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Special and Unclassified Equipment

Applying NIST Handbook 44 to New Technologies or Applications

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In today's rapidly changing marketplace, it isn't unusual for a field official or service person to encounter new and different types of commercial weighing or measuring devices or to find existing device types used in new applications. Determining what requirements in NIST Handbook 44 (HB 44), Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices, apply to these devices can be a challenge for officials, service personnel, and device owners alike. These determinations can be equally difficult for manufacturers and entrepreneurs trying to enter the commercial market in an application that involves assessing charges based on measurements. A particular challenge arises when there isn't a specific code (or set of requirements) in HB 44 to address the device or its application. A common misconception is that, if there isn't a specific code in HB 44 for a new type of device or a new application, HB 44 cannot be applied and the device cannot, therefore, be used. While the ultimate authority for determining whether or not a weighing or measuring device can be used in a given application rests with regulatory weights and measures officials, HB 44 does include provisions that allow equipment to be evaluated to ensure it is adequate and appropriate for use in making commercial measurements – even if a specific device code has yet to be developed to address the application in which the device is used. This article provides guidance to weights and measures officials for applying and interpreting the provisions of HB 44 to new types and applications of commercial weighing and measuring devices.

The General Code.

The process of assessing which requirements apply to commercial weighing or measuring devices using new technology or applications begins much the same way as for a routine inspection. The inspector must first determine which "codes" in HB 44 apply. At the beginning of each "Code" in HB 44, an "Application" section defines the specific device types and applications that are covered by that code.

One such paragraph in Section 1.10. General Code, G-A.2. Code Application, stipulates that all devices covered by HB 44 must comply with the General Code.

G-A.2. Code Application. – This General Code shall apply to all classes of devices as covered in the specific codes. The specific code requirements supersede General Code requirements in all cases of conflict.

Thus, whether the device is using new or existing technology or is being used in a new or conventional application, the provisions of the General Code can be applied. Requirements in the General Code are typically broad and rather "general" in nature – hence, the title of the code. These requirements lay out somewhat "universal" provisions to help ensure that equipment is designed, used, and maintained so

that indications provided by a commercial weighing or measuring device are clear and understandable; measurements are sufficiently accurate; and equipment is selected, installed, maintained, and operated in such a way that details of the weighing or measuring transaction are clear and understandable to both buyer and seller.

Specific Codes.

The General Code is supplemented by “specific” device codes, which address requirements directed more specifically to a given device type or application and which include requirements such as accuracy, testing, and use that are appropriate to the application. These specific codes are intended to be used in conjunction with the General Code as referenced in G-A.2. above. Like the General Code, each specific device code includes an “Application” Section, which includes paragraphs defining which types of devices are covered by the code and which types are not. A challenge for new technologies and applications comes when the inspector realizes that no specific code “fits” and that some codes may even exclude the device or its application.

When a Specific Code Doesn’t “Fit.”

While most weighing and measuring devices encountered by an inspector are adequately covered by existing specific codes, some devices are not. One example is when a commonly used weighing or measuring device is used in a different application or business or the device is being used in a different way. Another example is when a code exists for the weighing or measuring application where a device is being used, but the device type uses a new technology that was not envisioned when the applicable code was developed; such as, using automatic weighing systems in shipping applications or using GPS to determine charges for distance traveled. In either example, existing codes may not be adequate to address the device or its application.

Some device manufacturers or users mistakenly believe that the inspector cannot apply the provisions of HB 44 to these devices. Likewise, some inspectors erroneously believe that the use of the device cannot be permitted until specific requirements are developed. While the final determination that the device is appropriate for commercial use rests with the weights and measures authority, HB 44 provisions assist with these determinations.

A commonly overlooked requirement found in the General Code is particularly useful in these instances. Paragraph G-A.3. Special and Unclassified Equipment, recognizes that new device types and applications are inevitable in the commercial marketplace.

G-A.3. Special and Unclassified Equipment. – Insofar as they are clearly appropriate, the requirements and provisions of the General Code and of specific codes apply to equipment failing, by reason of special design or otherwise, to fall clearly within one of the particular equipment classes for which separate codes have been established. With respect to such equipment, code requirements and provisions shall be applied with due regard to the design, intended purpose, and conditions of use of the equipment.

This statement (or some variation of it) has been included in each edition of HB 44 since it was originally published in 1949, and a similar reference can even be found in the precursors to HB 44 as far back as 1937 (in NBS Handbook H 22).

When an inspector finds that a device does not fall under or is not adequately covered by a specific code, paragraph G-A.3. allows the inspector to draw upon other device codes to find requirements that best fit the device and its application. For example, in 1992, when requirements and procedures for “on-board weighing systems” were being developed, the National Conference on Weights and Measures (NCWM) Specifications and Tolerances Committee referenced paragraph G-A.3. with regard to assessing these systems; while these weighing devices would seem to fit best under the Scales Code, the tolerances, test procedures, and other requirements specified in that code at the time didn’t quite fit the application. Modifications were later made to include more specific requirements for these devices, but paragraph G-A.3. provided the mechanism through which these devices could be addressed in the meantime.

In some cases, a new feature on a device may not be adequately covered. For example, in jurisdictions where temperature compensated sales of petroleum product is permitted, jurisdictions might use paragraph G-A.3. as a basis for borrowing from codes that have specific requirements and procedures for devices equipped with temperature compensation features to assess a device covered by a code that has no such requirements.

In some cases, the inspector may find it necessary to reference more than one specific code in addition to the General Code. Paragraph G-A.3. provides the flexibility needed to allow new and innovative devices and applications while helping to ensure that the device and its application are appropriate in design, adequate in amount, and clear and understandable to all parties when used in a commercial transaction.

Applying G-A.3.

When applying this paragraph, the inspector should consider factors including, but not limited to, the following:

Are the features on the device being tested similar to those found in a specific code?

- For example, if the device is equipped with a printer, might requirements from the Scales Code that prohibit printing while the scale is in motion or requirements from the Liquid-Measuring Devices Code regarding information that must be on the printed receipt be appropriate?

How will the weighing or measuring process take place?

- For example, if the device weighs dynamically, perhaps test procedures and associated criteria for other dynamic weighing devices such as in-motion railway scales or belt conveyor scale systems might be used as a basis for identifying testing requirements for the new device. Or consider how changes were made to the Automatic Weighing Systems Code (which was

originally designed to address dynamic weighing in food packaging applications) to include dynamic scales used in shipping applications.

What kind of commodities are weighed or measured by the device?

- For example, if the device is measuring a liquefied gas, are there requirements in the LPG Code that might be used?
- How is the device intended to be used? Are the measurements made by the device used in the same way as that covered by another code?
- For example, if the device is being used to assess charges for transporting goods or people, what provisions of the taximeters code or the odometers code can be used?

Will customers typically be present during the weighing or measuring operation?

- If not, might requirements for unattended weighing devices or vehicle-tank meters that ensure full disclosure to the customer be applied? If so, might provisions for indicating and recording elements from the Scales or Liquid-Measuring Devices Codes be used?

When new technology is being used, the expectation is that the new technology will provide at least as good as or better accuracy than existing technologies. Likewise, as specified in many General Code paragraphs, there is an expectation that the use of the device will result in clear and transparent measurement transactions. Indications must be clear and understandable; measurements must be within the accuracy required by similar applications; details of the measurement process and the transaction should be understandable and easy to follow for consumers and operators alike; and the device and its application must not facilitate fraud. The User Requirements in the General Code will apply to most devices and provide additional requirements to ensure proper selection and use.

Developing New Requirements.

Paragraph G-A.3. is very useful in allowing devices to enter the marketplace; however, except for instances where the new device type or application is a unique, one-time scenario, the paragraph is intended only to serve as an interim measure until specific requirements can be developed and agreed upon by the weights and measures community. Because the application of paragraph G-A.3. allows the inspector to select from amongst many different codes in HB 44, long-term use can lead to non-uniformity since individual inspectors from different jurisdictions may understandably assess and interpret the applicable requirements differently. It is in the interest of the device manufacturer, the device user, and the inspector to develop specific requirements as quickly as possible. Thus, when inspectors encounter multiple instances of a new device type or application, proposals should be developed by the manufacturer or jurisdiction and submitted through the HB 44 development process to modify HB 44. Depending on the device and the extent of its differences, this might take the form of an entirely new code or perhaps simple modifications to select sections of an existing code.

Summary.

In summary, HB 44 includes adequate provisions for enabling new and different device types and applications to enter the commercial marketplace, while ensuring that measurement operations are clear, understandable, and do not facilitate fraud. Weights and measures jurisdictions have the ultimate authority for determining whether or not a new device or application is suitable for use in commercial weighing or measuring applications. The provisions of the General Code and paragraph G-A.3. Special and Unclassified Equipment can be used to identify requirements that are appropriate for the device. While G-A.3. is no replacement for specific, focused requirements, it can be invaluable in enabling new technologies and applications to enter the marketplace until such time that more specific requirements or a new code is developed.

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