

337 MASS FLOWMETERS

337-1 Appendix D – Definitions: Diesel Liter Equivalent (DLE) and Diesel Gallon Equivalents (DGE) for Compressed Natural Gas and Liquefied Natural Gas; Definition of Gasoline Gallon Equivalent and Gasoline Liter Equivalent for Compressed Natural Gas; S.1.2. Compressed Natural Gas and Liquefied Natural Gas Dispensers; S.1.3.1.1. Compressed Natural Gas Used as an Engine Fuel; S.1.3.1.2. Liquefied Natural Gas Used as an Engine Fuel; S.5.2. Marking of Diesel and Gasoline Volume Equivalent Conversion Factor; Compressed Natural Gas, S.5.3. Marking of Diesel Volume Equivalent Conversion Factor; Liquefied Natural Gas, UR.3.1.1. Marking of Equivalent Conversion Factor for Compressed Natural Gas, UR.3.1.2. Marking of Equivalent Conversion Factor for Liquefied Natural Gas, and UR.3.8. Return of Product to Storage, Retail Compressed Natural Gas and Liquefied Natural Gas

Source:

Clean Vehicle Education Foundation (2014)

Purpose:

Since natural gas is sold in the retail market place as compressed natural gas (CNG) and liquefied natural gas (LNG) an alternative fuel to gasoline and diesel fuel, the proposed additions and edits to Handbook 44 will provide definitions for volume units of CNG and LNG that are the energy equivalents for diesel liters and gallons so that end users can readily compare cost and fuel economy. At present only equivalents for gasoline are included in NIST Handbooks 44 and 130 for CNG as an engine fuel. The proposal also includes modification to definitions for gasoline volume equivalents to clarify those terms apply to CNG.

Item under Consideration:

Amend NIST Handbook 44as follows: (See pages S&T-65 through S&T-79 S&T 2015 Interim Agenda)

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... Informational item. CWMA recommends that the commodity shall be measured in mass units and indicated in mass units. Equivalency units may be included as supplemental information.

January 2015 NCWM Interim Meeting

The NGSC is providing (in January 2015) for consideration by the Weights and Measures community two separate proposals which reflect compromises on viewpoints within the NGSC: (1) on the recognition of the LNG motor-fuel application; (2) to replace the term “equal” for the term “means” to establish the relationship of mass units to supplemental units; and (3) to eliminate from use liter equivalent units of measurement in natural gas motor-fuel applications since this is a newly created unit that is not recognized in jurisdictions using SI units.

The first compromise proposal will be submitted for the Committee’s consideration in a separate document and modifies NIST HB 44 Section 3.37 MFM Code and corresponding NIST HB 130 MOS requirements to:

1. Recognize the indication of natural gas fuel sales in values of either volume equivalent units or mass units based on legislative policy within a jurisdiction;
2. Mandate labeling the equivalent unit conversion factor on a natural gas motor-fuel dispenser, and
3. No longer recognize SI mass units in favor of U.S. Customary mass units (i.e., lb).

The second of two compromise proposals being submitted and titled “Natural Gas Motor-Fuel Proposal to Phase-In Mass Indications While Recognizing Supplemental Fuel Information” is shown below and is intended to replace the NIST OWM fall 2014 compromise proposal. This alternate proposal is a joint collaboration of work by Ron Hayes (Missouri) and NIST OWM to further modify the HB 44 3.37 Mass Flow Meters Code where this proposal:

1. Keeps the suggested *new* phase in period where mass indications for all sales of natural gas motor-fuel will be of a specified maximum value and required for all dispensers effective January 1, 2017 as shown in amended paragraphs S.1.3.1.1. Compressed Natural Gas Used as an Engine Fuel, and S.1.3.3. Maximum Value of Quantity-Value Divisions;
2. Continues to recognize the use of *new* supplemental fuel information for use in making value comparisons and taxation purposes as well as prescribe the format for stating this information as shown in the proposed *new* Definition of diesel gallon equivalent (DGE) and *new* paragraph S.1.3.1.2. Natural Gas Used as an Engine Fuel, Supplemental Information and modifications to paragraph S.5.2. Marking of Gasoline Volume Equivalent Conversion Factor. This information might be provided in the form of placards, or on the kiosk, or as dispenser indications or labeling on the cabinet when it is clear that this is not the required transaction information; and
3. Recognizes the existing compressed natural gas motor-fuel application and includes the proposed *new* liquefied natural gas motor-fuel application as shown in modified paragraphs S.1.2. Compressed Natural Gas Dispensers and UR.3.8. Return of Product to Storage

The submitters of the second of two compromise proposals ask the Committee to consider the following modifications to HB 44 3.37 Mass Flow Meters Code:

S.1.3. Units.

S.1.3.1. Units of Measurement.

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S.1.3.1.1. ~~Compressed Natural Gas Used as an Engine Fuel.~~ – When ~~compressed~~ natural gas is dispensed as an engine fuel, the delivered quantity shall be indicated as follows:

(a) Effective and nonretroactive as of January 1, 2016, the delivered quantity shall be indicated in mass units in terms of kilograms or pounds and decimal subdivisions thereof.

This paragraph will become retroactive on January 1, 2017.
(Added 2015)

(b) For dispensers manufactured prior to January 1, 2016:

The dispenser shall display the mass measured for each transaction, either continuously on an external or internal display accessible during the inspection and test of the dispenser, or display the quantity in mass units by using controls on the device.

The delivered quantity shall be indicated in mass or in ~~“gasoline liter equivalent (GLE) units”~~ ~~or~~ “gasoline gallon equivalent (GGE) units.” (Also see ~~4~~Definitions.)
(Added 1994)(Amended 2015)

Paragraph S.1.3.1.1.(b) will be removed in the 2017 edition of NIST Handbook 44 when paragraph S.1.3.1.1.(a) becomes retroactive.

S.1.3.2. Numerical Value of Quantity-Value Divisions. – The value of a scale interval shall be equal to:

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S.1.3.3. Maximum Value of Quantity-Value Divisions.

- (a) The maximum value of the quantity-value division for liquids shall not be greater than 0.2 % of the minimum measured quantity.

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(b) *Effective and nonretroactive as of January 1, 2016, the maximum value of the mass division for dispensers of natural gas used to refuel vehicles shall not exceed 0.001 kg or 0.001 lb.*

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4. *Note: Paragraph S.1.3.3.(b) will become retroactive effective January 1, 2017.*

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(c) For dispensers of ~~compressed~~ natural gas used to refuel vehicles and manufactured prior to January 1, 2016, the value of the division for the ~~gasoline liter equivalent shall not exceed 0.01 GLE; the division for~~ gasoline gallon equivalent (GGE) shall not exceed 0.001 GGE. The maximum value of the mass division shall not exceed 0.001 kg or 0.001 lb.

Note: Paragraph S.1.3.3.(c) will be removed in the 2017 edition of NIST Handbook 44 when Paragraph S.1.3.3.(b) becomes retroactive.
(Amended 1994 and 2015)

Include a new definition for the supplemental term diesel gallon equivalent as follows:

A Diesel Gallon Equivalent (DGE) means 6.384 pounds (2.895 kg) of CNG or 6.059 pounds (2.748 kg) of LNG
(Added 2015)

Add a new paragraph S.1.3.1.2. as shown below:

S.1.3.1.2. Natural Gas Used as an Engine Fuel, Supplemental Information. – Dispensers of natural gas dispensed as an engine fuel may include supplemental information to assist consumers in making value comparisons with gasoline and diesel fuel and for use by taxation departments and other agencies that may need an approximation thereof. Quantity, unit price, and total price for the transaction must be clearly designated and distinguished from any supplemental information to ensure that the customer understands the basis for the transaction.

Supplemental units shall be clearly designated with the phrase “The following information is provided for comparison with other vehicle fuels and is not to be used as a basis for commercial transactions.”

Supplemental units shall be displayed using one or more of the following statements.

For compressed natural gas:

1 kg of Compressed Natural Gas means 0.3896 Gasoline Gallon Equivalent (GGE)

1 kg of Compressed Natural Gas means 0.3455 Diesel Gallon Equivalent (DGE)

1 lb of Compressed Natural Gas means 0.177 Gasoline Gallon Equivalent (GGE)

1 lb of Compressed Natural Gas means 0.157 Diesel Gallon Equivalent (DGE)

A Gasoline Gallon Equivalent (GGE) means 5.660 pounds (2.567 kg) of CNG

For liquefied natural gas:

1 kg of Liquefied Natural Gas means 0.3638 Diesel Gallon Equivalent (DGE)

1 lb of Liquefied Natural Gas means 0.165 Diesel Gallon Equivalent (DGE)

Modify paragraph S.5.2. as follows:

S.5.2. Marking of Gasoline Volume Equivalent Conversion Factor. – A device dispensing compressed natural gas shall have ~~either~~ the statement ~~“1 Gasoline Liter Equivalent (GLE) is Equal to 0.678 kg of Natural Gas” or “1 Gasoline Gallon Equivalent (GGE) is Equal to means~~ 5.660 lb of Natural Gas” permanently and conspicuously marked on the face of the dispenser according to the method of sale used.

As of January 1, 2017 devices must indicate as specified in S.1.3.1.1(a) and any information providing equivalent units may only be included as supplemental information as specified in S.1.3.1.2.

Paragraph S.5.2. will be removed from the 2017 edition of NIST Handbook 44 when paragraph S.1.3.1.1(a) becomes retroactive.
(Added 1994)(Amended 2015)

Amend the following HB 44 paragraphs as recommended in Fall 2014:

S.1. Indicating and Recording Elements.

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S.1.2. Compressed Natural Gas Dispensers. – Except for fleet sales and other price contract sales, a ~~compressed~~ natural gas dispenser used to refuel vehicles shall be of the computing type and shall indicate the quantity, the unit price, and the total price of each delivery. ~~The dispenser shall display the mass measured for each transaction either continuously on an external or internal display accessible during the inspection and test of the dispenser, or display the quantity in mass units by using controls on the device.~~
(Added 1994)(Amended 2015)

UR.3. Use of Device.

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UR.3.8. Return of Product to Storage, Retail Compressed Natural Gas and Liquefied Natural Gas Dispensers. – Provisions at the site shall be made for returning product to storage or disposing of the product in a safe and timely manner during or following testing operations. Such provisions may include return lines, or cylinders adequate in size and number to permit this procedure.

(Added 1998)(Amended 2015)

The NGSC representatives asks that the “Natural Gas Motor Fuel Proposal to Phase-In Mass Indications While Recognizing Supplemental Fuel Information” shown above be considered on its merits for adhering to basic weights and measures philosophy and principles of measurement, i.e., transactions are clear, transparent, verifiable, protect all consumers and promote fair competition in the marketplace. This proposal is an opportunity for a uniform method of sale by mass units and is aligned with practices adhered to globally for this application. The submitter acknowledges the proposal shown above might be made more palatable by including some corresponding NIST HB 130 language to address street price signage requirements; it is highly possible to develop, distribute, and vet a set of minimal modifications to HB 130 before July 2015, if deemed necessary.