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Suitability of Installation and Variations of Weighing and Measuring Devices Covered by an NTEP CC

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As part of any field examination of a weighing or measuring device, a field inspector must determine whether or not the device is “suitable” for the application. In addition to the suitability requirements included in the General and specific codes in NIST Handbook 44, inspectors in a jurisdiction that require National Type Evaluation Program (NTEP) Certificates of Conformance (CCs) must determine whether or not the device and its application are covered under a current CC.

The NIST Weights and Measures Division (WMD) frequently receives questions about how to determine if a *specific device* with a CC is covered by the CC when it:

- is used in an application not listed on the CC;
- has metrological parameters not listed on the CC;
- is modified by the original equipment manufacturer, service agency, or the user; or
- is repaired or remanufactured.

Ultimately, the decision of whether or not a *specific device* is covered by a CC rests with NTEP.

Background on Type Evaluation: Type evaluation can be defined as a systematic examination and testing of the performance of one or more weighing or measuring devices of an identified type (pattern) against documented requirements in NIST Handbook 44 and NCWM Publication 14. The results of the evaluation are used to determine whether a CC may be issued for the type. The holder of the CC is expected to report to NTEP any metrological and other significant changes to the type that may warrant a change to the CC and/or additional evaluation. Examples of metrological changes are discussed later in this article.

It should also be noted that CCs are granted to specific applicants. Seemingly identical instruments produced by different manufacturers must each have an NTEP CC. Additionally, other companies or distributors may enter into an agreement with the original holder of the CC to market the NTEP-certified device under the distributor’s own brand, designation, or company name. In these cases it is the responsibility of the distributor to acquire and maintain a separate NTEP CC.

Contents of the CC: A CC typically includes identification of the type along with information about specific model designations, description of the type, markings, inscriptions, specifications, etc., including, if applicable, the accuracy class. In the case of a family of devices, element, or a family of elements, CCs typically list minimum and maximum values for metrologically significant parameters such as division sizes, number of divisions, flow rates, types of products weighed or measured, capacities, meter and scale dimensions, and number of products or load-receiving elements that can be operated by a single indicating element. Information is also provided about the intended

use of the device, elements, or system. Additionally, the CC includes information on the evaluations performed on the equipment submitted for testing and/or suitable documentation used to verify compliance with applicable requirements in NIST Handbook 44 and National Conference on Weights and Measures (NCWM) Publication 14.

Suitability of the Application: The inspector should take into consideration both the NIST Handbook 44 suitability requirements and contents of the CC to the extent that is possible. The following are some general guidelines for determining if the device is suitable for a specific installation and is covered by the CC.

In determining if a device is suitable for a specific application, the field inspector should apply NIST Handbook 44 General Code paragraph G-UR.1. "Selection Requirements" and other suitability requirements in the specific codes, as applicable. In addition, the inspector should review the most current CC for the device. As mentioned earlier, the various applications in which the manufacturer intends to market the device and for which NTEP has evaluated the device are listed in the "Application" paragraph on the CC. Many times the "Application" paragraph will state that the device may be used for "General purpose weighing (or measuring) applications." This does not imply the devices can be used in all applications. For example, devices such as vehicle scales, livestock scales, lubricant devices, and retail motor-fuel devices have application-specific Handbook 44 specifications, test notes, and tolerances that would not make them suitable for other general purpose weighing (e.g., shipping scales) or measuring applications (e.g., agri-chemical liquids).

The inspection of measuring devices should include the different products measured by the device in a specific installation. The inspector needs to make sure that each product is suitable for the device and that the products measured by the device in normal use in that application are listed on the CC. NTEP has developed product tables that classify liquid products for various measurement technologies and product applications into "product families" and "subgroups." Each group includes a range of products that can be accurately measured by the device. For example, a CC for positive displacement meters lists products that are broken down by product families and product subgroups, along with examples of typical products and additional parameters such as viscosity, specific gravity, and abrasive solids (if applicable).

The inspector should be aware that some CCs apply to devices covered under product-specific Handbook 44 codes (LPG and Anhydrous Ammonia, Carbon-Dioxide Liquid-Measuring Devices), technology-specific codes (Mass Flow Meters), and application-specific codes (Automatic Bulk Weighing Systems and Vehicle-Tank Meters, etc.). A CC for a weighing/load-receiving element may list applications under the Scales Code and the code for Automatic Weighing Systems. A CC for a liquid-measuring element may list applications under the Liquid-Measuring Devices, Vehicle-Tank Meter, LPG and NH₃ Liquid-Measuring Devices, and Milk Meters codes. Again, this information should be listed on the CC for either the weighing or measuring element, device, or system. Additionally, the CC for a system may cite a CC number for a metrologically significant

element that has a stand-alone CC. For example, an automatic bulk-weighing system CC will cite the CC for the load cell(s) used in the load-receiving element for the system.

Changes or Modification to the Device: Since NTEP only evaluates a limited number of devices during the evaluation, a CC alone cannot guarantee that a device in the field complies with Handbook 44 and is suitable for the location. The inspector must determine if a device is still covered by the CC if the inspector observes what appears to be a change to a device during an initial verification inspection or a modification to an existing device during a subsequent verification. These would include metrological changes which may impact the suitability of the device at a specific installation or bring into question whether or not the *specific device* is still covered by the CC.

Metrologically significant changes are considered changes to the device that have the potential to affect the measurement accuracy, primary indications, accuracy of recorded representations of the device, and other changes to the device that can affect compliance with Handbook 44. From an NTEP perspective, such variations or changes to the type are only covered if they are listed in the applicable CC.

Many metrologically significant modifications and configurations can be identified by the inspector during initial and subsequent verifications. Examples include changing the type of load cell mounting hardware, replacing lever systems with load cells, changing the capacity or flow rate, adding “dump-through” capability on vehicle or railway track scales (emptying bulk material through the scale deck), the addition of livestock racks on vehicle scale or other flat platform load-receiving elements, changing conveyor widths, and changing the rounding algorithms for mathematical calculations involving measurement values. The NCWM is developing initial verification report forms and test procedures as part of the Conformity Assessment Process to help the field official verify that a *specific device* complies with the information listed on the CC. The information gathered by the states during the initial verification will be used to provide feedback to NTEP.

However, there are other metrological changes that are not always obvious to the inspector such as a device’s sensitivity to influence factors (e.g., temperature, voltage, and time), construction materials, and measurement technology. The inspector is not expected to investigate if these types of metrological changes have been made to the device during routine inspections since they need to be verified under controlled conditions. Therefore, the NCWM is currently developing a Verified Conformity Assessment Program to verify that the applicant has control over the testing for influence factor requirements and a “quality system” (i.e., design changes, parts suppliers, manufacturing process) during production.

Superficial differences, also referred to as “non-metrological variations,” include different devices produced by a particular manufacturer that are identical in design, materials, components, and measurement ranges, but differ superficially in color or other non-metrological features such as built-in printers or extra displays. Devices with such variations can normally be regarded as being covered by the applicable CC.

The inspector must also be certain that any metrological modification(s) to the device listed above as a result of a repair or remanufacture of the device are still covered by the CC. NIST Handbook 130 Uniform National Type Evaluation Regulation Section 4 and NCWM Publication 14 - NTEP Administrative Policy (2005) Section M state that if a person makes changes to a device to the extent that the metrological characteristics listed on the CC are changed, that *specific device* is no longer traceable to the active CC. If a person repairs or remanufactures a device, the device must be repaired or remanufactured consistent with the manufacturer's original design; otherwise, that *specific device* is no longer traceable to the active CC. Please note that there are additional marking and definition requirements for remanufactured devices and elements in NIST Handbook 44 General Code paragraph G-S.1.2. and Appendix D.

Possible Actions: The inspector should consider the following guidelines when there is a question about when a *specific device* is covered by an NTEP CC.

Generally speaking, NTEP can be contacted to verify if a *specific device* is covered by the CC, including such issues as whether or not the device is installed in an application for which it was not intended or if changes to the device are still covered by the CC. The NTEP laboratory that performed the evaluation is another source of information that may help determine if the *specific device* is covered by the CC. The holder of the CC may also be contacted to confirm if the CC covers changes made to the device by the user, service agent, or service agency, or if the specific product application or metrological parameters for the *specific device* were not intended to be covered by the CC.

If the inspector has determined that the *specific device* is no longer covered by the CC, the inspector should take appropriate actions based upon the Weights and Measures statutes, regulations, and policies established by the state and local jurisdiction to resolve the situation. The owner of the device should also be notified that the device is not considered to be covered by a CC. The owner of the device may choose to contact the holder of the CC to discuss solutions that would allow the device to be covered by the CC and comply with applicable Weights and Measures requirements. The state or local jurisdiction must decide the appropriate solution for devices that are no longer in production and/or the holder of the CC is no longer in business. Note that WMD, NCWM Inc., and NTEP do not have regulatory authority. WMD can provide information and interpretations of applicable NIST Handbooks to the inspector, state, and the local jurisdiction.

For questions about NTEP, including questions on CCs and NTEP technical policies, you may contact NCWM Headquarters by phone at 240-632-9454 or by email at ncwm@mgmtsol.com. Please contact Steve Cook by phone at 301-975-4004 or by email at owm@nist.gov if you have any questions on the information provided in this article.