Chapter 1. General Information

1.1. Scope

The procedures in this handbook are recommended for use to verify the net quantity of contents of packages kept, offered, or exposed for sale, or sold by weight, measure (including volume, and dimensions), or count at any location (e.g., at the point-of-pack, in storage warehouses, retail stores, and wholesale outlets).

1.1.1. When and Where to Use Package Checking Procedures

An effective program will typically include testing at each of the following levels.

a. Point-of-Pack

Testing packages at the "point-of-pack" has an immediate impact on the packaging process. Usually, a large number of packages of a single product are available for testing at one place. This allows the inspector to verify that the packer is following current good packaging practices. Inspection at the point-of-pack also provides the opportunity to educate the packer about the legal requirements that products must meet, and may permit resolution of any net content issues or other problems that arise during the testing. Point-of-pack testing is not always possible because packing locations can be in other states or countries. Work with other state, county, and city jurisdictions to encourage point-of-pack inspection on products manufactured in their geographic jurisdictions. Point-of-pack inspections cannot entirely replace testing at wholesale or retail outlets, because this type of inspection does not include imported products or the possible effects of product distribution and moisture loss. Point-of-pack inspections only examine the manufacturing process. Therefore, an effective testing program will also include testing at wholesale and retail outlets.

b. Wholesale

Testing packages at a distribution warehouse is an alternative to testing at the point-of-pack with respect to being able to test large quantities of, and a variety of products. Wholesale testing is a very good way to monitor products imported from other countries and to follow up on products suspected of being under filled or underweight based on consumer complaints or findings made during other inspections, including those done at retail outlets.

c. Retail

Testing packages at retail outlets evaluates the soundness of the manufacturing, distributing, and retailing processes of the widest variety of goods at a single location. It is acceptable and practical for weights and measures jurisdictions to monitor packaging procedures and to detect present or potential problems. Generally, retail package testing is not conducive to checking large quantities of individual products of any single production lot. Therefore, follow-up inspections of a particular brand or lot code number at a number of retail and wholesale outlets, and ultimately at the point-of-pack are extremely important aspects in any package-checking scheme. After the evaluation of an inspection lot is completed, the jurisdiction should consider what, if any, further investigation or follow-up is warranted. At the point-of-sale, a large number of processes may affect the quality or quantity of the product. Therefore, there may be many reasons for any inspection lot being out of compliance. A shortage in weight or measure may result from mishandling the product in the

store or the retailer's failure to rotate stock. Shortages may also be caused through mishandling by a distributor or failure of some part of the packaging process. Shortages may also be caused by moisture loss (desiccation) if the product is packaged in permeable media. Therefore, being able to determine the cause of an error in order to correct defects is more difficult when retail testing is used.

(Amended 2010)

1.1.2. Selecting a Product for Testing

Any commodity sold by weight, measure, or count may be tested. The product to be tested may be chosen in several ways. The decision may be based on different factors, such as (1) marketplace surveys (e.g., jurisdiction-wide surveys of all soft drinks or breads), (2) surveys based on sales volume, or (3) audit testing (see Section 1.3. "Sampling Plans") to cover as large a product variety as possible at food, farm, drug, hardware stores, or specialty outlets, discount and department stores. Follow-up of possible problems detected in audit testing or in review of past performance tends to concentrate inspection resources on particular commodity types, brand names, retail or wholesale locations, or even particular neighborhoods. The expected benefits for the public must be balanced against the cost of testing. Expensive products should be tested because of their cost per unit. However, inexpensive items should also be tested because the overall cost to individual purchasers may be considerable over an extended period of time. Store packaged items, which are usually perishable and not subject to other official monitoring, should be routinely tested because they are offered for sale where they are packed. Products on sale and special products produced for local consumption should not be overlooked because these items sell quickly in large amounts.

Regardless of where the test occurs, remember that it is the inspector's presence in the marketplace through routine unannounced testing that ensures equity and fair competition in the manufacturing and distribution process. Finally, always follow-up on testing to ensure that the problems are corrected; otherwise, the initial testing may be ineffective.

1.2. Package Requirements

The net quantity of content statement must be "accurate," but reasonable variations are permitted. Variations in package contents may be a result of deviations in filling. The limits for acceptable variations are based on current good manufacturing practices in the weighing, measuring, and packaging process. The first requirement is that accuracy is applied to the average net contents of the packages in the lot. The second requirement is applied to negative errors in individual packages. These requirements apply simultaneously to the inspection of all lots of packages except as specified in Section 1.2.5. "Exceptions to the Average and Individual 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 inspection lot will pass or fail as a whole based on the results of tests on a sample drawn from the lot in accordance with Section 1.3. "Sampling Plans" and Section 2.3.4. "Random Sample Selection." 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.
(Amended 2017)

1.2.2. Average Requirement

In general, the average net quantity of contents of packages in a lot must at least equal the net quantity of contents declared on the label. Plus or minus variations from the declared net weight, measure, or count are permitted when they are caused by unavoidable variations in weighing, measuring, or counting the contents of individual packages that occur in current good manufacturing practice. Such variations must not be permitted to the extent that the average of the quantities in the packages of a particular commodity or a lot of the commodity that is kept, offered, exposed for sale, or sold, is below the stated quantity. (See Section 3.6. "Pressed and Blown Glass Tumblers and Stemware" and Section 4.2.1. "Packages Labeled with 50 Items or Fewer" for exceptions to this requirement.)

(Refer to Section 1.4.1. Net Quantity of Contents Requirements for Pesticides Labeled with Minimum Net Quantity of Contents Declarations.)
(Amended 2018)

1.2.3. Individual Package Requirement

The variation of individual package contents from the labeled quantity must not be "unreasonably large." In this handbook, packages that are under filled by more than the Maximum Allowable Variation (MAV) specified for the package are considered unreasonable errors. Unreasonable shortages are not generally permitted, even when overages in other packages in the same lot, shipment, or delivery compensate for such shortage. This handbook does not specify limits of overfilling (with the exception of textiles), which is usually controlled by the packer for economic, compliance, and other reasons.
(Amended 2010)

1.2.4. Maximum Allowable Variation

The limit of the "reasonable minus variation" for an under filled package is called a "Maximum Allowable Variation" (MAV). An MAV is a deviation from the labeled weight, measure, or count of an individual package beyond which the deficiency is considered an unreasonable minus error. Each sampling plan limits the number of negative package errors permitted to be greater than the MAV.
(Amended 2010)

1.2.5. Exceptions to the Average and Individual Package Requirements

There is an exemption from the average requirement for packages labeled by count with 50 items or fewer. The reason for this exemption is that the package count does not follow a "normal" distribution even if the package is designed to hold the maximum count indicated by the label declaration (e.g., egg cartons and packages of chewing gum). Another exception permits an "allowable difference" in the capacity of glass tumblers and stemware because mold capacity doesn't follow a normal distribution.

1.2.6. Deviations Caused by Moisture Loss or Gain

Deviations from the net quantity of contents caused by the loss or gain of moisture from the package are permitted when they are caused by ordinary and customary exposure to conditions that normally occur in good distribution practice and that unavoidably result in change of weight or measure. According to

regulations adopted by the U.S. Environmental Protection Agency, no moisture loss is recognized on pesticides. (See Code of Federal Regulations 40 CFR 156.10.)

1.2.6.1. Applying a Moisture Allowance

Some packaged products may lose or gain moisture and, therefore, lose or gain weight or volume after packaging. The amount of moisture loss depends upon the nature of the product, the packaging material, the length of time it is in distribution, environmental conditions, and other factors. Moisture loss may occur even when manufacturers follow good distribution practices. Loss of weight "due to exposure" may include solvent evaporation, not just loss of water. For loss or gain of moisture, the moisture allowances may be applied before or after the package errors are determined.

To apply an allowance before determining package errors, adjust the Nominal Gross Weight (see Section 2.3.6. "Determine Nominal Gross Weight and Package Errors"), so the package errors are increased by an amount equal to the moisture allowance. This approach is used to account for moisture loss in both the average and individual package errors.

It is also permissible to apply the moisture allowances after individual package errors and average errors are determined.

Example:
A sample of a product that could be subject to moisture loss might fail because the average error is minus or the error in several of the sample packages are found to be unreasonable errors (i.e., the package error is greater than the Maximum Allowable Variation (MAV) permitted for the package's labeled quantity).

You may apply a moisture allowance after determining the package errors by adding the allowance to the Sample Error Limit (SEL) and then, comparing the average error to the SEL to determine compliance. The moisture allowance must be added to the MAV before evaluating sample errors to identify unreasonable minus errors**.**

(Amended 2010)

This handbook provides "moisture allowances" for some meat and poultry products, flour, pasta, and dry pet food. (See Chapter 2, Table 2-3. "Moisture Allowances") These allowances are based on the premise that when the average net weight of a sample is found to be less than the labeled weight, but not by an amount that exceeds the allowable limit, either the lot is declared to be within the moisture allowance or more information must be collected before deciding lot compliance or noncompliance.

Test procedures for flour, some meat, and poultry are based on the concept of a "moisture allowance" also known as a "gray area" or "no decision" area (see Section 2.3.8. "Moisture Allowances"). When the average net weight of a sample is found to be less than the labeled weight, but not more than the boundary of the "gray area," the lot is said to be in the "gray" or "no decision" area. The gray area is not a tolerance. More information must be collected before lot compliance or noncompliance can be decided. Appropriate enforcement should be taken on packages found short weight and outside of the "moisture allowance" or "gray area."

(Amended 2002)

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 of the package they purchase. 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.

1.4. Other Regulatory Agencies Responsible for Package Regulations and Applicable Requirements

In the United States, several federal agencies issue regulations regarding package labeling and net contents. The U.S. Department of Agriculture (USDA) regulates meat and poultry. The Food and Drug Administration (FDA) regulates food, drugs, cosmetic products, tobacco, and medical devices under the Food, Drug, and Cosmetic Act (FDCA) and the Fair Packaging and Labeling Act (FPLA). The Federal Trade Commission

(FTC) regulates most non-food consumer packaged products as part of the agency's responsibility under the FPLA. The Environmental Protection Agency (EPA) regulates pesticides. The Bureau of Alcohol and Tobacco Tax and Trade Bureau (TTB) in the U.S. Department of the Treasury promulgates regulations for beer, wine, and distilled spirits as part of its responsibility under the Federal Alcohol Administration Act.

Packaged goods produced for distribution and sale also come under the jurisdiction of state and local weights and measures agencies that adopt their own legal requirements for packaged goods. Federal statutes set requirements that pre-empt state and local regulations that are or may be less stringent or not identical to federal regulation depending on the federal law that authorizes the federal regulation. The application of Handbook 133 procedures occurs in the context of the concurrent jurisdiction among federal, state, and local authorities. Therefore, all agencies using this handbook should keep abreast of the revisions to federal agency regulations that may contain sampling or testing information not in the regulations at the time of publication of this handbook. (See Appendix A, Table 1-1. "Agencies Responsible for Package Regulations and Applicable Requirements" for information on the responsible agencies for package regulations. The requirements of this handbook must be used when testing products concurrently subject to federal regulations.)

1.4.1. Net Quantity of Contents Requirements for Pesticides Labeled with Minimum Net Quantity of Contents Declarations

The Environmental Protection Agency (EPA) permits packers of pesticides the option of declaring the net quantity of contents using either the average or the minimum package fill systems. If the manufacturer uses the minimum system, the term "minimum" must appear adjacent to the quantity declaration. If the packer uses the average system, the procedures in Section 2.3.7. "Evaluate for Compliance" are used to determine compliance. Use the procedures in Section 2.3. "Basic Test Procedure for Gravimetric Testing of Net Weight" to select and test a sample and use the following compliance procedure to determine if the sample passes or fails the minimum package fill requirements.

Compliance Requirements for Packaged Pesticides (e.g., antimicrobial wipes, insect repellent wipes, towelettes, liquid or dry products)

1. The net weight or measure of quantity shall be exclusive of wrappers or other materials and shall be the average quantity unless there is an explicit statement on the Principal Display Panel (PDP) in conjunction with the quantity declaration that the package was filled under the minimum system of fill [e.g., minimum weight 500 g (1 lb 1 oz).]

2. A Maximum Allowable Variation (MAV) is not applied.

3. Variation above minimum content is permissible only to the extent that it represents deviation unavoidable in good manufacturing practice.

4. Variation below the declared minimum quantity is NOT permitted.

5. Compliance Procedure and Requirements**:**

    a. After the samples are tested, the individual package errors are determined. The average error is not calculated.

    b. Review the individual package errors:

        - If a minus package error is found, the sample fails.

- If no minus package errors are found, the sample passes (e.g., the errors are 0 or plus)

(Added 2018)

1.5. Assistance in Testing Operations

If the storage, display, or location of any lot of packages requires special equipment or an abnormal amount of labor for inspection, the owner or the operator of the business must supply the equipment and/or labor as required by the weights and measures official.

1.6. Health and Safety

This handbook cannot address all of the health and safety issues associated with its use. The inspector is responsible for determining the appropriate safety and health practices and procedures before starting an inspection (e.g., contact the establishment's health and safety official). Comply with all handling, health, and safety warnings on package labels and those contained in any associated Safety Data Sheets (SDS). The inspector must also comply with federal, state, and local health and safety laws, and other appropriate requirements in effect at the time and location of the inspection. Contact your supervisor to obtain information regarding your agency's health and safety policies and to obtain appropriate safety equipment.

1.7. Good Measurement Practices

The procedures in this handbook are designed to be technically sound and represent good measurement practices. To assist in documenting tests, we have included "model" inspection report forms designed to record the information.

1.7.1. Traceability Requirements for Measurement Standards and Test Equipment

Each test procedure presented in this handbook includes a list of the equipment needed to perform the inspection. The scales and other measurement standards used (e.g., balances, mass standards, volumetric, and linear measures) to conduct any test must be traceable to the International System of Units (SI), usually through the National Institute of Standards and Technology (NIST). Standards must be used in the manner for which they were designed and calibrated.

1.7.2. Certification Requirements for Standards and Test Equipment

All measurement standards and test equipment identified in this handbook or associated with the test procedures must be calibrated or standardized before initial use. This must be done according to the calibration procedures and other instructions found on NIST's Laboratory Metrology and Calibration Procedures website at **www.nist.gov/pml/weights-and-measures/laboratory-metrology/calibration-procedures** or using other recognized procedures (e.g., those adopted for use by a state weights and measures laboratory). After initial certification, the standards must be routinely recertified according to your agency's measurement assurance policies.

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