample passes, go to Box 17 “Disposition of Inspection” and approve the Inspection Lot
- Prepare a comprehensive report of the test results and enforcement action taken and present the information to the party responsible for the product.

Background/Discussion:

This proposal will provide a standardized test method that will improve measurement accuracy at the point of pack and in testing at other locations. The test procedures recommend the use of a gravimetric audit procedure that may reduce destructive testing and reduce inspection time.

Even though some existing test measures may still be used the proposal encourages users to purchase the prescribed volumetric test measures, chutes and measuring instruments.

The NIST, OWM will develop and provide technical training on this subject matter and develop detailed equipment designs and drawings which will be made available on its website. The OWM will assist the animal bedding industry in implementing the proposed method of sale as well as developing and incorporating good manufacturing practices to ensure that the requirements of NIST Handbook 133 are met.

At the 2015 NCWM Interim Meeting there was support from Richard Whiting (American Wood Fiber). Mr. Whiting worked closely with NIST, OWM on reviewing this test procedure and agrees this procedure has less variability, less sensitivity, less time consuming, and is easier to perform in the field. A California county representative (regulator) suggested that the definition for animal bedding should account for wood shavings and chips. He also inquired about the results when the procedure is used to test ground corn and cat litter? It was also remarked that building a chute as specified and lifting it on shoulders and pouring needs to be examined. Could this be done with smaller chutes and multiple pours? Mr. Whiting who has performed this procedure remarked that this may need two inspectors. He also remarked that dense particle size have repeatability. The NIST Technical Advisor remarked that the background information is being reviewed formatting by the office publication coordinator and advised that no technical changes were being made and would be resubmit with Publication 16 (2015). The 2015 L&R Committee agreed that to move this forward as a Voting Item.

Refer to Appendix C., “Testing Packages of Animal Bedding and Peat Moss with Compressed and Expanded Volume Declarations” for the Executive Summary, additional background and supporting information.

Regional Association Comments:

During the 2014 NEWMA Interim Meeting, the L&R Chairman stated that NIST, OWM had submitted considerable information for the regions to review. This is one of a number of proposals that represents a large amount of work done at NIST to provide more consistent standards. An industry representative commented that he participated in the development of this proposal, and said industry has had a long-term struggle with various standards for both compressed and non-compressed packaging. He said these new procedures would allow for more accurate and easier testing in the field. He indicated that removal of the term “compressed” from the descriptor is important, because a consumer needs to know the usable amount of volume inside the package. These new procedures will minimize destructive testing, and will cover testing of new products in the market place. He strongly supports the proposal. A regulator asked if this procedure would include pelletized product. The industry representative indicated it would cover those products. Another regulator asked if compressed product would be broken up or crushed in the compressing process, and would therefore settle out to net a different volume. The industry representative explained that there is a certain amount of destruction, so the usable volume will generally be slightly less than the volume statement. A regulator expressed support for this item to allow for clear and easy understanding by the consumer. Another regulator asked a question about the chute design during the test procedure. The industry representative explained that one of the challenges in testing volume is the amount of variability, depending on the raw material you are starting with. He further explained that the chute allowed for more consistency among and between products and repeated testing. NEWMA forwarded the item to NCWM and recommended that this be a Voting Item.

At the 2014 SWMA Meeting, the Committee heard an overview of the changes being suggested from NIST. The Committee also heard that the requirement to put a compressed statement on a package was unnecessary and not useful to the end user. The recoverable volume is what the customer uses. The Committee heard that the test procedures are ready. SWMA forwarded the item to NCWM, recommending it as a Voting item.

CWMA Action - Item 260-3
Summary of comments considered by the regional committee (in writing or during the open hearings):
See 232-3
Item as proposed by the regional committee: (If different than agenda item)
Committee recommendation to the region:
<input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)
Reasons for the committee recommendation:
See 232-3
COMPLETE SECTION BELOW FOLLOWING VOTING SESSION
Final updated or revised proposal from the region: (If different than regional committee recommendation)
Regional recommendation to NCWM for item status:
<input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>) <input type="checkbox"/> Unable to consider at this time (<i>Provide explanation in the "Additional Comments" section below</i>)
Regional Report to NCWM:
Same as 232-3. An industry representative from American Wood Fibers supports the proposal. A regulator from Ohio expressed concern as to whether the cat litter industry had been notified that the method of sale would change from weight to volume. Provided clarification is made as to whether or not cat litter is exempted, this item should move forward as a voting item.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents

270 OTHER ITEMS

270-1 D Fuels and Lubricants Subcommittee

Source:

The Fuels and Lubricants Subcommittee (2007)

Purpose:

Update the Uniform Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation in NIST Handbook 130 including major revisions to fuel ethanol specifications. Another task will be to update the Basic Engine and Fuels, Petroleum Products, and Lubricants Laboratory Publication.

Item Under Consideration:

This item is under development. All comments should be directed to Dr. Matthew Curran, FALS Chair at (850) 921-1570, Matthew.Curran@freshfromflorida.com, or Ms. Lisa Warfield, NIST Technical Advisor at (301) 975-3308, lisa.warfield@nist.gov.

Background/Discussion:

The Subcommittee met on January 24, 2007, at 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 NIST Handbook 130. The Subcommittee also met at the 2007 NCWM Annual Meeting and continued its work on a number of items in addition to preparing a major revision of the Fuel Ethanol Specifications.

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

CWMA Action - Item 270-1
Summary of comments considered by the regional committee (in writing or during the open hearings):
Ron Hayes, past chair, indicated the FALS group would meet again in Philadelphia and update the Conference on activities.
Item as proposed by the regional committee: (If different than agenda item)
Committee recommendation to the region:
<input type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)
Reasons for the committee recommendation:
COMPLETE SECTION BELOW FOLLOWING VOTING SESSION
Final updated or revised proposal from the region: (If different than regional committee recommendation)
Regional recommendation to NCWM for item status:
<input type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>) <input type="checkbox"/> Unable to consider at this time (<i>Provide explanation in the "Additional Comments" section below</i>)
Regional Report to NCWM:
Ron Hayes, past chair, indicated the FALS group would meet again in Philadelphia and update the Conference on activities.

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents.

270-2 D Packaging and Labeling Subcommittee

Source:

Packaging and Labeling Subcommittee (2011)

Purpose:

Provide notice of formation of a new Subcommittee reporting to the L&R Committee.

Item Under Consideration:

This item is under development. All comments should be directed to Mr. Chris Guay, Packaging and Labeling Subcommittee Chair at (513) 983-0530, guay.cb@pg.com or Mr. David Sefcik, NIST Technical Advisor at (301) 975-4868, david.sefcik@nist.gov.

Background/Discussion:

2011 NCWM Interim Meeting: The PALS met for the first time to discuss ongoing issues and agenda items in regards to packaging and labeling regulations. There were 11 attendees that represented industry, state and county regulatory officials, and the NIST Technical Advisor.

The mission of PALS is to assist the L&R Committee in the development of agenda items related to packaging and labeling. The Subcommittee will also be called upon to provide important and much needed guidance to the regulatory and consumer packaging communities on difficult questions. PALS will report to NCWM L&R Committee. The NIST Technical Advisor reported that FTC will do a review of FPLA in 2013. The 2011 L&R Committee designated this item as a Developing Item and assigned its development to PALS.

2012 NCWM Interim Meeting: PALS met to discuss its formation and strategy. The NCWM Chairman will appoint eight voting members on the Committee to consist of four regulatory officials (one from each region) and four from industry (two retailers and two manufacturers). Mr. Guay, PALS Chair, reported that work will be done through webinar meetings to be held approximately four times a year. PALS members will be responsible for providing updates at their regional meetings and to seek input into issues. Mr. Guay added that PALS will be developing proposals and providing guidance and recommendations on existing proposals as assigned by the NCWM L&R Committee. He also stressed the need and importance of having key federal agencies (FDA, FTC, and USDA) participating. The NIST Technical Advisor commented that FTC announced that they will review the FPLA in 2013. The 2012 L&R Committee designated this item as a Developing Item and assigned its development to PALS.

2012 NCWM Annual Meeting: Mr. Guay reported the Subcommittee is considering further development of the following items:

- **Additional Net Content Declarations on the Principal Display Panel** - Package net contents are most commonly determined by the product form, for example – solid products are labeled by weight and liquid products are labeled by volume. Semi-solid products such as pastes, creams and viscous liquids are required to be labeled by weight in the United States and by volume in Canada.
- **Icons in Lieu of Words in Packaged labeled by Count** – Can a clear and non-misleading icon take the place of the word “count” or “item name” in a net content statement? While existing Federal regulation requires regulatory label information to be in “English,” the increasing presence of multilingual labels and the growing diversity of the U.S. population suggest more consumers are served with a clear and non-misleading icon.
- **Multilingual Labels**
- **Multipacks and Bundle Packages** - The net content statements for multipacks and bundled packages of individually labeled products can be different based on the approach used to calculate them. The difference is the result of the degree of rounding for dual inch-pound and metric declarations. Using two apparently valid but different methods can yield one net content statement result, that provide better accuracy between the metric and inch-pound declarations and a different net content result which is consumer friendly.

2012 SWMA Annual Meeting: Mr. Guay stated Item 231-1 has been assigned to PALS for a recommendation. PALS is working on a series of principles and recommendations regarding claims and statements made on packages outside of quantity statement (i.e., supplemental, quality and performance claims), on what is appropriate and what is not. PALS will recommend that Item 231-1 be Withdrawn. PALS is also looking at whether icons are appropriate as part of a quantity statement and how labeling of products with multilingual labels can be simplified. SWMA recommended that the item remain as a Developing Item.

2013 NCWM Interim Meeting: Mr. James Kohm (Director of Enforcement at the Federal Trade Commission [FTC]), briefed NCWM on the goals and objectives of FTC. Mr. Kohm gave a general overview of the Fair Packaging and Labeling Act (FPLA) and announced that it is under review in 2013.

Mr. Chris Guay provided an update on the action of PALS. PALS will be focusing on best practice principles for the various quantity and quality statements seen in the marketplace. PALS will also continue to work on the items addressed at the 2012 Annual Meeting.

2014 NCWM Interim Meeting Mr. Guay (PALS Chair) spoke that they are awaiting an announcement from FTC in regards to updating the FPLA regulations.

CWMA Action - Item 270-2
Summary of comments considered by the regional committee (in writing or during the open hearings):
Chris Guay, chair of this subcommittee commented on two items: 1) the subcommittee submitted comments twice to the FTC regarding regulations pertaining to FPLA (Federal Packaging and Labeling Act). The committee provided 15 recommendations, 5 of which were accepted and implemented into revised comments provided in FTC’s final rule. Once the changes become final, there may be changes necessary in the Handbook. 2) the committee is working on a project to establish recommended practices in relation to labeling statements on products. Currently, there is no guideline for manufacturers, and this project would provide guidance for those who wish to consider them. More will be discussed on this activity at the 100 th Annual Meeting of NCWM in Philadelphia.
Item as proposed by the regional committee: (If different than agenda item)
Committee recommendation to the region: <input type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)
Reasons for the committee recommendation:
COMPLETE SECTION BELOW FOLLOWING VOTING SESSION
Final updated or revised proposal from the region: (If different than regional committee recommendation)
Regional recommendation to NCWM for item status: <input type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>) <input type="checkbox"/> Unable to consider at this time (<i>Provide explanation in the “Additional Comments” section below</i>)
Regional Report to NCWM:
Chris Guay, chair of this subcommittee commented on two items: 1) the subcommittee submitted comments twice to the FTC regarding regulations pertaining to FPLA (Federal Packaging and Labeling Act). The committee provided 15 recommendations, 5 of which were accepted and implemented into revised comments provided in FTC’s final rule. Once the changes become final, there may be changes necessary in the Handbook. 2) the committee is working

on a project to establish recommended practices in relation to labeling statements on products. Currently, there is no guideline for manufacturers, and this project would provide guidance for those who wish to consider them. More will be discussed on this activity at the 100th Annual Meeting of NCWM in Philadelphia.

Additional letters, presentations and data may have been part of the committee’s consideration. Please refer to <http://www.ncwm.net/meetings/interim/archive> to review these documents.

270-3 D Moisture Allowance Task Group (MATG)

Source:

Moisture Allowance Task Group (2012)

Purpose:

Provide notice of formation of a new Task Group reporting to the Committee. This Task Group will provide additional guidance for making moisture allowances for products not listed in NIST Handbook 133.

Item Under Consideration:

This item is under development. All comments should be directed to Mr. Kurt Floren, Moisture Allowance Task Group Chair at (626) 575-5451, kflorenc@acwm.lacounty.gov or Ms. Lisa Warfield, NIST Technical Advisor at (301) 975-3308, lisa.warfield@nist.gov

Background/Discussion:

2012 NCWM Interim Meeting: Ms. Judy Cardin, Committee Chair, will be requesting that the NCWM Board of Directors form a new Task Group to review moisture allowance. The 2012 L&R Committee designated this item as a Developing Item.

2012 NCWM Annual Meeting: Mr. Kurt Floren (Los Angeles County, California) announced that he will Chair the Moisture Allowance Task Group.

2013 NCWM Interim Meeting: Mr. Floren announced that he is seeking a representative from each region for the MATG. He would prefer to have a representative from each region. Currently the following have regions have provided a representative; NEWMA, Mr. Frank Greene, (Connecticut) and WWMA, Mr. Brett Gurney (Utah). The following individuals have also expressed interest; Ms. Maile Hermida (Hogan Lovells US, LLP), Ms. Ann Boeckman (Kraft Foods Group), Mr. Chris Guay (Procter and Gamble Co.). Mr. Floren remarked that meetings will be held via web-meetings and at the NCWM Conferences.

At the 2014 NCWM Interim Meeting the MATG discussed how to proceed forward on this item and reviewed past history of prior work done.

At the 2014 NCWM Interim Meeting Kurt Floren (MATG Chair) informed the Committee that there has been scheduling conflicts with other priorities this past year and he has not had the opportunity to get a meeting scheduled. Mr. Floren would like to opportunity to continue this subcommittee group and will pursue this item addressed.

CWMA Action - Item 270-3
Summary of comments considered by the regional committee (in writing or during the open hearings):
Ron Hayes provided an update indicating that since the group had not met, the Board is considering dissolving the task group.
Item as proposed by the regional committee: (If different than agenda item)

<p>Committee recommendation to the region:</p> <input type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)
<p>Reasons for the committee recommendation:</p>
<p>COMPLETE SECTION BELOW FOLLOWING VOTING SESSION</p>
<p>Final updated or revised proposal from the region: (<i>If different than regional committee recommendation</i>)</p>
<p>Regional recommendation to NCWM for item status:</p> <input type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>) <input type="checkbox"/> Unable to consider at this time (<i>Provide explanation in the "Additional Comments" section below</i>)
<p>Regional Report to NCWM:</p> <p>Ron Hayes provided an update indicating that since the group had not met, the Board is considering dissolving the task group.</p>

Additional letters, presentations and data may have been part of the committee's consideration. Please refer to <http://www.ncwm.net/meetings/annual/publication-16> to review these documents.

NEW PROPOSALS

PROPOSAL 1 HANDBOOK 133: Chapter 1, paragraphs 1.2.1 & 1.3.1 and Chapter 3, paragraphs 3.10.1 & 3.10.2 **NEW**

General Information (See Instructions)			
1. Date:	2. Regional Association(s): <input checked="" type="checkbox"/> Central (CWMA) <input checked="" type="checkbox"/> Northeastern (NEWMA) <input checked="" type="checkbox"/> Southern (SWMA) <input checked="" type="checkbox"/> Western (WWMA)		3. Standing Committee: <input checked="" type="checkbox"/> L&R S&T PDC
4. Submitter Name: Mulch & Soil Council & NIST Office of Weights & Measures (Jointly)			
5. Street Address: 7809 FM 179			
6. City: Shallowater	7. State: TX	8. Zip Code: 79363	9. Country: USA
10. Phone Number: 806.832.1810	11. Fax Number: 806.832.5244	12. Email Address: Execdir@mulchandsoilcouncil.org	
Proposal Information (See Instructions)			

13. Purpose: Clarifying mulch and soil test procedures promoting uniform practices**14. Handbook to be Amended:**

___ *NIST Handbook 44* ___ *NIST Handbook 130* X *NIST Handbook 133*
 Section: Chapter 1 & Chapter 3
 Paragraph: 1.2.1 and 1.3.1 & 3.10.1 and 3.10.2

15. Proposal:**Chapter 1- General Information****1.2. Package Requirements****1.2.1. Inspection Lot**

An “inspection lot” (called a “lot” in this handbook) is defined as a collection of identically labeled (except for quantity or identity in the case of random packages) packages available for inspection at one time. The collection of packages will pass or fail as a whole based on the results of tests on a statistically valid, randomly drawn sample ~~drawn from of~~ the lot. This handbook describes procedures to determine if the packages in an “inspection lot” contain the declared net quantity of contents and if the individual packages’ variations are within acceptable limits.

1.3. Sampling Plans

This handbook contains two sampling plans used to inspect packages: “Category A” and “Category B.” Use the “Category B” Sampling Plans to test meat and poultry products at point-of-pack locations that are subject to U.S. Department of Agriculture Food Safety and Inspection Service (FSIS) requirements. When testing all other packages, use the “Category A” Sampling Plan.

Inspections by weights and measures officials must provide the public with the greatest benefit at the lowest possible cost. Sampling reduces the time to inspect a lot of packages, so a greater number of items can be inspected. Net content inspection, using sampling plans for marketplace surveillance, protects consumers who cannot verify the net quantity of contents. This ensures fair trade practices and maintains a competitive marketplace. It also encourages manufacturers, distributors, and retailers to follow good manufacturing and distribution practices.

Testing a “sample” of packages from a lot instead of every package is efficient, but the test results have a “sampling variability” that must be corrected before determining if the lot passes or fails. The “Category A” sampling plans give acceptable lots a 97.5 % probability of passing. An “acceptable” lot is defined as one in which the “average” net quantity of contents of the packages equals or exceeds the labeled quantity. The “Category B” sampling plans give acceptable lots at least a 50 % probability of passing. The sampling plans used in this handbook are statistically valid. That means the test acceptance criteria are statistically adjusted, so they are both valid and legally defensible. This handbook does not discuss the statistical basis, risk factors, or provide the operating characteristic curves for the sampling plans. For information on these subjects, see explanations on “acceptance sampling” in statistical reference books.

A randomly selected sample is necessary to ensure statistical validity and reliable data. This is accomplished by using random numbers to determine which packages are chosen for inspection. Improper collection of sample packages can lead to bias and unreliable results.

1.3.1. Audit Tests

Audits may be used to speed the process of detecting possible net content violations. These audit procedures may include:

- using smaller sample sizes;
- using tare lists provided by manufacturers to spot check; or

- selecting samples without collecting a random sample.

These audit procedures allow spot checking of more products than is possible with the more structured techniques, but do not take the place of “Category A” or “Category B” testing.

Do not take enforcement action using audit test results. If, after an audit test, there is suspicion that the package lot is not in compliance, use the appropriate “Category A” or “Category B” sampling plan to determine if the lot complies with the package requirements.

Chapter 3 – Test Procedures – For Packages Labeled by Volume

3.10. Mulch and Soils Labeled by Volume

Mulch is defined as “any product or material except peat or peat moss that is advertised, offered for sale, or sold for primary use as a horticultural, above-ground dressing, for decoration, moisture control, weed control, erosion control, temperature control, or other similar purposes.”

Soil is defined as “any product or material, except peat or peat moss that is advertised or offered for sale, or sold for primary use as a horticultural growing media, soil amendment, and/or soil replacement.”

3.10.1. Test Equipment:

- A test measure appropriate for the package size that meets the specifications for test measures in Table 3-4. “Specifications for Test Measures for Mulch and Soils”
- Drop cloth/polyethylene sheeting for catching overflow of material
- Level (at least 15 cm [6 in] in length)

Table 3-4 Specifications for Test Measures for Mulch and Soils

Nominal Capacity of Test Measure ⁴	Actual Volume of the Measure	Interior Length ¹	Interior Width ¹	Interior Height ²	Marked Intervals on Interior Wall ³	Volume Equivalent of Marked Intervals
-----------------------------------------------	------------------------------	------------------------------	-----------------------------	------------------------------	------------------------------------------------	---------------------------------------

30.2 L (1.07 cu ft) for testing packages that contain less than 28.3L (1 cu ft or 25.7 dry qt)	31.9 L (1.13 cu ft)	213.4 mm (8.4 in)	203.2 mm (8.0 in)	736.6 mm (29 in)	12.7 mm (¹ / ₂ in)	550.6 mL (33.6 cu in)
28.3 L (1 cu ft)	28.3 L (1 cu ft) <u>33.04 L</u> <u>(1.16 cu ft)</u>	304.8 mm (12 in)	304.8 mm (12 in)	304.8 mm (12 in) <u>355.6 mm</u> <u>(14 in)</u>		1179.8 mL (72 cu in)
56.6 L (2 cu ft)	63.7 L (2.25 cu ft) <u>61.3 L</u> <u>(2.16 cu ft)</u>	304.8 mm (12 in)	304.8 mm (12 in)	685.8 mm (27 in) <u>660.4 mm</u> <u>(26 in)</u>		
		406.4 mm (16 in)	228.6 mm (9 in)	685.8 mm (27 in) <u>660.4 mm</u> <u>(26 in)</u>		
84.9 L (3 cu ft)	92 L (3.25 cu ft) <u>89.4 L</u> <u>(3.16 cu ft)</u>	304.8 mm (12 in)	304.8 mm (12 in)	990.6 mm (39 in) <u>965.2 mm</u> <u>(38 in)</u>		
		406.4 mm (16 in)	228.6 mm (9 in)	990.6 mm (39 in) <u>965.2 mm</u> <u>(38 in)</u>		

Measures are typically constructed of 1.27 cm (¹/₂ in) marine plywood. **The measure must accommodate the entire contents of the package being tested, and** a transparent sidewall is useful for determining the level of fill, but must be reinforced if it is not thick enough to resist distortion. If the measure has a clear front, place the level gage at the back (inside) of the measure so that the markings are read over the top of the mulch.

Notes

¹. Other interior dimensions are acceptable if the test measure approximates the configuration of the package under test, **can accommodate the entire contents of the package at one time** and does not exceed a base configuration

of the package cross-section.

2. The height of the test measure shall be 355.6 mm (14 in) for a 1 cubic foot package, 660.4 mm (26 in) for a 1.5 - 2 cubic foot package or 965.2 mm (38 in) for a 3 cubic foot package. ~~may be reduced, but this will limit the volume of the package that can be tested.~~

3. When lines are marked in boxes, they should extend to all four sides of the measure if possible to improve readability. It is recommended that a line indicating the MAV level also be marked to reduce the possibility of reading errors when the level of the mulch is at or near the MAV.

4. The Nominal Capacity is given to identify the size of packages that can be tested in a single measurement using the dry measure with the listed dimensions. It is based on the most common package sizes of mulch in the marketplace. If the measures are built to the dimensions shown above the actual volume will be larger than the nominal volume so that plus errors (overflow) can be measured accurately.

(Amended 2010 and 20XX)

3.10.2. Test Procedure

1. Follow the Section 2.3.1. "Define the Inspection Lot." Use a "Category A" sampling plan in the inspection, and select a random sample.

~~2. Open each package in turn. Empty the contents of the package into a test measure and level the contents by hand. Do not rock, shake, drop, rotate, or tamp the test measure. Read the horizontal marks to determine package net volume.~~

2. Note Some types of mulch are susceptible to clumping and compacting. ~~Take steps~~ To ensure that the material is loose and free flowing when placed into the test measure, gently massage the package while rolling the bag on the ground (or flat surface) at least four full rotations (but no more than eight full rotations), without lifting or dropping the package, before opening to reduce the clumping and compaction of the material.

Note: Mulch products stored exposed to the elements may become saturated with moisture. Excessive moisture adds weight to mulch particles and distorts the volume test results. Test samples with flowing or collected moisture in the package shall be excluded from the test procedure.

~~3. Exercise care in leveling the surface of the mulch/soil and determine the volume reading from a position that minimizes errors caused by parallax.~~

3. Placing contents into the test measure.

➤ Open the bag, gather the bag opening to ensure that no product is lost. Place the gathered bag opening as far into the top of the measure as possible without touching or leaning against the measure.

➤ Release the bag opening and quickly dump the contents of the package into a test measure in a continuous flow

Note: Do not touch the product or test measure at any time during this procedure. Do not disturb the test measure by rocking, shaking, dropping or tamping it during the test procedure.

➤ Massage the outside of the bag to maintain a continuous flow of the product but not for the purpose of de-clumping the product.

- Using your hand, gently level the contents, being careful not to affect the compaction of the product.

4. Read the horizontal marks at a position level with the product and round the readings between two marked intervals up to the nearest 38.1 mm (½ in) increment to determine the package net volume.

5. 4. Determine package errors by subtracting the labeled volume from the package net volume in the measure. Record each package error.

$$\text{Package Error} = \text{Package Net Volume} - \text{Labeled Volume}$$

3.10.3. Evaluation of Results

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

Note: In accordance with Appendix A, Table 2-10. Exceptions to the Maximum Allowable Variations for Textiles, Polyethylene Sheeting and Film, Mulch and Soil Labeled by Volume, Packaged Firewood, and Packages Labeled by Count with 50 Items or Fewer, and Specific Agricultural Seeds Labeled by Count, apply an MAV of 5 % of the declared quantity to mulch and soil sold by volume. When testing mulch and soil with a net quantity in terms of volume, one package out of every 12 in the sample may exceed the 5 % MAV (e.g., one in a sample of 12 packages; two in a sample of 24 packages; four in a sample of 48 packages). However, the sample must meet the average requirement of the “Category A” Sampling Plan.

16. Justification: Recent observations of test activities being conducted by industry and states indicate there are areas in the current test procedures that are not sufficiently defined to assure uniform testing practices by all parties. Council testing conducted by Dr. William Fonteno at the Horticultural Substrata Lab at North Carolina State University indicates some reported and observed variations in testing procedures that are not completely defined in HB133 can have an adverse impact on testing results due to the highly variable particle size distribution that is the very nature of the products.

17. Other Contacts: These recommended changes to NIST Handbook 133 were developed, reviewed and endorsed by:

Ken Butcher, NIST/OWM, 100 Bureau Drive, Stop 2600, Gaithersburg, MD 20899
 Lisa Warfield, NIST/OWM, 100 Bureau Drive, Stop 2600, Gaithersburg, MD 20899
 David Sefcik, NIST/OWM, 100 Bureau Drive, Stop 2600, Gaithersburg, MD 20899
 Robert C. LaGasse, Executive Director, Mulch & Soil Council, 7809 FM 179, Shallowater, TX 79363
 Steve Liffers, Harvest Garden Pro, LLC, 1977 Bay Rd., Milford, DE 19963
 Brian Faircloth, Suwannee Lumber Company, US 19 & 351 A, P.O. Box 5090, Cross City, FL 32628
 John Leber, Swanson Bark & Wood Products, 240 Tennant Way, Longview, WA 98632
 Mike Lange, Black Gold Compost Co., P.O. Box 190, Oxford, FL 34484-0190
 Chris Littlefield, Kellogg Garden Products, 350 W. Sepulveda Blvd., Carson, CA 90745
 Kathryn Louis, Sun Gro Horticulture, 22650 183rd Ave. SE, Kent, WA 98042
 Rick Mahoney, Garick, LLC., 13600 Broadway Ave., Cleveland, OH 44125
 Jim McKinley, Lebanon Seaboard Corp., 101 Shelter Cove Lane, Zirconia, NC 28790
 Kent Rotert, BASF, 1725 Dayton Avenue, Ames, IA 50010
 Scott Salmon, Oldcastle Lawn & Garden, 900 Ashwood Pkwy., Ste. 250, Atlanta, GA 30338
 Randy Tyre, Waupaca Northwoods Inc., N2564 County Rd. QQ, Waupaca, WI 54981
 John Wohler, The Scotts Company, 7644 Keene Rd., NE, Gervais, OR 97026
 Dr. Bill Fonteno, North Carolina State University, 152 Kilgore Hall, P.O. Box 7609, Raleigh, NC 27695

18. Other Reasons For: To provide uniform procedures and coordinate training of inspectors by NIST and

manufacturers by the Mulch & Soil Council.
19. Other Reasons Against:
20. Evidence: This request for changes to Handbook 133 is not in conflict with any NIST publications or other Federal laws.
21. Additional Considerations: There should be no major costs resulting from this proposal. Some manufacturers and inspectors may need updated test measures suitable for the package size being tested. All stakeholders will benefit from coordinated training by NIST and industry and test procedures uniformly applied in interstate commerce.
22. Suggested Action: <input checked="" type="checkbox"/> Recommend NCWM Adoption <input type="checkbox"/> Developing Item <input type="checkbox"/> Informational Item <input type="checkbox"/> Other (Please Describe):
23. List of Attachments: Data Presentation PPT
For Regional Use Only
Comments:

CWMA Action - Item Clarifying mulch and soil test procedures promoting uniform practices
Summary of comments considered by the regional committee (in writing or during the open hearings):
An industry representative from the Mulch and Soil Council provided comments and asked for consideration of support for this item that was developed in conjunction with NIST. He indicated that the manual does not provide clear uniformity for testing procedures, and this proposal does that. One of the basic changes includes variable test containers; this is addressed in the proposal. The procedure states to pour contents into the container, and there is a wide variation on this methodology. Uniformity of test measures across states is a major issue. The proposal now describes how to pour the contents, and how to fluff a bag. In the overall practice, there aren't a large number of changes. A regulator from Ohio commented there is a great deal of concern for this proposal. She asked why states were not asked to provide data for the design and development of the proposal. She also questions the need to have different size of test measures depending on the size of bag you have, which is onerous for the inspector. The term "statistically valid random drawn sample" is concerning to her. The methodology of breaking up clumps before pouring into the measure may not be fair for the manufacturer. For these reasons, she recommends that the item be developmental, or withdrawn for additional input from states. The industry representative responded that fluffing of bags has been around for a number of years, and when following the proposed guidelines makes the process as standard as possible. With regard to container size for testing, the impact of a higher drop when pouring the contents into the container has an impact on the amount of contents being measured. The best way to get the most valid measure is to replicate how the product is originally packaged. He commented that while carrying a variety of container sizes for testing may be onerous, it is important to determine accurate results.
Item as proposed by the regional committee: (If different than agenda item)
Committee recommendation to the region:
<input type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input checked="" type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)
Reasons for the committee recommendation:
The committee feels that industry and state regulators can work together to more effectively develop this item prior

for further consideration.
COMPLETE SECTION BELOW FOLLOWING VOTING SESSION
Final updated or revised proposal from the region: (If different than regional committee recommendation)
Regional recommendation to NCWM for item status: <input type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input checked="" type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>) <input type="checkbox"/> Unable to consider at this time (<i>Provide explanation in the "Additional Comments" section below</i>)
Regional Report to NCWM: <p>An industry representative from the Mulch and Soil Council provided comments and asked for consideration of support for this item that was developed in conjunction with NIST. He indicated that the manual does not provide clear uniformity for testing procedures, and this proposal does that. A regulator from Ohio commented there is a great deal of concern for this proposal. She asked why states were not asked to provide data for the design and development of the proposal. She also questions the need to have different size of test measures depending on the size of bag you have, which is onerous for the inspector. The term "statistically valid random drawn sample" is concerning to her. The methodology of breaking up clumps before pouring into the measure may not be fair for the manufacturer. The industry representative responded that fluffing of bags has been around for a number of years, and when following the proposed guidelines makes the process as standard as possible. With regard to container size for testing, the impact of a higher drop when pouring the contents into the container has an impact on the amount of contents being measured. The best way to get the most valid measure is to replicate how the product is originally packaged. He commented that while carrying a variety of container sizes for testing may be onerous, it is important to determine accurate results.</p>

PROPOSAL 2 HANDBOOK 133: HANDBOOK 133, section 2.4 Borax (NEW)

General Information (See Instructions)			
1. Date: 12/17/2014	2. Regional Association(s): <input checked="" type="checkbox"/> Central (CWMA) <input checked="" type="checkbox"/> Northeastern (NEWMA) <input type="checkbox"/> Southern (SWMA) <input type="checkbox"/> Western(WWMA)	3. Standing Committee: <input checked="" type="checkbox"/> L&R <input type="checkbox"/> S&T <input type="checkbox"/> PDC	
4. Submitter Name: Lisa Warfield, NIST – OWM			
5. Street Address: 100 Bureau Drive,			
6. City: Gaithersburg	7. State: MD	8. Zip Code: 20899	9. Country:
10. Phone Number: 301-975-3308	11. Fax Number:	12. Email Address: Lisa.warfield@nist.gov	
Proposal Information (See Instructions)			
13. Purpose: Provides clarification for existing steps for the Borax Test Procedure.			
14. Handbook to be Amended: <input type="checkbox"/> NIST Handbook 44 <input type="checkbox"/> NIST Handbook 130 <input checked="" type="checkbox"/> NIST Handbook 133 Section: 2.4. Borax Paragraph:			

15. Proposal: See below:
16. Justification: NIST OWM has taught several classes for HB133 Basic and incorporated the Borax procedure as one of the hand-on training modules. Based on comments and recommendations received from the students, NIST has identified that the current test procedure needs clarification for the test equipment and steps that are in the current edition of Handbook 133. NIST is also proposing adding a Borax Audit Worksheet to HB133 – Appendix C. to assist inspectors in performing the test.
17. Other Contacts: David Sefcik, NIST Office of Weights and Measures, Laws and Metric Program at david.sefcik@nist.gov and at 301-975-4868.
18. Other Reasons For:
19. Other Reasons Against:
20. Evidence:
21. Additional Considerations:
22. Suggested Action: <input checked="" type="checkbox"/> Recommend NCWM Adoption <input type="checkbox"/> Developing Item <input type="checkbox"/> Informational Item <input type="checkbox"/> Other (Please Describe):
23. List of Attachments:
For Regional Use Only
Comments:

CWMA Action: Item Provides clarification for existing steps for the Borax Test Procedure
Summary of comments considered by the regional committee (in writing or during the open hearings): A NIST representative commented that this procedure is meant to provide clarification to the existing procedure, and has been used in four trainings, and they have received significant feedback and believes the proposal is ready to move forward.
Item as proposed by the regional committee: (If different than agenda item)
Committee recommendation to the region: <input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)
Reasons for the committee recommendation: The item is fully developed and ready for voting status.
COMPLETE SECTION BELOW FOLLOWING VOTING SESSION
Final updated or revised proposal from the region: (If different than regional committee recommendation)

<p>Regional recommendation to NCWM for item status:</p> <input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>) <input type="checkbox"/> Unable to consider at this time (<i>Provide explanation in the "Additional Comments" section below</i>)
<p>Regional Report to NCWM:</p> <p>A NIST representative commented that this procedure is meant to provide clarification to the existing procedure, and has been used in four trainings, and they have received significant feedback and believes the proposal is ready to move forward. The Committee agrees that the item is fully developed and ready for voting status.</p>

**PROPOSAL 3 HANDBOOK 130: Section: Uniform Regulation for the Method of Sale of
Commodities Paragraph: 2.10 **NEW****

General Information (See Instructions)			
1. Date: 4/15/2015	2. Regional Association(s): __ Central (CWMA) <u>X</u> Northeastern (NEWMA) __ Southern (SWMA) __ Western (WWMA)		3. Standing Committee: <u>X</u> L&R S&T PDC
4. Submitter Name: American Lumber Standard Committee c/o John McDaniel, President			
5. Street Address: 19715 Waters Rd., P.O. Box 210			
6. City: Germantown	7. State: Maryland	8. Zip Code: 20874	9. Country: USA
10. Phone Number: (301) 972-1700	11. Fax Number: (301) 540-8004	12. Email Address: alsc@alsc.org	
Proposal Information (See Instructions)			
13. Purpose: To correct the treatment of nominal dimension of softwood lumber and to make consistent with NIST Voluntary Product Standard PS 20.			
14. Handbook to be Amended: __ NIST Handbook 44 <u>X</u> NIST Handbook 130 __ NIST Handbook 133 Section: Uniform Regulation for the Method of Sale of Commodities Paragraph: 2.10			
15. Proposal: Amend NIST Handbook 130, Method of Sale Regulation as follows: 2.10. Softwood Lumber. – Applies to softwood boards, timbers, and dimension lumber that have been surfaced, but shall not apply to rough lumber, to lumber that has been matched, patterned, or shiplapped, to other products set forth in Tables 1-4 of the Department of Commerce Voluntary Product Standard PS 20-15 "American Softwood Lumber Standard," or latest edition; but shall not apply to rough lumber or lumber (other than products in the Tables) remanufactured or joined so as to have changed the form or identity, such as individually assembled or packaged millwork items. "Nominal sizes" are for U.S. customary dimensions are size designations used for convenience in describing to describe approximate, rather than actual sizes of lumber. "Nominal sizes" were originally derived from the dimensions of rough lumber before surfacing and are always greater than the actual or minimum dressed dimensions: thus a dry "2x4" is surfaced to actual minimum dressed dimensions of 1½ in x 3½ in (38mm x 89 mm). The requirements in this Section 2.10.1 section refer to actual sizes of lumber. For Examples of nominal sizes and minimum dressed sizes for board and dimension lumber			

are shown in—(see Table 1 to this section, Softwood Lumber Sizes). A more complete listing of nominal size categories are found in the referenced Tables from~~The nominal sizes used in this section follow Department of Commerce Voluntary Product Standard PS 20-10,~~ “American Softwood Lumber Standard,” PS 20-15, or latest edition. ~~SI equivalents are included for actual measurements only.~~

2.10.1. Definitions.

2.10.1.1. Surfaced (dressed) lumber. – Lumber that has been surfaced by a machine (to attain smoothness of surface and uniformity of size) on one side (S1S), on two sides (S2S), one edge (S1E), two edges (S2E), or a combination of sides and edges (S1S1E, S1S2E, S2S1E, S4S).

2.10.1.2. Boards. – Lumber 38 mm (1½ in) or less in actual thickness and 38 mm (1½ in) or more in actual width. Lumber less than ~~139~~140 mm (5½ in) in actual width may be classified as strips.

2.10.1.3. Timbers. – Lumber 114 mm (4½ in) or more in smallest dimension. Timbers may be designated as beams, stringers, posts, caps, sills, girders, or purlins.

2.10.1.4. Dimension lumber. – Lumber from 38 mm (1½ in) to, but not including, 114 mm (4½ in) in actual thickness, and 38 mm (1½ in) or more in actual width. Dimension lumber may be designated as framing, joists, planks, rafters, or studs.

2.10.1.5. Rough lumber. – Lumber that has not been ~~dressed~~surfaced, but that has been sawed, edged, and trimmed at least to the extent of showing saw marks, or other primary manufacturing marks in the wood, on the four longitudinal surfaces of each piece for its overall length.

2.10.1.6. Matched lumber. – Lumber that has been worked with a tongue on one edge of each piece and a groove on the opposite edge to provide a close tongue and groove joint by fitting two pieces together; when end-matched, the tongue and groove are worked in the ends also.

2.10.1.7. Patterned lumber. – Lumber that is shaped to a pattern or a molded form, in addition to being dressed, matched, or shiplapped, or any combination of these workings.

2.10.1.8. Shiplapped lumber. – Lumber that has been worked or rabbeted on both edges of each piece to provide a closelapped joint by fitting two pieces together.

2.10.1.9. Grade. – The commercial designation assigned to lumber meeting specifications established by a nationally recognized grade rule writing organization.

2.10.1.10. Species. – The commercial name assigned to a species of trees.

2.10.1.11. Species group. – The commercial name assigned to two or more individual species having similar characteristics.

2.10.1.12. Representation. – A “representation” shall be construed to mean any advertisement, offering, invoice, or the like that pertains to the sale of lumber.

2.10.1.13. Minimum dressed sizes (width and thickness). – The standardized width and thickness at which lumber is dressed when manufactured in accordance with the U.S. Department of Commerce Voluntary Product Standard PS 20-~~1510~~, “American Softwood Lumber Standard,” or latest edition, and regional grading rules conforming to PS 20-~~1510~~ or latest edition. (See Table 1. Softwood Lumber Sizes containing examples of some minimum dressed sizes.)

2.10.2. Identity. – Representations shall include a declaration of identity that specifies the grade or grades, species or species group, and whether the lumber is unseasoned (green) or dry.

2.10.3. Quantity. – Representations shall be in terms of:

(a) the number of pieces;

(b) the minimum ~~surfaced~~dressed width and thickness or actual width and thickness, except that the use of nominal dimensions shall be allowed as long as:

(1) The term “nominal” or “nom” is also used, and

(2) The actual or minimum dressed sizes are prominently displayed to the customer either by means of a table or label; and

;and

(c) either the length of individual pieces or the lineal footage, ~~except that the use of nominal dimensions shall be allowed as long as a table of minimum surfaced sizes is displayed prominently or the actual dimensions are prominently displayed to the customer and the term “nominal” or “nom” is also used in conjunction with any representation of dimensions.~~

Table 1. Softwood Lumber Sizes

~~Examples of minimum dressed standard surfaced~~ sizes at the time of manufacture for both unseasoned (green) and dry lumber as published by the U.S. Department of Commerce in Voluntary Product Standard PS 20-~~15~~ **10** or latest edition.

Product Classification (Nominal Size)	Minimum Dressed Sizes**			
	Unseasoned		Dry	
Inches	Inches	Millimeters	Inches	Millimeters
Surfaced Lumber*				
2 x 2	1 ⁹ / ₁₆ X 1 ⁹ / ₁₆	40 x 40	1½ x 1½	38 x 38
2 x 2½	1 ⁹ / ₁₆ x 2 ¹ / ₁₆	40 x 52	1½ x 2	38 x 51
2 x 3	1 ⁹ / ₁₆ x 2 ⁹ / ₁₆	40 x 65	1½ x 2½	38 x 64
2 x 4	1 ⁹ / ₁₆ x 3 ⁹ / ₁₆	40 x 90	1½ x 3½	38 x 89
2 x 6	1 ⁹ / ₁₆ x 5 ⁵ / ₈	40 x 143	1½ x 5½	38 x 140
2 x 8	1 ⁹ / ₁₆ x 7½	40 x 190	1½ x 7¼	38 x 184
2 x 10	1 ⁹ / ₁₆ x 9½	40 x 241	1½ x 9¼	38 x 235

2 x 12	1 ⁹ / ₁₆ x 11½	40 x 292	1½ x 11¼	38 x 286
Board Lumber				
1 x 2	²⁵ / ₃₂ x 1 ⁹ / ₁₆	20 x 40	³ / ₄ x 1½	19 x 38
1 x 3	²⁵ / ₃₂ x 2 ⁹ / ₁₆	20 x 65	³ / ₄ x 2½	19 x 64
1 x 4	²⁵ / ₃₂ x 3 ⁹ / ₁₆	20 x 90	³ / ₄ x 3½	19 x 89
1 x 6	²⁵ / ₃₂ x 5 ⁵ / ₈	20 x 143	³ / ₄ x 5½	19 x 140
1 x 8	²⁵ / ₃₂ x 7½	20 x 190	³ / ₄ x 7¼	19 x 184
1 x 10	²⁵ / ₃₂ x 9½	20 x 241	³ / ₄ x 9¼	19 x 235
1 x 12	²⁵ / ₃₂ x 11½	20 x 292	³ / ₄ x 11¼	19 x 286
<p>*The dry thicknesses of nominal 3 in and 4 in lumber are 2½ in (64 mm) and 3½ in (89 mm); unseasoned thicknesses are 2⁹/₁₆ in (65 mm) and 3⁹/₁₆ (90 mm). Widths for these thicknesses are the same as shown above.</p>				
<p>**PS 20-1510 defines dry lumber as being 19 % or less in moisture content and unseasoned lumber as being over 19 % moisture content. The size of lumber changes approximately 1 % for each 4 % change in moisture content. Lumber stabilizes at approximately 15 % moisture content under normal use conditions.</p>				
<p>(Added 1971)</p>				

16. Justification:

The American Lumber Standard Committee, the Standing Committee for maintenance of the American Softwood Lumber Standard, Voluntary Product Standard 20 (“P.S. 20”), recommends that certain clarifications be made to the Uniform Regulation for the Method of Sale of Commodities, Section 2.10 and the Table on page 121 in NIST Handbook 130.

Background

For some time there has been confusion in the regulated community as to the specific requirements for the display and advertising of quantity measure for the widths and thicknesses of softwood lumber, particularly when nominal measure is used. This has led to inconsistent labeling in the market and, in some cases, enforcement actions by various state and local weights and measures authorities. These suggested changes would provide greater clarity and make the language internally consistent and consistent with industry terminology. No changes are suggested in the underlying concepts, substantive requirements or practical applications (as we understand them).

Explanation of Specific Changes

1. P.S. 20 contains four tables with nominal dimensions of different products. It is our understanding that nominal dimensions for these products are accepted by Weights & Measures officials. NIST 130 does not include these products in the description of product scope (and indeed even excludes some) and contains information from only one of the P.S. 20 Tables. The change would make clear that the products in all of the P.S. 20 Tables are all covered.

2. The current section 2.10 indicates that SI equivalents are only used for actual dimensions. In fact, the Table includes metric dimensions for nominal sizes. Other legal authorities require metric. We suggest the sentence be deleted.
3. There is a statement in Section 2.10 that the "...requirements of this section refer to actual sizes of lumber." We suggest clarifying that this reference is only to the definitions in Section 2.10.1. The section as a whole does include nominal dimensions where indicated.
4. Repositioning the nominal dimension provisions. The nominal dimension provisions are currently in subsection 2.10.3 (c) on length. These dimensions relate to width and thickness. We recommend placing them in subsection 2.10.3(b).
5. Reformatting of the width and thickness provision -- Subsection 2.10.3(b) (as changed) is altered to make clear that the requirement of displaying the term "nom" or "nominal" when nominal measure is used is applicable with either the disclosure of actual or minimum dressed sizes. The current language with its multiple conjunctions could be read in two different ways.
6. Adding the option for labeling. The current language provides for the use of a "table of minimum surfaced sizes is displayed prominently." In the marketplace, many producers label each piece of lumber. Alternatively, sellers might choose to prominently display a label, rather than a table, to more effectively convey the information to consumers.
7. Consistent use of the term "dressed sizes" rather than "surfaced sizes." Subsection 2.10.1.13 appropriately contains a definition of "Minimum dressed sizes (width and thickness)" and refers to P.S. 20 as a source for this information. P.S. 20 similarly uses that term.⁴ However, there is inconsistency in other parts of Section 2.10. For example, Subsection 2.10.1.1 defines the term "Surfaced (dressed) lumber." Subsection 2.10.3(b) refers to "minimum surfaced width and thickness." Subsection 2.10.3(c) uses "minimum surfaced sizes." Table 1 on page 121 of the Handbook introduces yet another variation with reference to "minimum standard surfaced sizes." We urge that one term "dressed" consistently be used throughout.
8. Table 1 of the section sets forth some, but not all, of the nominal and minimum dressed sizes from P.S. 20. It is recommended that both Section 2.10 and the Table be revised to indicate that the Table contains examples. Alternatively, all four tables from P.S. 20-15 could be included.

Section 2.10.1.2 Boards. The dimension for width of dry 1x6 board lumber is changed from 139mm to 140 mm to be consistent with P.S. 20. (The actual conversion is 139.7mm.)

¹ See, P.S. 20, Sections 3.3.1, 3.3.1.1, 3.3.1.2, 3.3.2, 3.3.3, 3.4.4, and Tables 1-4. Although Section 3.3.2 is titled Dressed (surfaced) lumber, "dressed" is used alone in all of the other sections

17. Other Contacts:

The proposal is also supported by the American Wood Council, Robert Glowinski, President (202) 463-2768
18. Other Reasons For: None have emerged
19. Other Reasons Against: None have emerged
20. Evidence:
21. Additional Considerations: No additional costs are anticipated
22. Suggested Action: <input checked="" type="checkbox"/> Recommend NCWM Adoption ___ Developing Item ___ Informational Item ___ Other (Please Describe):
23. List of Attachments: Attachment A – American Lumber Standard Committee Proposed Changes to Section 2.10 Softwood Lumber Attachment B American Lumber Standard Committee Explanation and Justification for Proposed Changes
For Regional Use Only
Comments:

CWMA Action - Item to correct the treatment of nominal dimension of softwood lumber and to make consistent with NIST Voluntary Product Standard PS 20.
Summary of comments considered by the regional committee (in writing or during the open hearings): An industry representative from the American Lumber Standard Committee commented that the proposal addresses method of sale for soft lumber in Handbook 130. This Committee serves as the standing committee for PS 20, and provisional standard that provides guidance to the industry. The proposal does three things: 1) provides corrections, provides needed clarification, 2) consistency of language, 3) needed clarification. Since any products that are covered with PS 20 fall under compliance with Handbook 130. The underlying practices and concepts are not changed. The proposal is merely a cleanup of the current practice, and makes it consistent with PS 20.
Item as proposed by the regional committee: (If different than agenda item)
Committee recommendation to the region: <input checked="" type="checkbox"/> Voting Item on the NCWM Agenda <input type="checkbox"/> Information Item on the NCWM Agenda <input type="checkbox"/> Withdraw the Item from the NCWM Agenda (<i>In the case of new items, do not forward to NCWM</i>) <input type="checkbox"/> Developing Item on the NCWM Agenda (<i>To be developed by source</i>)
Reasons for the committee recommendation: The items is fully developed and ready for voting status.
COMPLETE SECTION BELOW FOLLOWING VOTING SESSION
Final updated or revised proposal from the region: (If different than regional committee recommendation)

Regional recommendation to NCWM for item status:

- Voting Item on the NCWM Agenda
- Information Item on the NCWM Agenda
- Withdraw the Item from the NCWM Agenda (*In the case of new items, do not forward to NCWM*)
- Developing Item on the NCWM Agenda (*To be developed by source*)
- Unable to consider at this time (*Provide explanation in the "Additional Comments" section below*)

Regional Report to NCWM:

An industry representative from the American Lumber Standard Committee commented that the proposal addresses method of sale for soft lumber in Handbook 130. This Committee serves as the standing committee for PS 20, and provisional standard that provides guidance to the industry. The proposal does three things: 1) provides corrections, provides needed clarification, 2) consistency of language, 3) needed clarification. Since any products that are covered with PS 20 fall under compliance with Handbook 130. The underlying practices and concepts are not changed. The proposal is merely a cleanup of the current practice, and makes it consistent with PS 20.

Mr. Tim White, Michigan | Committee Chair
 Mr. Doug Rathbun, Illinois | Member
 Mr. Ivan Hankins, Iowa | Member
 Ms. Lori Jacobson, South Dakota | Member
 Ms. Rebecca Richardson, Marc-IV | Associate Membership Representative
 Mr. John Albert, Missouri | NCWM Representative

Laws and Regulations Committee

Appendix A

Items 232-4 and 237-1: Background and Justification for Handbook 130 Definition of “Diesel Gallon Equivalent (DGE)” of Natural Gas as a Vehicular Fuel

Clean Vehicle Education Foundation

Development of the “Gasoline Gallon Equivalent” by NCWM*

In 1993, under the auspices of the National Conference on Weights and Measures (NCWM), a Compressed Natural Gas (CNG) Working Group came together to determine the way in which CNG would be sold to the public at retail as a motor fuel. .

The working group focused on three issues:

1. How to provide the Natural Gas Vehicle (NGV) industry a method of sale that would be familiar and acceptable to consumers
2. How to provide weights and measures officials a verifiable and quantifiable means to determine the accuracy of natural gas dispensers; and
3. How to meet these requirements with a uniform, national standard.

NCWM considered three proposals for the method of sale of CNG:

1. joules, the unit of energy measurement in SI units
2. mass
3. the Gasoline Gallon Equivalent (GGE)

The Natural Gas Vehicle Coalition (now NGVAmerica) recommended that the Gasoline Gallon Equivalent be adopted as the method of sale for CNG, and that it be based on the energy equivalent of a gallon of gasoline. The use of the GGE was recommended primarily for the convenience of the retail customer comparing the cost and fuel economy of a natural gas vehicle to a comparable gasoline vehicle. During the discussion, a proposal was made to eliminate the reference to energy content of CNG and replace it with a fixed conversion factor based on mass, with the fixed mass of CNG being equal to a gallon of gasoline. Measurement of mass in the retail dispenser and verification by W&M officials is easier and less costly than measurement of energy content.

* *Report of the 78th National Conference on Weights and Measures, 1993*, NIST Special Publication 854, pp 322-326.

Report of the 79th National Conference on Weights and Measures, 1994, NIST Special Publication 870, pp 213-217.

Program and Committee Reports for the National Conference on Weights and Measures, 79th Annual Meeting, July 17-21, 1994, NCWM Publication 16, pp 89-92.

Since the energy content of a unit measure of CNG (standard cubic foot - scf) and gasoline (gallon) vary widely depending on the sample of fuel measured, the reference gallon of gasoline was determined to be Indolene, the gasoline used by EPA to certify emissions and fuel economy, with an energy content (lower heating value) of 114,118 BTU/gal. Work conducted by the Institute of Gas **Technology** and the Gas Research Institute (now combined into the Gas Technology Institute) surveyed 6811 samples of natural gas nationwide and concluded that the “average” natural gas in the US had an energy content (lower heating value) of 923.7 BTU/scf, and a density of 0.0458172 lbs/cubic foot. This translates 20,160.551 BTU/lb. Dividing gasoline’s 114.118 BTU/gal by natural gas’s 20,160.551 BTU/lb gives 5.660 lbs of natural gas = 1 GGE. Similar calculations determined that a gasoline liter equivalent of natural gas equals 0.678 kg of natural gas.

At its 79th annual meeting in July of 1994, NCWM adopted resolutions that:

“All natural gas kept, offered or exposed for sale or sold at retail as a vehicle fuel shall be in terms of the gasoline liter equivalent (GLE) or gasoline gallon equivalent (GGE), and

All retail natural gas dispensers shall be labeled with the conversion factor in terms of kilograms or pounds. The label shall be permanently and conspicuously displayed on the face of the dispenser and shall have either the statement “1 Gasoline Liter Equivalent (GLE) is equal to 0.678 kg of Natural Gas” or “1 Gasoline Gallon Equivalent (GGE) is equal to 5.660 lbs of Natural Gas” according to the method of sale used.”

These statements can be found in NIST Handbook 130*, along with the definition of “natural gas” which seems to apply only to Compressed Natural Gas, not to Liquefied Natural Gas. Handbook 130, §§3.11 and 3.12 (Engine Fuels, Petroleum Products, and Automotive Lubricants Regulations) confirm that these requirements are for CNG, rather than LNG. Similar requirements and definitions are found in Handbook 44.

During the discussions it was recognized that, although diesel and gasoline are both sold in gallon units, a gallon of diesel fuel has substantially more energy content than a gallon of gasoline. While it is convenient to use the Gasoline Gallon Equivalent unit when comparing the cost and fuel economy of gasoline-powered light-duty vehicles to equivalent natural gas vehicles, a Diesel Gallon Equivalent unit would be more useful for operators of medium and heavy-duty (usually diesel powered) vehicles. However, in 1994, the NCWM working group “agreed to defer development of a “Diesel Gallon Equivalent” until the issues related to the ‘Gasoline Gallon Equivalent’ were decided by the NCWM and agreed to meet again if additional work is necessary.”** The issue of the formal definition a Diesel Gallon Equivalent (DGE) unit has not come before NCWM

* “Method of Sale Regulation,” §2.27

** *Report of the 79th National Conference on Weights and Measures, 1994*, NIST Special Publication 870, p 214

from that time until today, although the DGE is often used in the industry, defined as 6.31 lbs of natural gas.

Need for a Definition of a “Diesel Gallon Equivalent” Unit

Today there are an increasing number of commercial vehicles using natural gas as a fuel, to lower emissions and Greenhouse Gases, decrease America’s use of petroleum, and lower fuel costs (U.S. DOE Clean Cities Alternative Fuel Price Report for April 2012 shows in Table 2 ‘Overall Average Fuel Price on Energy-Equivalent Basis’ that diesel is priced at \$4.12/gal and CNG at \$2.32/gal (http://www.afdc.energy.gov/afdc/pdfs/afpr_apr_12.pdf).

Since the NCWM’s working group deferred development of a DGE unit in 1994, there has been little call by the natural gas vehicle industry for the formalization of that unit in the sale of **Compressed** Natural Gas. However the use of **Liquefied** Natural Gas (LNG) as a motor fuel has been growing and there is significant interest in using the DGE as a unit for the sale of that fuel.

LNG as a motor fuel is used almost exclusively by commercial vehicles, most of which view diesel as the conventional alternative. Using the same logic as was used for the development of the GGE unit, the convenience of the retail customer comparing the cost and fuel economy of a natural gas vehicle to a comparable conventional vehicle, it makes sense for NCWM to now “officially” define the DGE.

Other than §3.12. Liquefied Natural Gas, in the Engine Fuels and Automotive Lubricants Regulation section of Handbook 130, we find no specific provisions in either Handbook 44 or Handbook 130 for the retail sale of LNG as a motor fuel. However LNG is sold in California and other states on a mass basis (by the pound), which allows for easy confirmation by weights and measures authorities. An “official” definition of the DGE as a specific mass of natural gas would allow states to easily move from retail sale by pound to retail sale by DGE, simplifying the sale process for the retail customer used to dealing with “gallons of diesel” as a fuel measure.

Therefore, at this time we are asking for a definition of the Diesel Gallon Equivalent (and Diesel Liter Equivalent) units by NCWM.

Justification of the Definition of a DGE as 6.312 Pounds of Natural Gas

Handbook 130 contains the following definitions of natural Gas as a vehicle fuel*:

Gasoline liter equivalent (GLE). – Gasoline liter equivalent (GLE) means 0.678 kg of natural gas.

Gasoline gallon equivalent (GGE). – Gasoline gallon equivalent (GGE) means

* NIST handbook 130, 2006, Method of State Regulation, §§2.27.1.2 and 2.227.1.3; also Engine Fuels, Petroleum Products, and Automotive Lubricants Regulation, §§1.25 and 1.26.

2.567 kg (5.660 lb) of natural gas.

As the NCWM working group recognized during its deliberations in 1993 on the Gasoline Gallon Equivalent unit, both gasoline and natural gas can vary in their BTU content from sample to sample. The working group determined the gasoline gallon (energy) equivalent based on a gallon of Indolene (114,118 BTU/gal – lower heating value) and a survey of 6811 natural gas samples nationwide with an average of 923.7 BTU/scf (lower heating value) and a density of 0.0458172 lbs/cubic foot. This equates to 20,160.551 BTU/lb. Dividing gasoline's 114.118 BTU/gal by natural gas's 20,160.551 BTU/lb gives 5.660 lbs of natural gas = 1 GGE. Similar calculations determined that a gasoline liter equivalent of natural gas equals 0.678 kg of natural gas.

Starting with 5.660 lbs of natural gas = 1 GGE and 0.678 kg of natural gas = 1 GLE, we can calculate the mass of natural gas necessary to make a DGE and a DLE by comparing the amount of energy in a gallon of diesel fuel to the amount of energy in a gallon of gasoline fuel and apply that ratio to scale up the masses of natural gas calculated for the GGE and GLE units.

Unfortunately it is no easier today than it was in 1993 to set one energy value as representative of a unit for all gasoline, (or diesel) fuel. EPA's certification fuel has likely changed in energy content since 1993, as both gasoline and diesel fuels have been modified for improved emissions.

We recommend using the most recent Department of Energy *Transportation Energy Data Book*^{*}, as an authoritative reference for both gasoline and diesel fuel energy values. Taking further surveys or basing our calculations on today's EPA certification fuel only delays our action, substantially increases costs, and, in the end, provides a limited potential increase in accuracy based on one point in time. Table B.4 of the *Transportation Energy Data Book*, on the heat content of fuels http://cta.ornl.gov/data/tedb30/Edition30_Full_Doc.pdf lists the net energy of gasoline as 115,400 BTU/Gal, and diesel as 128,700 BTU/Gal.

Therefore a Diesel Gallon Equivalent of natural gas is:

$$(128,700/115,400) \times 5.660 = 6.312 \text{ lb (2.863 kg)}$$

and a Diesel Liter Equivalent of natural gas is:

$$(128,700/115,400 \times 0.678 = 0.756 \text{ kg}$$

Prepared by:
Clean Vehicle Education Foundation
<http://www.cleanvehicle.org>

^{*} Stacy C. Davis and Susan W. Diegel, Oak Ridge National Laboratory, *Transportation Energy Data Book*, Edition 30, 2011, ORNL-6978, or <http://cta.ornl.gov/data/index.shtml>

Appendix B

How to Determine the Net Weight and Purge of Packaged Chitterlings¹ Using NIST Handbook 133, “Checking the Net Contents of Packaged Goods”

Executive Summary

When a Weights and Measures Inspector tests frozen chitterlings, the purpose of the inspection is to determine if the package contains the labeled net weight and if the purge is 20 % or less after thawing (purge is based on the labeled net weight). Inspectors typically use Section 2.3. “Basic Test Procedure” and other portions of National Institute of Standards and Technology (NIST) Handbook 133, “Checking the Net Contents of Packaged Goods” (the 2005 edition was adopted by USDA in 73 Federal Register 52192 on Sept. 9, 2008) to conduct these tests. To determine the amount of purge, inspectors modify the procedures in Section 2.6. “Determining the Net Weight of Encased-In-Ice and Ice Glazed Products.” The modifications include thawing the product while it is still in the package, then draining it and applying the 20 % purge limit established by the Food Safety and Inspection Service (FSIS) of the U.S. Department of Agriculture (USDA). Inspectors defer to the USDA purge value because a specific limiting value for the purge for chitterlings has not been adopted by the National Conference on Weights and Measures (NCWM), and, therefore, a value is not in NIST Handbook 133. The USDA recommends that purge determinations be conducted at the packing plant. However, state and local inspections of chitterlings are needed outside packing plants because inspections are usually only carried out in response to consumer complaints about short weight or excessive purge in the packages they purchase at retail or over the Internet. In the past few years, most of the inspection results shared with the Office of Weights and Measures (OWM) at NIST indicated that inspectors have found the purge from chitterlings was often much greater than 20 %. In 2011, several states contacted the OWM seeking technical assistance because of ongoing disputes they were having with packers over the test procedures used and the amount of purge allowed. Some states reported that they found purge amounts as high as 50 % in packages put-up by both domestic and foreign packers. In addition to the test data from inspectors and multiple packers, a study conducted at Iowa State University on the purge from frozen chitterlings revealed purge ranging from 30 % to 50 %. OWM reviewed the test methods used by the states, Iowa State University, and several chitterling packers to identify opportunities for improving the accuracy and repeatability of the test procedure. A few differences between the test procedures used by packers and state inspectors were found, but, overall, the approaches to testing were consistent. As noted above, the NIST Handbook 133 does not include a test procedure or purge allowance for chitterlings. Because state weights and measures officials are required to investigate the complaints they receive, and there is a general need for a nationally uniform test procedure for use in law enforcement, there appears to be sufficient justification for the NCWM to add a specific test procedure and purge limits for this unique product⁵ to NIST

⁵ Because they are similar and have the same issues with freezing and thawing this procedure may be used for testing beef tripe (which is made from the stomach of cows).

Handbook 133. The OWM has developed a draft test procedure for review and evaluation by packers and officials that may, depending on the level of support it finds among officials and packers, be submitted to the NCWM for possible addition to NIST Handbook 133 later in 2014. Adoption and use of a uniform test procedure should improve test uniformity, increase confidence in the test results and protect consumers and packagers from unfair trade practices.

Other Issues That Can Be Studied if a Uniform Test Method Is Adopted

Further study and guidance is needed regarding the methods used to thaw frozen chitterlings. Several weights and measures inspectors reported that thawing large packages of chitterlings takes an extensive amount of time and is labor and resource intensive (e.g., large quantities of warm water are used or several days are required for the product to thaw so it can be tested). If quicker thawing techniques could be identified, it could improve productivity and reduce inspection costs for packers and officials. Another effort that should benefit packers would be to identify and share good packing and filling practices to reduce variations in the packing process. The purge values on different lots tested by the states and in the university study varied significantly and large variations between packers were found. Reducing variability will benefit packers and consumers alike and may be achieved with only minor changes in the filling process. Perhaps the most significant issue that needs further study is if the 20 % limit is appropriate for frozen chitterlings. Several packers reported that they can only meet the 20 % purge limit and avoid consumer complaints on frozen chitterlings if they target their purge results to fall within 5 % to 10 %. Yet, chitterlings from these packers still do not meet the 20 % limit when their frozen chitterlings are thawed and tested using NIST Handbook 133 procedures.

The NIST Office of Weights and Measures invites interested weights and measures officials and packers to join a work group that will coordinate a review of the draft chitterling test procedure and other issues related to the testing of chitterlings (and beef tripe). If you are interested in participating in this work or if you have comments or questions please contact Ken Butcher at (301) 975-4859 or kbutcher@nist.gov

What are Chitterlings?

The USDA's definition of chitterlings is in 9 CFR Ch. III §317.8 (30). The term "Chitterlings" shall apply to the large intestines of swine, or young bovine animals when preceded with the word "Calf" or "Veal." Meat food products that contain chitterlings or calf or veal chitterlings, in accordance with § 318.6(b)(8) of this subchapter shall be identified with product names that refer to such ingredients, as for instance, "Chitterling Loaf," "Chitterling Pie," or "Calf Chitterlings and Gravy." Their texture is similar to calamari (squid). According to the USDA,⁶ chitterlings are a popular food served in many parts of the United States, the Caribbean, Latin America, western Asia, and Europe. Also called "chitlins," as defined above, they are the large intestines of swine (hogs) or calves. According to one industry source, chitterlings are eaten year round but about 90 % are sold during the Thanksgiving, Christmas, and New Year Holidays. Chitterlings are also used as casings for some sausages.

Chitterling Cleaning, Processing and Packaging

The large intestine of a hog is a soft tubular organ typically 5 meters to 6 meters (16 ft to 20 ft) long. When the intestine is removed from a freshly killed hog, it usually contains undigested food, fecal matter, and fat with glands and connective tissue still attached. To avoid foodborne illnesses, intestines require a thorough cleaning prior to consumption. Chitterlings can become contaminated with the bacteria *Yersinia enterocolitica*, which can cause a diarrheal illness called "yersiniosis." *Yersinia* survives in cold temperatures and can grow inside the refrigerator. Other foodborne pathogens (e.g., salmonella and *E. coli*) may also be present. For these reasons, the FSIS regulations require the product be thoroughly cleaned by the packer to prevent disease.

At most packing plants, the cleaning is performed using machines that flush fecal matter from pig intestines using tap water. The chitterlings are uncoiled and manually placed over a feed tube which sprays water through the tube forcing the fecal material out. During the process, the intestines are cut and cleaned again in centrifugal or agitating washing bowls prior to undergoing final inspection and cleaning before being packaged. Although the cleaning equipment is designed to minimize structural damage to the cells of the intestines, the pressurized water may wash away some of the mucosa (intestinal lining) along with the digested material and fecal matter. The damage to the mucosa may increase the amount of purge released from the chitterlings. Packers tell consumers that even chitterlings sold as "pre-cleaned" should be rinsed and cleaned again before cooking.

⁶http://www.fsis.usda.gov/wps/portal/fsis/topics/food-safety-education/get-answers/food-safety-fact-sheets/foodborne-illness-and-disease/yersiniosis-and-chitterlings/ct_index Accessed July 11, 2014.

Water Content⁷ and Purge

Meat and poultry products have naturally occurring high water content. For example, a whole chicken fryer is 66 % water and a whole beef brisket is made up of about 71 % water. USDA studies show that raw chitterlings typically have water content of 67 % to 69 %.

CURRENT USDA GUIDANCE:

Net Weight on Chitterlings⁸

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QUESTION TO FSIS: *“According to the Food Standards and Labeling Policy Book, frozen chitterlings are permitted to contain 20 % of the frozen net weight as purge. At what point in the process should the determination of the 20 % purge be measured; post packaging and prior to freezing, or post packaging after freezing?”*

FSIS RESPONSE: *“Historically, FSIS has not objected to chitterlings having up to a 20% purge due to the washing and preparation with water. Net weight should be verified after packaging and prior to freezing. When verifying net weights, inspection personnel will not take regulatory action for product containing up to 20% purge. This maximum of 20% purge is representative of actual purge from the washing process; it is not acceptable to add additional liquid to the package.”*

The basis of the FSIS allowance for purge may represent the purge found with fresh-raw chitterlings and may NOT be based on data from actual purge testing on frozen chitterlings. The 20 % purge value appears to have been taken from the 1981 Edition of USDA Agriculture Handbook No. 8-10 prepared by the USDA Human Nutrition Information Service⁹ based on unfrozen chitterlings. As explained earlier several packers reported that they can only meet the 20 % purge limit and avoid consumer complaints on frozen chitterlings if they target their purge results to fall between 5 % to 10 %.

⁷ “Yield and Comparison of Nutritive and Energy Values; Fatty Acids and Cholesterol Content of Raw and Cooked Chitterlings.” By M.W. Vaughn, D.P. Wallace and B.W. Forster in Journal of Food Science – Volume 43 (1978).

⁸ http://askfsis.custhelp.com/app/answers/detail/a_id/1309 - Accessed on July 10, 2014.

⁹ See Page 126 -- Pork, Fresh Chitterlings, Raw - Composition of Foods: pork products: raw, processed, prepared / Part 2 of 2 of Agriculture Handbook 1983. Volume 008-10 Pages p. 101-206. Author: Anderson, Barbara A. Doc ID ah008_10pt2 U.S. Dept. of Agriculture, Human Nutrition Information Service Subject: Pork--Composition--Tables; Canned pork--Composition--Tables; Food Composition Tables (<http://naldc.nal.usda.gov/catalog/CAT84802715>).

See also <http://naldc.nal.usda.gov/naldc/download.xhtml?id=CAT84802715&content=PDF> which was accessed on July 10, 2014.

Does USDA consider Purge to be retained water?

No, FSIS Directive 6700.1 (11/27/2002) addresses this question:

17. How is the retained water statement handled with chitterlings since the product is allowed to be packaged with up to a 20 percent purge?

Answer: Many years ago, before 1992, FSIS allowed, under normal conditions and good manufacturing practices, purge in containers of chitterlings not to exceed 20 percent of the marked weight of the product. The policy is long-held and is practiced industry wide. Consumers who purchase this product are aware of the policy and practice and have come to expect moisture content in chitterlings. As a result of this long-standing policy, no retained water statement is required when chitterlings are packaged with a purge. If chitterlings retain water during post evisceration processing and are not packaged with a purge, the product's labeling is required to bear a retained water statement.

The Impact of Freezing on Cells – Industry Approaches to Compliance

When meat or poultry products are frozen, the water that is a natural component of all meats turns to solid ice crystals. The water expands when it freezes and the sharp-edged crystals push into the surrounding tissue, rupturing the cells. The water that is outside the cell wall freezes first. As it does, it leeches water from the cell walls. After thawing, the product will have lost some of its natural springiness because the water released from the cells during freezing flows out of the thawing meats. Studies have shown that under some conditions, cell destruction can also occur during the thawing process.¹⁰ After chitterlings are washed, they are weighed in advance of packaging. The weight includes the chitterlings (and the fluid held within the cell walls), and water accumulated in the folds and on the surface of the chitterlings, which are then packaged for freezing. Chitterlings are made up of gelatinous cells that easily rupture and the amount of damage depends primarily on the speed of the freezing process. When the chitterlings are thawed, the purge flowing out includes water that was originally held within many of the cells, the surface water, and water trapped in the crevices and folds of the product.

There are studies showing freezing damages the cells and releases water that cannot be reabsorbed. If chitterlings are tested before freezing and a purge of 20 % is found, any test conducted after freezing and thawing will find a much higher level of purge. Purge occurs with all meats, but with chitterlings, the amount of purge is measured and is required to meet a limit. The USDA limits the amount of water at point of pack to 20 % so consumers receive a certain amount of meat solids in a product that is packaged in water. A limit on purge is similar to a standard-of-fill that the Food and Drug Administration defines for other food products with similar water versus solid content issues (e.g., tuna fish). For these reasons, and to ensure they meet the USDA requirements, several chitterling packers keep their pre-packaged chitterling purge levels to 7 % to 10 %. Yet, as mentioned above, packages from those packers are often

¹⁰ Mazur, Peter, "Freezing of Living Cells: mechanisms and implications." American Journal of Physiology, 247. 1984.

found to have purge levels of 24 % to 34 % when thawed, and the NIST Handbook 133 procedures are used to test purge levels.

Background

In 2011 the OWM was contacted by several state weights and measures officials for assistance in resolving disagreements with packers over the use of NIST Handbook 133, "Checking the Net Contents of Packaged Goods." Several state inspectors reported they routinely receive consumer complaints about the amount of purge in chitterlings, and they had used Section 2.6. "Determining the Net Weight of Encased-in-Ice and Ice Glazed Products" to verify the net weight. They also reported that the amount of purge had been determined after thawing the frozen chitterlings. Data from the inspectors revealed that the purge from all of the chitterlings tested exceeded a 20 % limit specified by USDA. OWM also learned that at least one state had taken legal action against a packer whose chitterlings failed the 20 % purge limit. The state had collected its evidence using a test procedure similar to Section 2.6. but had added some practical modifications so it was usable in testing chitterlings.¹¹

Another concern raised by the inspectors was that neither a purge limit nor test procedures for the determination of purge are included in NIST Handbook 133. As noted above, the test procedures in Section 2.6. were originally developed for drained weight testing of shrimp and other frozen foods to verify only net weight declarations. OWM agreed to review the test methods used by the state inspectors to see if the current test procedure could be revised to make it appropriate for use in testing chitterlings.

Note: The 2005 edition of NIST Handbook 133 was adopted by the Food Safety and Inspection Service (FSIS) of the U.S. Department of Agriculture for use in testing meat and poultry products in 2008 (see 9 CFR 442.2 "Quantity of Contents Labeling and Procedures and Requirements for Accurate Weights" and 73 FR 52192).

Based on the information presented above, state weights and measures inspectors need to have a test procedure tailored to the testing of chitterlings in NIST Handbook 133 so inspectors can test in retail stores in response to consumer complaints. States do not have access to packing plants located in other states or countries; therefore, they rely on tests at retail or wholesale locations for their investigations. Testing at the retail level (the end point in distribution) allows inspectors to look at a variety of packers to ensure fair competition, and state inspectors are able to discover changes to the product that may occur during distribution from environmental factors, mishandling or tampering of product. Packers and consumers both benefit from having retail marketplace surveillance to maintain equity and fair competition.

¹¹ In November 2010, San Diego County District Attorney's Office filed a complaint and stipulated judgment against Clougherty Packing, LLC for \$451,564. Clougherty settled without admitting fault or liability. The case resulted from a consumer complaint to the California Department of Measurement Standards (CDMS) regarding large amounts of purge from chitterlings. More than 60,000 packages of chitterlings were ordered off-sale after samples were tested and shortages ranging from 31 % to 45 % were found.

Net Weight versus Purge

A review of test results from several states and a university indicates that a majority of the packaged chitterlings tested comply with the average and individual package requirements for net weight as required under NIST Handbook 133. Currently, the handbook does not include limits on the amount of purge from chitterlings. State weights and measures officials follow a 20 % limit published by the USDA. Determining the amount of purge goes beyond net weight testing. Several inspectors reported the test procedure to conduct the purge tests in Section 2.6. had to be modified. Inspectors asked for technical assistance in evaluating whether their modifications to the current procedure were acceptable and requested revisions to accommodate purge testing be made to NIST Handbook 133 so the test procedure would be uniform and accepted nationally.

USDA established the limits on purge to ensure that packages of chitterlings contain a certain percentage of meat. Currently, the USDA policy sets the upper limit of purge at 20 % of the labeled quantity. Recent inspections conducted by several states and a comprehensive study by a university found that packages of frozen chitterlings from several packers (including one supplier from Europe) contain purge in the range of ± 30 % to + 50 %. The following results were obtained using the current test procedures based on Section 2.6. Inspections by state weights and measures inspectors in California, Florida, Mississippi and Louisiana, which were carried out in response to consumer complaints about high amounts of purge in packages of chitterlings, revealed the following: (1) In October 2010, weights and measures inspectors from Louisiana tested samples from 10 lots (totaling more than 7740 containers) and found an average purge of 49 %; (2) In October 2010, Florida weights and measures inspectors tested samples from a lot of 324 packages and found an average purge 33 %; and (3) In November 2010, the San Diego District Attorney announced a settlement in an investigation of a consumer complaint. In this case weights and measures inspectors had tested lots totaling 60,588 packages from one packer and had found shortages of 31 % to 45 %.

Several chitterling packers have expressed concerns about the appropriateness of the test procedures used by inspectors and about the high purge levels inspections had uncovered. One packer/retailer commented that it was difficult for his company to compete against many other packers because chitterlings are not routinely tested for compliance with purge limits. Several packers shared in-plant test data from their plants showing they target for a purge of 7 % to 10 % on in-plant tests. These packers reported that if they do not target for low purge levels in their testing, they see a dramatic jump in consumer complaints about excessive purge.

The data from one university study of five packers indicates that the purge from sample lots (total $5 \times 30 = 150$ packages) ranged from 26.9 % to 57.3 % or from about 7 % to 37 % higher than the 20 % limit set by the USDA. The data was obtained in laboratory conditions and showed significant differences in purge amounts. The differences are likely caused by packers having different pre and post freezing purge targets and variations in test equipment and drain procedures. There are also likely to be different fill target weights, weighing devices (e.g., different scale divisions), and other unique packaging procedures or freezing processes.

Variations in the standard deviations found on packages produced by the different packers ranged from 1.7 % to 5.2 %. The results include samples with purge rates as low as 18 % and as high as 66 %. The range of net contents is so wide that it would likely frustrate the ability of consumers to estimate how many packages to purchase to obtain a specific amount of chitterlings for use in a recipe, to determine serving size, and to make value comparisons. Even packages from the same packer had a wide range of purge values.

Packer	a	b	c	d	e
Average Purge*	34.2 %	57.3 %	26.9 %	33.6 %	27.9 %
Standard Deviation (σ)	1.9	3.2	1.7	5.2	2.4
Range of Results ($\pm 3 \sigma$)	28 % to 40 %	47 % to 66 %	21 % to 31 %	18 % to 49 %	20 % to 35 %
*Data is percentage purge based on labeled quantity from a 2008 study conducted by Dr. Ken Prusa, Professor, Iowa State University of Science and Technology on samples from five packers of 30 packages of frozen chitterlings using the procedures in Section 2.6. of NIST Handbook 133. Published with permission.					

Thawing Procedures

Several inspectors requested guidance on how to efficiently thaw chitterlings to improve the proficiency of their tests and accuracy of the results. Inspectors stated the thawing process for large frozen packages (e.g., 2.2 kg, 5.0 kg [5 lb and 10 lb] packages of frozen product) is time consuming regardless of the product. Access to large quantities of hot water and sink space are significant problems in many locations (the National Marine Fisheries, an agency of the U.S. Department of Commerce has indicated that their inspectors face similar challenges when they conduct inspections of imported seafood). A few state inspectors reported that they have to let sample packages of chitterlings sit in room temperature water for long hours or in a refrigerator for several days to allow them to thaw. Another packer reported that its tests had not revealed any correlation between thaw time and increased purge. Still, reviewing the current thawing procedures to identify ways to increase uniformity, repeatability, and accuracy may be beneficial.

The thawing procedure in NIST Handbook 133 specifies that the water temperature be maintained between 23 °C to 29 °C (75 °F to 85 °F). Some inspectors asked if the temperatures of the water increases purge or if the temperature of the chitterlings at the time they are drained impacts purge levels. One packer has conducted some preliminary testing to explore that question. The results of those tests indicated that the water temperature used to thaw the chitterlings probably does not increase purge results, however, the water must not be too hot because it may cause the proteins in the chitterlings to denature. The packer's tests indicated the temperature of the chitterlings at the time they are drained may increase purge values. The data showed that warm chitterlings (e.g., room temperature or about 70 °F) lost about 10 % more purge than chitterlings cooled to 40 °F before draining. Because the packer's data is limited more study is needed to better understand this aspect of purge testing.

Draft Proposed Section 2.7. for a Chitterling (and Beef Tripe) Test Procedure

Introduction

This test procedure was originally developed for the Food and Drug Administration (FDA) in the 1960s for its use in testing frozen blocks of seafood and other products. Over the years it has been modified for use in testing a variety of products including frozen seafood and glazed chicken breasts. Based on a review of the USDA procedures and information received from several weights and measures inspectors and chitterling packers, several changes are proposed for Section 2.6. “Determining the Net Weight of Encased-in-Ice and Ice Glazed Products” to make it appropriate for use in testing frozen chitterlings when determining their net weight and the amount of purge in the package.

The draft test procedure can be used in USDA inspected packing plants and in wholesale and retail locations by weights and measures officials to determine if it is practical and to identify additional areas for improvement. For the test procedure to be added to NIST Handbook 133, it must be adopted by the NCWM.¹² Before submitting any proposal to the NCWM, support from both packers and weights and measures officials must be garnered. One goal of this paper is to raise the question of whether or not the 20 % purge limit set by USDA is appropriate for previously frozen chitterlings. Based on the information presented below, the current purge value of 20 % may not be appropriate for use in testing frozen chitterlings. However, increasing it to 30 % would not dramatically increase compliance levels. Before an appropriate purge value for frozen chitterlings can be recommended, data from tests of packages from many packers must be collected using a uniform test procedure.

The OWM recommends the formation of a work group to review of the draft chitterling test procedure. The group should consider investigating some of the other issues mentioned above, including developing and sharing good packing practices and alternative thawing procedures. Once a uniform test method and good packing practices are in place, data could then be collected to determine if a different purge limit for frozen chitterlings should be considered. OWM will use the draft test procedure to provide training to interested state officials and will recommend that states use it in investigations of consumer complaints. OWM will also encourage states to share their experience with the draft procedure so it can be improved, and invite them to share test data with the group so the data can be used to evaluate the test procedure and existing purge limit.

¹² The NCWM is a not-for-profit corporation dedicated to developing the U.S. standards for weights and measures. The NCWM is open to all interested parties and among its membership are representatives of the American Meat Institute and Food Marketing Institute and many of their member companies.

Modifications of Section 2.6. Net Weight of Encased-In-Ice and Ice Glazed Products for Use with Chitterlings

1. As with other foods where drained weight testing is used, the weight-per-volume of solids is approximately the same as the fluid poured from the package so all of the samples must be opened. For this reason, the use of an average tare weight or an average purge value cannot be used to compute package errors.

Change: Add the following note to the test procedure in NIST Handbook 133:

Note: All of the packages in the sample must be opened. This is because the purge from each package may vary significantly. Another reason is that the weight-per-volume of solids is often nearly equal to the weight of the liquid poured from the package. For these reasons an average tare weight or average purge value calculated using just a few packages would not be representative of the sample.

2. A Weights and Measures Inspector reported that a 300 mm (12 in) sieve could hold 2.2 kg (5 lb) of chitterlings when tilted at 30 degrees but several measurements were required when larger containers were tested. It was suggested that a note be added to the test procedure to clarify that multiple measurements were permitted and to alert inspectors that some sieves may not hold the entire contents of larger packages.

Change: Add the following:

Note: If the amount of chitterlings in the package exceeds the capacity of the sieve, divide the solids evenly among several sieves of the same dimensions or make multiple determinations using a single sieve.

Addressing Differences from Current Field Use

3. **Packed or Unpacked** – Section 2.6. requires products to be unwrapped so they can be thawed in a water bath. The temperature is typically maintained using a constant flow of warm water. In discussions with state weights and measures inspectors who have tested chitterlings, we learned that they thaw the chitterlings while they are still packaged so they can obtain an accurate measurement of the purge from each package. State inspectors also report that allowing selected frozen sample packages to thaw for several days at 4 °C (40 °F) and then using a warm water bath to complete the process is a practical alternative that should be recognized when limited time and other resources exist (e.g., a sample size of 48 packages is needed to test a large inspection lot and there are limited sinks and water supplies at the point of inspection.)

Change: Revise the procedure so frozen chitterlings can be thawed in the package and add a statement indicating that alternative thawing procedures may be used. Also, delete reference to the wire mesh basket used to hold unwrapped products under water while preventing the loss of product solids.

Associated with this provision is a note which reads that “Direct immersion does not result in the product absorbing moisture because the freezing process causes tissue to lose its ability to hold water.” If the procedure is modified to allow frozen chitterlings to be thawed in the package the note is no longer relevant and it should be removed.

Change: Delete the NOTE.

4. **Thawing Procedure** – Inspectors have reported difficulties using the thawing techniques prescribed in Section 2.6. due to the size of the containers, sample sizes, availability of an adequate size water bath, and supply of hot water. The draft procedure calls for the packages to be immersed in a water bath. But, when the sample is made up of 4.0 kg (10 lb) buckets, many sinks cannot hold more than a few containers. To determine if the center of a bucket has thawed an inspector recommended that a dowel rod be inserted gently into the container to determine if there is any remaining frozen product or chunks of ice.

Change: Amend the section to allow for the use a sink, ice chest or other large vessel. Add a note for the inspector to use a dowel rod to determine if the product has completely thawed and that there are no chunks of ice in the container.

5. A packer suggested guidance to help inspectors decide when chitterlings are “thawed out.” The recommendation was to add a statement that a “thawed condition” is one in which no ice crystals are observed or felt in or on the chitterlings.

Change: Insert a note that the chitterlings are thawed when it is determined by touch that they are not rigid and no ice crystals are observed or felt within or on their outside surface.

6. **Drain Angle** – The techniques that inspectors use to tilt the sieve to drain chitterlings (and other frozen products) vary widely which may affect test results. The current procedure specifies that the sieve be tilted at a 30 degree angle for two minutes. To address this issue, a tilt-angle block was fabricated so that it raises a 304 mm (12 in) sieve to the correct height of 152 mm (6 in) to achieve a 30 degree angle. (See figure 1 on page 17 for an example). The angle block was designed for use with both the 203 mm (8 in) and 304 mm (12 in) sieves and at other drain angles. A drawing of one type of angle block is available upon request from OWM to allow for local construction.

Change: Add Figure 1 (page 17) to the test procedure and provide access to drawings of one type of tilt-angle block so it can be fabricated locally. Include the following note:

Note: Other methods may be used for draining as long as the correct drain angle is used.

7. **USDA Policy on Chitterling Purge** – Several inspectors pointed out that NIST Handbook 133 does not include a purge limit. It was suggested that the current USDA limit on purge be added to NIST Handbook 133.

Change: Add a requirement to NIST Handbook 133 to include the USDA 20 % limit on purge.

8. **USDA Policy on Chitterling Purge** – The USDA procedure for purge tests conducted inside a packing plant is to calculate it using the individual labeled quantity and actual net weight of the package, not the gross weights of the individual packages (standardized). USDA policy also only applies an average requirement to purge tests. No Maximum Allowable Variation is applied to the individual purge results. This USDA policy must be added to the NIST Handbook 133 procedure to ensure consistent testing and application of the purge requirements between the packing plant and the field.

Change: Add a step in the procedure to calculate purge values for each package using the quantity labeled on the package.

10. **Other Changes** – Amend the procedure to explain how to determine purge values and net weight requirements. These additions are incorporated in the following draft of 2.X.

A draft procedure for determining the net weight and percent of purge of chitterlings is presented below. If the procedure is added to NIST Handbook 133, it will be added as a new Section 2.7. in Chapter 2. “Test Procedures – For Packages Labeled by Weight – Gravimetric Testing.” Worksheets for use in testing chitterlings with both the Category A and Category B Sampling Plans are included.

Draft NIST Handbook 133 – Chitterling Test Procedure 2.7.

Because of the unique properties of chitterlings, they require special test methods to ensure the integrity and consistency of the test.

2.7. Determining the Net Weight and Percent of Purge in Packages of Fresh and Frozen Chitterlings

2.7.1. Test Equipment

- Scale or balance and mass standards (the standards are used to verify the accuracy and repeatability of the weighing device).
- Partial immersion thermometer or equivalent with 1 °C (2 °F) graduations and a – 35 °C to + 50 °C (– 30 °F to + 120 °F) accurate to ± 1 °C (± 2 °F).
- Sink (e.g., water bath, ice chest) or other receptacle of suitable size to hold the packages for thawing and water source and hose with fresh water that can be maintained at a temperature between 23 °C to 29 °C (75 °F to 85 °F) (for thawing plastic bags or buckets of chitterlings).

An alternative thawing procedure for packages requires access to a refrigerator that must be available for storing sample packages for several days to thaw.

- Stainless Steel Sieve(s) and Drain Pan(s) - Number 8 mesh, 203 mm (8 in) or 304 mm (12 in). Use is based on the labeled net weight of the package under inspection.
- Stopwatch (to measure drain periods).
- Knife or box cutter (to open packages).
- Waterproof marking pen (for numbering the packages).
- Disposable (non-latex) gloves.
- Paper towels (drying sieve drain pan, packages and work area).
- Large plastic bags (to hold product emptied from packages).

- Plastic rod (to insert into buckets of chitterlings to determine if the product is thawed and to ensure there are no chunks of ice remaining).

2.7.2. Test Procedure for Net Weight and Purge Determination for Fresh and Frozen Chitterlings.

This procedure is used to determine (1) the net weight and (2) the purge in packages of fresh and frozen chitterlings. The purge determination procedure requires the destructive testing of all of the sample packages.

1. Follow Sections 2.3.1. Define the Inspection Lot, 2.3.2. Select Sampling Plans (use the “Category A” Sampling Plans in Table 2-1 if the testing is outside of a USDA inspected packing facility or, the “Category B” Sampling Plan in Table 2-2 if the testing is inside a USDA inspected packing facility), 2.3.3. Record Inspection Data, and 2.3.4. Random Sample Selection.
 - Select the random sample of packages.
 - Dry the sample packages and number each (e.g., 1-12) using a waterproof marker.
 - Record the Product Brand, Inspector Name, Labeled Net Weight (top of Column A), Packer Identity, Lot Code, Number of Unreasonable Errors, MAV from Table 2-9, and the Unit of Measure of the scale used for weight determinations on the worksheet. The appropriate information can be transferred to an official inspection report at the conclusion of the inspection. The worksheet should be added to the official record of the inspection.

2.7.2.1. Net Weight and Purge Determinations

Follow these procedures to determine the net weight and amount of purge from chitterlings.

2.7.2.1.1. Test Procedure for Determining the Net Weight and Purge from Fresh and Frozen Chitterlings.

1. Determine the Gross Weight of each sample package (record in Column B).
2. Determine the tare weight of the sieve drain pan (record in Drain Pan Tare above Column F).

Frozen Chitterlings

3. Fully immerse the unopened package of frozen chitterlings in a water bath maintained at a temperature between 23 °C to 29 °C (75 °F to 85 °F).

Note: An alternative approach to thawing large frozen packages (e.g., 5 kg [10 lb] plastic pails) is to randomly select [mark them to be held for inspection] the sample packages and place them in a refrigerator for partial thawing over several days and then carrying out the final thawing using the water bath technique.

Note: If the products are to be placed in refrigerated storage for several days for partial thawing, segregate them from other product inventory and mark each container with an identifier to allow the inspector to ensure that they were the samples selected for testing (mark both lid and container on buckets) when the inspection is resumed after the thawing process. Also, mark the packages with a conspicuous notice that they are being held for inspection.

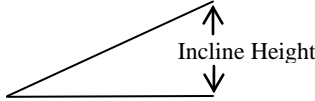
4. Maintain a continuous flow of water into the bath to keep the temperature within the specified range until the chitterlings are thawed. The chitterlings are thawed when it is determined by touch that they are not rigid and no ice crystals are observed or felt within or on their outside surface.

Note: for buckets insert a plastic rod into the chitterlings to determine if the product is thawed and to ensure there are no chunks of ice remaining.

Fresh and Frozen Chitterlings

5. Draining the Chitterlings: depending on the availability of a sink and work space and the inspector's preference, use the procedures in either Method a. or Method b. to drain the chitterlings.¹³ Refer to the Table for the appropriate size sieve to use based on the labeled net weight on the package.

¹³ If carried out with proficiency, which comes with practical experience, the procedures in Method a. and Method b. will provide identical results. The procedure in Method b requires additional steps to calculate the Purged Net Weight but some inspectors have indicated that they prefer Method b. because the drain time and product is easier to control (because the chitterlings in the sieve may continue to drain). Regardless of the method used the inspector must handle the product carefully but quickly to avoid errors that may void the test. Also, some inspectors often use a waste container to collect the package liquids so that all of the product can be returned the package for subsequent return to the packer. Other inspectors report that some retailers do not want the product repackaged so the liquids are drained into a sink, the solids discarded, and the disposition reported on the inspection report.

Table 1.			
Labeled Net Weight	Sieve Diameter	30 Degree Tilt from Horizontal	Incline Height
If more than 453 g (1 lb) use a:	300 mm (12 in)		175 mm (6.9 in)
If less than 453 g (1 lb) use a:	203 mm (8 in)		116.8 mm (4.6 in)
<ul style="list-style-type: none"> • This procedure requires that the sieve and drain pan be cleaned and dried after each use. It is a good measurement practice to obtain the dry weights of both the sieve and pan and recheck those weights periodically during the test to make sure the cleaning and drying procedures are efficient. • If the amount of chitterlings in the package exceeds the capacity of the sieve, divide the solids evenly among two or more sieves of the same dimensions or make multiple determinations using a single sieve. Exercise care when transferring the chitterlings into the sieves to avoid spilling liquid which can void the test. 			

Method A. Place a sieve over a sink or waste collection container.⁹ Pour the chitterlings into the sieve and distribute them over the surface of the sieve with a minimum of handling. Hold the sieve firmly and incline it 30 degrees (see Figure 1 for an example of a tilt block for use with a sink drain set at 30 degrees) to facilitate drainage, then start the stop watch and drain for exactly two-minutes. At the end of the drain time immediately transfer the chitterlings to a Drain Pan for weighing. Determine the Purged Net Weight of the chitterlings using the following formula and Record in Column F of the worksheet.

$$\text{Drained Chitterlings and Drain Pan} - \text{Drain Pan Tare} = \text{Purged Net Weight}$$

Method B. Place a sieve on its Drain Pan. Pour the chitterlings into the sieve and distribute them over the surface of the sieve with a minimum of handling. Hold the sieve firmly and incline it 30 degrees to facilitate drainage, then start the stop watch and drain for exactly two-minutes. At the end of the drain time immediately transfer the Drain Pan with the Purged Liquid to the scale for weighing. Dry the empty package to determine its tare weight and enter it in Column C. Determine the Purged Net Weight of the chitterlings using the following formula and Record in Column F of the worksheet.

$$(\text{Gross Weight of Package} - \text{Package Tare Weight}) - (\text{Weight of Purged Liquid \& Drain Pan} - \text{Drain Pan Tare}) = \text{Purged Net Weight}$$

$$(\text{Column B} - \text{Column C}) - (\text{Weight of Purged Liquid \& Drain Pan} - \text{Drain Pan Tare}) = \text{Purged Net Weight}$$

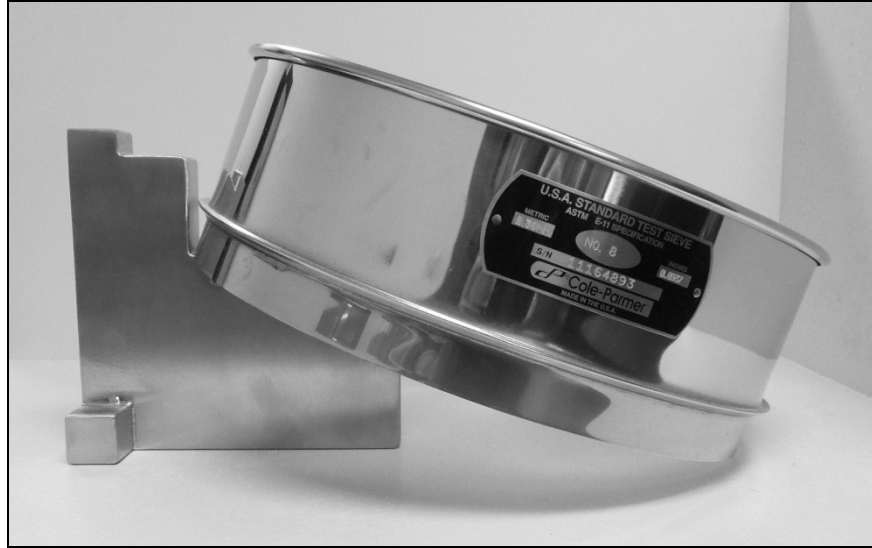


Figure 3. Tilt Block set at 30 degrees

6. Calculate Purge using the formula shown below (use the labeled net weight in Column A and NOT the gross weight of the package in Column B) and record the result in Column G of the Worksheet.

$$\text{Purge in \%} = (\text{Labeled Weight} - \text{Purged Net Weight}) \div \text{Labeled Weight} \times 100$$

$$\text{Purge in \%} = \text{Column A} - \text{Column F} \div \text{Column A} \times 100$$

Example: The labeled net weight is 5 lb and the Purged Net Weight is 4.19 lb

$$5 \text{ lb} - 4.19 \text{ lb} = 0.81 \text{ lb} \div 5 \text{ lb} = 0.162 \times 100 \% = 16.2 \% \text{ purge}$$

7. Dry the empty package and determine its tare weight (record in Column C of the worksheet.)
8. Subtract the individual Package Tare Weight from the individual Package Gross Weight to obtain the Actual Package Net Weight (record in Column D of worksheet). Do not use an Average Tare Weight. Use the formula:

$$\text{Actual Package Net Weight} = \text{Gross Weight} - \text{Tare Weight}$$

$$\text{Actual Package Net Weight} = \text{Column B} - \text{Column C}$$

9. Subtract the Actual Package Net Weight from the Labeled Net Weight (record in Column E of worksheet). Use the formula:

$$\text{Package Error} = \text{Labeled Net Weight} - \text{Actual Package Net Weight}$$

$$\text{Package Error} = \text{Column A} - \text{Column D}$$

Repeat for all packages in the sample.

Note: The determination of compliance with the net weight and purge requirements are carried out concurrently. The calculation of the average net weight and average purge is completed after all of the packages are opened and all purge amounts are obtained. The sample must pass both the net weight and purge tests to comply with this section.

2.7.3. Evaluations of Results – Compliance Determinations

1. Net Weight

- a. **Individual Package Requirement:** If there are negative package errors, determine if any of the values exceed the Maximum Allowable Variation (MAV) for the packaged quantity in NIST Handbook 133, Appendix A, Table 2-9. “U.S. Department of Agriculture, Meat and Poultry Groups and Lower Limits for Individual Packages” (i.e., if the labeled net weight is more than 3 lb up to 10 lb then the MAV = 42.5 g (0.094 lb) 1.5 oz).
 - If a package error exceeds the MAV, mark it as “Failed” in the MAV Fail column.
 - Count the number of packages that exceed the MAV. If the number of packages that exceed the MAV is greater than the number allowed in NIST Handbook 133, Appendix A, Tables 2-1. Sampling Plans for Category A or Table 2-2. Sampling Plans for Category B, the sample fails. Mark the sample as “Failed” in the Net Weight Compliance section of the worksheet.
 - If the sample passes the Individual Package Requirement, apply the Average Error Requirement.
- b. **Average Error Requirement:** Sum the package errors in Column E and enter the value in E1 – Total Error. Divide the value in E1 by the Sample Size (n) to obtain an Average Error and enter the value in E2. If the Average Error (E2) is a positive number, the sample passes. Go to the Net Weight Compliance Section and mark the sample as “Passed.”
 - If the Average Error (E2) is a negative number, calculate the sample standard deviation of the package errors (Column E) and enter it in the block provided in the Net Weight Compliance section.

- Use the Sample Correction Factor (SCF) to calculate the Sample Error Limit (SEL).

$$\text{Sample Error Limit (SEL)} = \text{Sample Standard Deviation} \times \text{Sample Correction Factor}$$

- Disregarding the signs,
 - if the Average Error (E2) is larger than the SEL, the sample fails. Mark it “Failed” in the Net Weight Compliance Section of the worksheet,
 - or
 - if the Average Error is less than the SEL, the sample passes. Go to the Net Weight Compliance Section and mark the sample as “Passed.”

2. Purge

Follow these procedures to determine the amount of purge from the chitterlings. Apply the Average Requirement in Section 2.3.7.2. to the purge to determine if the sample passes or fails the requirement. The Average Adjusted Purge (AAP) for the sample shall not exceed 20 % of the labeled weight. The Maximum Allowable Variations (Lower Limits for Individual Packages) in NIST Handbook 133, Appendix A, Table 2-9. are not applied in the purge test.

- Sum the purge values in Column G and enter the value in G1 – Total Purge. Divide the value in G1 by the Sample Size (n) to obtain an Average Purge and enter the value in G2. If the Average Purge (G2) is less than or equal to 20 %, the sample passes. Go to the Purge Compliance Section and mark the sample as “Passed.”
- If the Average Purge is greater than 20 %, calculate the Sample Standard Deviation of the values in Column G and enter it in the block provided in the Purge Compliance section.
- Use the Sample Correction Factor (SCF) to calculate the Purge Sample Error Limit (PSEL) in percent.
- Subtract the PSEL from the Average Purge (G2) to obtain an Adjusted Average Purge (AAP) and enter that value in G3.

➤ Pass or Fail

- If the AAP (G3) is greater than 20 %, the sample fails. Enter the Purge Value (G3) in the Purge Compliance section and mark the sample as “Failed.”

or

- if the AAP (G3) is 20 % or less, the sample passes. Enter the Purge Value (G3) in the Purge Compliance section and mark the sample as “Passed.”

INSPECTOR: <i>S. INSPECTOR</i>		CHITTERLING WORKSHEET								
DATE: <i>July 12, 2014</i>		NET WEIGHT & PURGE DETERMINATIONS								
PACKER: <i>PACKER INC.</i> <i>1000 ROADWAY</i> <i>PACKINGTOWN, USA</i>		LOT CODE: <i>A342012</i>		DRAIN PAN TARE:		UNIT OF MEASURE: <i>lb</i>				
		BRAND: <i>ALLBRAND</i>		<i>0.997 lb</i>						
PACKAGE NUMBER	A	B	C	D	E	IF ERROR EXCEEDS MAV = FAIL	F	G		
	LABELED NET WEIGHT	PACKAGE GROSS WEIGHT	PACKAGE TARE WEIGHT	ACTUAL PACKAGE NET WEIGHT B - C =	PACKAGE ERROR D - A =		PURGED NET WT WEIGHT OF DRAINED CHITTERLINGS (OR PURGED LIQUID) AND DRAIN PAN - DRAIN PAN TARE =	PURGE % $\frac{(A - F) \times 100}{A}$		
1	<i>5 lb</i>	<i>5.130</i>	<i>0.032</i>	<i>5.098</i>	<i>0.098</i>		<i>4.19</i>	<i>16.2</i>	%	
2		<i>5.160</i>	<i>0.033</i>	<i>5.127</i>	<i>0.127</i>		<i>4.21</i>	<i>15.8</i>	%	
3		<i>5.012</i>	<i>0.032</i>	<i>4.980</i>	<i>- 0.020</i>		<i>4.17</i>	<i>16.6</i>	%	
4		<i>5.170</i>	<i>0.034</i>	<i>5.136</i>	<i>0.136</i>		<i>4.20</i>	<i>16.0</i>	%	
5		<i>5.020</i>	<i>0.033</i>	<i>4.987</i>	<i>- 0.013</i>		<i>4.18</i>	<i>16.4</i>	%	
6		<i>5.102</i>	<i>0.032</i>	<i>5.070</i>	<i>0.070</i>		<i>4.22</i>	<i>15.6</i>	%	
7		<i>5.051</i>	<i>0.033</i>	<i>5.018</i>	<i>0.018</i>		<i>4.24</i>	<i>15.2</i>	%	
8		<i>5.116</i>	<i>0.032</i>	<i>5.084</i>	<i>0.084</i>		<i>4.20</i>	<i>16.0</i>	%	
9		<i>5.120</i>	<i>0.034</i>	<i>5.086</i>	<i>0.086</i>		<i>4.19</i>	<i>16.2</i>	%	
10		<i>5.023</i>	<i>0.032</i>	<i>4.991</i>	<i>- 0.009</i>		<i>4.20</i>	<i>16.0</i>	%	
11		<i>5.122</i>	<i>0.032</i>	<i>5.090</i>	<i>0.090</i>		<i>4.26</i>	<i>14.8</i>	%	
12		<i>5.020</i>	<i>0.033</i>	<i>4.987</i>	<i>- 0.013</i>		<i>4.18</i>	<i>16.4</i>	%	
NUMBER OF UNREASONABLE ERRORS ALLOWED: NONE Table 2-9. MAV: <i>0.0094 lb</i>		E1 - TOTAL ERROR		<i>0.054 lb</i>		G1 - TOTAL PURGE		<i>191.2</i>		%
		E2 - AVERAGE ERROR (E1 ÷ n =)		<i>0.0045</i>		G2 - AVERAGE PURGE (G1 ÷ n =)		<i>15.9</i>		%
		G3 - ADJUSTED AVERAGE PURGE (G2 - PSEL =)								%
<p>NET WEIGHT COMPLIANCE: (1) If any of the minus package errors (see Column E) exceed the MAV, the sample fails. (2) If none exceeds the MAV and the Average Error (E2) is a positive number, the sample passes. (3) If the Average Error (E2) is a minus number, calculate the sample standard deviation and enter it below. (4) Use the Sample Correction Factor (SCF) to calculate the Sample Error Limit (SEL). (5) Disregarding the signs, (a) if the Average Error (E2) is larger than the SEL, the sample fails or (b) if the Average Error is less than the SEL the sample passes.</p> <p>STANDARD DEVIATION: 0.0601×0.635 (SCF) = 0.0382 (SEL) PASSED <input checked="" type="checkbox"/> FAILED</p>										
<p>PURGE COMPLIANCE: MAVS ARE NOT APPLIED IN THE PURGE TEST (1) If the Average Purge Error (G2) is less than or equal to 20 %, the sample passes. (2) If the Average Purge Error is greater than 20 %, calculate the sample standard deviation and enter it below. (3) Use the Sample Correction Factor (SCF) to calculate the Purge Sample Error Limit (PSEL) in percent. (4) Subtract the PSEL from the Average Purge (G2) to obtain an Adjusted Average Purge (AAP) and enter that value in G3. (5)(a) If the AAP (G3) is greater than 20 %, the sample fails or (b) if the AAP (G3) is 20 % or less, the sample passes.</p> <p>STANDARD DEVIATION: 2.420×0.635 (SCF) = 1.536 (PSEL) PURGE (G3) <i>18.83 %</i> PASSED <input checked="" type="checkbox"/> FAILED</p>										
<p>SAMPLE DISPOSITION: <i>Lot passes on both criteria.</i></p>										

INSPECTOR: <i>S. INSPECTOR</i>		CHITTERLING WORKSHEET FOR USE INSIDE A USDA INSPECTED PACKING PLANT NET WEIGHT & PURGE DETERMINATIONS WORKSHEET FOR SAMPLE OF 10 PACKAGES – HB 133 CATEGORY B									
DATE: <i>July 14, 2014</i>											
PACKER: <i>PACKER INC. 1000 ROADWAY PACKINGTOWN, USA</i>				LOT CODE: <i>A34526</i>		DRAIN PAN TARE: <i>0.997 lb</i>		UNIT OF MEASURE: <i>lb</i>			
				BRAND: <i>ALLBRAND</i>							
PACKAGE NUMBER	A	B	C	D	E	IF ERROR EXCEEDS MAV = FAIL	F	G			
	LABELED NET WEIGHT	PACKAGE GROSS WEIGHT	PACKAGE TARE WEIGHT	ACTUAL PACKAGE NET WEIGHT B – C =	PACKAGE ERROR D – A =		PURGED NET WT DRAINED CHITTERLINGS (OR PURGED LIQUID) AND PAN - DRAIN PAN TARE =	PURGE % $\frac{(A - F) \times 100}{A}$			
1	5	5.130	0.032	5.098	0.098		4.19	16.2	%		
2		5.160	0.033	5.127	0.127		4.21	15.8	%		
3		5.012	0.032	4.980	- 0.020		4.17	16.6	%		
4		5.170	0.034	5.136	0.136		4.20	16.0	%		
5		5.020	0.033	4.987	- 0.013		4.18	16.4	%		
6		5.102	0.032	5.070	0.070		4.22	15.6	%		
7		5.051	0.033	5.018	0.018		4.24	15.2	%		
8		5.116	0.032	5.084	0.084		4.20	16.0	%		
9		5.120	0.034	5.086	0.086		4.19	16.2	%		
10		5.023	0.032	4.991	- 0.009		4.20	16.0	%		
NUMBER OF UNREASONABLE ERRORS ALLOWED: NONE			E1 – TOTAL ERROR			0.057 lb		G1 – TOTAL PURGE		160	%
Table 2-9. MAV: 0.094 lb			E2 – AVERAGE ERROR			0.057 lb		G2 – AVERAGE PURGE:		16	%
			$(E1 \div n =)$					$(G1 \div n =)$			%
<p>NET WEIGHT COMPLIANCE: (1) If any of the minus package errors (see Column E) exceed the MAV the sample fails. (2) If none of the package errors exceeds the MAV and the Average Error (E2) is a positive number the sample passes. (3) If the Average Error (E2) is a minus number the sample fails. PASSED: <input checked="" type="checkbox"/> FAILED: <input type="checkbox"/></p>											
<p>PURGE COMPLIANCE: MAVS ARE NOT APPLIED IN THE PURGE TEST (1) If the Average Purge Error (G2) is less than or equal to 20 %, the sample passes. (2) If the Average Purge Error (G2) is greater than 20 %, the sample fails. PURGE: 16 % PASSED: <input checked="" type="checkbox"/> FAILED: <input type="checkbox"/></p>											
<p>SAMPLE DISPOSITION: <i>Approved for sale.</i></p>											

BLANK FORMS FOR CATEGORY A AND CATEGORY B SAMPLING PLANS ARE PROVIDED ON THE FOLLOWING PAGES

INSPECTOR:		CHITTERLING WORKSHEET						
DATE:		NET WEIGHT & PURGE DETERMINATIONS						
PACKER:		LOT CODE:			DRAIN PAN TARE:		UNIT OF MEASURE:	
		BRAND:						
PACKAGE NUMBER	A	B	C	D	E	IF ERROR EXCEEDS MAV = FAIL	F	G
	LABELED NET WEIGHT	PACKAGE GROSS WEIGHT	PACKAGE TARE WEIGHT	ACTUAL PACKAGE NET WEIGHT B - C =	PACKAGE ERROR D - A =		PURGED NET WT WEIGHT OF DRAINED CHITTERLINGS (OR PURGED LIQUID) AND DRAIN PAN - DRAIN PAN TARE =	PURGE % $\frac{(A - F) \times 100}{A}$
1								%
2								%
3								%
4								%
5								%
6								%
7								%
8								%
9								%
10								%
11								%
12								%
NUMBER OF UNREASONABLE ERRORS ALLOWED:			E1 - TOTAL ERROR			G1 - TOTAL PURGE		%
Table 2-9. MAV:			E2 - AVERAGE ERROR (E1 ÷ n =)			G2 - AVERAGE PURGE (G1 ÷ n =)		%
			G3 - ADJUSTED AVERAGE PURGE (G2 - PSEL =)					%
<p>NET WEIGHT COMPLIANCE: (1) If any of the minus package errors (see Column E) exceed the MAV, the sample fails. (2) If none exceeds the MAV and the Average Error (E2) is a positive number, the sample passes. (3) If the Average Error (E2) is a minus number, calculate the sample standard deviation and enter it below. (4) Use the Sample Correction Factor (SCF) to calculate the Sample Error Limit (SEL). (5) Disregarding the signs, (a) if the Average Error (E2) is larger than the SEL, the sample fails or (b) if the Average Error is less than the SEL the sample passes.</p> <p>STANDARD DEVIATION: × 0.635 (SCF) = (SEL) PASSED FAILED</p>								
<p>PURGE COMPLIANCE: MAVS ARE NOT APPLIED IN THE PURGE TEST (1) If the Average Purge Error (G2) is less than or equal to 20 %, the sample passes. (2) If the Average Purge Error is greater than 20 %, calculate the sample standard deviation and enter it below. (3) Use the Sample Correction Factor (SCF) to calculate the Purge Sample Error Limit (PSEL) in percent. (4) Subtract the PSEL from the Average Purge (G2) to obtain an Adjusted Average Purge (AAP) and enter that value in G3. (5)(a) If the AAP (G3) is greater than 20 %, the sample fails or (b) if the AAP (G3) is 20 % or less, the sample passes.</p> <p>STANDARD DEVIATION: × 0.635 (SCF) = (PSEL) PURGE (G3) PASSED FAILED</p>								
SAMPLE DISPOSITION:								

Appendix C

Testing Packages of Animal Bedding and Peat Moss with Compressed/Expanded Volume Declarations

Executive Summary

Animal Bedding (Bedding), also called pet or stall bedding, litter or simply bedding, is generally sold by dry volume in compressed or uncompressed packages. Based on numerous failed inspections of packaged animal bedding, the Office of Weights and Measures (OWM) conducted a study in which compressed and uncompressed packages of animal bedding were measured using a variety of procedures and test equipment. The results from those tests indicate that the current procedures in the 2014 edition of NIST Handbook 133, “Checking the Net Contents of Packaged Goods,” the dimensional inspection procedure for testing compressed packages (e.g., peat moss); and the volumetric inspection procedure (e.g., mulch); are inadequate for use in testing animal bedding. Uncompressed volume measurements of animal bedding are dependent on a number of factors, including the size and shape of the measuring container, the method of filling the measuring container, and the means used to break up the bedding prior to measuring. Based on the findings of this study, a draft procedure was developed for testing the uncompressed volume of animal bedding. OWM also designed and constructed new test measures to be used with the procedure, and then brought these measures to several animal bedding packaging plants for on-site verification of the test methods. Preliminary findings indicate that the draft procedure provides more consistent measurement results. Further, the study shows that there is no correlation between compressed and uncompressed volumes of animal bedding, leading to the conclusion that the requirement for compressed volume statements on the package label is unnecessary. The following proposal includes recommended changes to the method of sale for Animal Bedding in NIST Handbook 130, “Uniform Laws and Regulations in the Areas of Legal Metrology and Engine Fuel Quality,” a revised test procedure for NIST Handbook 133 relating to the verification of the compressed volume of peat moss (which has been used with animal bedding), new test procedures for measuring the compressed and uncompressed volumes of animal bedding, suggested test equipment and a gravimetric auditing procedure that allows inspectors to avoid destroying all of the packages.

The following amendments to the Method of Sale of Commodities Regulation in NIST Handbook 130 are proposed:

1. For the reasons described in background Section 2(a) (page 27), the OWM recommends that the method of sale for animal bedding be amended to eliminate the requirement that packages bear a declaration of compressed volume. If this recommendation is adopted, the method of sale will require that packages of bedding only have a declaration of the expanded (uncompressed) volume that can be recovered by the consumer.
2. For the reasons described in background Section 2(b) (page 28) the OWM recommends that a new definition for animal bedding and a revised method of sale be adopted to replace the current wording in Section 2.23. Animal Bedding, in the Uniform Method of Sale of Commodities Regulation in NIST Handbook 130. The proposed definition for animal bedding and recommended revisions to the method of sale are presented in the following:

2.23. Animal Bedding. – ~~Packaged animal bedding of all kinds, except for baled straw, shall be sold by volume, that is, by the cubic meter, liter, or milliliter and by the cubic yard, cubic foot, or cubic inch. If the commodity is packaged in a compressed state, the quantity declaration shall include both the quantity in the compressed state and the usable quantity that can be recovered. Compressed animal bedding packages shall not include pre-compression volume statements.~~

Example:

250 mL expands to 500 mL (500 in³ expands to 1000 in³).

2.23.1. Definitions.

- (a) **Animal Bedding – any material, except for baled straw, kept, offered or exposed for sale or sold for primary use as a medium for any companion or livestock animal to nest or eliminate waste.**
- (b) **Expanded Volume – the volume of the product that can be recovered from the package by the consumer after it is unwrapped and uncompressed.**

2.23.2. Method of Sale.

- (a) **Packaged animal bedding shall be advertised, labeled, offered and exposed for sale and sold on the basis of the Expanded Volume. If unit pricing is offered to retail consumers, it shall be in terms of the price per liter.**
- (b) **The quantity declaration shall include the terms “Expanded Volume” or wording of similar import that expresses the facts, and shall be in terms of the largest whole unit of the milliliter, liter, or cubic meter. A declaration may also include the quantity in terms of largest whole unit of cubic inches, cubic foot, or cubic yard only.**
- (c) **The display of pre-compression volume, compressed volume or supplementary dry measure units (e.g., dry quart, bushel) anywhere on the package is prohibited.**

Examples: Expanded Volume 41 Liters (1.4 Cubic Feet)

Expanded Volume 1.4 Cubic Feet (41 Liters)

Expanded Volume 27.9 Liters (1700 Cubic Inches)

Expanded Volume 113 L (4 Cubic Feet)

Expanded Volume 8 Cubic Feet (226 L)

2.23.1.3. Exemption - Non-Consumer Packages of Animal Bedding Sold to Laboratory Animal Research Industry. – Packaged animal bedding consisting of granular corncobs and other dry (8 % or less moisture), pelleted, and/or non-compressible bedding materials that are sold to commercial (non-retail) end users in the laboratory animal research industry (government, medical, university, preclinical, pharmaceutical, research, biotech, and research institutions) may be sold on the basis of weight.

(Added 1990) (Amended 2012 **and 20XX**)

The following test procedures and other amendments are proposed for Chapter 3. “Test Procedures for Packages Labeled by Volume” in NIST Handbook 133:

1. For the reasons described in the background of Section 4 (page 46), the OWM recommends adoption of amendments to Section 3.9. “Peat Moss.” The proposed amendments revise the dimensional test procedure used in verifying compressed volume declarations on packages of peat moss and, if the requirement that packages bear a declaration of the compressed volume in the package is not eliminated as recommended above, animal bedding (see page 4).
2. For the reasons described in the background of Section 3 (page 30), the OWM recommends adoption of a new Section 3.15. that includes a volumetric test procedure for animal bedding (see page 13).
3. For the reasons described in the background of Section 3(b) (page 31), the OWM recommends that no enforcement action be taken on the 1 % percent Maximum Allowable Variation (MAV) in Table 2-6 (which covers most sizes of the expanded volume declarations on bedding packages) because that value is unreasonable. Instead,

the OWM recommends a tentative MAV of 5 % be applied to single measurement determinations of bedding volume and a tentative MAV of 10 % be applied when multiple measurements are used to make volume determinations. OWM recommends these MAV values be used pending further studies of test data collected using large test measures, single measurement determinations and utilizing the new test procedure.

4. For the reasons described in the background of Section 3(e) (page 34), the OWM recommends that test measures not be filled by hand. Instead, the OWM recommends that compressed bedding be uncompressed in suitable sized chutes and then poured into a test measure (see page 39). As described on page 36, Section 3(f), pouring the bedding helps the product volume recover from the compression applied during packaging.

5. For the reasons described in the background of Section 3(h) (page 40), the OWM recommends that for official inspections the volume of the bedding in the test measure be determined without leveling the product and using a modified headspace method (based on NIST Handbook 133, Section 3.7. "Volumetric Test Procedure for Paint...").

6. For the reasons described in the background of Section 3(i) (page 44), the OWM recommends that officials use a gravimetric auditing procedure to identify potentially short measure samples to reduce destructive testing and conserve inspection resources.

7. For the reasons described in the background of Section 3(j) (page 46), the OWM recommends that, unless the sample packages of animal bedding fail the dimensional test (of the compressed volume, that the final decision to accept or reject an Inspection Lot be based on the results of a test that verifies the expanded (uncompressed) volume declared on the package.

The current test procedure in NIST Handbook 133, Section 3.9. "Peat Moss" will be modified as shown:

3.9. Dimensional Test Procedure for Verifying the Compressed Quantity Declaration on Packages of Peat Moss

3.9.1. Compressed Volume Packages

3.9.1.1. Test Equipment

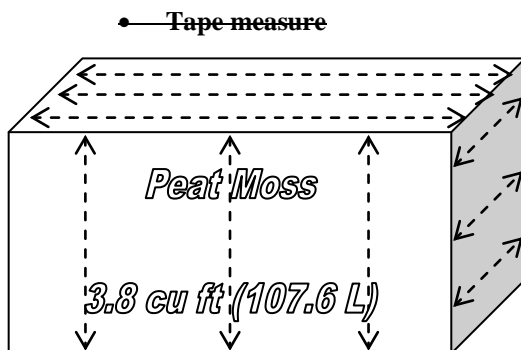


Figure 3-1. Peat Moss

3.9.1.2. Test Procedure

- ~~6. Follow Section 2.3.1. "Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample.~~
- ~~7. For each dimension (length, width, and height) take three equidistant measurements.~~
- ~~8. Calculate the average of each dimension.~~

~~9. Multiply the averages to obtain the compressed cubic volume as follows:~~

$$\text{average height} \times \text{average width} \times \text{average length} = \text{cubic measurement}$$

~~10. Subtract the labeled volume from the measured volume to determine package error.~~

~~(Amended 2010)~~

~~3.9.2. Uncompressed Volume Packages~~

~~Use the following method to test peat moss sold using an uncompressed volume as the declaration of content. The procedure as defined by the latest version of ASTM D2978-03, "Standard Test Method for Volume of Processed Peat Materials."~~

~~3.9.2.1. Test Equipment~~

- ~~• 12.7 mm (or 1/2 in) sieve~~
- ~~• Use one of the following measures as appropriate for the package size. (Refer to Table 3-4, "Specifications for Test Measures for Mulch and Soils" for additional information on test measure construction.)~~
 - ~~➤ 28.3 L (1 ft³) measure with inside dimensions of 30.4 cm (12 in) by 30.4 cm (12 in) by 30.4 cm (12 in). Mark the inside of the measure with horizontal lines every 1.2 cm (1/2 in) so that package errors can be directly determined~~
 - ~~➤ 100 L (3.5 ft³) measure with inside dimensions of 50 cm (19.68 in) by 50 cm (19.68 in) by 40 cm (15.74 in). The inside of the measure should be marked with horizontal lines every 1.2 cm (1/2 in) so that package errors can be directly determined~~
- ~~• Straight edge, 50.8 cm (20 in) in length~~
- ~~• Sheet for catching overflow of material~~
- ~~• Level (at least 15.24 cm (6 in) in length)~~

~~3.9.2.2. Test Procedure~~

- ~~7. Follow Section 2.3.1, "Define the Inspection Lot." Use a "Category A" sampling plan in the inspection; select a random sample.~~
- ~~8. Open each package in turn, remove the contents, and pass them through the sieve directly into the measuring container (overfilling it). Use this method for particulate solids (such as soils or other garden materials) labeled in cubic dimensions or dry volume. Some materials may not pass through the sieve for peat moss; in these instances, separate the materials by hand (to compensate for packing and settling of the product after packaging) before filling the measure.~~

~~Note: Separated material (product not passing through the sieve) must be included in the product volume.~~

- ~~9. Shake the measuring container with a rotary motion at one rotation per second for 5 seconds. Do not lift the measuring container when rotating it. If the package contents are greater than the measuring container capacity, level the measuring container contents with a straightedge using a zigzag motion across the top of the container.~~

- ~~10. Empty the container. Repeat the filling operations as many times as necessary, noting the partial fill of the container for the last quantity delivered using the interior horizontal markings as a guide.~~
- ~~11. Record the total volume.~~
- ~~12. To compute each package error, subtract the labeled quantity from the total volume and record it.~~

~~3.9.3. Evaluation of Results~~

~~Follow the procedures in Section 2.3.7. "Evaluate for Compliance" to determine lot conformance for either procedure.~~

3.9.1. Test Equipment

- Calculator or Spreadsheet Software (programmed to make volume calculations)
- Volumetric Package Worksheet (Appendix C at end of this report)
- Non-permanent marking pen.
- Knife or Razor Cutter (for use in opening packages and unwrapping shrink-wrapped pallets in warehouses)
- Cellophane or Duct Tape (for use in securing packaging tails)
- Dimensional Measuring Frame (see Exhibit 1 and drawings at www.nist.gov/owm [to be posted])



Exhibit 9. Picture of a Dimensional Measuring Frame.

- Rigid Rulers – Starrett¹⁴ or equal with 1.0 mm graduations. The edges of a ruler used with a measuring frame must be straight and the edges must be the zero point (see Exhibit 2).
 - 300 mm (12 in)
 - 500 mm (19.5 in)
 - 1 m (39 inch)
- Carpenter Squares
 - 300 mm (12 in)
 - 600 mm (24 in)

3.9.2. Test Procedure

Note: Test Notes

Rounding: When a package measurement falls between graduations on a ruler, round the value up. This practice eliminates the issue of rounding from the volume determination and provides the packager the benefit of the doubt. If a ruler with a graduation of 1.0 mm is used, the rounding error will be limited to 0.5 mm or less. It is good practice to circle a measurement that has been rounded up or make a statement to such effect so that it becomes a part of the record.

Dimension Identification: The following package nomenclature is used to identify the dimensions measured in this test procedure.

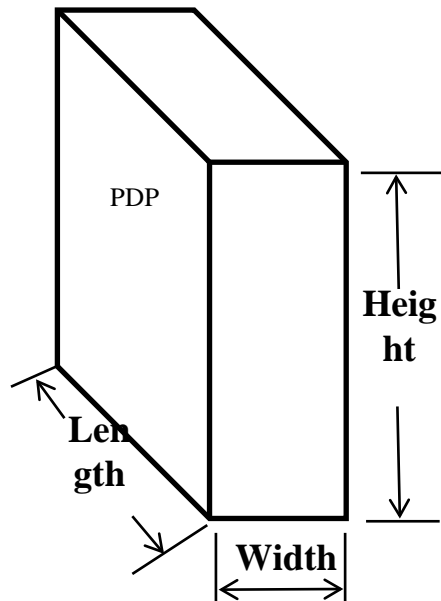


Figure 3-2. Dimension Identification.

¹⁴ Notice: The mention of trade or brand names does not imply endorsement or recommendation by the U.S. Department of Commerce over similar products available from other manufacturers.

Note: Packages of compressed peat moss do not have declaration of expanded volume.

Safety



This procedure does not address all of the safety issues that users need to be aware of in order to carry out the following tasks. Users are sometimes required to conduct tests in warehouse spaces or retail stores where forklifts are in motion – care must be taken to warn others to avoid or exercise care around the test site. The procedure requires users to lift heavy objects including large bulky packages and test measures and includes the use of sharp instruments to obtain packages from shrink-wrapped pallets. Users may be required to climb ladders or work platforms to obtain sample packages. When opening and emptying packages, dust, or other particles may be present or escape from the packages, which may cause eye injuries and respiratory or other health problems. Users must utilize appropriate safety equipment and exercise good safety practices. If safe working conditions cannot be ensured, suspend testing until the situation is corrected.

2. Follow the Section 2.3.1. “Define the Inspection Lot.” Use a “Category A” Sampling Plan for the inspection. Collect the sample packages from the Inspection Lot using random sampling. If the packages are not randomly selected, the sample will not be representative of the lot and the test results will not be valid for use in enforcement action. Place the sample packages in a location where there is adequate lighting and ample space for the packages and test equipment.
2. Examine the package for excess packaging material (i.e., packaging tails). Fold the packaging material consistent with design of the packaging and tape the material securely to the package so that its effect on the dimensional measurement is minimized. If the thickness of packaging tail appears excessive, it is appropriate to determine its average thickness by making at least three measurements along its length using a dead weight dial micrometer specified in Section 4.5. “Polyethylene Sheeting” and subtract the thickness from the measurement of length, width or height. Any deduction from a measurement should be noted on the inspection report.
3. If a Dimensional Measuring Frame is used, place it on a solid support. If a table is used, select one of sufficient load capacity to hold the weight of the frame and the heaviest package to be tested.
4. Position the frame so that the zero end of the ruler can be placed squarely and firmly against a surface of the frame and so that the ruler graduations can be read. Position yourself so that you can read both the ruler and the edge of the carpenter square in Exhibit 2.
5. Place the package against two sides of the frame without compressing the package. Place a carpenter square against the package at the point of measurement and align the ruler perpendicular to the edge of the carpenter square as shown in Exhibit 3 where the package length and Exhibit 4 where the package height are being determined.

**Using a Measuring Frame for Dimensional Testing
Ruler and Carpenter Square define Zero Reference and Measurement Point**



Exhibit 10. The rigid frame allows the observer to hold the zero reference point firmly in place.



Exhibit 11. Length Measurement.



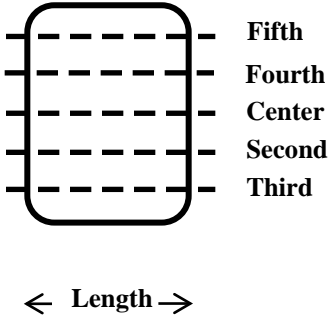
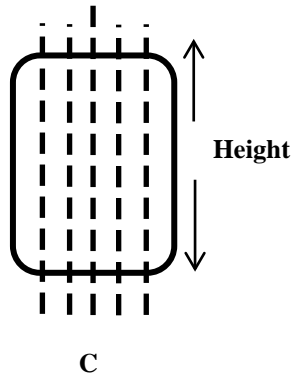
Exhibit 12. Height Measurement – A packaging tail on the end of the package can affect this measurement so it has been folded over and taped against the end of the package.

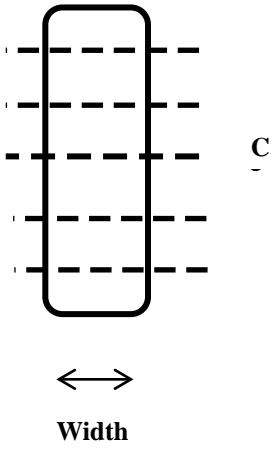


Exhibit 13. Width Measurement – the frame is rotated on its end to vertical so that the carpenter square does not compress the product.

6. Measurements – take at least five measurements* of each of the dimensions as follows:

*On small packages (height or length dimensions of 152 mm [6 in] or less) at least three measurements are taken using the following the instructions).

Inspect the package for shape and place the flattest surfaces against the measuring frame.	
<p>ii. Length (see Exhibit 3):</p> <p>g. take the first measurement across the center line of the Length axis of package.</p> <p>h. take the second measurement at half the distance between the center Line and either of the package edges.</p> <p>i. take the third measurement half the distance between the second measurement and the package edge.</p> <p>j. take the fourth measurement on the opposite end of the package at half of the distance between the center line and the package edge.</p> <p>k. take the fifth measurement at half of the distance between the fourth measurement and the package edge.</p>	
<p>iv. Height: (see Exhibit 4):</p> <p>c. take the first measurement across the center line of the Height axis of the package.</p> <p>b. take the second measurement at half the distance between the center line and the package edge.</p> <p>c. take the third measurement half the distance between the second measurement and the package edge.</p> <p>d. take the fourth measurement on the opposite end of the package at half of the distance between the center line and the package edge.</p> <p>e. take the fifth measurement at half of the distance between the fourth measurement and the package edge.</p>	

<p>v.</p>	<p>Width: (see Exhibit 5): If using one, turn the measuring frame on end and place the package on its bottom and against the frame as shown in the picture and on the right where the package width is being measured.</p> <ol style="list-style-type: none"> a. take the first measurement across the center line of Width axis of the package. <u>d.</u> take the second measurement at half the distance between the center line and the package edge. c. take the third measurement half the distance between the second measurement and the package edge. d. take the fourth measurement on the opposite end of the package at half of the distance between the center line and the package edge. <u>l.</u> take the fifth measurement at half of the distance between the fourth measurement and the package edge. 	
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7. Record the dimensions of each package in millimeters in a software program or inspection form that includes the information shown in the sample worksheet “Calculate the Compressed Volume of the Package in Liters” (below). Enter the measurements in the appropriate spaces and calculate the volume in liters. Calculate the package error by following the steps listed in the table and then calculate the average error for the sample.

Note: The following table is an example of the information from an actual test that is included in a worksheet for verifying the compressed volume on packages of peat moss. The Inspection Worksheet for Dimensional Testing (see Appendix C) has space for a sample of 12 packages and includes the steps for calculating the Average Package Error. Here, the package error in the dimensional volume was + 6.8 L (+ 0.24 ft³). Apply a tentative MAV of 5 % to a dimensional measured volume.

Note: Reasonable values for the MAVs for the uncompressed volumes of bedding must be developed once a uniform test procedure is adopted.

SAMPLE WORKSHEET				
Calculate the Compressed Volume of the Package in Liters				
Unit of Measure = 1.0 mm		Length (L)	Width (W)	Height (H)
	1.	482	282	690
	2.	490	278	690
	3. (Center Line)	493	276	681
	4.	499	272	677
	5.	493	269	657
a.	Average:	491	275.4	679
b.	$L \times W \times H = \text{Volume}/1\ 000\ 000$	<i>91.8L</i>		
c.	Labeled Compressed Quantities:	85 L	NA cu in	3.0 cu ft
d.	Conversion Factors	NA	$(b) \times 61.02374$	$(b) \times 0.03531467$
e.	Converted Volume	85 L	NA cu in	3.24 cu ft
f.	Package Error = (b – c)	6.8 L	NA cu in	0.24 cu ft

3.9.3. Evaluation of Results

Follow the procedures in Chapter 2, Section 2.3.7. “Evaluate for Compliance” to determine lot conformance.

Section 3.15. Test Procedure for Verifying the Expanded Volume Declaration on Packages of Animal Bedding

3.15.1. Test Equipment

- Calculator or Spreadsheet Software
- Modified Standard Package Report Form – Appendix D (at end of report).
- Package Inspection Worksheet Appropriate for Test Measure:
 - Appendix A – 26 Point Measurement Grid and Package Error Worksheet for Cylindrical Test Measures (at the end of the report)
 - Appendix B – 25 Point Measurement Grid and Package Error Worksheet for Square or Rectangular Test Measures (at the end of the report)
- Permanent Ink - Marking Pen.
- Knife or Razor Cutter (for use in opening packages and unwrapping shrink-wrapped pallets in warehouses)
- Cellophane Tape, Duct Tape (for repairing chutes and sealing packages)
- Polyethylene Bags (49 L to 113.5 L [13 gal to 30 gal]) (to hold product once it is uncompressed)
- Rigid Rulers – Starrett¹⁵ or equal with 1.0 mm graduations. The edges of a ruler used with a measuring frame must be straight and the edges must be the zero point (see Exhibit 2).
 - 300 mm (12 in)
 - 500 mm (19.5 in)
 - 1 m (39 in)
- Tarp - Canvas 3 m × 3 m (10 ft × 10 ft)
- Broom and Dust Pan
- Levels – for verifying the level of the test measure and taking headspace readings.
 - 152 mm (6 in) Bubble Level
 - 1 m (40 in) Carpenter Level
- Scale 15 kg (30 lb) (only used if the audit procedure is utilized.)

¹⁵ Notice: The mention of trade or brand names does not imply endorsement or recommendation by the U.S. Department of Commerce over similar products available from other manufacturers.

- Chutes for Uncompressing and Pouring the Bedding into a Test Measure

Table 1. Recommended Chute Dimensions			
Nominal Capacity	Height	Width	Length
70 L (2.5 ft ³)	254 mm (10 in)	228 mm (9 in)	1219 mm (48 in)
100 L (3.5 ft ³)	254 mm (10 in)	279 mm (11 in)	1397 mm (55 in)
170 L (6 ft ³)	279 mm (11 in)	355 mm (14 in)	1727 mm (68 in)
240 L (8.5 ft ³)	304 mm (12 in)	406 mm (16 in)	2006 mm (79 in)
283 L (10 ft ³)	304 mm (12 in)	406 mm (16 in)	2286 mm (90 in)

NOTE: Chutes (see examples below) may be constructed using hinges and pins so that they lie flat for transporting. They can be constructed of sheet metal or with other slick surface material which enable the bedding to flow easily. The construction of the chutes used in this study allows the sides to move in or out slightly so that the bedding does not become clogged at the outlet. The heights and lengths may be adjusted slightly to fit into vehicles for transport but the widths should not be reduced because narrowing the opening can restrict material flow and result in “bridging” where the bedding collects and creates a block. Also, the width should be kept smaller than the opening of the test measure so that spillage does not occur during pouring.




Figure 4. Testing Chutes.

- Test Measures (see Table 2. “Test Measures for Animal Bedding”)

Table 2. Test Measures for Animal Bedding NOTES: a, b, c, and d

Only Interior Dimensions are Used for Volume Calculations
Must Be Calibrated with Traceable Measurement Standards Prior to Use

Rectangular & Square Test Measures						
Actual Volume of the Measure^{b & d}	Interior Wall Dimensions			Surface Area	Marked Increments on Ruler	Increment Volume
	Length	Width	Height^d			
31.9 L 1.13 ft ³	213.4 mm (8.4 in)	203.2 mm (8 in)	736.6 mm (29 in)	43 362 mm ² (67.2 in ²)	12.7 mm (0.5 in)	550.6 mL* 0.55 L (33.6 in ³)
28.3 L 1 ft ³	304.8 mm (12 in)	304.8 mm (12 in)	304.8 mm (12 in)	92 903 mm ² (144 in ²)		1.18 L** (72 in ³)
63.7 L 2.25 ft ³	304.8 mm (12 in)	304.8 mm (12 in)	685.8 mm (27 in)			
	406.4 mm (16 in)	228.6 mm (9 in)	685.8 mm (27 in)			
92 L 3.25 ft ³	304.8 mm (12 in)	304.8 mm (12 in)	990.6 mm (39 in)			
	406.4 mm (16 in)	228.6 mm (9 in)	990.6 mm (39 in)			
*1.0 mm = 43 mL (2.6 cu in) ** 1.0 mm = 92 mL or 0.09 L (5.6 cu in)						
Square Test Measures						
Actual Volume of the Measure^{b & d}	Interior Wall Dimensions			Surface Area	Marked Increments On Ruler	Increment Volume
	Length	Width	Height^d			
77.4 L (2.73 ft ³)	381 mm (15 in)	381 mm (15 in)	533.4 mm (21 in)	145 161 mm ² (225 in ²)	1.0 mm (0.03937 in)	0.14 L (8.5 in ³)
144 L (5.09 ft ³)	508 mm (20 in)	508 mm (20 in)	558.8 mm (22 in)	258 064 mm ² (400 in ²)		0.25 L (15.2 in ³)
283 L (10 ft ³)	609.6 mm (24 in)	609.6 mm (24 in)	762 mm (30 in)	371 612 mm ² (576 in ²)		0.37 L (22.5 in ³)

Table 2. Test Measures for Animal Bedding NOTES: a, b, c, and d

Only Interior Dimensions are Used for Volume Calculations
Must Be Calibrated with Traceable Measurement Standards Prior to Use

Cylindrical Test Measures

These dimensions are based on the tube having a ¼ inch wall thickness. Other tube thicknesses may be used.

Actual Volume <i>Volume = $\pi r^2 h$</i>	Interior Diameter (Outside Diameter)	Height	Surface Area <i>Area = πr^2</i>	Increment	Increment Volume
52 L (1.8 ft ³)	292.1 mm (304.8 mm) 11.5 in (12 in)	780 mm (30.70 in)	67 012 mm ² (103.8 in ²)	1.0 mm (0.03937 in)	0.06 L (4 in ³)
124 L (4.3 ft ³)	444.5 mm (457.2 mm) 17.5 in (18 in)	800 mm (31.49 in)	155 179 mm ² (240.52 in ²)		0.15 L (9.4 in ³)
279 L (9.8 ft ³)	596.9 mm (609.6 mm) 23.5 in (24 in)	1000 mm (39.37 in)	279 829 mm ² (433.76 in ²)		0.27 L (16.4 in ³)

Notes for Table 2:

- a. Rectangular and Square Based Dry Measures are typically constructed of 12.7 mm to 19.05 mm (0.5 in to 0.75 in) Marine Plywood. A 4.76 mm (³/₁₆ in) transparent sidewall is useful for determining the level of fill, but must be reinforced or be made of thicker material if it distorts when the measure is filled. If the measure has a clear front, place the level gage at the back (inside) of the measure so that the markings are read over the top of the mulch. Any of these measures may be made without an attached bottom for ease of emptying if they are placed on a solid level base during filling and measurement.
- b. Other size measures may be used if calibrated and the volume equivalence of the increment of 1.0 mm is no greater than ¹/₆ the MAV. Widening the base of a measure reduces the column height of the product and will reduce compression but the trade-off is that the larger surface area increases the volume so the potential for measurement errors increase. One of the benefits of the cylindrical design is that, in addition to eliminating the 90 degree angles of the corners where gaps in fill frequently occur, the surface area of a cylinder is less than an equal volume square measure and that results in better resolution in the volume measurements (i.e., compare the readability of a 24 in sq box which has a surface area of 576 in², to the 24 in cylinder which has a surface area of 433 in²). The height of the test measure may be reduced, but this will limit the volume of the package that can be tested.
- c. If lines are marked in any test measures, they should extend around all sides of the measure if possible to improve readability. It is recommended that a line indicating the MAV level also be marked to reduce the possibility of reading errors when the level of the product is at or near the MAV.
- d. If the measures are built to the dimensions shown above, the actual volume of most of the measures will be larger than the nominal volume so that plus errors (overfill) can be measured accurately.

3.15.2. Test Procedure

Test Notes:

Rounding: When a volume measurement falls between graduations on a ruler, round the value in the direction that favors the packer. This practice eliminates the issue of rounding from the volume determination and provides packagers the benefit of the doubt. The ruler graduation is 1.0 mm so the

rounding error will be limited to 0.5 mm or less. It is good practice to circle a measurement that has been rounded up or make a statement to such effect so that it becomes a part of the inspection record.

Safety:



This procedure does not address all of the safety issues that users need to be aware of in order to carry out the following tasks. Users are sometimes required to conduct test in warehouse spaces or retail stores where fork-trucks are in motion – care must be taken to warn others to avoid or exercise care around the test site. The procedure requires users to lift heavy objects including large bulky packages and test measures and includes the use of sharp instruments to obtain packages from shrink-wrapped pallets. Users may be required to climb ladders or work platforms to obtain packages. When opening and emptying packages, dust, and other particles may be present or escape from the packages which may cause eye injuries and respiratory or other health problems. Users must utilize appropriate safety equipment and exercise good safety practice. If safe working conditions cannot be ensured, suspend testing until the situation is corrected.

- 8.** Follow the Section 2.3.1. “Define the Inspection Lot,” select “Category A – Sampling Plan” in this Inspection. Determine the Sample Size based on the size of the Inspection Lot using Category A. Collect the sample packages from the Inspection Lot using Section 2.3.4. “Random Sampling Selection.”

Test Note: Place the test equipment and sample packages in a location where there is adequate lighting and ample space around the packages and equipment so the packages can be opened and the chutes and test measures used safely.

Optional – Audit Screening by Weight

The full test procedure requires that all of the packages be opened for testing. Regardless of the type of bedding, the product cannot be returned to the original package. An alternative gravimetric auditing procedure may be used to reduce the amount of destructive testing and conserve inspection resources.

Audit Procedure: After randomly selecting the sample packages from the Inspection Lot, obtain the gross weight for each package. Select the lightest and heaviest packages and conduct an expanded volumetric test on these two packages. If the lightest and heaviest packages pass (i.e., each contains at least the expanded volume declared on the label), it is highly likely that the remaining packages in the sample will also pass. Accept these two package samples as an AUDIT TEST and move on to inspect other types of bedding or Inspection Lots of other types or brands of bedding. If either of the two packages is found to have a minus error that exceeds the Maximum Allowable Variation, the sample fails. No further testing is required (i.e., assuming no MAV is allowed for the sample size (see Appendix A, Table 2-1. “Sampling Plans for Category A”). If either of the packages is found to have a minus error that does not exceed the MAV, continue to test all of the packages and take action based on the final results from the complete sample.

Test Note: If the gravimetric audit procedure is used, ensure that the scale is placed on a solid level support and that its accuracy has been verified to a test load that is at least 10 percent more than the gross weight of the packages (e.g., to estimate that load, place one of the packages on the scale and then test the scale with a load above the package’s gross weight). See Section 2.2. “Measurement Standards and Test Equipment” for additional information.

- 9.** Select the appropriate test measure for the package size.
 - Spread a tarp large enough to hold a chute and test measure.

- Place the chute and test measure on the tarp. Verify that the test measure is level.
- 10.** Select a chute of appropriate capacity (see Table 1) for the package size and position it on the tarp.
- 11.** Open the Packaging, Uncompressing and Pouring the Bedding into the Test Measure Twice.
 - **Open Package:** Place the package in the chute and use a knife or box cutter to open and remove the wrapper. Spread the bedding uniformly along the length of the chute. The bedding is uncompressed in two steps. The first step is to loosen the clumps of bedding by gently pulling them apart (do not tear the fibers of cellulose bedding or “grind” any bedding between your hands because these practices break the material down). Spread your fingers and pick the material up using your hands from beneath to loosen it up. There should be no clumps of bedding in the chute. If any bedding has fallen out of the chute onto the tarp, collect it and return it to the chute. The following pictures illustrate this step of the procedure. The second step of the expanded volume recovery process is to pour the bedding into a test measure as described in Step 2.

Exhibit 14.



Exhibit 15.



Exhibit 16. First pour into the test measures.



- **First Pour:** The first pour into the test measure is only used to further un-compress the bedding so no measurements are taken. Hold the chute above the test measure and tilt it so that you pour the bedding into the center of the test measure. The bedding should be poured slowly into the test measure in one continuous stream and not “dumped” (if it is “dumped” or poured too quickly some of the bedding will blow out of the measure or the bedding will be packed down and its volume reduced). The flow rate should be controlled by the tilt angle of the chute. The chute itself can be shaken but **DO NOT HIT OR SHAKE THE TEST MEASURE.** (Do not adjust the

flow by closing the opening of the chute as that may cause the bedding to heap up and then fall into the measure in clumps which may result in impact compression). Empty the bedding back into the chute and spread it out evenly along its length.



Exhibit 17. Showing how to hold a chute for the pour.



Exhibit 18. Showing how to cradle the chute on one arm and holding it with one hand while tilting it with the other hand.

- **Second Pour:** The second pour into the test measure is used to make the volume determination. Hold the chute above the test measure and tilt it so that you pour the bedding into the center of the test measure. The bedding should be poured slowly into the test measure in one continuous stream and not “dumped.” The flow rate should be controlled by the tilt angle of the chute. The chute can be shaken but **DO NOT HIT OR SHAKE THE TEST MEASURE.**

Test Note: Stop filling the measure if it appears that the test measure will overflow. The overflow product should be measured separately (use a smaller test measure of adequate size and capacity if one is available) and the multiple measurement volumes are added. If pouring into a square test measure, pour at an angle to two corners for the widest opening (see Exhibit 12).



Exhibit 19. Filling a 44 L Test Measure.



Exhibit 20. Filling a Square Test Measure at an Angle to use the Larger Opening.

12. Volume Determination.

DO NOT HAND LEVEL THE SURFACE OF THE BEDDING AS MANUAL LEVELING “PACKS” THE BEDDING AND REDUCES ITS VOLUME. DO NOT JAR OR SHAKE THE TEST MEASURE

Test Note: Before using a test measure for volume determinations, place a level of adequate length on top of the test measure at five approximately equal measuring points across the top. A permanent marking pen can be used to evenly space the marks across the top edge of the test measure so that it can be positioned to take the measurements (see Exhibit 13).



Exhibit 21. Marking the evenly spaced measuring points across the top of the test measure.

- Place a rigid level or straight edge of adequate size on top the test measure and select a ruler of adequate length to reach to the lowest level of the top surface of the bedding. Start at the measuring points to your left or right, place the ruler against the side of the level, and hold it with either hand. The zero graduation is pointed down so the ruler can be lowered into the test measure for measurement. Lower the ruler into the test measure slowly until its end is at the surface level of the bedding (see Exhibits 14 and 15).



Exhibit 22. Placing ruler into the test measure with zero end down.



Exhibit 23. Ruler shown with zero end at surface of the bedding.

- Determine the depth of each measurement point from the surface of the bedding to the bottom edge of the straight edge and record the value in the appropriate space on the worksheet. Take a minimum of 25 measurements (at least 26 for cylindrical measures) across the top of the test measure in a grid pattern. Read the graduations on the ruler from a position that minimizes errors caused by parallax.

Table 2. Illustrations of Depth Determinations with Cylindrical Test Measures



The picture on the left (Figure1) shows how to read the depth from the bottom of the straightedge (top edge of measure) down to the bedding in a 44 L test measure from a position that reduces parallax. The graphic below (Figure 2) illustrates the actual worksheet with the headspace procedure on the 44 L cylinder test measure (its internal radius is 151 mm and its height is 610 mm). The bedding was poured into the test measure but not leveled. Then 26 measurements were made at the locations shown on the grid to determine the depth of the product from the top edge of the measure. The average of the 26 values was 500.7 mm which was subtracted from the height of the test measure to obtain 109.26 mm for the average height of the column of bedding in the measure.

The volume was calculated using: $Volume\ in\ liters = \pi r^2 h$
 $Pi) 3.14159265 \times 23035.69 \times 109.26\ mm = 7.90\ L^*$

Figure 1. Shows how to read the depth of container.

*After the calculation was completed the result was divided by 1 000 000 to obtain the volume in liters.

Figure 5. Illustration of Worksheet.

	413	367	390	
439	439	430	419	432
478	475	492	462	478
552	542	528	532	530
578	580	577	569	565
	589	590	573	

**Table 2. Illustrations of Depth Determinations
with Cylindrical Test Measures**



Figure 6. Using the headspace measurement on a 279 L test measure. The ruler is read from the bottom edge of a straight edge or level from a position that reduces parallax.



Figure 4. Illustrating how the ruler is placed on the bedding with the headspace method. The ruler is read from the bottom edge of a straight edge or level from a position that reduces parallax.

Table 3. Illustrations of Depth Determinations with Square Test Measures



Figure 1.

246	162	81	132	177
195	115	43	46	112
111	77	51	95	146
220	138	46	98	131
264	193	118	148	180

Figure 2.

The picture on the left (Figure 1) shows how to read the depth from the bottom of the straightedge (top edge of measure) down to the bedding in a 283 L square test measure from a position that reduces parallax. The graphic on the right (Figure 2) illustrates the actual worksheet with the headspace procedure on the square test measure (its internal dimensions are 609.6 mm × 609.6 mm × 762 mm (24 in × 24 in × 30 in). The bedding was poured into the test measure but not leveled. Then 25 measurements were made at the locations shown on the grid to determine the depth of the product from the top edge of the measure. The average of the 25 values was 133 mm that was subtracted from the height of the test measure to obtain 629 mm for the average height of the column of bedding in the measure.

The volume was calculated using: Volume in liters = lwh 609.6 mm × 609.6 mm × 629 mm = 233.74 L*

*After the calculation was completed, the result was divided by 1 000 000 to obtain the volume in liters.



Figure 3. Using the headspace measurement on 56.6 L (2 cu ft) test measure. The ruler is read from the bottom edge of a straight edge or level from a position that reduces parallax.

Table 3. Illustrations of Depth Determinations with Square Test Measures

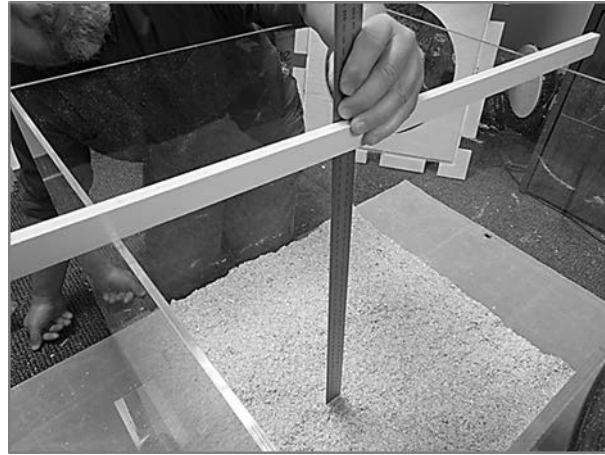


Figure 4. Showing how the ruler is placed on the bedding with the headspace method. The ruler is read from the bottom edge of a straight edge or level from a position that reduces parallax.

13. Using a Worksheet for Volume Calculation

- Enter the sample number of the package on the worksheet along with its labeled expanded volume.
- Test Measure Information
 - For a cylindrical test measure, enter its interior height and radius in the spaces labeled A and B.
 - For a square or rectangular test measure enter its interior height and the area of its base (i.e., length × width) in spaces labeled A and B.
- Sum the measurements in the grid, divide the value by the number of measurements (i.e., 25 or 26), and enter this value in the space labeled C, Average Depth.
- Calculate the Average Height of the Bedding (subtract C [Average Depth] from A [Interior Height of Test Measure]) and enter this value in the space labeled D.
- Calculate the Volume of Bedding in the Package:
 - For a cylindrical test measure, the formula (*Volume in Liters* = $\pi r^2 h$) is shown in E on the worksheet. It is *Volume* (Liters) = $3.14159265 \times r^2 (B^2) \times \text{Average Height (D)} \div 1\,000\,000$. Enter the package volume in the space provided for this value in E.
 - For a square or rectangular test measure the formula (*Volume in Liters* = LWH) is shown in E on the worksheet. It is *Volume* (Liters) = B (Area of Test Measure Base) × D (Average Height) $\div 1\,000\,000$. Enter the package volume in the space provided for this value in E.
- Calculate the Package Error using the following formula:
 - Package Error = Labeled Expanded Volume (Liters) _____ – E Package Volume (Liters) _____

$$\text{Package Error (Liters)} = \text{Labeled Expanded Volume} - \text{Package Volume}$$

- Transfer the individual package errors (verify whether they are positive or negative) to the “Modified Standard Package Report for Animal Bedding” in Appendix D. Fill in the required header information. For Box 7, “Number of Unreasonable Package Errors Allowed for Sample Size,” use Appendix A, Table 2-1. “Sampling Plans for Category A, Column 4.” Based on the sample size, determine how many packages may have minus package errors that exceed the MAV (i.e., unreasonable package error).

Then:

- Calculate the Total Error (Enter in Box 8 “Total Error”).

14. Evaluation of the Test Results and Determination of Pass or Fail

- Determine if any of the minus package errors exceeds the MAV. Apply a tentative MAV value of 5 % ($0.05 \times$ labeled expanded volume) to single measurement volume determinations and a tentative MAV value of 10 % ($0.10 \times$ labeled expanded volume) on multiple-measurement volume determinations (enter in Box 4 “MAV”). If none of the minus package errors exceeds the MAV, go to Step 3. If any of the minus package errors exceed the MAV, enter the number of packages in Box 9 “Number of Unreasonable Minus Errors.” Go to Box 10 “Is Box 9 Greater than Box 7?” and determine if the value exceeds the number in Box 7 “Number of Unreasonable Package Errors Allowed for Sample Size.” If the number of packages with unreasonable errors exceeds the number permitted in Box 7 “Number of Unreasonable Package Errors Allowed for Sample Size,” the sample fails. Go to Box 17 “Disposition of the Inspection Lot” and reject the Inspection Lot.
- Calculate the Average Error for the sample by dividing Box 8 “Total Error” by Box 6 “Sample Size” and enter the value in Box 11 “Calculate Average Error,” then go Box 12 “Does Box 11 equal Zero or Plus?” If the Average Error is zero or a positive number, the sample passes, go to Box 17 “Disposition of the Inspection Lot” and approve the Inspection Lot. If the Average Error is a negative value go to Step 4.
- Calculate the Sample Standard Deviation and enter in Box 13 “Compute Sample Standard Deviation.” To obtain the Sample Correction Factor for the sample size use Appendix A, Table 2-1. “Sampling Plans for Category A,” Column 3 “Sample Correction Factor” and enter that in Box 14 “Sample Correction Factor.” Then calculate the Sample Error Limit by multiplying Box 13 “Compute Sample Standard Deviation” and Box 14 “Sample Correction Factor.” Enter the value in Box 15 “Compute Sample Error Limit.”
- Disregarding the signs, determine if the minus in Box 11 “Calculate Average Error” is larger than the value in Box 15 “Compute Sample Error Limit.”
 - If yes, the sample fails, go to Box 17 “Disposition of Inspection” and reject the Inspection Lot.
 - If no, the sample passes, go to Box 17 “Disposition of Inspection” and approve the Inspection Lot
- Prepare a comprehensive report of the test results and enforcement action taken and present the information to the party responsible for the product.

Background

1. Animal Bedding

Animal Bedding (Bedding), also called pet or stall bedding, litter or simply bedding, is generally sold by dry volume in compressed or uncompressed packages. A survey of several Internet retailers and retail stores conducted near the NIST revealed that a few packers sell bedding (e.g., pelletized) by net weight, which is prohibited by the current method of sale. Quantity declarations are often presented in a mixture of customary volume measurements including dry quart, cubic inch, and the cubic foot. Quantity declarations in metric units are predominantly by the liter and milliliter. For compressed packages, a declaration of both the compressed volume and uncompressed volume is required according to the NIST Handbook 130, Section B. Uniform Method of Sale of Commodities, 2.23. "Animal Bedding." Package sizes vary widely. For example, compressed volumes can range from about 4 L (230 cu in) to 85 L (3 cu ft). The uncompressed (expanded) volumes can range from about 6 L (600 cu in) up to 340 L (12 cu ft). It is consumer preference that determines how much bedding is used to "surface" a cage or stall. Unlike compressed peat moss, which is also labeled in volume, there are no user instructions on packages of bedding recommending a specific depth for a consumer to fill a cage or litter box or to "surface" a stall (see Section 2. "Method of Sale and Terminology" for more on this subject). Also, unlike packages of peat moss, the shape of packages of bedding is subject to wide variations due to the packaging stretching and plumping because of the pressure exerted by the compressed material they hold. Several manufacturers describe the "ideal" bedding as having minimal dust and "fines" (small particles of the bedding material), a moisture of 8 % to 15 %, and good "loft" so that the product provides good absorption of liquids.

2. Method of Sale and Terminology

a. Compressed Volume Declaration

The presence of a declaration of compressed volume is of little or no value to consumers. Several packers were asked what value was the compressed volume information to consumers. The unanimous response was that a compressed volume declaration does not help consumers to make value comparisons and it is ineffective in preventing unfair competitive practices. The packers agreed that it is the expanded volume declared on packages of bedding that is the most useful information for consumers. The primary reason is that it helps the purchaser estimate the size of package to buy or how many packages are needed to "bed" a cage or "surface" a stall. The area coverage obtained from a compressed package depends in large part on the characteristics of the material and the packaging process (e.g., force of compression). An expanded volume declaration is the only quantity declaration that is reliable and that aids consumers. Even a net weight declaration on bedding packages would not be useful. This is because the bedding in a heavier package may not expand as much as the bedding in a lighter package. For example, in this study packages of one product were found to vary in weight by only one or two grams but differed in volume yields by almost two liters. For bedding the weight/volume relationship is counter-intuitive because of variations in the raw material, moisture content; the size of the material, "fines" or small particles, and the amount of "dust" that varies from package to package. Packers and consumers alike would benefit if the National Conference on Weights and Measures (NCWM) would remove the requirement for a compressed volume declaration from the method of sale regulation and require bedding to be advertised, sold and unit priced on the basis of the expanded (uncompressed) volume declaration.

NOTE: At the beginning of this study the OWM reviewed the existing dimensional test procedures in Section 3.9. "Peat Moss" and found the procedures lacked some generally accepted good practices inherent in dimensional metrology to reduce measurement uncertainty. As a result, OWM developed a new dimensional test procedure for use in verifying the compressed volume of packages of bedding that is a significant improvement over the current method in Section 3.9. "Peat Moss." It was only during the second phase of the study that it became clear that it was the expanded volume test that was critical in ensuring that consumers receive full measure. If the recommendation to remove the compressed volume declaration requirement for packages of bedding is not accepted, the proposed dimensional test methods and equipment recommendations will improve the measurement process and increase the accuracy of volumetric results for packages of bedding and peat moss alike. If the requirement for bedding packages to include a compressed volume declaration is

eliminated, the OWM recommends Section 3.9. “Peat Moss” be amended to adopt the proposed dimensional test procedure.

b. Proposed Terminology and Prohibited Terms

Typically bedding is a material offered for sale for use with pets, animals, reptiles, birds or other creatures but it may be offered for sale for other purposes such as providing a ‘surface’ for stalls, paddocks or arenas. Bedding or surfacing materials may be used with horses, dogs, cats, birds, ferrets, rabbits, guinea pigs, exotic animals, chinchillas, hamsters, rats, gerbils, mice, turtles, snakes and many other creatures from the wild or domesticated pets and farm animals. The following suggested definition is written to include any material intended for use with any creature that is labeled by volume but is not intended to apply to straw or hay sold by the bale.

Definition of Animal Bedding

In 2013 the NCWM considered the following definition for Animal Bedding but did not accept it. The NCWM’s reticence was only due to concerns that the proposal might not cover all types of animal bedding.

Animal bedding is defined as “any product or material, except for baled straw or peat moss, that is advertised, offered for sale, or sold for primary use as a medium for animals to bed, nest or eliminate waste, such as compressed wood pulp or cellulose fibers (confetti, granules, or pellets), softwood shavings, shredded paper, compressed coconut fiber, ground corn cob, pelleted paper or wheat straw, cotton fibers, and bamboo products or any other material.”

While an all-encompassing list of raw materials helps improve clarity, manufacturers are always identifying new raw materials for use as bedding. The NCWM usually chooses open-ended definitions for products to be covered by a method of sale. This places more emphasis on the way that the product is used to be determinative of whether or not a product falls under a method of sale so there are no “loopholes” and packers understand what is expected. Adopting a definition that is all inclusive of the raw materials that are currently used to make bedding as well as still being able to encompass new materials that may enter the stream of production is the most flexible and efficient approach.

The OWM recommends the following:

Animal Bedding – any material, except baled straw, that is kept, offered or exposed for sale or sold for primary use as a medium for any companion or livestock animal to nest or eliminate waste.

Units of Measure

The Federal Trade Commission considers “pet care” products to be exempt from its regulatory control under the Fair Packaging and Labeling Act. Because the labeling of bedding falls solely under the jurisdiction of states who have adopted the Uniform Packaging and Labeling Regulation (UPLR) in NIST Handbook 130, “Uniform Laws in the Areas of Legal Metrology...,”¹⁶ the display of customary units is optional. Since 1999 the UPLR has required metric units to be declared on all packages which fall under its regulations but it also allows packagers the option of displaying customary units such as the cubic foot or cubic inches. As a result, quantity declarations may be shown on packages of bedding in terms of the milliliter (mL), liter (L), or cubic meter (m³). As currently written, the method of sale for bedding in Section 2.23. of the Method of Sale of Commodities Regulation in NIST Handbook 130 requires units in both systems of measurement to be displayed. That provision is inconsistent with the requirements in the UPLR that were adopted to encourage the use of voluntary metric only labeling. Also the current regulation does not prohibit the use of other customary dry measurements such as the dry quart or bushel which, if used instead of liters, cubic inches, or cubic feet, may frustrate value comparisons since most consumers may not know the volume of a dry quart and bushel are equivalent to 0.388 cubic foot and 1.244 cubic feet respectively.

¹⁶ <http://www.nist.gov/pml/wmd/pubs/hb130-14.cfm>

Proposed Method of Sale

A proposal to revise the current method of sale in Section 2.23. “Animal Bedding” is presented below. The proposal includes a new definition for “animal bedding,” limits the units of measure that can be used, and includes other restrictions to ensure that label terms are used consistently. The requirement for a “compressed volume” declaration of quantity is eliminated. The proposal replaces the term “usable” with the term “expanded volume.” The term “expanded volume” is preferred because it informs consumers that the quantity declaration represents the volume of product to be recovered once it is unwrapped and uncompressed. The proposal requires the use of the term “expanded volume” only in conjunction with the quantity statement on the lower 30 % of the Principal Display Panel and does not prohibit the use of the terms “compressed,” “expands to,” or “usable” elsewhere on the label. However, the proposed language prohibits the display of “pre-compression” and “compressed” volume declarations anywhere on the package. Finally, it clarifies that metric units are required to appear on the Principal Display Panel and that specific customary units such as cubic inches and cubic feet (e.g., dry quart and bushel are not permitted to appear on the package) may be included at the option of the packer. Because these products will all bear expanded volume in metric units and because consumers have a good comprehension of the volume contained in a liter, OWM is recommending that the method of sale include a provision that, while it does not require unit prices be posted, requires all unit pricing when it is voluntarily provided by the retailer be unit priced on the basis of price per liter.

2.23. Animal Bedding.

2.23.1. Definitions.

- (a) Animal Bedding – any material, except for baled straw, kept, offered or exposed for sale or sold for primary use as a medium for any companion or livestock animal to nest or eliminate waste.**
- (b) Expanded Volume – the volume of the product that can be recovered from the package by the consumer after it is unwrapped and uncompressed.**

2.23.2 Method of Sale.

- (a) Packaged animal bedding shall be advertised, labeled, offered and exposed for sale and sold on the basis of the Expanded Volume. If unit pricing is offered to retail consumers it shall be in terms of the price per liter.**
- (b) The quantity declaration shall include the terms “Expanded Volume” or wording of similar import that expresses the facts, and shall be in terms of the largest whole unit of the milliliter, liter, or cubic meter. A declaration may also include the quantity in terms of largest whole unit of cubic inches, cubic foot, or cubic yard only.**
- (c) The display of pre-compression volume, compressed volume, or supplementary dry measure units (e.g., dry quart, bushel) anywhere on the package is prohibited.**

Examples: Expanded Volume 41 Liters (1.4 Cubic Feet)

Expanded Volume 1.4 Cubic Feet (41 Liters)

Expanded Volume 27.9 Liters (1700 Cubic Inches)

Expanded Volume 113 L (4 Cubic Feet)

Expanded Volume 8 Cubic Feet (226 L)

2.23.4-3. Exemption - Non-Consumer Packages of Animal Bedding Sold to Laboratory Animal Research Industry. – Packaged Animal Bedding consisting of granular corncobs and other dry (8 % or less moisture), pelleted, and/or non-compressible Bedding materials that are sold to commercial (non-retail) end users in the laboratory animal research industry (government, medical, university, preclinical, pharmaceutical, research, biotech, and research institutions) may be sold on the basis of weight.

3. Technical Issues and Recommendations

a. A Test Procedure and New Designs of Test Measure for Use with Bedding are needed to Ensure Accurate and Repeatable Results.

There is no test procedure for animal bedding in NIST Handbook 133 “Checking the Net Contents of Packaged Goods”¹⁷ (NIST Handbook 133). When there is no test procedure for such a unique product, weights and measures officials must either develop new methods or modify existing ones for use.¹⁸ Most weights and measures officials use the peat moss dimensional procedure (see Section 3.9. “Peat Moss”) to verify a declaration of compressed volume on bedding. They use the mulch test procedure and the volumetric measures designed for use in testing bags of mulch (see Section 3.10. “Mulch and Soils by Volume”) to verify uncompressed volume declarations. The mulch test procedure, like other volumetric methods, (such as those used in determining the weight-per-bushel for grain), require that the product be poured into a test measure from a consistent height, and there are strict limits on the handling of the product. Handling must be kept to a minimum because it reduces product volume. The way that bedding should be handled is significantly different from how pine bark and other mulches are handled when testing mulch because bedding has to be uncompressed or broken up before it can be tested. This has led to the practice of breaking the product up on a tarp and then placing the product into a test measure by hand. Packagers have concerns with this practice because they know from their testing experience at the point-of-pack that hand-filling reduces the volume delivered to the test measure, increasing the variability of tests. Another factor that contributes to the measurement uncertainty in testing bedding is the size of the packages, which can range from a few hundred cubic inches to more than 10 cu ft. Most states and packers only have test measures with capacities up to 3 cu ft so they have to take multiple measurements to test a 10 cu ft package. Because uncertainties associated with multiple readings of a single test measure are additive, the resulting measurement has a large uncertainty and may be only an approximation of the true volume contained in the package instead of one that is accurate and repeatable within reasonable limits.

b. Reasonable Maximum Allowable Variations for both the compressed and expanded volume declarations must be developed in the near future or packages of Bedding should be exempted from the Individual Package Requirement in NIST Handbook 133¹⁹

Ideally, the same test procedures and equipment specifications should be used by both packagers and weights and measures officials. This will allow for the collection of data that can be used to develop a reasonable MAV for bedding. Currently, the MAV Tables in NIST Handbook 133, Appendix A. (See Table 2-6. “Maximum Allowable Variations for Packages Labeled by Liquid and Dry Volume”) define an unreasonable package error as a package found to have a minus error greater than one percent (1 %) of the labeled quantity. In 2013 the

¹⁷ <http://www.nist.gov/pml/wmd/pubs/hb133-15.cfm>

¹⁸ The fact that test procedures for a specific product are absent from NIST Handbook 133 does not preclude the inspection of any package by weights and measures officials. That is because they have the authority to verify the quantity of any package sold by weight, measure or count as well as the duty to prevent fraud and unfair competition in the marketplace. Since there are literally thousands of products for which no specific test procedure will be found in NIST Handbook 133 officials are encouraged to contact NIST Office of Weights and Measures and other weights and measures colleagues for assistance when they encounter new or unique products.

¹⁹ Currently the average error of a lot, shipment or delivery of bedding, where the sample size is 12 or fewer packages, must be at least equal to the labeled quantity and no individual package may have an unreasonable minus error (i.e., exceed the permitted Maximum Allowable Variation).

NIST Office of Weights and Measures (OWM) reviewed limited data from inspections conducted in 2012 and 2013 by several states. This data revealed that most of the packages failed to meet the expanded volume declarations. In addition, the standard deviations found in the results were such that OWM recommended against enforcement of the 1 % percent MAV in Table 2-6, because the value appears to be unreasonable. Since these packages are required to bear two volume declarations, compressed and expanded, values for the MAV for both the compressed and expanded volumes will need to be quantified. (See discussion of the usefulness of the compressed quantity declaration elsewhere in this paper.) It is recommended, given the nature of the product, the uncertainty inherent in reading the test measures and other issues discussed in the following, more data from a wider range of bedding materials and package sizes will be needed before a final recommendation for a reasonable MAV can be proposed. However, based on current test results and anecdotal information and comments from several state officials who have tested a great deal of bedding, it is anticipated that an MAV of between 5 % to 10 % for tests where the volume of bedding is determined in a single measurement will ultimately be found to be reasonable. The tentative 5 % MAV recommendation would only be reasonable for a single measurement test. For example, if a 2 cu ft test measure is used to test a bag with an 8 cu ft expanded volume; four measurements are needed, so the MAV value must be at least doubled. For multiple measurements of volume for a single package, it is recommended that the tentative MAV be increased to 10 %. Note that previous data obtained using hand-filling cannot be combined with data obtained using the recommended test procedures to develop recommendations for the MAV values. If reasonable values for the MAVs cannot be developed in the near future, it is recommended that bedding be exempted from the Individual Package Requirement just as the NCWM has done with prepackaged firewood.

c. Uniform Specifications for Test Measures of Appropriate Sizes for Packages of Bedding

It is known that industry and weights and measures officials use a variety of test measures, dimensional determinations, and volumetric procedures to verify the quantity declarations on packages of bedding. Because there are no specifications for test measures, officials typically use the measures specified in NIST Handbook 133 for testing packages of bark mulch. The dimensions of the mulch test measures were selected to replicate the package cross-section of bags of mulch that are sold in uncompressed quantities of 57 L (2 cu ft) or more. It is obvious that the cross-sections of bedding packages differ substantially from those of packages of mulch, and most bedding is compressed while bark mulch is not.

The maximum capacity of the mulch test measures is 2 cu ft or 3 cu ft.²⁰ When officials test large packages of bedding, they currently use multiple fills of the test measures to verify the quantity of an 8 cu ft, 10 cu ft, or 12 cu ft bag. Each of those individual measurements includes errors resulting from reading and rounding the results. When 4, 5, or 6 readings are combined, the measurement errors are added up, and the resulting action may be taken on faulty data. The Office of Weights and Measures recommends that multiple measurements of bedding be avoided whenever possible and a test measure of adequate size be used so that a single measurement can be made to determine the volume of bedding in a package.

To avoid the multiple-measurement issue, we constructed several large capacity test measures of square and cylindrical designs so that the volume of a package could be determined in a single measurement. The larger test measure designs also enlarge the area of the bottom of the column of product in the test measure. The larger area allows the height of the column to be reduced which reduces compression (see Exhibit 18). The OWM has developed specifications and some notes on test measure design and construction, which are presented in the following. Unlike mulch, where there are typically a few package sizes such as 56 L (2 cu ft) or 85 L (3 cu ft), bedding is sold (as mentioned above) in a variety of package sizes so test measures with a fixed volume marked on a scale with a few graduations above and below a set volume are impractical for use in testing bedding. For this reason, the OWM recommended designs for the test measures that are specific to bedding, and can be used to test most package sizes in a single measurement.

One reason for using the cylindrical design typically used for dry measures is that its shape reduces the occurrence of the voids frequently seen in the corners of square test measures. Voids in bedding cannot be

²⁰ We understand that some packers (and at least one weights and measures jurisdiction) use a 1 cu ft test “struck” measure for volume measurements which further demonstrates the need for test measure specifications.

completely avoided but with the cylindrical design their number is reduced so that they have less impact on the measurement result. The voids that appeared in the cylindrical measures in this study appeared less frequently than in square test measures. (See Exhibit 17 showing void in corner of square test measure.) As noted, the cylindrical design is preferred for dry measures as stated in NIST Handbook 44, "Specifications, Tolerances and Other Technical Requirements for Commercial Weighing and Measuring Devices," Section 4.45. Dry Measures. A cylinder is one of the most structurally sound and strongest of the geometrical shapes. That strength derives from the geometrical shape which disperses stress throughout walls of the vessel. (See Exhibit 16 of the cylindrical and square test measures used in this study.) In addition, the surface area of a cylinder is smaller than the surface area of a square test measure of similar capacity so the volume can be determined with greater accuracy.

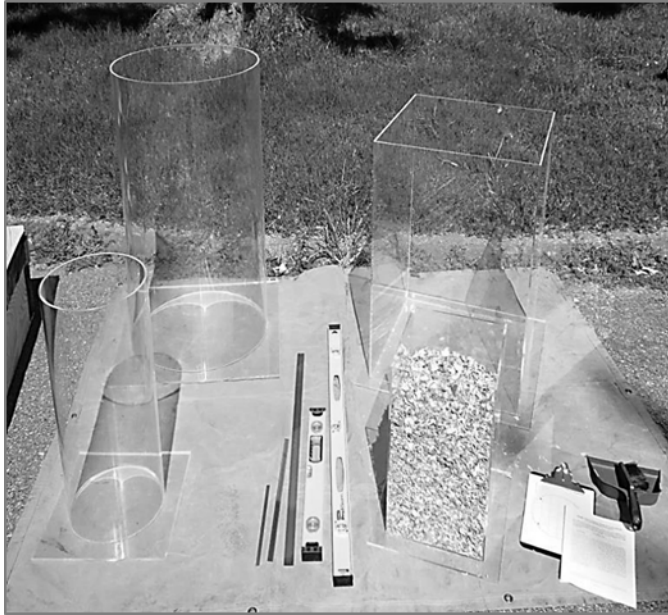


Exhibit 24. Test Measures Used in Study. The large test measures hold up to 279 L (10 cu ft) while the small measures hold up to 52 L (1.5 cu ft).



Exhibit 25. Gap in Corner of Test Measure.



Exhibit 26. Two Different Test Measures. The test measure on the left contains 226 L (8 cu ft) of bedding while the test measure on the right contains 56 L (2 cu ft).

d. Traceability of Measuring Instruments and Test Measures

Another issue of concern is whether not the measurement standards (i.e., test measures and measuring instruments such as tape measures) used by officials and industry have been calibrated and that certificates have been issued indicating that they are traceable to national measurements standards. If untraceable measuring equipment is used in volumetric determinations, the data is questionable. When questionable measurements are involved there will be disagreements over test results and there is the likelihood that packages will be misbranded.²¹ To achieve uniformity and to ensure confidence in test data, all test measures, and measuring devices used by weights and measures officials and that are used in industry quantity control must be calibrated to be traceable to the SI. Calibrations can be provided by NIST recognized state metrology laboratories or other accredited facilities. (See pictures in Exhibit 19 of a calibrated internal diameter micrometer being used to verify the actual dimensions of the test measures used in this study.)

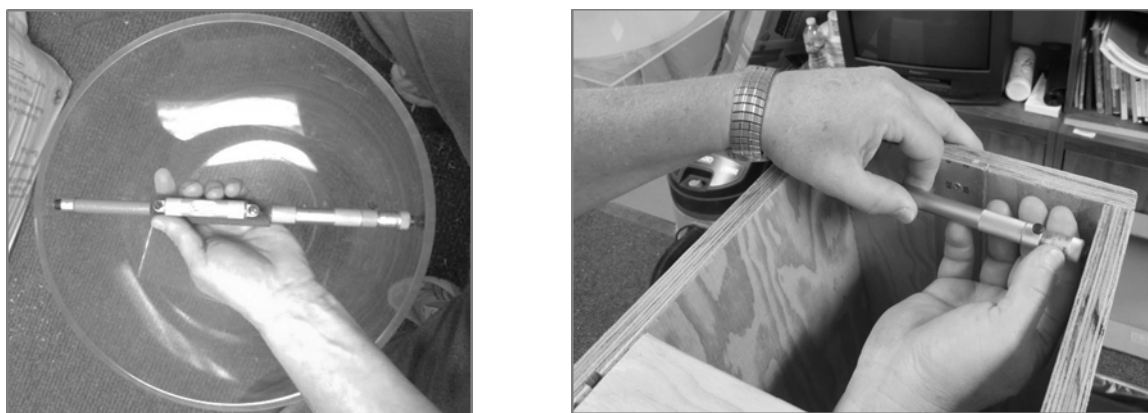


Exhibit 27. Calibrated Internal Diameter Micrometer.

e. Hand Filling Reduces the Product Volume

The standard test method for determining the weight per bushel of grain is determined using a cylindrical dry measure, which is filled using a pour method. This test method has been adapted in NIST Handbook 133 for determining the volume of Borax to verify the net weight of packages of that product. The accuracy and reliability of the pour method and the use of cylindrical dry measures is established, and it dates back to reports to the NCWM issued in 1913 and before.²² A pour filling method is also used in testing mulch and some states use that method (after breaking up the compressed product) to test bedding, while other states use hand filling. Hand filling is used because the compressed product has to be broken up before placing it in a test measure. It is important to note that most of the packaging machines, which fill packages of bedding, have measurement chambers that are filled to a predetermined level with loose bedding using a “pouring” system, and then compressed into the package form and then wrapped. Thus, using a pour method to fill a test measure somewhat replicates the process followed in making the original volume measurement.

²¹ Misbranding means overstating the net quantity of contents, misleads consumers, frustrates value comparisons, and is an unfair trade practice.

²² See “Testing of Capacity Measures” by R.Y. Ferner, National Bureau of Standards on pages 181 - 200 in the Report of the 8th National Conference on Weights and Measures (1913). Cylindrical Test Measures: in addition to its strength which reduces the chance of deflection in the cylinder walls, another benefit of the cylindrical design is that it eliminates the 90 degree angles of the corners (where gaps in product fill frequently occur). Still another advantage of the design is that the surface area of a cylinder is less than that of an equal size square. It is the smaller surface area that improves the resolution in the volume measurements (i.e., using a 1.0 mm increment to compare the 0.37 L readability of a 24 in² square box with a surface area of 576 in², to 0.27 L readability of a 24 in cylinder which has a surface area of 433 in²).

In this study we compared the volume obtained by pouring the bedding into a test measure to the volume obtained by hand filling the test measure. We found that hand-filling test measures consistently reduced the volume obtained regardless of the type or size of the bedding (i.e., large and small flake). We also found that hand filling has a larger standard deviation than the pour method, which results in a larger uncertainty in test results. We verified the effect of hand-filling by first determining a specific volume of each product using a pour method and adjusting the volume. We then transferred the bedding to the test measure by hand. As shown in the following tables, we consistently found the resulting volume was substantially reduced. We then transferred the product into the test measure using a plastic lined chute and the pour filling method. We performed ten tests for each fill method and found the product volumes from the pouring tests were consistently higher than those found in the hand-filling method. We also found the standard deviations in the pour filling method were consistently lower than those found using the hand-filling method (see Tables 1, 2, and 3). It is important to note that at the end of the ten tests with hand filling we retested the bedding using the pour method and found that the volume of the product recovered close to the original amount.

Table 1. 42 L – Large Flake Wood Product		
Fill Method	Average Volume	Standard Deviation
Hand	41.64 L	1.32
Pour	42.14 L	0.17

Table 2. 35 L – Small Flake Wood Product		
Fill Method	Average Volume	Standard Deviation
Hand	33.69 L	0.22
Pour	35.05 L	0.19

Table 3. 38 L – Shredded Paper		
Fill Method	Average Volume	Standard Deviation
Hand	38.35 L	0.97
Pour	38.78 L	0.36

Exhibit 28. Photo to the right shows the use of a chute to pour small flake bedding into a 283 L (10 cu ft) test measure.

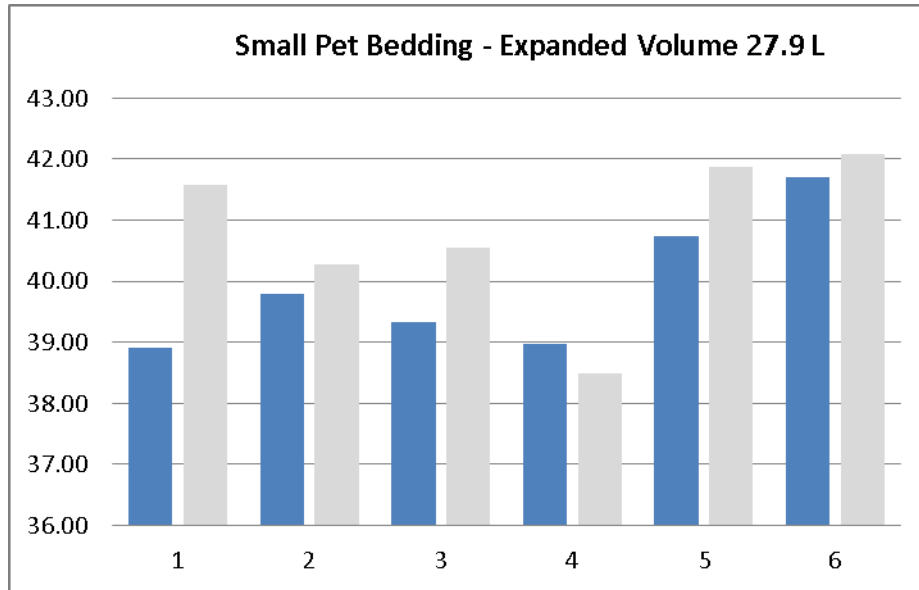


Exhibit 29. Photo to the left shows the use of a chute to pour shredded paper bedding into a 44 L (1.5 cu ft) test measure.

Even though we found the repeatability of pour filled tests to be significantly better than hand filling, more testing will be needed to confirm that the results are reproducible with all types of bedding.

f. The Pour Filling Method aids in the Recovery of Product Volume

More than 100 measurements were made using the pour filling method pictured above and it was found that the volume quantities obtained on second pour were generally greater than those obtained during the first pour. The increase in volume found on the second pour was common with most products and makes sense after examining the packaging process. The compression bagging machines are designed to compress product in different ratios but in one example the product is compressed in a ratio of 5 to 1 using up to 1000 or more pounds per square inch of pressure (i.e., 10 cu ft of loose bedding is compressed to 2 cu ft). Even though the test procedure calls for compressed product to be “uncompressed” by hand, that process in itself does not appear to be sufficient to completely loosen the product on its own. The pouring aids in uncompressing the product and allows it to recover more of its original pre-compression volume. The findings indicate that the volumetric test procedure should require at least two pours for each package with the expanded volume being determined on the second pour. The graph below illustrates the findings on a sample of six packages of small pet bedding of shredded paper. The results illustrate (the first pour volume is illustrated by the dark column and the second pour volume is illustrated by the lightly shaded column) how the product volume typically, but not always (see package 4, which also happened to be the lightest weight package in the sample), increases on the second pour. Some of the differences between the first and second pour were 2 L (122 cu in or 7 %) or more. We found similar increases of volume with all other products, further supporting the suggested requirement for at least two pours before the volume is determined.



g. Chutes – Used for Uncompressing Bedding and Pouring into the Test Measure

Because the compressed bedding must be uncompressed by hand before it can be poured into a test measure, it was decided that a tray or chute of adequate size could be used for both purposes. When experimenting with plain cardboard chutes, it was found that the bedding would not flow into the test measures evenly and without a lot of shaking. Cardboard chutes were then lined with polyethylene sheeting creating a smooth slippery surface that allowed the bedding to flow freely and evenly into the test measure. The latest generation of the chutes was constructed of wood in various dimensions to hold the expanded volume of various size packages of bedding. Constructed of ¼ inch plywood, they are lined with thick poly sheeting to ensure the product flows out smoothly. In Exhibit 22 upper left picture, a 280 L (10 cu ft) chute is being used to uncompress the bedding. In the picture on the right the bedding has been uncompressed and is ready to be poured into the test measure. The pictures on the next page show how the bedding is uncompressed in a chute by hand. The last picture shows the four sizes of chutes used in this study.

Exhibit 30. These pictures show a package of bedding being opened and the product being uncompressed and prepared for measuring.





Exhibit 31. The following pictures show how a larger chute (over 280 L) and smaller chutes are used to fill the test measures.



The specifications for the chutes corresponding to typical size packages of bedding are shown below and will be included in the equipment list for the expanded volume test procedure.

Chute Specifications			
Chute Nominal Capacity	Height	Width	Length
70 L (2.5 ft ³)	254 mm (10 in)	228 mm (9 in)	1219 mm (48 in)
100 L (3.5 ft ³)	254 mm (10 in)	279 mm (11 in)	1397 mm (55 in)
170 L (6 ft ³)	279 mm (11 in)	355 mm (14 in)	1727 mm (68 in)
240 L (8.5 ft ³)	304 mm (12 in)	406 mm (16 in)	2006 mm (79 in)
283 L (10 ft ³)	304 mm (12 in)	406 mm (16 in)	2286 mm (90 in)

NOTES: The chutes are constructed using hinges and pins so that they can lay flat for transportation. They can be constructed of sheet metal or other slick surface material which enable the bedding to flow easily. The construction of the chutes used in this study allows the sides to move in or out slightly so that the bedding does not become clogged at the outlet. The heights and lengths may be adjusted slightly to fit into vehicles for transport but the widths should not be reduced because narrowing the opening can restrict material flow. Also, the width should be kept smaller than the opening of the test measure so that spillage does not occur during pouring.

h. Calculating the Volume of Bedding in a Test Measure Using a Headspace Method

i. Hand Leveling of the Bedding causes “Packing” and Reduces Volume

Whenever dry measures are used, NIST Handbook 133 cautions inspectors that measures should be filled “without agitating” (Section 2.4. “Borax”), or that the inspector should “not rock, shake, drop, rotate, or tamp the test measure” (Section 3.10. “Mulch”). This study was conducted following the handbook’s guidance and the test measures were filled using the pour method. Following the instructions in Section 3.10. “Mulch,” care was exercised “in leveling the surface” of the bedding so that visual readings could be taken across the top surface of the bedding to determine the volume. In Exhibit 25 below, a level is being used to check for level. For this study multiple measurements were taken (e.g., 4 to 12 readings which were averaged) of the height of the bedding inside the test measures. One of the advantages of using the transparent test measures was that the amount of “packing” that was taking place inside the test measure could be seen and measured as the surface of the product was leveled. The term “packing” is used here to clearly distinguish the unintentional, but unavoidable, reduction of volume that results from the act of hand-leveling the bedding. This seems to be a reasonable distinction to make since some level of compression of all of the bedding types tested occurred, and cannot be eliminated. However, larger surface areas of the recommended test measure designs reduce the height of the column in the measure substantially, which in turn will reduce the amount of compression that occurs during testing.



Exhibit 32. Leveling the Surface. Showing the use of a 150 mm mesh to level the surface of large flake bedding.



Exhibit 33. Checking Level. Checking the surface of large flake bedding for an approximation of a level condition.

The impact of “packing” was first observed when leveling out a test measure filled with small flake bedding. It was determined that using hands to level the product would not result in consistent results between inspectors. A 150 mm piece of rigid stainless steel mesh was then used to level the product. However, even when all three testers used the same mesh to level the small flake bedding, there were wide variations over the surface of the product as well as a reduction in volume. Samples of large flake and cellulose bedding were tested and it was found that “packing” occurred with those products.

It should be noted that measurements were made in millimeters because that size increment is easily readable in field situations and it simplifies the calculations. “Packing” is a concern because a 1.0 mm change in height of the bedding has a significant impact on the resulting volume in any test measure (the errors vary depending on the surface area of the test measure). For the 63.7 L (2 cu ft) wooden test measure used for measuring mulch, a 1.0 mm error in a height measurement will result in an error of 92 mL (5.6 cu in) while a 1.0 mm error in a 283 L (10 cu ft) square wooden test measure recommended for use in testing bedding will result in a volume error of 0.37 L (22.6 cu in). On the other hand, due to its smaller surface area, a 1.0 mm error in measurement in the 279 L (9.8 cu ft) cylindrical measure is equivalent to 0.27 L (16.4 cu in).

To find a way to address the issue of the “packing” caused by hand leveling, the bedding was repoured into the test measure and, without leveling the product, the headspace measurement procedure was used as described in the following Item ii. “Headspace Measurement Procedure Adapted for Bedding.” Twenty six measurements were taken across the surface area of the bedding to determine its volume. Those values were averaged and subtracted from the height of the test measure to ascertain the volume as illustrated in Figure 1. The bedding was then leveled with the 150 mm wire mesh and another 26 measurements were taken across the surface to determine the volume. The differences were significant and verified that leveling the product by hand reduced the volume. The volume, after leveling on the smaller test measures, ranged from 0.2 L to 0.5 L less than the unleveled volume and up to 5 L less than the unleveled volume on the larger test measures. Because these significant differences were discovered early in this study no further leveling of the bedding was done, and the headspace method was used for all subsequent volume determinations. It was found, after a little practice, the measurements were easily made and the improvements in accuracy were well worth the added effort.

ii. Headspace Measurement Procedure Adapted for Bedding

Testing any product (from grain to Borax) using a dry measure can be fraught with opportunities for measurement errors from “packing” when the product is leveled.²³ Measurements were taken inside the test measure rather than around the outside of the test measure. This allowed more accurate measurements to be made directly on the product so that the variations in the surface (which cannot be eliminated) could be “smoothed” out by averaging multiple measurements. This headspace method is used in NIST Handbook 133 for determining the volume of paint in a can and is described in Section 3.7. “Volumetric Test Procedure for Paint, Varnish, and Lacquers.” In that procedure the volume is determined by measuring from the bottom of a spanner bar down to the surface of the liquid and this value is subtracted from the interior height of the can to obtain a height measurement, which can then be used to calculate the volume of the paint. The surface of a liquid is level so only three measurements are taken and averaged. Because the surface of bedding is very irregular, a greater number of measurements must be taken in a uniform pattern across the surface of the bedding to obtain a representative depth from the top of the test measure. By taking at least 25 measurements spaced across the surface area of the square or cylindrical measures, good results were obtained with a good representation of the average depth. The follow graphics illustrate how the headspace method works:

²³ See page 191 in “Testing of Capacity Measures” by R.Y. Ferner, National Bureau of Standards on pages 181 - 200 in the Report of the 8th National Conference on Weights and Measures for 1913 for an earlier discussion of the “packing” effect.”



Picture 1. This picture shows how to read the depth of container.

The picture on the left (Picture 1) shows how to read the depth from the bottom of the straightedge (top edge of measure) down to the bedding in a 44 L test measure from a position that reduces parallax. Picture 2 below illustrates the actual worksheet with the headspace procedure on the 44 L cylinder test measure (its internal radius is 151 mm and its height is 610 mm). The bedding was poured into the test measure but not leveled. Then 26 measurements were made at the locations shown on the grid to determine the depth of the product from the top edge of the measure. The average of the 26 values was 500.7 mm which was subtracted from the height of the test measure to obtain 109.26 mm for the average height of the column of bedding in the measure.

The volume was calculated using: $Volume\ in\ liters = \pi r^2 h$
 $3.14159265 \times 23035.69 \times 109.26\ mm = 7.90\ L^*$

*After the calculation was completed, the result was divided by 1 000 000 to obtain the volume in liters.

Figure 7. Illustration of Worksheet.

	413	367	390	
439	439	430	419	432
478	475	492	462	478
552	542	528	532	530
578	580	577	569	565
	589	590	573	



Figure 3. Using the headspace measurement on a 279 L test measure. The ruler is read from the bottom edge of a straight edge or level from a position that reduces parallax.



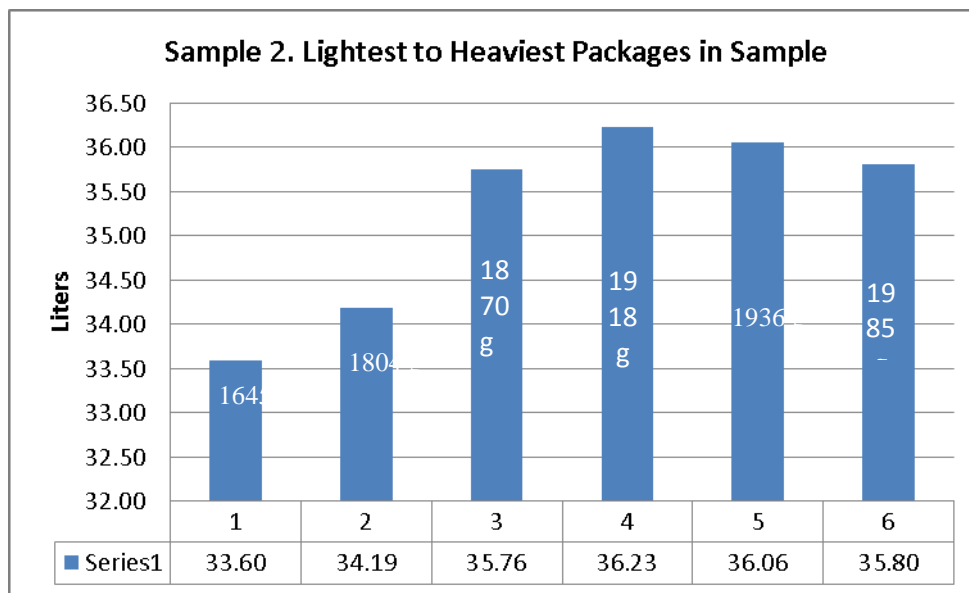
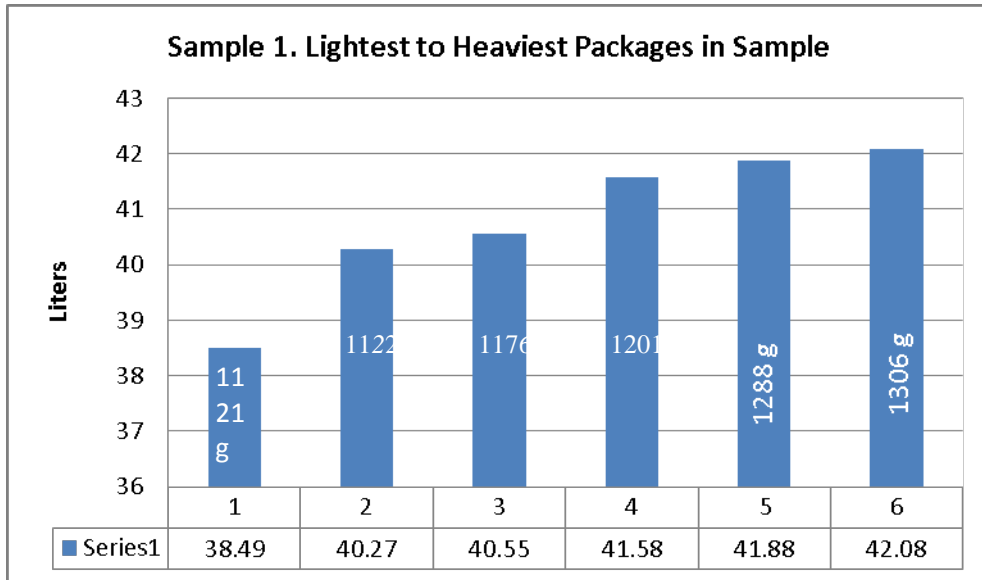
Figure 4. Showing how the ruler is placed on the bedding with the headspace method. The ruler is read from the bottom edge of a straight edge or level from a position that reduces parallax.

Some packers may choose to level the product in a test measure or take fewer readings across the surface to determine if the package passes or fails a quantity control test in a production environment. But, in official inspections by weights and measures officials, it is recommended that the product be poured into the test measure and measured without leveling so that the “packing” (volume reduction) that is known to occur whenever the product is handled can be avoided. Also, for official tests, it is critical that variations be measured so the data can be utilized in the calculations of sample standard deviations and sample error limits to decide if a sample passes or fails.

i. Optional Audit Screening by Weight

The verification of the expanded volume of animal bedding outside of a production plant requires the inspector to destroy the package and un-compress the product. After the product is tested, it cannot be returned to the original packaging so it will need to be discarded or placed in a large trash bag to be held for disposition by the retail store. In carrying out this study, the packages were weighed prior to opening them for the volumetric test to see if there was a consistent relationship between weight and volume. In reviewing the test data, it was found that the net weight of the packages did not correlate with the expanded volume found in testing. However, it was determined that the package gross weights could be used in an audit procedure. For example, if the expanded volumes of the lightest and heaviest packages in a sample passed, it could be expected that all of the remaining packages in the sample would also contain at least the expanded volume. The Industry experts we spoke with agreed that this type of weight screening was workable could be used to save both time and labor expenses and also reduce destructive testing and product waste.

To see if a weight screening approach would work in the real world, two sets of samples comprised of six packages from two different lots of a bedding product made of cellulose were collected. The expanded volume declared for both samples was 27.9 L (1700 cu in). All of the packages in each sample were weighed to obtain their gross weights and then each was tested to verify the expanded volume. The results from both samples revealed that the expanded volumes of the four intermediate weight packages fell well within the range in volume between the lightest and heaviest packages in the sample (the gross weights of each bag are shown on the bars of the graphs).



Regardless of the type of product under test, the volumetric test destroys the packaging and the product cannot be repackaged. This is a suggested alternative approach to reduce destructive testing and to save inspection resources. The test procedure will contain the recommendation that after randomly selecting the sample packages from the inspection lot, a gross weight be taken on all, select the lightest and heaviest packages first, and conduct a volumetric test on them to verify the expanded volume. If the lightest and heaviest packages pass the volumetric test, it is likely that the remaining packages in the sample will also pass. Jurisdictions may want to accept the sample as an AUDIT TEST and inspect another lot. If either of the two packages are found to have a minus error that exceeds the MAV the sample fails and no further testing should be done (assuming 0 MAVs are allowed for the sample size (see NIST Handbook 133, Appendix A, Table 2-1. "Sampling Plans for Category A"). However, if either of the first two packages has a minus error that does not exceed the MAV the inspector should test all of the packages in the sample as they normally would in a NIST Handbook 133 test procedure. If the gravimetric audit procedure is used, the inspector will be advised to ensure that the scale is sitting on a solid level support and that its accuracy has been verified to a test load that is at least 10 % more

than the gross weight of one of the packages (e.g., to estimate that value place one of the packages on the scale and then test the scale with a load above the package's gross weight).

j. There is Little Benefit for Consumers in Verifying the Compressed Quantity Declaration

Based on a review of test data provided by states from the 2012 - 2013 testing, it is noted that in most instances the fact that a package passed the compressed dimensional test did not ensure that the package would pass the uncompressed volume test. Test findings for the compressed and uncompressed quantities in this study were consistent with the state results. Furthermore, in the opinion of industry experts, even if the compressed quantity is correct that does not mean that the expanded (uncompressed) volume declaration will be accurate.

It is unlikely that most packages of animal bedding would fail the dimensional test. If the sample packages do not measure up, the Inspection Lot should be rejected without further testing. However, if should a sample passes the dimensional test, the volumetric test must be carried out before a final decision on whether or not the lot passes both tests is made.

4. Packages of Compressed Bedding

a. How Manufacturers determine a Compressed Volume Declaration.

A compressed volume declaration on a package of bedding is determined from the target dimensions of the finished goods package as designed. Manufacturers design these packages as cuboids with all right angles and flat surfaces. Typically the natural variability of the fibers they package will almost always create some "plumping" along the surfaces and rounding on the edges resulting in irregular package dimensions. For most manufacturers the target compressed volume design intentionally errs on the side of a smaller compressed volume declaration than could be reasonably claimed, but that approach ensures compliance with the stated compressed volume (assuming the package is adequately filled). Because packers tend to understate the compressed volume declaration, these products routinely pass the compressed package (peat moss) test procedure in NIST Handbook 133.

b. A Dimensional Test is used to Verify Compressed Volume.

This method of determining the volume has a large uncertainty. This is due to the difficulty in obtaining exact measurements of irregularly shaped packages in flexible packaging. Typically bedding packages (like peat moss) are formed in a rectangular cuboid, but the edges of most bags are rounded and there is expansion (or "plumping") of the panels of a bag (including the ends and sides). Some packages of compressed bedding are irregular in shape and so loosely packed such that they do not hold a cuboid form firmly enough for reproducible measurements to be made. Exhibit 26 on the left shows a package of peat moss, which is the product that the original test procedure was developed to verify. Exhibit 27 on the right is a package of "compressed" bedding that is too loosely packed to utilize the peat moss dimension procedure.

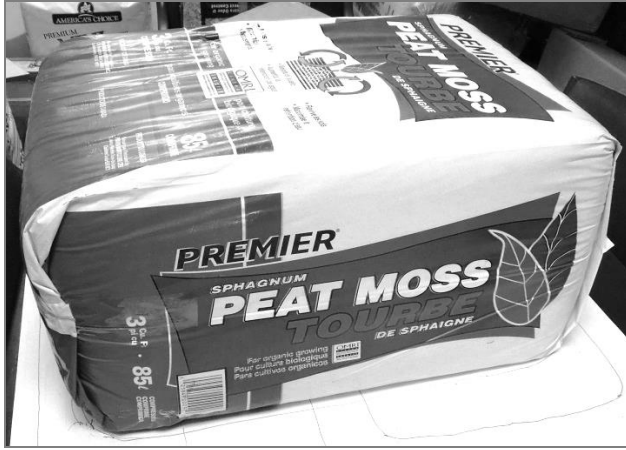


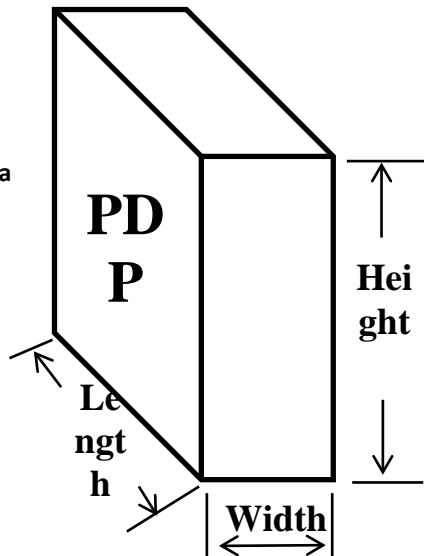
Exhibit 34. Peat Moss.



Exhibit 35. Compressed Bedding.

Note: For the purpose of providing uniform identity of the dimensions recorded for this study, a cuboid is shown in Exhibit 28 with the dimensions identified and oriented with the Principal Display Panel (PDP) as it is defined in the NIST Handbook 130, “Uniform Packaging and Labeling Regulation.”

Exhibit 36. Determining the Volume of a Cuboid.



The formula for determining the volume of a cuboid²⁴ is $Volume = Length \times Width \times Height$ (Note: an alternative formula $Volume = Height \times Area\ of\ the\ Base$ (where $L \times W$ give the area of the base). In the case of packages of bedding, this formula may not provide an accurate determination of volume. This is because the geometric formula for a cuboid is based on the 6 panels of the cuboid being flat and the 12 edges meeting at 90 degree right angles. On most compressed bedding, the package edges are rounded and there can be “plumping” or depressions in the package panels (excess packaging tails²⁵ can also cause errors) making it

²⁴ A cuboid has six rectangle faces, twelve edges and eight vertices. It is also called a right cuboid because the edges meet at right angles of exactly 90 degrees.

²⁵ A packaging “tail” is that part of the flexible packaging remaining after the package is heat sealed and cut.

difficult to visually define a measurement point. The following picture shows the rounded edge of a 16 L package of red cedar bedding. The “plumping” of the package and rounded edges (angles) make it difficult to define a measurement point for the length, width, and height of the package.



Exhibit 37. Plumped bedding package illustrating rounded edges (angles), which hinders getting accurate measurement points.

A packaging “tail” is the part of the packaging remaining after the package is heat sealed and cut. Typically tails are found only on the top or bottom of the package and can be avoided in taking the length and width measurements along one side of the package. As shown in the photographs in Exhibit 32 the size of a “tail” can vary greatly from product to product. If, for some reason, they cannot be avoided for the dimensional test, they must be folded consistent with the packaging design and taped against the body of the package to provide a clear field of view and placement of measuring equipment during the dimensional test.



Package Tails: The “tail” on the package shown at right was folded and taped so that dimensional measurements of height could be made. The thickness of single layer of this wrapper was 0.0035 in. At several measurement points on one end of this package there were seven layers (0.024 in) of packaging. In addition, the “tail” on the other end of the package totaled three layers (0.010 in). The total thickness for both ends was 0.034 in). In NIST Handbook 44, “Specifications, Tolerances and other Technical Requirements for Commercial Weighing and Measuring Devices,” Section 5.52. “Linear Measures” the Acceptance Tolerance for a 36 in ruler is ± 0.046 in. In this example, the error caused by not deducting for the thickness of the packaging equaled at least 70 % of the tolerance allowed for a 36 in ruler.



Unlike the ASTM International test method for peat,²⁶ NIST Handbook 133 does not require adjustment of the net volume to reduce measurements to account for the thickness of the packaging (e.g., on a 3 mil thick package [0.003 in], each measurement would be reduced by twice the bag thickness or (0.006 in) which benefits packers). (See the discussion in the table above for an example of how the packaging thickness with multiple thicknesses relates to the tolerance for the measuring device.) By not deducting for the thickness of the packaging, the calculated volume is increased to the benefit of the packer.

NIST Handbook 133 requires the measurements to represent the dimensions of the cuboid of the bedding so the inspector must ensure that tails are folded and measurement points taken such that multiple folds of packaging material do not affect the accuracy of the measurements. The following pictures (Exhibit 32) show the edges from 16 L (1000 cu in), 85 L (3 cu ft) and 113 L (4 cu ft) packages of mini and large flake bedding showing how rounded “angles” make it difficult to define a measurement point for the length, width, and height of the package.

²⁶ See Section 6.2 of ASTM International D2978-03 (Reapproved 2010) “Standard Test Method for Volume of Processed Peat Materials.”

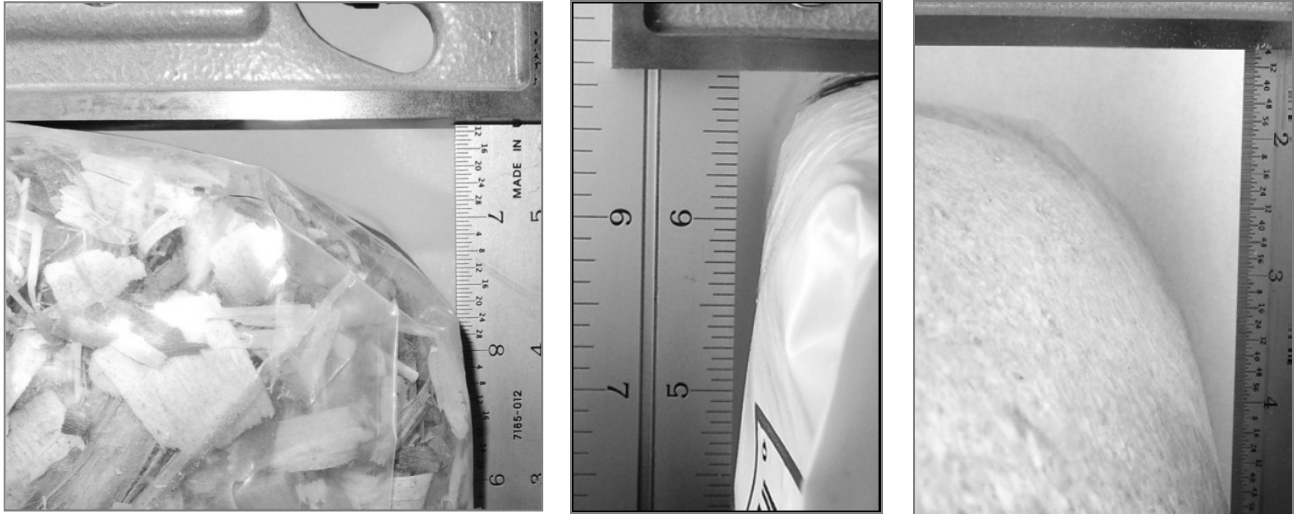


Exhibit 39. Measurement Technique.

The radius of the edges of the packages tested with quantities of 16 L to 156 L ranged from about $\frac{3}{16}$ in to more than 2.5 in. The following graphics illustrate how the radius impacts the accuracy of the area determination. The area of the colored rectangle with 90 degree angles shown below is 96 sq in.

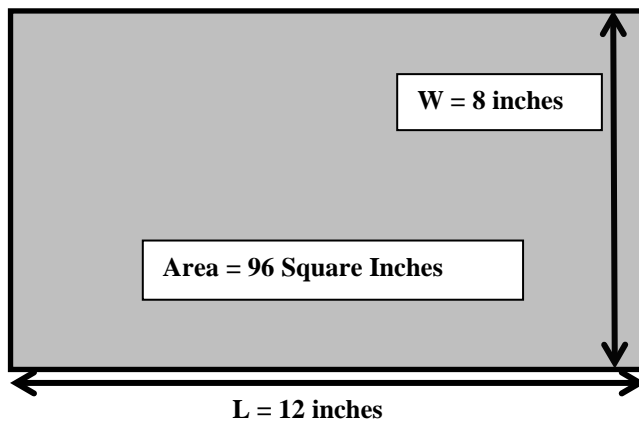


Exhibit 40. Graphics illustrating impacts the accuracy of the area.

If this rectangle is redrawn with rounded corners the area will decrease as the radius increases.

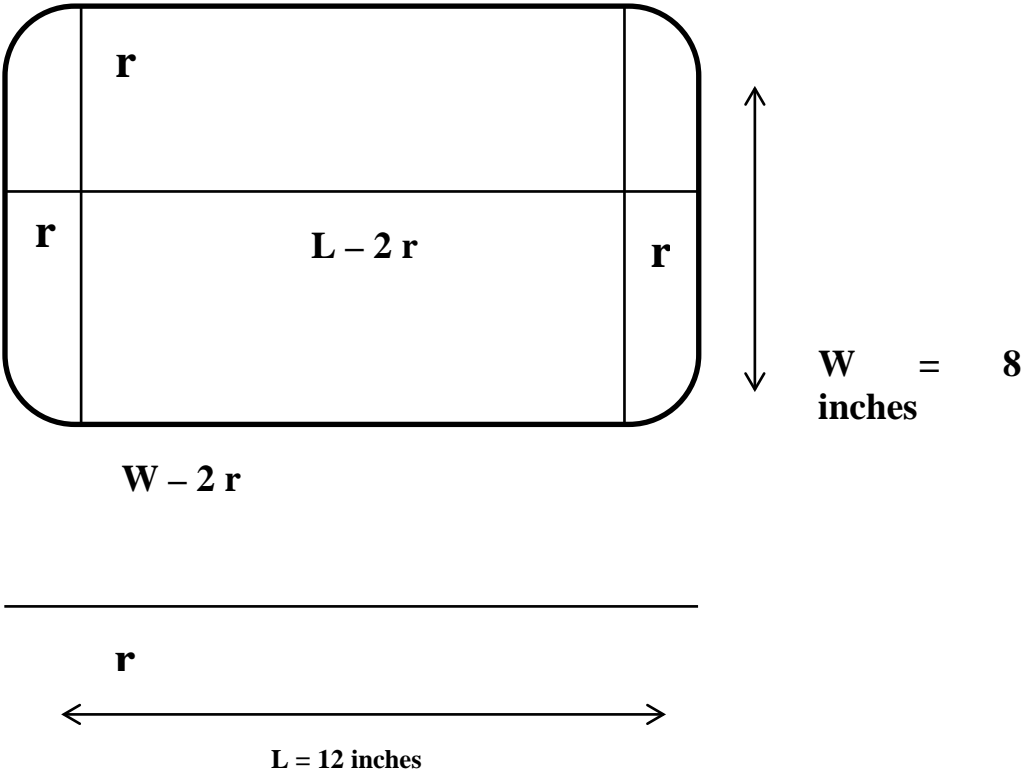


Exhibit 41. The impact of rounded corners on determining the accuracy of

This table illustrates how rounded corners impact the accuracy of a volume determination. The comparison of radius measurements show how the cuboid volume differs from the actual volume of the package from 1 cu in to 86 cu in as the radius of the corners increases.

Radius (r) of Corners in Inches	Length	Width	Height	Volume with Rounded Corners $H \times (L \times W - (4 - 3.14159265) r^2)$	Cuboid Volume $L \times W \times H$	Difference from Cuboid in Cubic Inches
	in Inches			Volume in Cubic Inches		
$\frac{3}{16}$	12	8	16	1535.5	1536 cu in	- 0.5
0.25				1535		- 1.0
0.5				1532		- 4.0
1.0				1522		- 14.0

2.5				1450		- 86.0
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c. Product Variations are Common in Other Dimensional Tests in NIST Handbook 133

It is important to remember that dimensional testing is used for other packaged goods in NIST Handbook 133 such as bundled and boxed firewood as well as polyethylene sheeting and even paint. Similar measurement challenges are encountered in defining the measurement point and in accounting for irregular shapes. However, bedding can be distinguished from packages of firewood because packages of bedding are required to bear declarations of the quantity in terms of the usable (expanded) volume which can be verified in a test measure.

Average of Multiple Measurements

One approach that NIST Handbook 133 uses to deal with variations in product sizes is to take multiple measurements along each panel and then average the results. The assumption for this approach is that the greater the number of measurements taken, the better the average value reflects the actual dimensions of the product under test. Because the shapes of bedding packages vary significantly, additional measurements improve the accuracy of the measurements. For the test procedure recommended NIST is advises that at least five measurements be taken for each dimension being verified (i.e., length, width, and height) and that these values be averaged.

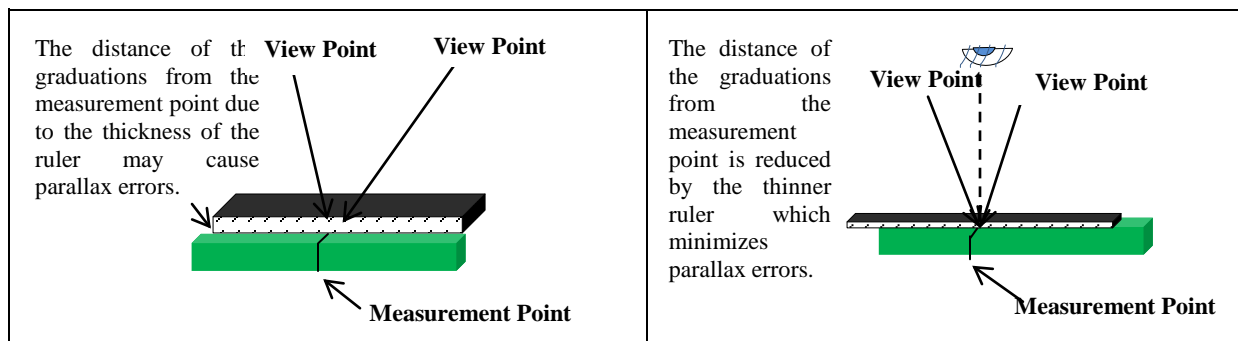
5. Errors

a. Observational Error

For this test procedure a linear measurement is understood to be the distance between two points in a straight plane, that is a reference (or zero) point and a measurement point. There are many possibilities for error in testing packages dimensionally. One of the most difficult issues with bedding packages is identifying measurement points due to the irregular surfaces of the planes (e.g., plumping of the package). Several recommendations are provided below that may help reduce measurement errors and uncertainty. Some basic measurement issues which are problematic in most measuring processes will be reviewed so that every reader has an understanding of the factors that were considered in developing these test procedures.

i. Parallax

When the graduations are too far from the measurement point, such as when a thick ruler is used, there is a possibility that measurement errors will occur as a result of parallax. Parallax is the apparent displacement of a graduation due to a slight change in the position of the observer. This is illustrated in the exaggerated graphic on the left.



One way to reduce parallax error is to use a thin ruler and place it so that its graduations are as close to the measurement point as possible. By understanding parallax you can usually reduce it to a minimum by using suitable test equipment and aligning your eyes so that they are perpendicular to the graduation (see dashed line) and the measurement point. See graphic above right.

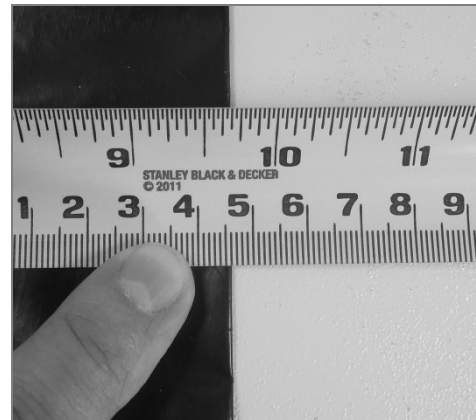
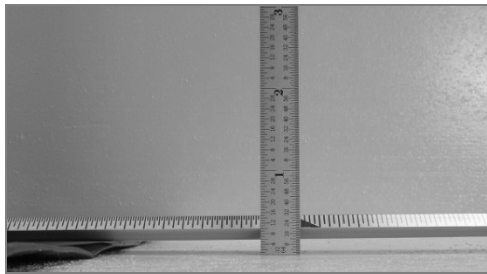


Note how the graduations are on the tapered portion of the ruler so that they lay close to the measurement point.



A thin rigid stainless steel ruler reduces parallax because the graduations lay close to the measurement point. Metal rulers are available that have a thickness of 0.4 mm.

A rigid tape measure can also cause parallax errors. This is because the curve in the blade (which strengthens the tape) will hold the markings up off the package being measured by as much as $\frac{9}{32}$ in or more on a 1 in wide tape. To eliminate this problem the inspector must push the tape flat against the package. See picture at right.



b. Manipulative Errors

i. Bending a Tape or Using Improper Angles on a Ruler or Tape will Result in Measurement Errors

For this test procedure a linear measurement is considered the distance between two points in a straight plane. When a linear measuring device is used, it is important that the measuring instrument not bend or “deflect” because any measurement taken that is not parallel to the edge of the package (i.e., the straight plane mentioned before) will introduce trigonometric errors (these are typically cumulative). This is one reason that flexible tapes are not recommended for use in this NIST Handbook 133 test procedure. As mentioned above, most tape measures have a curve in the blade to stiffen it. Because tapes are flexible, it is essential that the inspector reduce the deflection to a minimum before taking a reading of any measurement. Another source of error is the angle of the measurement. Always keep a 90 degree angle to the edges of the package to avoid introducing errors (see photos exaggerated examples.)



Do not bend the tape.



Wrong! Keep the angle of the tape or ruler perpendicular to the edges of the package or trigonometric errors will occur.

Exhibit 42. Proper Measurements are required to avoid errors.

ii. Rounding

Another source of error occurs when the measurement point falls halfway between two graduations on a ruler. Here the error can be as much as half the graduation. For example if you use a ruler with $1/16$ in (1.58 mm) graduations, the potential rounding error is $1/32$ in (0.75 mm) or more. To avoid disputes over the possibility of subjective judgments, the draft procedure requires rounding of measurements that fall between two graduations up in favor of the packer as a matter of practice. The use of millimeters will help to further reduce the errors in volumetric determinations and will simplify the calculations as well.

iii. Slippage

It is difficult to keep the zero “reference point” stabilized when you are measuring any object free handed. Packages of bedding are much more difficult to measure because of their irregular shapes. When measuring most items, you place the zero of the ruler at one edge of the object and then move your head to read the ruler at the measurement point. Experts in dimensional measurement have found that when the observer moves their head from the reference point to view the measurement point they frequently move their hands apart and lose the zero reference.²⁷ See Exhibit 35. This draft procedure recommends that at least 5 measurements be taken to determine the length, width, and height of a package so there will be a potential for 15 instances of slippage, which can have significant impact on the accuracy of the volume determination. Several inspectors who recognize the problem of slippage and who routinely test bedding reported that they use a clipboard or place the package against a wall to provide a solid base for the zero reference. Using that concept, an inexpensive but rigidly constructed three-sided “Measurement Frame” was built to aid in keeping the reference point stable against a solid surface to improve the accuracy of the measurements. See Exhibit 36.

²⁷ See Chapter 5, “Measurement with Graduated Scales and Scaled Instruments in “Fundamentals of Dimensional Metrology” for additional information on good measurement practices.



Exhibit 43. Taking Measurement Points.

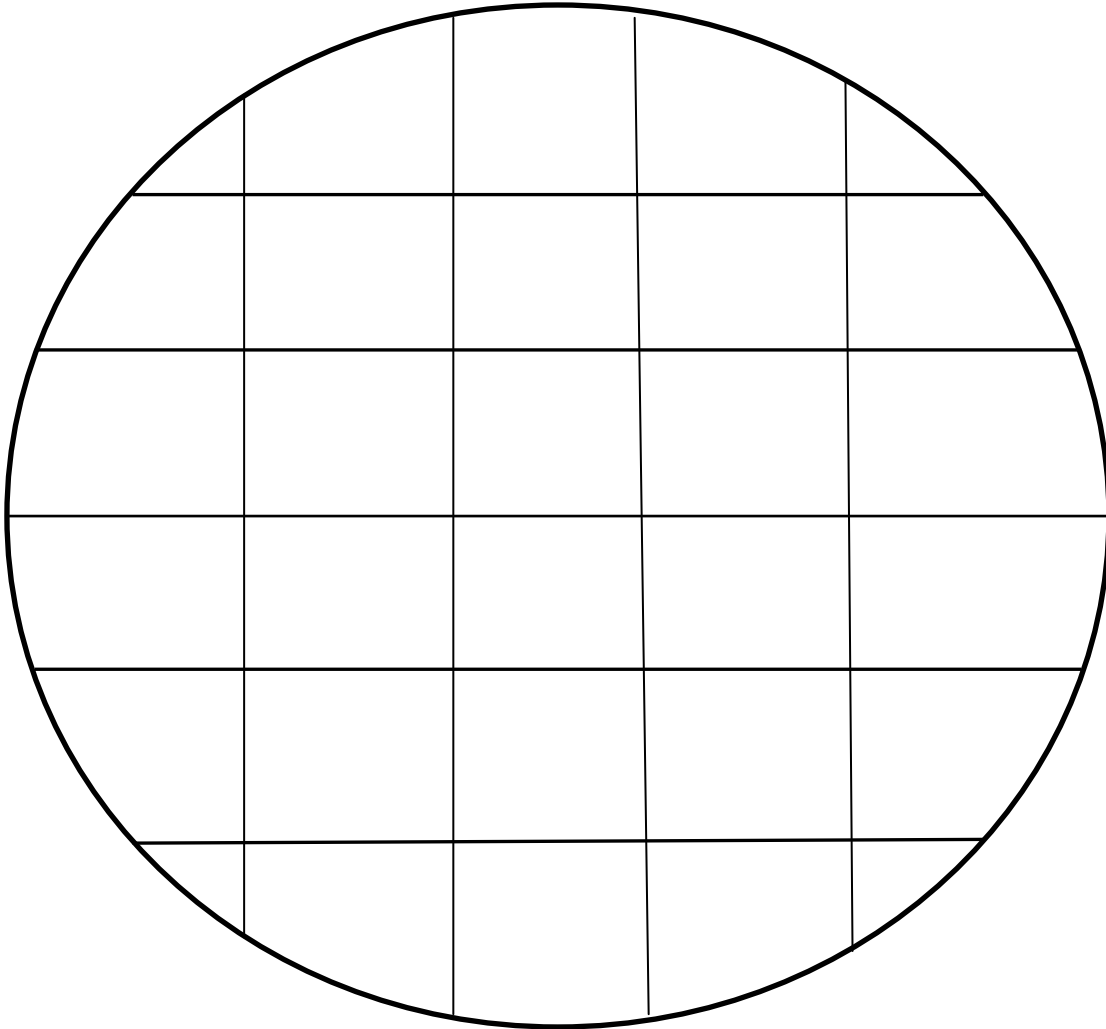


Exhibit 44. Measurement Frame built as an aid to keep reference point stable.

Another step to improve the process is the use of a carpenter square or straight edge to help define the measurement point. The square or straight edge is moved to five points along the package to allow the inspector to make measurements of variations in the dimension. By combining the use of the measurement frame, a rigid rule with 1.0 mm graduations and the carpenter square or straight edge, the accuracy and reproducibility of the measurements (and so the compressed volume measurement) are improved substantially.

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Appendix A. 26 Point Measurement Grid and Package Error Worksheet for Cylindrical Test Measures



Sample Package _____ Labeled Expanded Volume (L): _____

A. Interior Height of Test Measure: _____ B. Radius of Test Measure (r): _____

C. Average Depth (Sum of Measurements \div 26): _____

D. Average Height of Bedding (= A - C): _____

E. Volume (L): _____ = $3.14159265 \times r^2 (B^2)$: _____ \times D: _____ \div 1 000 000

F. Package Error (L): _____ = Labeled Volume (L): _____ - E (L): _____

Volume is calculated using: *Volume in liters = $\pi r^2 h$* For example: if r^2 is 23035 and height of bedding is 109.26 then
 $((\text{Pi}) 3.14159265 \times r^2 (23035) \times 109.26) \div 1\,000\,000 = 7.90 \text{ L}$

Appendix B. 25 Point Measurement Grid and Package Error Worksheet for Square or Rectangular Test Measures

Sample Package _____ Labeled Expanded Volume (L): _____

A. Interior Height of Test Measure: _____ B. Area of Test Measure Base (L× W): _____

C. Average Depth (Sum of Measurements ÷ 25): _____

D. Average Height of Bedding (= A - C): _____

E. Volume (L): _____ = B. Area of Test Measure Base: _____ × D: _____ ÷ 1 000 000

F. Package Error (L): _____ = Labeled Volume (L): _____ - E (L): _____

Volume is calculated using: *Volume in liters = (lw)h* For example: If length and width are 609.6 the area of the measure's base is 371612. If the Average Height of the Bedding is 109.26 then:

B. Area of Test Measure Base (371612) × Average Height of Bedding (109.26) ÷ 1 000 000 = 40.6 L

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Appendix C. Inspection Worksheet for Dimensional Testing

Date:	NIST Handbook 133 - Category A Lot Size _____ Sample Size _____ Worksheet for Packages of Animal Bedding and Peat Moss Labeled by Volume – Dimensional Procedure																			
Labeled Quantity	Converted to Fluid Ounce or Metric			Largest Quantity			Manufacturer :													
							Product:													
				Lot Code:						Plant Number:										
1 cubic foot = 1728 cu in *Total Volume (cu ft) (measure in in) = L × W × H ÷ 1728 or *Total Volume (L) (measure in mm) = L × W × H ÷ 1 000 000																				
Dimensional Measurements																				
Dimensions Measured in: <input type="checkbox"/> mm <input type="checkbox"/> in Package Error in: mL cu in																				
	Length					Avg	Width					Avg	Height					Avg	Total	
1.																				+
																				-
2.																				+
																				-
3.																				+
																				-
4.																				+
																				-
5.																				+
																				-
6.																				+
																				-
7.																				+
																				-
8.																				+
																				-
9.																				+
																				-
10.																				+
																				-
11.																				+
																				-
12.																				+
																				-

<p>Step 1. What is the MAV for this labeled quantity in Table 2-6?</p> <p><input type="checkbox"/> _____ mL <input type="checkbox"/> _____ cu in</p>	<p>Total Package Error</p>										
<p>Step 2. How many minus errors exceed the MAV _____? If the number of unreasonable errors exceeds the number permitted for the sample size in Table 2-1., the sample fails; go to Step 7. If there are no Unreasonable Errors, sum the package errors, and calculate the Average Error entering it in Step 3. Go to Step 4.</p>	<p>Step 3: Average Package Error</p>										
<p>Step 4. If the Average Error is zero or a positive number, the sample passes; go to Step 7. If the Average Error is a negative number, go to Step 5.</p> <p>Step 5. Calculate the Sample Standard Deviation (<i>s</i>) and multiply (<i>s</i>) by the Sample Correction Factor (<i>SCF</i>) for the sample size to obtain the Sample Error Limit (<i>SEL</i>); go to Step 6.</p> <p style="text-align: center;">(<i>s</i>) _____ × (<i>SCF</i>) _____ = <i>SEL</i> _____</p>	<p>Box 6. Disregarding the signs, is the <i>SEL</i> in Step 5 larger than the Average Package Error in Step 3? If yes, the sample passes, go to Step 7 and approve the lot. If no, the sample fails, go to Step 7 and reject the lot.</p>										
<p>Step 7. Action Taken: <input type="checkbox"/> Lot Rejected <input type="checkbox"/> Lot Approved</p>											
<p>Random Numbers: Enter the numbers as you select them in the top row and reorder them in the bottom row.</p>											

Appendix D. Modified Standard Package Report for Animal Bedding

Date:	Modified Standard Package Report for Animal Bedding		Sampling Plan A – Table 2-1., Appendix A in NIST Handbook 133	Report Number:	
Location (name, address)		Product/Brand Identity	Manufacturer	Container Description:	
		Lot Codes			
1. Labeled Quantity (Expanded Volume):	2. Unit of Measure: Liter	3. MAV: - Single Volume Determination 5 % - Multiple Volume Determinations 10 %	4. MAV (0.05 × Box 1. Expanded Volume) or (0.10 x Box 1. Expanded Volume)	5. Inspection Lot Size:	6. Sample Size (n):
					7. Number of Unreasonable Package Errors Allowed for Sample Size:
Gross Weight for Audit Testing		Package Error		Test Notes	
		-	+		
<i>1.</i>					
<i>2.</i>					
<i>3.</i>					
<i>4.</i>					
<i>5.</i>					
<i>6.</i>					
<i>7.</i>					
<i>8.</i>					
<i>9.</i>					
<i>10.</i>					
<i>11.</i>					
<i>12.</i>					
		Total:	Total:		
8. Total Error:	9. Number of unreasonable minus (-) errors (compare each package error with Box 4):		10. Is Box 9 greater than Box 7? <input type="checkbox"/> Yes, lot <u>fails</u> go Box 17 <input type="checkbox"/> No, go to Box 11.	11. Calculate Average Error: (Box 8 ÷ Box 6 =)	
12. Does Box 11 = Zero (0) or Plus (+)? <input type="checkbox"/> Yes, lot <u>passes</u> , go to Box 17 <input type="checkbox"/> No, go to Box 13, 14, 15 & 16	13. Compute Sample Standard Deviation:		14. Sample Correction Factor:	15. Compute Sample Error Limit (Box 13 × Box 14 =)	
16. Disregarding the signs, is Box 11 larger than Box 15? <input type="checkbox"/> Yes, lot <u>fails</u> , go to Box 17 <input type="checkbox"/> No, lot <u>passes</u> , go to Box 17			17. Disposition of Inspection Lot <input type="checkbox"/> Approve <input type="checkbox"/> Reject		
Comments:			Official's Signature		
			Acknowledgement of Report		

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APPENDIX E. EXPERTS IN THE ANIMAL BEDDING INDUSTRY CONTACTED FOR TECHNICAL ASSISTANCE.

NIST EXTENDS ITS SINCERE APPRECIATION TO THESE EXPERTS FOR THEIR ADVICE AND ASSISTANCE.

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