



## Module 4.3.5

### Small Capacity Weighing Systems Class III

#### Overview and Scope

This segment sets standards for basic inspection and testing of Class III weighing systems up to 150 kg (300 lb). The segment is geared toward specific concepts related to device technology, operations, and specific inspection requirements and test procedures for these devices.

#### Prerequisites

4.2 NIST Handbook 44 - Introduction to Device Control; 4.3.1 Static Electronic Weighing Systems, General

#### Learning Objectives

##### 1 Technologies Used in Small Capacity Class III Scales

A weights and measures inspector should understand the method of operation and the primary technologies used in typical small capacity scales. To demonstrate this, the inspector can:

- 1.1 Identify whether the device is single load cell or multiple load cell design.
- 1.2 Restate that these scales may be made up of weighing elements/modules and indicator elements/modules.
- 1.3 Identify the metrological components/modules of a point-of-sale system (weighing element, customer display, operator display, operator controls and printer).
- 1.4 Recognize that these scales may be networked to central computer systems that control preset pricing information and preset tare information related to specific price look up codes (PLU's or SKU's).
- 1.5 Recognize that scale performance will vary with the size of the load (linearity), position of load, influences such as temperature, supply voltage, etc, and disturbances such as drafts, vibration, EMI/RFI, etc.

##### 2 Scale Markings and Operations

A weights and measures inspector should understand the various marking requirements applicable to a scale system and demonstrate ability to operate a scale. To demonstrate this, the inspector can:

- 2.1 Recognize and interpret required identification markings on a scale or element (i.e. Table 6.3.a.).
- 2.2 Recognize and interpret required markings on the controls, indications and features of a scale in this category.

- 2.3 Operate the following functions/operations on a scale.
  - 2.3.1 Power on/off.
  - 2.3.2 Zero.
  - 2.3.3 Tare (both platter and keyboard tare) and Tare Clear - if scale has a tare function. Note: on POS systems the inspector may ask the store representative to operate the system during tests, depending on jurisdiction policy.
  - 2.3.4 Unit price entry and clear of unit price.
  - 2.3.5 Pre-pack function (for either or both tare and unit price) and clear pre-pack.
  - 2.3.6 Print.
- 2.4 Recognize and interpret the information displayed on a scale, including:
  - 2.4.1 Gross, Net, and Tare weight indications.
  - 2.4.2 Center of Zero, Motion, and others.
  - 2.4.3 Underload/Overload error conditions.

### 3 Technical Requirements

A weights and measures inspector should understand the various technical requirements applicable to a small capacity scale. To demonstrate this, the inspector can:

- 3.1 Apply the rules regarding the following scale features/indications and where to find them in HB44.
  - 3.1.1 Zero load indications, zero setting operations, and automatic zero setting (zero tracking).
  - 3.1.2 Digital scale divisions and limit of indication.
  - 3.1.3 Clear of unit price only after a transaction has been indicated.
  - 3.1.4 Level indication for portable scales.
  - 3.1.5 Motion detection requirements - zero, tare, printing, etc.
  - 3.1.6 Design requirements for weighing elements.
  - 3.1.7 Mathematic agreement of computed price information.
- 3.2 Apply the rules for matching weighing elements to indicating elements (modules).

### 4 User Requirements

A weights and measures inspector should understand the various user requirements applicable to a small capacity scale. To demonstrate this, the inspector can:

- 4.1 Assess suitability of a small capacity class marked scale for a given application, considering design, class, application and typical load in Tables 7a. and 8.
- 4.2 Apply requirements for scale installation in UR.2.
- 4.3 Apply general use requirements in UR.3. (Subsections 3.1., 3.2., 3.3., and 3.5.).

4.4 Apply maintenance requirements in UR.4.

## 5 Basic Test Procedures

A weights and measures inspector should be able to apply the appropriate performance tests to a small capacity scale and evaluate compliance the applicable tolerances and performance standards. To demonstrate this, the inspector can:

- 5.1 Appraise whether the verification standards to be used in the test are appropriate for use in official tests.
- 5.2 Use test weights appropriately and care for them when not in use.
- 5.3 Determine minimum amounts of standards required for testing a given scale.
- 5.4 Select appropriate test loads for an Increasing Load Test for a given scale, perform the test, and evaluate the test results for compliance with applicable tolerances.
- 5.5 Select appropriate test loads for a Decreasing Load Test for a given scale, perform the test, and evaluate the test results for compliance with applicable tolerances.
- 5.6 Select appropriate test loads for a Shift Test (eccentric loading) for a given scale, perform the test, and evaluate the test results for compliance with applicable tolerances and agreement requirements.
- 5.7 Discuss appropriate times to perform a Discrimination Test or a Repeatability Test.
- 5.8 Select appropriate test loads for a Discrimination Test for a given scale, perform the test, and evaluate the test results for compliance with the applicable standards.
- 5.9 Select appropriate test loads for a Repeatability Test for a given scale, perform the test, and evaluate the test results for compliance with applicable tolerances and agreement requirements.

### **Contributors:**

1/11/2009 Initial Draft – NEWMA (Contact: Ross Andersen, New York; 4/11/2011  
Formatting – (Ross Andersen);11/4/2013 added technology influences (Ross Andersen)