

Appendix 8

DEPARTMENT OF COMMERCE National Bureau of Standards CUSTOMARY SYSTEM OF WEIGHTS AND MEASURES Commercial Weights and Measures Units

By virtue of the authority vested in the Secretary of Commerce by 15 U.S.C. 272 and delegated to the National Bureau of Standards by Department Order 90-A, the Bureau is charged with the responsibility for "The custody, maintenance, and development of the national standards of measurement, * * *." The method employed for disseminating information on weights and measures units has been through official National Bureau of Standards publications. However, all such units have never been listed together in any Federal legislation or in the FEDERAL REGISTER. On February 27, 1968, in the House Committee on Science and Astronautics Report No. 1107, accompanying H.R. 13058, legislation to repeal the Standard Container Act of August 31, 1916 (39 Stat. 673; 15 U.S.C. 251-256), and the Standard Container Act of May 21, 1928 (45 Stat. 685; 15 U.S.C. 257-257i), and amend the Fair Packaging and Labeling Act of November 3, 1966 (80 Stat. 1296; 15 U.S.C. 1451), the following Committee view was expressed:

Testimony revealed that although standard weights and measures are defined in publications by the Bureau of Standards, these definitions are not defined by law nor have they been published in the FEDERAL REGISTER. Consequently, the Committee recommends that the Secretary of Commerce cause to be published in the FEDERAL REGISTER a listing of the common weights and measures used in normal commerce throughout the United States and relate them to the standards developed in accordance with existing law, 15 U.S.C. 272.

Commercial units of weight and measure in common use are based on the yard and the avoirdupois pound. The yard and avoirdupois pound were last defined in the FEDERAL REGISTER of July 1, 1959, in terms of the national standards of length and mass: The meter and the National Prototype Kilogram. From the two units, the yard and the pound, are derived all other U.S. Customary multiple and submultiple units that will be found in ordinary commerce. They are defined as:

1 yard=0.914 4 meter¹
1 pound (avoirdupois)=0.453 592 37 kilogram¹

LINEAR MEASURE U.S. CUSTOMARY

12 inches=1 foot=0.304 8 meter¹
3 feet=1 yard=0.914 4 meter¹
5,280 feet=1 statute mile=1.609 kilometers
6,076.115 feet=1 International Nautical Mile=1.852 kilometers¹

¹ Denotes exact figures.

METRIC

10 millimeters=1 centimeter
10 centimeters=1 decimeter
10 decimeters=1 meter
10 meters=1 dekameter
10 dekameters=1 hectometer
10 hectometers=1 kilometer

AREA MEASURE U.S. CUSTOMARY

144 square inches=1 square foot=0.092 9 square meter
9 square feet=1 square yard=0.836 1 square meter
43,560 square feet=1 acre=0.404 7 hectare
640 acres=1 square mile=259 hectares
1 square mile=1 section=259 hectares
36 sections=1 township=932 4 hectares

METRIC

100 square millimeters=1 square centimeter
10,000 square centimeters=1 square meter
100 square meters=1 are
100 ares=1 hectare
100 hectares=1 square kilometer

WEIGHT U.S. CUSTOMARY (AVOIRDUPOIS)

437.5 grains=1 ounce=28.349 5 grams
7,000 grains=1 pound=0.453 592 37 kilogram
16 ounces=1 pound=0.453 592 37 kilogram
2,000 pounds=1 short ton=0.907 2 metric ton
2,240 pounds=1 long ton=1.016 metric tons

METRIC

10 milligrams=1 centigram
10 centigrams=1 decigram
10 decigrams=1 gram
10 grams=1 dekagram
10 dekagrams=1 hectogram
10 hectograms=1 kilogram
1,000 kilograms=1 metric ton

Appendix 8—Continued

CAPACITY, OR VOLUME, LIQUID MEASURE

U.S. CUSTOMARY

1 gallon=231 cubic inches=3.785 4 liters
4 fluid ounces=1 gill=0.118 3 liter
4 gills=1 pint=0.473 2 liter
2 pints=1 quart=0.946 4 liter
4 quarts=1 gallon=3.785 4 liters

METRIC

10 milliliters=1 centiliter
10 centiliters=1 deciliter
10 deciliters=1 liter
10 liters=1 dekaliter
10 dekaliters=1 hectoliter
10 hectoliters=1 kiloliter

CAPACITY, OR VOLUME, DRY MEASURE

U.S. CUSTOMARY

1 bushel=2,150.42 cubic inches=35.239 1 liters
2 dry pints=1 dry quart=1.101 2 liters
8 dry quarts=1 peck=8.809 8 liters
4 pecks=1 bushel=35.239 1 liters

The accepted volume of a barrel in the United States varies significantly depending both on the commodity for which it is used and on how it is defined in State law (varying from State-to-State).

METRIC

The volumetric units are the same for both liquid and dry measure in the Metric System.

CUBIC MEASURE

U.S. CUSTOMARY

1,728 cubic inches=1 cubic foot=0.028 316 8 cubic meter
27 cubic feet=1 cubic yard=0.764 554 9 cubic meter

METRIC

1,000 cubic millimeters=1 cubic centimeter
1,000 cubic centimeters=1 cubic decimeter
1,000 cubic decimeters=1 cubic meter

SPECIAL UNITS

The unit used for the sale of firewood is the cord of 128 cubic feet. The unit used for the sale of precious stones is the Metric Carat of 200 milligrams.

The units used for over-the-counter sales of precious metals in the United States are troy units.

TROY WEIGHT

24 grains=1 pennyweight=1.555 17 grams
20 pennyweights=1 ounce troy=31.103 47 grams
12 ounces troy=1 pound troy=0.373 242 kilogram

The apothecaries system of units, once widely used in the United States for pharmaceutical purposes, is now used only very little. Usage of the Metric System has replaced the apothecaries system at the manufacturing level, and at most of the retail level.

ELECTRICITY AND NATURAL GAS

When a consumer is billed for having used electricity, what has been sold is electrical energy, and that energy is expressed in terms of kilowatt-hours. One kilowatt-hour equals 3,600,000 joules (the joule is the unit of energy in the International System of Units).

Consumption of natural gas normally is expressed in terms of therms. One therm equals 105,480,400 joules.

Dated: July 15, 1968.

A. V. ASTIN, *Director.*

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