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August 14, 2025

VIA ELECTRONIC SUBMISSION
Mr. Don Onwiler, CAE
Executive Director
National Council on Weights & Measures
9011 South 83rd Street
Lincoln, NE 68516

Re: Form 15 Submission - Proposal to Amend NIST Handbook 133

Dear Mr. Onwiler:

This firm serves as government and regulatory affairs counsel to the New Jersey Food Council ("NJFC"), which is the trade association representing the food retail and distribution industry in New Jersey. On behalf of the NJFC, we respectfully submit this proposal to amend the National Institute of Standards and Technology ("NIST") Handbook 133 at Chapter 2, Section 2.3.8.1. This request is made jointly with the separate submission to amend NIST Handbook 130 at Article IV, Chapter B, Section 1.12.1 and Article VI, Section 2.3.2, concerning the sale of produce by count.

The revisions to Handbook 133 being presented for consideration reflect modern supply chains and sales practices as it concerns fresh produce. Retailers in New Jersey for instance, have recognized a noticeable increase in fines and penalties for selling "short-weight" produce, which appears attributable to the normal loss of moisture and not the incidental or purposeful under-packing of containers. Scientific research, as well as NIST's own findings, demonstrate that moisture loss is a variable which must be accounted for in the weights and measures inspection process. Moreover, the way produce is sold to consumers today is much different than it was just 20 years ago. The global sourcing of fruits and vegetables allows for a multitude of produce to be sold at all times of the year. A global supply chain also brings different methods of packing products to preserve their freshness in an effort to combat the naturally occurring processes, like moisture loss, which begins after produce is harvested.

While several products such as meat, poultry, flour, pasta and even cannabis are provided a "moisture allowance," produce is not. It is therefore requested that Handbook 133 at Chapter 2, Section 2.3.8.1. be amended to provide a moisture allowance for produce at six (6) percent, which reflects the high water content of fruits and vegetables.

Proposal to Amend Handbook 133 to Address the Naturally Occurring Loss of Moisture in Fresh Produce

Under the Fair Packaging and Labeling Act ("FPLA"), 15 U.S.C. § 1451 et seq., and implementing standards in NIST Handbook 133, commodities sold by weight must meet their labeled net quantity at the time of sale, subject to allowable variations. *See* 15 U.S.C. § 1453. NIST Handbook 133 has been voluntarily adopted by many jurisdictions, including New Jersey, as a model for packaging and labeling standards. One allowable variation is for moisture loss, and NIST specifically permits a moisture allowance for certain products. Moisture loss is a scientifically recognized, inevitable process during storage and distribution of produce due to its perishable and hydrophilic nature. Failing to account for this natural variability imposes an unfair compliance burden on industry and does not reflect the true intent of fair packaging and labeling practices.

Fruits and vegetables are known for being great sources of hydration because they consist mostly of water. The Food Studies Institute has identified the water content of fruits and vegetables, with the most commonly eaten produce consisting of at least 80 percent water.[1] A recent article in the *Journal of Agriculture and Food Research*, a peer-reviewed open access scientific journal focusing on agriculture and food sciences explains that postharvest water loss is a natural process "due to changes in water vapor pressure between the fruit and its surroundings, leading to alterations in textural properties and osmotic pressure."[2] Managing postharvest water loss is extremely complex because the rate of loss varies between products, and even amongst the same type of produce due to varietal differences. An experiment with different squash cultivars stored under identical conditions found variations in moisture loss.[3] Depending upon the type of product, the moisture loss can be significant, with one experiment showing that blueberries can have a 14 percent moisture loss during storage.[4]

Previous studies that appeared in the *Journal of the Science of Food and Agriculture* have also shown that leafy greens, berries, stone fruits and cucumbers, are especially susceptible to transpirational water loss, even under refrigerated conditions.[5] Moisture loss rates may be influenced by humidity and temperature fluctuations in transport and retail environments, duration

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[1] "Water Content of Fruits and Vegetables," FOOD STUDIES INSTITUTE, (available at https://foodstudies.org/wp-content/uploads/2024/01/Water-Content-in-Fruits-Vegetables.pdf).

[2] M.J. Gidado, et. al, Challenges of postharvest water loss in fruits: Mechanisms, influencing factors and effective control strategies – A comprehensive review, JOURNAL OF AGRICULTURE AND FOOD RESEARCH, Vol. 17, September 2024, at 1.

[3] *Id.* at 2.

[4] *Ibid.*

[5] Juan C. Diaz-Perez, et al, "Fruit Size and state of ripeness affect postharvest water loss in bell pepper fruit (*Capsicum annuum L.*), JOURNAL OF THE SCIENCE OF FOOD AND AGRICULTURE, October 9, 2006 (available at https://scijournals.onlinelibrary.wiley.com/doi/10.1002/jsfa.2672).

of storage and shelf time before purchase, and surface area to volume ratios of specific produce types.[6] Mandating strict net weight compliance for products that contain high amounts of water and inevitably lose that moisture after packaging may mislead regulators into interpreting natural weight fluctuations as a deceptive practice.

NIST provides a moisture allowance for products such as dried pasta, flour, pet food, meat and poultry, and even cannabis. *See* NIST Handbook 133, Chapter 2, Section 2.3.8.1. (2025). The 2025 NIST Handbook 133 at Chapter 1, Section 1.2.6. states that "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*** (emphasis added)." NIST goes on to explain that "moisture loss may occur even when manufacturers ***follow good distribution practices***" and that "when no predetermined allowance is found in NIST Handbook 133, the ***potential for moisture loss must be considered***. *Id.* at Sections 1.2.6.1, 2.3.8 (emphasis added). This logic must be applied to fresh produce, especially when the packaging in which the produce is enclosed is breathable and allows transpiration.

Table 2-3.
Moisture Allowances

Verifying the labeled net weight of packages of:	Moisture Allowance is:	Notes
Flour	3 %	
Dry pet food	3 %	Dry pet food means all extruded dog and cat foods and baked treats packaged in Kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at time of pack.
Pasta products	3 %	Pasta products means all macaroni, noodle, and like products packaged in kraft paper bags, paperboard cartons, and/or flexible plastic bags with a moisture content of 13 % or less at the time of pack.
Borax	see Section 2.4. Borax	
Cannabis	3 %	*Cannabis* means plant material only, and not products containing *Cannabis*, whether containing more than 0.3 % Total Delta-9 THC (also known as cannabis, Marijuana, or Marihuana) or containing 0.3 % or less Total Delta-9 THC (also known as Hemp).
Fruits	6 %	Fruits mean the mature or ripened reproductive structures (ovary of a flower) formed by plants that enclose seeds and help with their dispersal. Fruits shall include: a) "small

[6] *Id*. at 1-2.

		fruits" which includes, but is not limited to, cherries, currants, and cherry tomatoes; and b) "berries," which includes all fruit whose names end in the term "berry", except when offered for sale and sold by the box, basket or other standard dry-measure receptacle.
Vegetables	6 %	Vegetables means any part of a plant including: (a) edible underground parts, such as roots, tubers, and bulbs; (b) edible above ground parts, such as stems, leaves, and flowers; and (c) edible fruits and seeds, such as usually unripe fruits and seeds.

The members of the NJFC have been faced with increased violations for produce items being deemed short-weight, which appears to be attributable to moisture loss and not deceptive practices. An example of one such violation is attached at Exhibit A, where the retailer faced a fine of several hundred dollars for produce items which exceeded the maximum allowable variation by an average of 3.8 percent.[7] The NJFC, on behalf of its members and through its counsel, therefore requests that NIST amend Chapter 2, Section 2.3.8.1. of NIST Handbook 133 and more specifically, Table 2-3 Moisture Allowances, to add "fruits" and "vegetables," assigning a moisture allowance of six (6) percent, to reflect the high concentration of water in these products. As amended, with NJFC's proposed changes underlined, Table 2-3. Moisture Allowances would read as follows:[8]

Accounting for moisture loss is important since consumers expect to find all kinds of produce in their local supermarket, regardless of the time of year. Fruits and vegetables that are not regionally in-season must therefore come through a complex supply chain where the product is picked, packaged, shipped, delivered, and then placed on the shelf for sale. Domestic production from California is a major source of produce, which will travel over 2,500 miles to get to New Jersey retailers. In fact, the produce in the aforementioned short-weight example came from California.

The U.S. Department of Agriculture ("USDA") has also reported that the amount of imported fruits and vegetables has dramatically increased. From 2007 to 2023, the last full year of data available, the USDA noted that

> the percent of U.S. fresh fruit and vegetable availability supplied by imports grew from 50 percent to 59 percent for fresh fruit and from 20 percent to 35 percent for fresh vegetables (excluding potatoes,

[7] Identifying information of the retailer, distributor, and the weights and measures officer have been redacted for their privacy.

[8] The relevant pages of NIST Handbook 133 with the proposed revisions are also attached at Exhibit B.

> sweet potatoes, and mushrooms). The import share increased by more than 20 percentage points during this period for 10 crops: asparagus, avocados, bell peppers, blueberries, broccoli, cauliflower, cucumbers, raspberries, snap beans, and tomatoes.[9]

Even products that are locally sourced when in-season are subject to the natural loss of moisture under the best of conditions. Yet, when these products are sold, there is no consideration given to the fact that produce is a living organism which after being harvested begins to rapidly lose water volume.

It would therefore be wholly appropriate for NIST to amend Handbook 133 as described herein to provide a moisture allowance for fresh produce.

Conclusion

For the reasons outlined above, the NJFC and its members respectfully request that amendments be made to NIST Handbook 133 at Chapter 2, Section 2.3.8.1. This request is made jointly with the separate submission to amend NIST Handbook 130 at Article IV, Chapter B, Section 1.12.1 and Article VI, Section 2.3.2, both of which address the sale of produce by count. These proposed revisions, in their totality, will harmonize policy with the realities of produce sales and industry practice, while continuing the consumer protections sought by this body.

Thank you for your consideration. We welcome the opportunity to discuss these proposed amendments further.

Sincerely,

Michael D. DeLoreto
Director

MDD:ach

Attachments

cc: Linda Doherty, President, New Jersey Food Council
Mary Ellen Peppard, Vice President, New Jersey Food Council

[9] Steven Zahniser, "U.S. fresh fruit and vegetable supplies continue to rely on imports," U.S. DEPARTMENT OF AGRICULTURE ECONOMIC RESEARCH SERVICE, Jan. 16, 2025 (available at https://www.ers.usda.gov/data-products/charts-of-note/chart-detail?chartId=110713).

Exhibit A

Complaint - Summons

Department of Law and Public Safety
Division of Consumer Affairs
Office of Weights and Measures

WMA | 2024 |

☐ MUNICIPAL COURT

☐ Superior Court, Special Civil Part of _____ County, NJ

Count/Page _____ Of _____

The State of New Jersey vs.

Defendant

Address | City

State NJ | ZIP Code | Telephone | WM License Number / WM Registration Number

STATE OF NEW JERSEY
COUNTY OF _____ } ss:

Complaining Witness: _____
Name

COMPLAINT

a State Weights and Measures Law Enforcement Officer of the State Office of Weights and Measures, 1261 Routes 1 & 9 South, Avenel, New Jersey 07001, (732) 621-2093, by certification or on oath, says to the best of his/her knowledge or information and belief, the named defendant, on or

about 12/1/2024 (Month Day Year), in _____, County of _____, State of New Jersey

did commit the following violation:

EXPOSED FOR SALE AT _____ PACKAGE(S) OF _____ BRAND MANDARINS NOT WHICH EXCEEDED THE MAXIMUM ALLOWABLE VARIATIONS FROM THE DECLARED QUANTITIES OF CONTENTS.

350
33
383.

in violation of (one charge only) N.J.A.C. 13:47K-5.2.5
Statute or Regulation

OATH: Subscribed and sworn to before me

this _____ day of _____, yr. _____

_____
Signature of Complaining Witness

OR

_____
Signature of Person Administering Oath

CERTIFICATION: I certify that the foregoing statements made by me are true. I am aware that if any of the foregoing statements made by me are wilfully false, I am subject to punishment.

1/22/25
Date

_____
Signature of Complaining Witness

COMPLAINT

SUMMONS

PROBABLE CAUSE DETERMINATION FOR ISSUANCE OF PROCESS:

COURT USE ONLY

Probable cause is found for the issuance of this Complaint-Summons

☐ Yes ☐ No _____
Signature of Judicial Officer

☐ Yes ☐ No _____
Signature of Judge

LAW/CODE ENFORCEMENT USE ONLY

☒ The complaining witness is a law enforcement officer or a code enforcement officer with territorial and subject matter jurisdiction and a judicial probable cause determination is not required prior to the issuance of this Complaint - Summons

YOU ARE HEREBY SUMMONED TO APPEAR

BEFORE THIS COURT TO ANSWER THIS COMPLAINT. IF YOU FAIL TO APPEAR ON THE DATE AND AT THE TIME STATED, A WARRANT MAY BE ISSUED FOR YOUR ARREST.

NOTICE TO APPEAR

☒ COURT APPEARANCE REQUIRED	COURT DATE	Month	Day	Year	Time	AM / PM
		02	19	25	10	AM

1/22/25
Date Summons Issued

_____
Signature of Person Issuing Summons

SUMMONS

PLEASE READ CAREFULLY

1. PLEA OF NOT GUILTY

If you intend to plead not guilty to the violation in this Complaint - Summons and have a trial in court, you must notify the Municipal Court Administrator, whose address and telephone number are shown below, of your intention at least 7 days prior to the court date shown on the reverse side. If you fail to notify the Court Administrator of your intention, it may be necessary for you to make 2 court appearances.

2. COURT APPEARANCE REQUIRED

If "Court Appearance Required" is checked on the bottom of the reverse side, you must appear in court at the time and place indicated, even if you wish to plead guilty. If "Court Appearance Required" is not checked, you must still appear in court if: a. you wish to have a trial; or b. the charge is not listed on the State or Local (Supplemental) Violations Bureau Schedule.

3. PLEA OF GUILTY: PAYMENT THROUGH VIOLATIONS BUREAU

If you wish to plead guilty and give up your rights to have a lawyer and a trial, you may do so provided "Court Appearance Required" has not been checked on the reverse side and provided the charge is listed on the State Violations Bureau Schedule. You may telephone the Violations Clerk to determine whether it is listed on the Schedule and the amount of the penalty. If it is permissible for you to plead guilty without a court appearance, you may do so by paying the indicated amount and by completing in full the APPEARANCE, GUILTY PLEA AND WAIVER section (below) and by bringing or mailing this Complaint-Summons, together with payment in the amount of the prescribed penalty, to the Violations Bureau at the address indicated below prior to the court date listed on the reverse side.

Fines $250.00
Court Costs 33.00
Total $283.00

ADDRESS: [redacted]

TELEPHONE [redacted] OFFICE HOURS: _____

If payment is made by mail, do not send cash, but send check or money order payable to this Municipal Court. Please write the Complaint-Summons number on the face of the check or money order. If payment is received by the Violations Bureau after your court date, you may be assessed additional penalties. A receipt will be sent to you only if your payment is accompanied by a self-addressed stamped envelope.

APPEARANCE, GUILTY PLEA AND WAIVER

By signing and dating this document, I enter my appearance before the Court to answer the charges contained in this Complaint-Summons. I give up my rights to have a lawyer and a trial. I admit that I committed the violation charged, plead guilty and make payment of the prescribed penalty.

_____ _____

Defendant's Signature Date

NOTICE

IF YOU FAIL TO APPEAR IN RESPONSE TO THIS SUMMONS OR TO PAY THE PRESCRIBED PENALTY, ADDITIONAL PENALTIES MAY RESULT, A WARRANT MAY BE ISSUED FOR YOUR ARREST AND YOUR DRIVING PRIVILEGE IN NEW JERSEY MAY BE REVOKED.

PLEASE NOTIFY COURT OF DISABILITY ACCOMODATION NEEDS.

Package Checking Detail

Insp Date: 11/1/2024 **Business ID:**
Business:

NJ

Inspection:
Registration #:
Phone:
Inspector:
Reason: 01. Routine

Commodity: Mandarins
Brand:
Units: ounce
Cost: $0.06/ounce
Pkg Type: Std
Distributor:

CA Fax:

Commodity Class: Produce
Lot Code: 021130193455
Lot Size: 5
Avg Tare: 0.320
Insp Cat/MAV: S/Normal

Test	Gross Wt	Tare	Net Wt	Labeled Wt	Error	MAV	Cost Err	% Err
1	46.080	0.320	45.760	48.000	-2.240	1.504*	($0.14)	-4.7%
2	46.480	0.320	46.160	48.000	-1.840	1.504*	($0.11)	-3.8%
3	46.480		46.160	48.000	-1.840	1.504*	($0.11)	-3.8%
4	46.800		46.480	48.000	-1.520	1.504*	($0.09)	-3.2%
5	46.480		46.160	48.000	-1.840	1.504*	($0.11)	-3.8%

 # MAV Failures: 5

Notes:

Inspector

Acknowledged Receipt:

Exhibit B

3. If the average error is a negative value when testing under the Sampling Plans for "Category A," compute the Sample Error Limit (SEL) as follows:

   - Compute the Sample Standard Deviation and record it in Box 21.

$$s = \sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(X_i - \bar{X})^2}$$

   - Obtain the Sample Correction Factor from Column 3 of Appendix A. Table 2-1. "Sampling Plans for Category A" test. Record this value in Box 22.

   - Compute the Sample Error Limit using the formula:

Sample Error Limit (Box 23) =
Sample Standard Deviation (Box 21) × Sample Correction Factor (Box 22)

4. Compliance Evaluation of the Average Error:

   - If the value of the Average Error (Box 18) is smaller than the Sample Error Limit (Box 23), the sample passes.

   - If the value of the Average Error (disregarding the sign) (Box 18) is larger than the Sample Error Limit (Box 23), the sample fails. However, if the product is subject to moisture loss, the sample does not necessarily fail. Follow the procedures under "Moisture Allowances" in this chapter.

(Amended 2018)

(Amended 2022)

2.3.8. Moisture Allowances

When no predetermined allowance is found in NIST Handbook 133, the potential for moisture loss must be considered. Inspectors should follow their jurisdiction's guidance for making their determination on an acceptable moisture allowance.

(Added 2010)

If the product tested is subject to moisture loss, provide for the moisture allowance by following one of the two procedures listed below.

2.3.8.1. Applying Moisture Loss before Determining Package Errors

1. Determine the percent value of the moisture allowance if the product is listed below. (see Table 2-3. "Moisture Allowances.")

Table 2-3. Moisture Allowances		
Verifying the labeled net weight of packages of:	**Moisture Allowance is:**	**Notes**
Flour	3 %	
Dry pet food	3 %	Dry pet food means all extruded dog and cat foods and baked treats packaged in Kraft paper bags and/or cardboard boxes with a moisture content of 13 % or less at time of pack.
Pasta products	3 %	Pasta products means all macaroni, noodle, and like products packaged in kraft paper bags, paperboard cartons, and/or flexible plastic bags with a moisture content of 13 % or less at the time of pack.
Borax	see Section 2.4. Borax	
Cannabis	3 %	*Cannabis* means plant material only, and not products containing *Cannabis*, whether containing more than 0.3 % Total Delta-9 THC (also known as cannabis, Marijuana, or Marihuana) or containing 0.3 % or less Total Delta-9 THC (also known as Hemp).
Fruits	6%	Fruits mean the mature or ripened reproductive structures (ovary of a flower) formed by plants that enclose seeds and help with their dispersal. Fruits shall include: a) "small fruits" which includes, but is not limited to, cherries, currants, and cherry tomatores; or b) "berries," which includes all fruit whose names end in the term "berry", except when offered for sale and sold by the box, basket or other standard dry-measure receptable.
Vegetables	6%	Vegetables means any part of a plant including: (a) edible underground part, such as roots, tubers, and bulbs; 9b) edible above ground part, such as stems, leaves, and flowers; and (c) edible fruits and seeds, such as usually unripe fruits and seeds.
Wet Tare Only[1]		
Fresh poultry	3 %	Fresh poultry is defined as poultry above a temperature of − 3 °C (26 °F) that yields or gives when pushed with the thumb.
Franks or hot dogs	2.5 %	

Table 2-3.
Moisture Allowances

Bacon, fresh sausage, and luncheon meats	0 %	For packages of bacon, fresh sausage, and luncheon meats, there is no moisture allowance if there is no free-flowing liquid or absorbent material in contact with the product and the package is cleaned of clinging material. Luncheon meats are any cooked sausage product, loaves, jellied products, cured products, and any sliced sandwich-style meat. This does not include whole hams, briskets, roasts, turkeys, or chickens requiring further preparation to be made into ready-to-eat sliced product. When there is no free-flowing liquid inside the package and there are no absorbent materials in contact with the product, Wet Tare and Used Dried Tare are equivalent.

[1] Wet tare procedures must not be used to verify the labeled net weight of packages of meat and poultry packed at an official United States Department of Agriculture (USDA) facility and bearing a USDA seal of inspection. The Food Safety and Inspection Service (FSIS) adopted specific sections of the 2005 4th edition of NIST Handbook 133 by reference in 2008 but not the "Wet Tare" method for determining net weight compliance. FSIS considers the free-flowing liquids in packages of meat and poultry products, including single-ingredient, raw poultry products, to be integral components of these products (see Federal Register, September 9, 2008 [Volume 73, Number 175] [Final Rule – pages 52189-52193]).

Notes:

(1) There is no moisture allowance when inspecting meat and poultry from a USDA inspected plant when Used Dry Tare and "Category A" sampling plans are used.

(2) For the Wet Tare Only section of Table 2-3. "Moisture Allowances," free-flowing liquid and liquid absorbed by packaging materials in contact with the product are part of the wet tare. (Note Added 2010)

(Amended 2010, 2013, and 2024)

2. To compute moisture allowance, multiply the labeled quantity by the decimal percent value of the allowance. Record this value in Box 13a.

Example:
Labeled net quantity of flour is 907 g (2 lb)
Moisture Allowance is 3 % (0.03)
Moisture Allowance = 907 g (2 lb) × 0.03 = 27 g (0.06 lb)

3. If the Moisture Allowance is known in advance (e.g., flour, pasta products, and dry pet food), it can be applied by adjusting the Nominal Gross Weight used to determine the sample package errors. The Moisture Allowance in Box 13a is subtracted from the Nominal Gross Weight to obtain an Adjusted Nominal Gross Weight which is entered in Box 14. The Nominal Gross Weight is defined in Section 2.3.6.1. as the sum of the Labeled Weight and the Average Tare Weight from Box 13.

Example:
Use a Labeled Weight of 907 g (2 lb) and an Average Tare Weight of 14 g (0.03 lb)

The calculation is:

Labeled Net Quantity 907 g (2 lb) + Average Tare Weight 14 g (0.03 lb) = 921 g (2.03 lb) – Moisture Allowance 27 g (0.06 lb) = Adjusted Nominal Gross Weight of 894 g (1.97 lb)

This result is entered in Box 14.

4. Determine package errors by subtracting the Adjusted Nominal Gross Weight from the Gross Weights of the Sample Packages.