



CALIFORNIA DEPARTMENT OF  
FOOD & AGRICULTURE

*Extracts from the*  
**CALIFORNIA CODE OF REGULATIONS**  
**TITLE 4, DIVISION 9**

**WEIGHTS AND MEASURES FIELD REFERENCE MANUAL (2023)**

**Chapter 11**

**Sampling and Testing Procedures for Determining the Net Contents of  
Packaged Commodities**

**Section 4600.**

**Amendments to NIST HB 133 – 2023**

**Editorial Changes to NIST HB 133 – 2023**

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**CALIFORNIA DEPARTMENT OF FOOD AND AGRICULTURE**  
**DIVISION OF MEASUREMENT STANDARDS**

## DISCLAIMER

This document represents the Division of Measurement Standards' field manual for enforcing regulations pertaining to weights and measures in California. This field manual is not to be considered as the official Code of Regulations, as published by Barclays Law Publishers.

To find the latest online version of the California Code of Regulations (CCR) Title 4, Division 9, visit the California Office of Administration Law (OAL) at:

<http://ccr.oal.ca.gov/linkedslice/default.asp?SP=CCR-1000&Action=Welcome>

The CCR may also be accessed at <http://oal.ca.gov/> by clicking the "Publications" tab at the top of the OAL home page.

For information concerning the contents of this document, please contact the Division of Measurement Standards by e-mail at [dms@cdfa.ca.gov](mailto:dms@cdfa.ca.gov).

NIST Handbook 133 (2023 Edition) - Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices as adopted by the 107<sup>th</sup> National Conference on Weights and Measures in July 2023 is available at:

[www.nist.gov/pml/wmd/pubs/hb133.cfm](http://www.nist.gov/pml/wmd/pubs/hb133.cfm)

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**Chapter 11. Sampling and Testing Procedures for Determining the Net  
Contents of Packaged Commodities**

**Article 1. Definitions**

**§ 4600. National Uniformity.** Sampling and testing procedures for determining the net contents of packaged commodities shall conform to the latest requirements set forth in the National Institute of Standards and Technology Handbook 133, "Checking the Net Contents of Packaged Goods," which is herein incorporated by reference. Copies of Handbook 133 may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

Note: Authority cited: Sections 12027, 12211 and 12609, Business and Professions Code.  
Reference: Section 12211, Business and Professions Code.

(NOTE 1: Sections 4601 through 4626 have been REPEALED)

(NOTE 2: NIST Handbook 133 – Checking the Net Contents of Packaged Goods can be downloaded at:

<https://www.nist.gov/system/files/documents/2023/02/10/2023%20NIST%20Handbook%20133.pdf>

**Article 2. Sampling and Testing Procedures for  
Determining the Net Contents of Packaged Commodities**

**(Sections 4650 through 4657 have been REPEALED)**

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**2022 Amendments to the 2023 Edition of NIST Handbook-133**

The following table indicates the items amended by the 107<sup>th</sup> (2022) National Conference on Weights and Measures (NCWM). As appropriate, the text on the cited pages indicates the changes to a Handbook 133 section, or paragraph as “Added 2022” or “Amended 2022.” Unless otherwise noted, the effective date of the regulations added or amended in 2022 is January 1, 2023.

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Chapter 1. General Information	NET-19.1	1.2.4.1. Total Quantity MAV for Multiunit and Variety Packages	Added	8
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### 2022 Editorial Changes to the 2023 Edition of NIST Handbook-133

The following items were deemed editorial in nature based on the following criteria: 1) the modified text did not change the meaning or procedure outlined, 2) modified text corrected an omission or clarified how the text was written, or 3) the item itself was reformatted and relocated in the text to make the organization of the content more meaningful.

**Note:** For the purposes of this table, the **bold**, underscored text indicates new language added and **bold**, ~~strikeout~~ text indicates deleted text.

Chapter	Section	Action	HB-133 Page
Chapter 2. Test Procedures – Packages Labeled by Weight - Gravimetric Testing	Table 2-3 Notes	The notes were included within the content of the table as opposed to after the table.	27
Chapter 3. Test Procedures – For Packages Labeled by Volume	3.2. Gravimetric Test Procedure for Non-Viscous Liquids	Example content updated and format switched to a table layout.	47
Chapter 3. Test Procedures – For Packages Labeled by Volume	3.2. Gravimetric Test Procedure for Non-Viscous Liquids	<del>A p</del> <u>Partial</u> immersion thermometer (or equivalent) with <del>a range of – 35 °C to + 50 °C (30 °F to 120 °F), at least 1 °C (42 °F) graduations,</del> and <del>with a tolerance of – 35 °C to + 50 °C (– 30 °F to + 120 °F) accurate to ± 1 °C (± 2 °F).</del>	47
Chapter 3. Test Procedures – For Packages Labeled by Volume	Example for Determining Scale Suitability	Formatted and clarified example content in a table	49
Chapter 3. Test Procedures – For Packages Labeled by Volume	3.3. Volumetric Test Procedure for Non-Viscous Liquids	<del>A p</del> <u>Partial</u> immersion thermometer (or equivalent) with <del>a range of – 35 °C to + 50 °C (30 °F to 120 °F), at least 1 °C (42 °F) graduations,</del> and <del>with a tolerance of – 35 °C to + 50 °C (– 30 °F to + 120 °F) accurate to ± 1 °C (± 2 °F).</del>	52
Chapter 3. Test Procedures – For Packages Labeled by Volume	3.11.1. Test Equipment	<del>A p</del> <u>Partial</u> immersion thermometer (or equivalent) with <del>a range of – 35 °C to + 50 °C (30 °F to 120 °F), at least 1 °C (42 °F) graduations,</del> and <del>with a tolerance of – 35 °C to + 50 °C (– 30 °F to + 120 °F) accurate to ± 1 °C (± 2 °F).</del>	74
Chapter 3. Test Procedures – For	3.14.2.b. Stacked Firewood	Clarified calculation	92

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Packages Labeled by Volume		<p>Width of Stack. This dimension is calculated by averaging the length of individual pieces of wood in the stack <b><u>and multiplying it by the number of rows.</u></b></p> <p><b><u>Width of Stack = Average Piece Length (APL) x Number of Rows</u></b></p>	
Chapter 3. Test Procedures – For Packages Labeled by Volume	3.14.3. Field Audit Procedure – Bundled and Bagged Firewood	<p>After the bundle or bag is secured, use a flexible measuring tape to measure the circumference near each end of the bundle or bag of firewood <b><u>as shown in (see Figure 3-13a. “Strapping the Ends of a Bundle”).</u></b> Using one movement, extend the measuring tape around the end of the bundle or bag to obtain its circumference <b><u>(see Figure 3-13b. “Measuring the Circumference of the Bundle”).</u></b></p>	94
Chapter 3. Test Procedures – For Packages Labeled by Volume	4.8.1.2. Audit Test Procedure	<p><b>Note:</b> Graph paper of an appropriate size that allows for tracing of the entire chamois shall be used. However, if a single sheet of appropriate-sized graph paper is not available, it may be necessary to tape sheets of graph paper together to create an area sufficient in size to measure the area for a chamois (e.g., chamois greater than 23.22 dm<sup>2</sup> [2.5 ft<sup>2</sup>]).</p>	134
Chapter 3. Test Procedures – For Packages Labeled by Volume	4.8.2.2. Test Procedure	<p>6. Calculate the area of the rectangle cut from the pattern by multiplying the length by width and record as Area (A) in <b><u>square</u></b> centimeters or square inches.</p>	134
Appendix E. General Tables of Units of Measurement	Units of Capacity or Volume – Dry Volume Measure	<p>Correct the equivalent for dry pint <b><u>4.12 33.600 312 5</u></b> cubic inches”</p>	224
Appendix E. General Tables of Units of Measurement	General Tables of Units	<ul style="list-style-type: none"> <li>Information was expanded to fully describe the retirement of the U.S. survey foot, including three new tables that present U.S. survey unit conversion factors in terms of the International foot. Section 2 surveying</li> </ul>	197–225

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Chapter	Section	Action	HB-133 Page
		<p>length and area tables were reformatted to align with the U.S. survey foot retirement FRN.</p> <ul style="list-style-type: none"> <li>• Several NIST publications, Federal Register Notices, and federal statutes and code of regulations references were updated in the footnotes. Website URLs were verified and updated.</li> <li>• Unit symbols and abbreviations were added to the “starting units” column to improve usability.</li> <li>• Removed the ångström unit to align with the latest edition of the BIPM SI Brochure and NIST SP 330, as it was eliminated in 2019.</li> <li>• Added footnote guidance for users to consult federal/state laws and regulations and industry documentary standards to confirm the barrel quantity used for a specific application.</li> </ul>	
Appendix G. Table of Acronyms		Added	251



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## Introduction

### A. Source.

The information and procedures in this handbook comprise all of those adopted by the National Conference on Weights and Measures, Inc. (NCWM). Contact NCWM at:

135 M Street, Suite 100  
Lincoln, NE 68508  
Phone: (402) 434-4880  
E-mail: [info@ncwm.com](mailto:info@ncwm.com)  
Fax: (402) 434-4878  
URL: [www.ncwm.com](http://www.ncwm.com)

The NCWM is supported by the National Institute of Standards and Technology (NIST), which provides its Executive Secretary and publishes its documents. NIST also develops technical publications for use by weights and measures agencies; these publications may subsequently be endorsed or adopted by the NCWM or its members.

This handbook is recommended by NCWM for adoption by states when reviewing or amending their official laws and regulations on testing the net contents of packaged goods. A similar recommendation is made with regard to the local jurisdictions within a state in the absence of the promulgation of such laws and regulations at the state level.  
(Amended 2019)

### B. Purpose.

This handbook has been prepared as a procedural guide for the compliance testing of net content statements on packaged goods. Compliance testing of packaged goods is the determination of the conformance of the results of the packaging, distribution, and retailing process (the packages) to specific legal requirements for net content declarations. This handbook has been developed primarily for the use of government officials. However, commercial and industrial establishments packaging, distributing, and selling commodities will find this handbook useful.

In conducting compliance testing, the conversion of quantity values from one measurement system to another (e.g., from the metric system to the U.S. customary system) should be handled with careful regard to the implied correspondence between the accuracy of the data and the number of digits displayed. In all conversions, the number of significant digits retained should ensure that accuracy is neither sacrificed nor exaggerated. For this 2020 edition of NIST Handbook 133, "Checking the Net Content of Packaged Goods" all dimensions for test procedures, devices, or environments have been rounded to two significant digits (e.g., 2.5 cm to 1.0 in) or to a precision level applicable to the test equipment (e.g., 200 kPa for 25 psi and 35 MPa for 5000 psi).

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**C. Amendments**

Amendments to NIST Handbook 133 are deliberated and developed by NCWM's Committee on Laws and Regulations before presentation to the general membership for a vote. In some instances, amendments that significantly affect other NIST Handbooks may be processed jointly by two or more committees.

Amendments to the handbooks are made in accordance with NCWM procedures and policies. The process begins at the regional weights and measures association meetings in the fall of each year and is culminated at the NCWM Annual Meeting in July. After passing through one or more of the regional associations, the proposed amendment is placed on the agenda of the appropriate NCWM committee for consideration at the NCWM's Interim Meeting in January. After final deliberation and development by the committee, the amendment may be presented to the membership for a vote at the NCWM Annual Meeting in July. The NCWM policy provides for exceptions to the process to accommodate urgent or priority items. NIST staff provides technical assistance and advice throughout the process.

The policy is available on the NCWM website at [www.ncwm.com](http://www.ncwm.com). For information on the regional weights and measures associations, visit [www.ncwm.com/other-links](http://www.ncwm.com/other-links).

**D. Revisions to the Handbook**

NIST publishes a new edition of this handbook after significant changes are made. If NIST determines that amendments made by NCWM were minor or editorial in nature an annual publication will not be published. Instead, NIST will issue a notice that the current edition is still valid and will publish a list of the changes on the NIST website.

**E. Annotation**

Beginning in 1971, amendments or additions to sections in the handbook are annotated at the end of each section (e.g., "Amended 1982") as a service to those states that are planning to update their own laws or regulations. The references to each revision and the year will enable government officials and industry members to trace the rationale for the changes by referring to the "Report of the XXX National Conference on Weights and Measures (also known as the NCWM Annual Report) for the year indicated and make decisions regarding adoptions and amendments to their laws and regulations.

**F. Effective Enforcement Dates of Regulations**

Unless otherwise specified, new or amended sections are intended to become effective and subject to enforcement on January 1 of the year following adoption by NCWM.

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**G. Section References**

In most references made to specific sections or subsections in this handbook, the word “Section” followed by the section number is used.

**H. The International System of Units**

The “International System of Units,” “SI,” or “SI Units” means the modernized metric system as established in 1960 by the General Conference on Weights and Measures (CGPM). In 1988, Congress amended the Metric Conversion Act of 1975 (see Section 5164 of Public Law 100-418) to declare that it is the policy of the United States to designate the metric system of measurement as the preferred measurement system for U.S. trade and commerce, and it further defined “the metric system of measurement” to be the International System as established by the CGPM and as interpreted or modified for the United States by the Secretary of Commerce. (see Metric Conversion Law 15 U.S.C. 205; NIST Special Publication (SP) 330, “The International System of Units (SI); NIST SP 814, “Guide for the Use of the International System of Units (SI); Interpretation of the International System of Units [the Metric System of Measurement] for the United States in the “Federal Register” of May 16, 2008, [“Federal Register” Vol. 73, No. 96] or subsequent revisions). In 1992, Congress amended the Federal Fair Packaging and Labeling Act (FPLA) to require certain consumer commodities to include the appropriate SI units along with the customary inch-pound units in their quantity statements.

(Amended 2019)

**I. “Mass” and “Weight.” [NOTE 1, page 9]**

The mass of an object is a measure of the object’s inertial property or the amount of matter it contains. The weight of an object is a measure of the force exerted on the object by gravity or the force needed to support it. The pull of gravity on the earth gives an object a downward acceleration of about  $9.8 \text{ m/s}^2$ . In trade and commerce and everyday use, the term “weight” is often used as a synonym for “mass.” The “net mass” or “net weight” declared on a label indicates that the package contains a specific amount of commodity exclusive of wrapping materials. The use of the term “mass” is predominant throughout the world and is becoming increasingly common in the United States.

**J. Use of the Terms “Mass” and “Weight.” [NOTE 1, page 9]**

When used in this handbook, the term “weight” means “mass.” The term “weight” appears when U.S. customary units are cited or when both inch-pound and SI units are included in a requirement. The terms “mass” or “masses” are used when only SI units are cited in a requirement. The following note appears where the term “weight” is first used in a law or regulation.

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**NOTE 1:** *When used in this law (or regulation), the term “weight” means “mass.” (see paragraphs I. “Mass” and Weight and J. Use of the Terms “Mass” and “Weight” in the Introduction section of NIST Handbook 133 for an explanation of these terms.)*  
(Introduction added 2015)