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Consumer Package Labeling Guide: Selling by Volume



NIST SP 1020-2

Consumer Package Labeling Guide: Selling by Volume

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Introduction

This guide is intended to provide manufacturers, packers, distributors, and retailers of packaged products with information about the labeling requirements for commodities that are sold by liquid and dry volume in the consumer marketplace. The information in this guide is based on the Uniform Packaging and Labeling Regulation contained in NIST Handbook 130¹. NIST develops Handbook 130 in cooperation with the National Conference on Weights and Measures, an organization of industry representatives, government officials, and other interested parties. Handbook 130 is adopted and enforced by many state and local regulatory agencies.

Declaration of Identity

The identity of the product shall appear on the package label and shall not be misleading or deceptive. When the label appears directly on the package, the identity of the product shall appear on the principal display panel and be generally parallel to the base of the package. The principal display panel is the panel of the package that the manufacturer, packer, or distributor intends to be displayed at retail. Directions on how to determine the area of the principal display panel are included later in this guide. The base of the package shall be determined by how the package is designed to be displayed.

The identity shall be:

- the name specified in, or required by, any federal or state regulation, or
- the common or usual name, or
- the generic name or other appropriate description, including a statement of function.

For example: "moisturizing lotion" or "vegetable oil."

¹"Uniform Laws and Regulations in the area of legal metrology and engine fuel quality."

Declaration of Responsibility

The name and address of the manufacturer, packer, or distributor must be conspicuously displayed on any package that is sold, kept, offered, or exposed for sale at a location that is different from where it was packed. The name shall be the actual corporate name or, when not incorporated, the name under which business is conducted. The address shall include the street address, city, state², and ZIP code³. The street address may be omitted, however, if it is listed in a current city or telephone directory.

Unless it would be misleading, the declaration may be the responsible party's principal place of business instead of the location where the commodity was manufactured, packed, or distributed. When the responsible party is not the manufacturer, the declaration shall include the responsible party's connection with the package, such as "Manufactured for and packed by" or "Distributed by."

Declaration of Quantity

All declarations of quantity shall permit price and quantity comparisons. In general, a declaration of quantity shall be expressed in terms of liquid measure if the commodity is liquid, or dry measure if the commodity is dry.

A declaration of net quantity shall appear on the package label and shall be accurate exclusive of all packaging materials. When the label appears directly on the package, the quantity declaration shall appear in the lower 30 % of the principal display panel and be generally parallel to the base of the package.

All declarations of quantity associated with a liquid measure shall express the volume at the required reference temperature. The following reference temperatures shall be used:

²The country name if outside the United States.

³The country mailing code if outside the United States.

distilled spirits	15.6 °C (60 °F)
frozen products	-18 °C (0 °F)
malt beverages (e.g., beer)	3.9 °C (39.1 °F)
petroleum products	15 °C (60 °F)
refrigerated products (usually labeled "Keep Refrigerated," e.g., milk and other dairy products)	4 °C (40 °F)
unrefrigerated products (including liquids sold unchilled, like soft drinks)	20 °C (68 °F)

Units and Symbols

For metric declarations:

- The metric units required are those of the International System of Units (SI).
- The units of liquid and dry measure used in an SI quantity declaration shall be in terms of the liter or milliliter, and the SI units of cubic measure used shall be in terms of the cubic meter, cubic decimeter, or cubic centimeter. Only the following words and symbols for SI units shall be used in conjunction with a liquid, dry, or cubic volume declaration:

milliliter	mL or ml
liter	L or l
cubic centimeter	cm ³ or cu cm
cubic decimeter	dm ³ or cu dm
cubic meter	m ³ or cu m

For inch-pound declarations:

- The units of liquid, dry, and cubic measure used in an inch-pound quantity declaration shall be in terms of the avoirdupois system. Only the following words and abbreviations shall be used in conjunction with a volume declaration:

avoirdupois	avdp
bushel	*
cubic foot	ft ³ or cu ft
cubic inch	in ³ or cu in
cubic yard	yd ³ or cu yd
dry pint	dry pt
dry quart	dry qt
fluid ounce	fl oz
gallon	gal
liquid	liq
peck	*
pint	pt
quart	qt
* This unit of measurement has no acceptable abbreviation.	

- Whenever the declaration of quantity is in terms of the dry pint or dry quart, the declaration shall include the word "dry."
- When the term "ounce" is used in declarations of liquid measure the declaration shall identify the particular meaning of the term by including the word or abbreviation for "fluid." However, the term "fluid" may be omitted when, by association of terms, the proper meaning is obvious. For example: 1 pint 4 ounces.

Capitalization

SI symbols for volume shall not be capitalized except for the letter "L" for liter. Inch-pound abbreviations for volume may appear in both upper and lower case letters.

Use of Punctuation

Periods or other punctuation shall not be used after an SI symbol. Periods or other punctuation should not be used after inch-pound abbreviations.

Use of Spaces

A space should be used between the SI symbol and the number to which it refers. For example: 250 mL, not 250mL; 1.5 m³, not 1.5m³, 3^{-1/4} gal, not 3^{-1/4}gal.

Singular Form

SI symbols shall always be written in the singular form. An "s" shall not be added to a symbol to express the plural of the symbol. Inch-pound abbreviations should also be written in the singular form. For example, "L" is the symbol for both "liter" and "liters;" "fl oz" is the abbreviation for both "fluid ounce" and "fluid ounces."

Prohibited Symbols

Incorrect symbols to use in SI quantity declarations of volume include: Lit, ML, mls, gr, and m². Incorrect symbols to use in inch-pound quantity declarations of volume include: pnt, oz, ci, bu, pk, and yds.

Use of Units and Symbols

Largest Whole Unit

The quantity declaration shall be in terms of the largest whole unit of volume, with any remainder expressed in fractions.

For SI declarations:

- The quantity shall not be expressed in mixed units. For example: 3.5 L, not 3 L 500 mL.
- A liquid or dry volume of less than one liter shall be expressed in milliliters.

- A liquid or dry volume of more than one liter shall be expressed in liters and decimal fractions of a liter.
- A cubic volume of less than one cubic meter shall be expressed in cubic centimeters or cubic decimeters.
- A cubic volume of more than one cubic meter shall be expressed in cubic meters and decimal fractions of a cubic meter.
- A remainder shall be expressed as a decimal fraction of the largest whole unit (common fractions are not allowed). For example: 1.25 L, not $1\frac{1}{4}$ L; 420.2 cm^3 , not $420\frac{1}{5}\text{ cm}^3$.

For inch-pound declarations:

- A liquid volume of less than one pint shall be expressed in fluid ounces and fractions of a fluid ounce.
 - A liquid volume of at least one pint, but less than one gallon, shall be expressed in terms of the largest whole unit (quarts, quarts and pints, or pints) with any remainder expressed in fluid ounces or fractions of the pint or quart. An exception is that two quarts may be declared as one-half gallon. This declaration may be accompanied by an additional declaration in fluid ounces.
 - A liquid volume of more than one gallon shall be expressed in terms of the largest whole unit (gallons, gallons and quarts, or gallons and pints) with any remainder expressed in fluid ounces or fractions of the pint or quart. This declaration may be accompanied by an additional declaration in fluid ounces.
 - A dry volume of one dry pint or more shall be expressed in terms of the largest whole unit (dry pint, dry quart, peck, or bushel) with any remainder expressed in fractions of the smallest unit.
 - A remainder may be expressed as either a common or decimal fraction. For example: 1.5 gal, $3\frac{1}{2}$ qt, 14.3 fl oz, and $12\frac{1}{4}\text{ yd}^3$ are all acceptable.
- Or,

- A remainder may be expressed in the next smaller whole unit or units with any further remainder expressed in terms of a common or decimal fraction of the smallest unit present. For example: 1 gal 1 pint and 3 qt 8.3 fl oz are both acceptable.

Rule of 1000

The selected multiple or submultiple prefixes for SI units shall result in numerical values between 1 and 1000. This rule requires milliliters to be used when a volume declaration is less than 1 liter, and liters to be used when a volume declaration is 1000 milliliters or more. For example: 500 mL, not 0.5 L; 1.4 L, not 1400 mL.

Number of Digits Displayed

SI declarations shall be shown in three digits except where the quantity is below 100 milliliters. If below 100 milliliters, the SI declaration may be shown in two digits. In either case, any final zero appearing to the right of the decimal point need not be shown.

Dual Unit Declarations

A quantity declaration shall usually appear in both SI and inch-pound units. Either unit may appear first in the declaration. For example: 500 mL (16.9 fl oz) and 1 gal (3.79 L) are both acceptable.

Rounding

When declaring equivalent SI and inch-pound quantities on a package, neither declaration may overstate or understate the actual quantity. Conversions, the proper use of significant digits, and rounding must be based on the packer's knowledge of the accuracy of the original measurement and the effect of that accuracy on the converted number. Net content declarations shall not be rounded up to overstate a quantity. When, as a result of rounding, metric and inch-pound declarations do not exactly match, the quantity of product in the package shall meet the largest declaration.

Fractions

An SI quantity declaration shall contain only decimal fractions. For example: 1.5 L, not $1\text{-}\frac{1}{2}$ L. An SI declaration shall not be carried out to more than three places. For example: 2.36 not 2.364287.

An inch-pound quantity declaration may contain either decimal or common fractions. In an inch-pound declaration that contains decimal fractions, the fraction shall not be carried out to more than three places. In an inch-pound quantity declaration that contains common fractions, all fractions shall be reduced to their lowest term. For example: $\frac{1}{2}$, not $\frac{2}{4}$; $\frac{1}{8}$, not $\frac{4}{32}$. In addition, common fractions shall be in terms of halves, quarters, eighths, sixteenths, or thirty-seconds unless there is a firmly established general consumer usage and trade custom of employing different common fractions for a particular commodity. For example: $3\text{-}\frac{3}{16}$ qt, not $3\text{-}\frac{1}{3}$ qt; $1\text{-}\frac{3}{8}$ L, not $1\text{-}\frac{2}{5}$ L; $14\text{-}\frac{9}{16}$ fl oz, not $14\text{-}\frac{4}{7}$ fl oz.

Words Accompanying a Quantity Declaration

Optional Use of Phrase "Net" or "Net Content"

A quantity declaration may stand alone, or may include the term "Net Contents," or just the word "Net." For example: Net 16 fl oz (473 mL); 2 qt (1.89 L); and Net Contents 3 ft³ (27.9 dm³) are all acceptable.

Qualifying Phrases Prohibited

Words or phrases that qualify the quantity declaration shall not appear on the package. For example: "approximately," "minimum," "when packed," "not less than," "at least," "giant," and "full" are prohibited from appearing near the quantity declaration.

Combination Declarations

When a quantity declaration of volumet is not fully informative on its own, it shall be combined with appropriate declarations of weight, count, or size. All combination declarations shall be accurate and shall appear on the principal display panel as part of the quantity declaration.

Supplemental Declarations

When appropriate, the required quantity declaration may be supplemented by one or more additional declarations of weight, measure, count or size. All supplemental declarations shall be accurate and shall appear somewhere other than on the principal display panel.

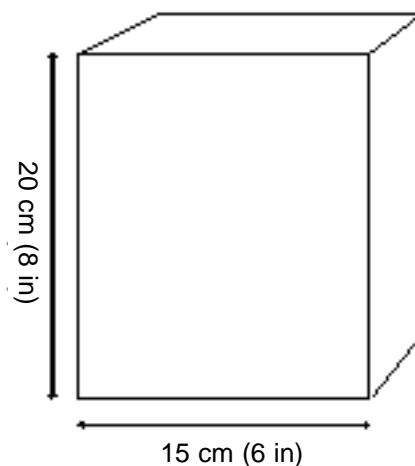
Prominence and Placement

All information required to appear on a consumer package shall be prominently displayed in the English language. When appropriate, information may also be displayed in additional languages. Any required information that is hand lettered shall be clear and equal in legibility to printed materials.

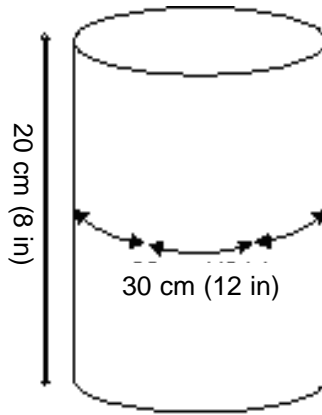
Principal Display Panel

The area of the principal display panel shall be:

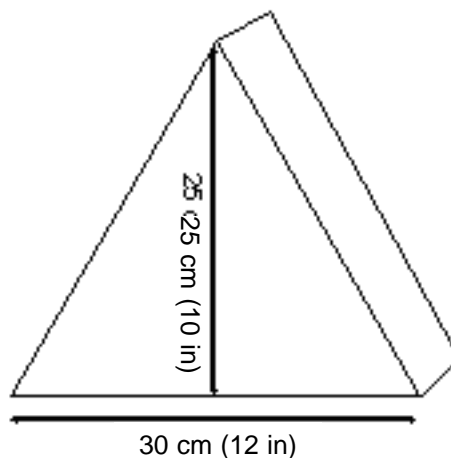
- for rectangular containers, the height times the width (H x W) of the front of the package, where the front of the package is determined by how the package is designed to be displayed;



- for cylindrical or nearly cylindrical containers, 40 % of the height times the circumference [0.4 x (H x C)] of the container;



- for other shaped containers, 40 % of the total surface area of the container. However, if the container has an obvious principal display panel (for example, the face of a drink pouch or the top of a bag of mulch) the area shall be calculated from the shape of that surface.



Color Contrast

The quantity declaration shall be in a color that contrasts conspicuously with its background. However, the quantity declaration may be blown, formed, or molded on a glass or plastic surface if no other label information is presented in a contrasting color.

Free Area

The area surrounding the quantity declaration shall be free of printed information:

- above and below by a space equal to at least the height of the declaration lettering; and
- to the left and right by a space equal to twice the width of the letter "N" of the declaration lettering type and style.

Style of Type

The quantity declaration shall be in a style of type or lettering that is bold, clear, and conspicuous when compared to other type, lettering, or graphics on the package. However, if all the label information is blown, formed, or molded on a glass or plastic surface, then the quantity declaration may also be blown, formed, or molded on the surface.

Proportionality

No number or letter shall be more than three times as high as it is wide.

Minimum Height

The height of any letter or number in the quantity declaration shall be at least that shown in the Table on the following page. When all lowercase letters are used in SI symbols, it is the lowercase "d," or its equivalent in the print or type, that shall meet the minimum height requirement. No letter shall be less than 1.6 mm ($1/16$ in) in height. Other letters and exponents shall be presented in the same type style, and in proportion to the type size used.

Minimum Height of Numbers and Letters		
Area of Principal Display Panel	Minimum Height: Numbers and Letters	Minimum Height: Label information blown, formed, or molded on surface of container
Less than or equal to 32 cm ² (5 in ²)	1.6 mm (¹ / ₁₆ in)	3.2 mm (¹ / ₈ in)
More than 32 cm ² (5 in ²) and less than or equal to 161 cm ² (25 in ²)	3.2 mm (¹ / ₈ in)	4.8 mm (³ / ₁₆ in)
More than 161 cm ² (25 in ²) and less than or equal to 645 cm ² (100 in ²)	4.8 mm (³ / ₁₆ in)	6.4 mm (¹ / ₄ in)
More than 645 cm ² (100 in ²) and less than or equal to 2581 cm ² (140 in ²)	6.4 mm (¹ / ₄ in)	7.9 mm (⁵ / ₁₆ in)
More than 2581 cm ² (400 in ²)	12.7 mm (¹ / ₂ in)	14.3 mm (⁹ / ₁₆ in)
Note: The type and size requirements specified in this table do not apply to the “e” mark.		

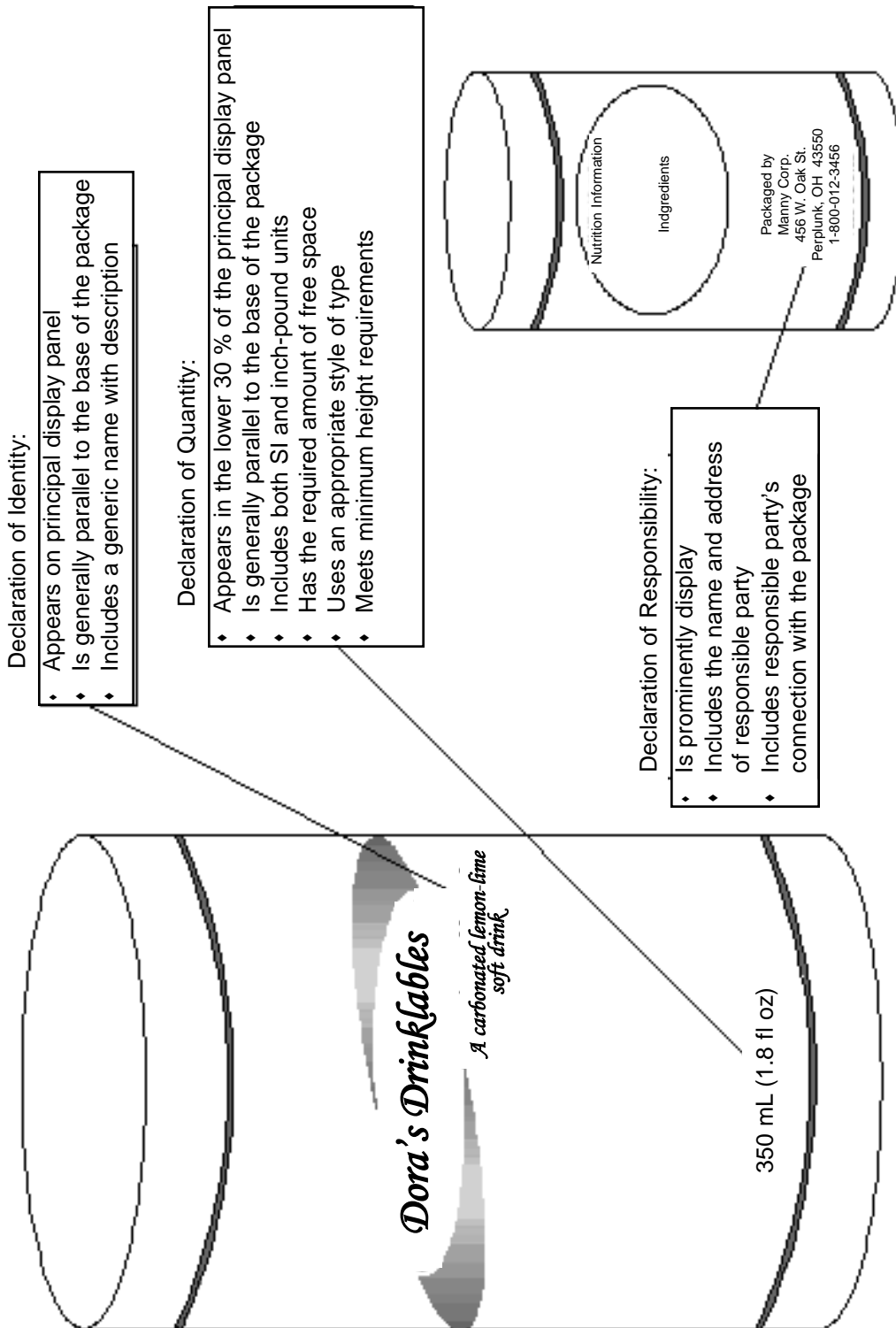


Figure 1: Example of a package labeled to be sold by volume

Conversion Factors – Liquid Volume Measure (underlined figures are exact)						
Units	Fluid Ounces	Liquid Pints	Liquid Quarts	Gallons	Cubic Inches	Milliliters (Cubic Centimeters)
1 fluid ounce	= $\frac{1}{16}$	$\frac{0.0625}{1}$	$\frac{0.03125}{0.5}$	$\frac{0.0078125}{0.125}$	$\frac{1.8046875}{28.875}$	$\frac{29.57353}{473.1765}$
1 liquid pint	= $\frac{16}{32}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{0.25}{1}$	$\frac{57.75}{231}$	$\frac{946.3529}{3785.412}$
1 liquid quart	= $\frac{128}{64}$	$\frac{8}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{1}$	$\frac{16.387064}{1}$
1 gallon	= $\frac{0.5541126}{0.03381402}$	$\frac{0.03463203}{0.002113376}$	$\frac{0.01731602}{0.001056688}$	$\frac{0.004329004}{0.0002641721}$	$\frac{0.06102374}{1}$	

Conversion Factors – Dry Volume Measure (underlined figures are exact)						
Units	Dry Pints	Dry Quarts	Pecks	Bushels	Cubic Foot	Liters (Cubic Decimeters)
1 dry pint	= $\frac{1}{2}$	$\frac{0.5}{1}$	$\frac{0.0625}{0.125}$	$\frac{0.015625}{0.03125}$	$\frac{0.01944463}{0.03888925}$	$\frac{0.5506105}{1.101221}$
1 dry quart	= $\frac{16}{64}$	$\frac{8}{32}$	$\frac{1}{4}$	$\frac{0.25}{1}$	$\frac{0.311114}{1.244456}$	$\frac{8.809768}{35.23907}$
1 peck	= $\frac{51.42809}{1.816166}$	$\frac{25.71405}{0.9080830}$	$\frac{3.214256}{0.1135104}$	$\frac{0.80356395}{0.02837759}$	$\frac{1}{0.03531467}$	$\frac{28.31685}{1}$
1 bushel						
1 cubic foot						
1 liter						

Conversion Factors – Cubic Volume Measure (underlined figures are exact)					
Units	Cubic Inches	Cubic Feet	Cubic Yards	Milliliters (Cubic Centimeters)	Liters (Cubic Decimeters)
1 cubic inch =	<u>1</u>	0.000 578 703 7	0.000 021 433 47	16.387 064	0.016 387 064
1 cubic foot =	1 728	<u>1</u>	0.037 037 04	28 316.846 592	28.316 846 592
1 cubic yard =	<u>46 656</u>	<u>27</u>	<u>1</u>	<u>764 554.857 984</u>	<u>764.554 857 984</u>
1 cubic centimeter =	0.061 023 74	0.000 035 314 67	0.000 001 307 951	<u>1</u>	<u>0.001</u>
1 cubic decimeter =	61.023 74	0.035 314 67	0.001 307 951	1 000	1
1 cubic meter =	61 023.74	35.314 67	1.307 951	<u>1 000 000</u>	<u>1 000</u>

How to use the conversion factors:

- (1) Look up the unit that you already have in the left-hand column.
- (2) Travel along the row for that unit until you reach the column of the unit that you want.
- (3) The number in the location where the unit that you have and the unit that you want intersect is the conversion factor.
- (4) Multiply the number that corresponds to the unit that you have by the conversion factor. The resulting number is the equivalent value in the units that you want.

For example: You have a volume of 20 fluid ounces that you want to convert to milliliters. Using the Liquid Volume Measure chart, the conversion factor for going from fluid ounces to milliliters is 29.573 53. Multiply the number of fluid ounces by 29.573 53 to get the number of milliliters.

$$20 \text{ fl oz} \times 29.573 53 \frac{\text{mL}}{\text{fl oz}} = 591.470 6 \text{ mL}$$

Labeling Checklist for Volume

Declaration of Identity

- Appears on the principal display panel.
- Is generally parallel to the base of the package.
- Is the name specified in, or required by, federal or state regulation; the common or usual name; or the generic name or other appropriate description including a statement of function.

Declaration of Responsibility

- Is conspicuously displayed on any package that is sold, kept, offered, or exposed for sale at a location other than the premises where it was packed.
- Includes the name and address of the manufacturer, the packer, or the distributor.
- Uses the actual corporate name or, when not incorporated, the name under which the business is conducted.
- Includes the city, state (or country), and ZIP code (or mailing code used in other countries).
- Includes the street address unless this information is listed in a current city or telephone directory.
- Uses the address of the responsible party's principal place of business or the address of the location where the package was manufactured, packed, or distributed unless such address would be misleading.
- If the responsible party is not the manufacturer, then includes the party's connection with the package (i.e., "Manufactured for and packed by," or "Distributed by").

Declaration of Quantity

- Appears in the lower 30 % of the principal display panel.
- Appears generally parallel to the base of the package.
- Is prominently displayed in English (multi-lingual information is permitted).
- Is in a color that contrasts conspicuously with its background.
- Has an adequate amount of free area around it.
- Appears in a style of type or lettering is bold, clear, and conspicuous.
- Is of a type or lettering that is proportional.
- Is of a type or lettering that meets the minimum height requirements.
- Generally includes both SI and inch-pound units.
- Uses only approved words, symbols or abbreviations for the SI and inch-pound units.
- Uses SI symbols that are not capitalized.
- Uses SI symbols and inch-pound abbreviations that are not accompanied by periods or other punctuation marks.
- Uses SI symbols and inch-pound abbreviations in the singular form.
- Is declared in the largest whole unit.
- SI units comply with the Rule of 1000.
- Uses SI declarations that are displayed in 3 digits.
- Is properly rounded so as to not overstate the quantity.
- Uses SI declarations containing only decimal fractions.
- Does not appear in conjunction with an improper qualifying phrase.
- When necessary, is combined with appropriate additional declarations.

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Handbook 130 is available on the NIST Weights and Measures Division website at: www.nist.gov/owm; click on "Handbook 130, Uniform Laws and Regulations" under the "Quick List (popular links)" section.

The **Fair Packaging and Labeling Act (FPLA)** is available

- on the FDA website at: www.fda.gov/opacom/laws/fplact.htm; or
- on the FTC website at: www.ftc.gov/ogc/stat3.htm,
click on "Fair Packaging and Labeling Act
(80 Stat. 1296, 15 U.S.C. §§ 1451-1461)."

A **Food Labeling Guide** is available on the FDA website at:

www.cfsan.fda.gov/~dms/flg-toc.html