

Software Scales

Device Description: _____

Contact Name: _____ Phone: _____

Company: _____ Address: _____

E-mail: _____ City: _____

Instructions For Completing Pre-Evaluation Checklists

You will usually need to complete **both** the “General” checklist and the specific checklist which is most applicable to your device or system type. For example, for a weighing device or weighing system the “General” checklist (which applies to all device types) and the “Scales” checklist should be completed. Both the “General” and “Watt-hour Meter” checklists should be completed and submitted with an electric watt-hour metering system application.

The exceptions are the computer software/hardware component pre-evaluation checklists which have the “General” requirements incorporated in them. Use the checklist for computer systems connected with either scales or measuring systems. Only one pre-evaluation checklist will be needed unless the software will be connected to both types of systems

These checklists include requirements extracted from the California Code of Regulations. Though not all-encompassing, the checklists contain requirements beyond those which would apply to any single device type or accessory. It is best to think of a device type as a weighing or measuring device system or as a component of such a system whichever best describes the device(s).

When applying the requirements to your device you have three options; Check

- YES** If your device or system complies
- NO** if the device or system does not comply.
- NA** if sections appear not to apply to the device or system type(s)

If selecting “**NO**”, consider if your device or system is ready for evaluation. If the deficiency is of such a nature that it will not effect the ability to test for accuracy, such as failure to conform with marking requirements or lack of provision for sealing, the evaluation can probably begin while deficiencies are being corrected.

If you are not able to conduct accuracy testing your system or device is probably not yet ready for an evaluation.

I have reviewed the enclosed specifications, tolerances, and test notes for the device type for which we have applied for evaluation and approval. To the best of my knowledge I have determined the device meets all applicable requirements.

Signed: _____

Date: _____

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1. Marking - Indicating Elements

Since the United States permits indicating and weighing elements to be separately evaluated with different indicating and weighing elements assembled at the time of scale installation, in 1987, marking requirements were adopted for indicating elements not permanently attached to weighing elements. The indicating element must be marked with the accuracy class and the maximum number of scale divisions, n_{max} , for which it complies with the applicable requirements. An indicating element may be marked with a "III/III L" if it may be used in both Class III and III L applications. If the indicating element has different maximum numbers of scale divisions for Class III and III L applications, both maxima must be marked so that the maximum for each accuracy class is clear.

Indicating elements that process only digital information ("slave indicators") must also be marked with n_{max} for each accuracy class (if applicable). This marking is required because the absence of an analog-to-digital converter is not apparent from its appearance. If a weighing system has more than one "slave indicator," the value of n_{max} must be marked on the main indicator but the other indicators do not have to be marked with n_{max} .

	Yes	No	NA
1.1. The name, initials, or trademark of the manufacturer. A remote display is required to have the manufacturer's name or trademark and model designation. (Code Reference G-S.1.)			
1.2. The manufacturer's model designation that positively identifies the type or design. (Code Reference G-S.1.)			
1.3. Except for equipment with no moving or electronic component parts, a nonrepetitive serial number. (Code Reference G-S.1.)			
1.4. The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number. (Code Reference G-S.1.)			
1.5. The serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.). (Code Reference G-S.1.)			
1.6. If the information is placed on a badge or plate, the badge or plate must be permanently attached to the device.			
1.7. Identifying information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.			
1.8. The indicator is marked with its accuracy class. Indicate class: _____			
1.9. The device meets all the parameters for the accuracy class.			
1.10. The indicator is marked with the maximum number of scale divisions (for each accuracy class) for which it complies with requirements.			

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	Yes	No	NA
1.11. The system shall be marked with the operating temperature range if the temperature range is other than 14 °F to 104 °F (-10 °C to 40 °C).			
1.12. The nominal capacity by minimum scale division shall be clearly and conspicuously marked adjacent to the weight display (acceptable location depends on conspicuousness).			
1.13. The capacity division size shall be marked for all weight units that can be displayed, such as, both lb and kilograms.			
1.14. If equipped with variable resolution, the scale shall be marked with the weight ranges and corresponding scale division sizes.			
1.15. If the capacity by division statement is displayed on a video terminal with the weight values, then the capacity by division statement must be adjacent to the weight display and displayed whenever the system is in the weighing mode.			
1.16. All markings must be clear and easily readable.			
1.17. The lettering must be permanent. Record the grade for the permanence of markings:			
1.18. The badge or decal must be durable (difficult to remove at all temperatures).			
1.19. If the indicator is for Class III/III L applications, the "CLC" (concentrated load capacity) shall be marked on or adjacent to the identification markings or nomenclature plate that is attached to the system (or space provided to include the CLC).			
2. Marking - Software			
2.1. For software that is evaluated for use in separable hardware, the identifying information (manufacturer name or trademark, model designation, and serial number) must be visible on the video display terminal when called up on the menu or be continually displayed.			
3. Marking - Weighing\Load-Receiving Elements			
<p>Weighing elements that are not permanently attached to the indicator may be interfaced with many different indicators. Consequently, these weighing elements must be marked with information that clearly identifies the manufacturer, the model, and the capacity of the weighing element.</p> <p>Since the United States permits indicating and weighing elements to be evaluated separately with different indicating and weighing elements to be assembled at the time of scale installation, additional marking requirements were adopted in 1987. To facilitate the proper installation of equipment and to permit verification by the enforcement official, a weighing element not permanently attached to an indicating element must be marked with (1) its accuracy class, (2) the maximum number of scale divisions, n_{max}, and (3) minimum verification scale division, e_{min}, for which the weighing element complies with the applicable requirements.</p>			

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	Yes	No	NA
3.1. Weighing elements not permanently attached to an indicating element shall be clearly and permanently marked with:			
3.1.1. The name, initials, or trademark of the manufacturer or distributor. A remote display is required to have the manufacturer's name or trademark and model designation. (Code Reference G-S.1.)			
3.1.2. A model designation that positively identifies the pattern or design of the device. (Code Reference G-S.1.)			
3.1.3. Except for equipment with no moving or electronic component parts, a nonrepetitive serial number. (Code Reference G-S.1.)			
3.1.4. The serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number. (Code Reference G-S.1.)			
3.1.5. The serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.). (Code Reference G-S.1.)			
3.1.6. If the information required by G-S.1. is placed on a badge or plate, the badge or plate must be permanently attached to the device.			
3.1.7. Identifying information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.			
3.1.8. The nominal capacity of the weighing element.			
3.1.9. Its accuracy class. Indicate class: _____			
3.1.10. The device meets all the parameters for the accuracy class.			
3.1.11. The maximum number of scale divisions for which it complies with requirements.			
3.1.12. The minimum verification scale division for which it complies with requirements.			
3.1.13. The weighing element shall be marked with the operating temperature range if the temperature range is other than 14 °F to 104 °F (-10 °C to 40 °C).			
3.1.14. The lettering must be permanent. Record the grade for the permanence of markings.			
3.1.15. If the information is placed on a badge or plate, the badge or plate must be permanently attached to the device. If a badge, label, or plate made of a metal or plastic is used, then it must be riveted, welded, or attached to the scale by an adhesive so that a tool is required to remove it (bolts or removable screws are not acceptable).			

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	Yes	No	NA
3.1.16. The information must be mounted on a protected surface such as the side of the weighing element, behind a ramp or under a cover plate. Access to the marking should be available with minimum effort.			
3.1.17. The information must be on a surface that is an integral part of the chassis.			
3.1.18. All markings must be clear and easily readable.			
3.1.19. The identification information for the weighing elements of vehicle, axle-load, livestock, and railway track scales shall be located: 3.1.19.1. Near the point where the signal leaves the weighing element. This would be the transverse lever on a mechanical scale.			
3.1.19.2. The information shall be on or near the junction box nearest the point where the signal leaves the scale on an above-ground scale.			
4. Marking - Livestock, Vehicle, and Railway Track Scales			
4.1. The section capacity of a railway track scale shall be marked on or adjacent to the identification badge on the indicating element.			
4.2. A vehicle, axle-load, or livestock scale shall be marked with the concentrated load capacity of the scale. Such marking shall be identified as "concentrated load capacity" or by the abbreviation "CLC" and shall be accurately and conspicuously shown:			
4.2.1. On, or adjacent to, the identification or nomenclature plate that is attached to the indicating element of the scale,			
4.2.2. On the load-receiving element of the scale. These capacity markings shall be added to the load-receiving element of any such scale not previously marked at the time of modification.			
4.3. If a vehicle scale is marked with maximum load ratings in addition to the required CLC, the ratings shall not exceed the maximum specified.			
4.4. The marked nominal capacity on all vehicle, axle-load, and livestock scales shall not exceed the concentrated load capacity times the quantity of the number of sections in the scale minus 0.5.			
4.5. Combination vehicle/railway track scales shall be marked with (1) the nominal capacity and CLC for vehicle weighing, and (2) nominal capacity and section capacity for railway weighing. The e_{min} for both vehicle weighing and railway weighing shall also be marked. Note: Combination scales (vehicle/railway truck) shall be marked with all required information.			

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	Yes	No	NA
<p>5. Customers' Indications - Digital Computing Scales</p> <p>In a direct sale application, a customer has the responsibility to verify that the various aspects of the sale are correct. Consequently, metrologically significant information must be made available to the customer, particularly if it is provided to the operator. To facilitate value comparisons and to recognize current sales practices, unit prices shall be in whole units of weight or multiples of whole units. Scales indicating in metric units may indicate the price per 100 grams. Otherwise, fractional pricing is prohibited. Multiplier keys that multiply the unit price entry by 2 or 4 are acceptable because the unit price is always in whole units of weight.</p> <p>Shipping scales must display to the customer the same metrologically significant numerical information as is on the operator's display. As a minimum, the customer display must include the shipping weight, zone code, and total price.</p>			
<p>5.1. Any indication of function or condition shall not be represented in a manner which interferes with the interpretation of weight. For example, a "+" and a "-" sign used as an over/under indication may not be placed adjacent to a weight value.</p>			
<p>5.2. If the operator's side of the scale indicates net weight, unit price and total price, the customer's side must indicate the same information in the same units.</p>			
<p>5.3. Customer's unit price display must be in terms of whole units price per pound or multiple pound prices (e.g., 3 lb/\$1.00) except for scales indicating in metric units which may indicate unit prices in price per 100 grams. Otherwise, fractional pricing (i.e., 1/4 lb or 1/2 lb prices) is prohibited.</p>			
<p>5.4. Multiplier keys are permitted. If provided, multiplier keys shall function only once after a particular unit price has been entered. After a particular multiplier key has been activated, only one multiplication can be performed, and the other multiplier key must be temporarily immobilized.</p>			
<p>5.5. For shipping scales, the customer's side must display the same metrologically significant numerical information as is on the operator's display. This includes as a minimum, the shipping weight, zone code, and total price.</p>			
<p>6. Indicating and Recording Elements - General</p> <p>There are several general requirements to facilitate the reading and interpretation of displayed weight values. Other requirements address the proper operation of indicating and recording elements.</p>			
<p>6.1. Except for batching scales, the value of the scale division in all available weight units for both indicating and recording elements must be in values of 1, 2, or 5 times 10k where k is an integer (e.g., 0.1, 0.2, or 0.5; 1, 2, or 5; 10, 20, or 50, etc.).</p>			
<p>6.2. Except for postal scales, digital weight values shall be in a single unit of measure.</p>			
<p>6.3. Digits for indications or recorded representations must be uniform in size and character (unless d ≠ e).</p>			

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	Yes	No	NA								
6.4. All indications or recorded representations shall be uniform throughout the series (i.e., the width of each scale division must be the same in terms of weight).											
6.5. For scales indicating in two or more units, consecutive scale division values shall be indicated throughout the entire weighing range for all units.											
6.6. If an indicator or a video display terminal gives the only weight indication for the scale when in the weighing mode, the weight display must be a continuous live display. It must be located in an area dedicated to the weight display and clearly distinguished and separated from other information on the display. (If the video display is in addition to another primary display, the operator's display need not be a "live" display, but the weight information must be in a dedicated area and separated from the other information on the display.)											
6.7. Subordinate indications or recorded representations must be appropriately designated or portrayed.											
6.8. The minimum acceptable indication of zero balance must be one of the following:											
6.8.1. If a decimal point is used, at least one digit to the left and all digits to the right of the decimal point must be displayed.											
6.8.2. All decades to the right of a decimal point must be active (i.e., a fixed zero cannot appear to the right of a decimal point).											
6.8.3. If a decimal point is not used, at least one active decade plus any constant (fixed) zeros must be displayed.											
6.8.4. When in the "sleep" or "screen saver" mode, the zero indication must be defined. Example: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Capacity (lb)</th> <th>Minimum Zero Indication (lb)</th> </tr> </thead> <tbody> <tr> <td>25 x 0.01</td> <td>0.00</td> </tr> <tr> <td>5000 x 1</td> <td>0</td> </tr> <tr> <td>100 000 x 20</td> <td>00</td> </tr> </tbody> </table>	Capacity (lb)	Minimum Zero Indication (lb)	25 x 0.01	0.00	5000 x 1	0	100 000 x 20	00			
Capacity (lb)	Minimum Zero Indication (lb)										
25 x 0.01	0.00										
5000 x 1	0										
100 000 x 20	00										
6.9. Digital elements shall be designed so that:											
6.9.1. All digital values of like value in a system must agree with one another.											
6.9.2. Displayed and printed values of gross, tare, and net must be in the same weight units.											
6.9.3. Each digital value must coincide with its associated analog value to the nearest graduation.											
6.9.4. All digital values must round to the nearest scale division.											

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	Yes	No	NA
6.10. When dead-load verification values, electronic recalibration values, electronic display verification sequences, or other test values are displayed by an indicator (or a video display terminal getting weight values from a separate primary indicator) the device shall either:			
6.10.1. Not print; or			
6.10.2. Provide a clear and continuous indication on the printed representations that the displayed value is other than a valid weight representation.			
6.11. A weighing system must not display or record any values when the correct calculated values exceed the display or printing capability. (An entry of 8 digits made into a defined field length of 7 digits will give an error indication.)			
6.12. Upon return to gross load zero, a device may automatically display other information. For example, it may cycle the time, date, and zero indications, provided that the display for the other information occurs only when the scale is at zero and the zero indication can be displayed or is displayed as part of the cycled information. The values must be clearly defined. The scale must inhibit a weighing operation, display weight values or give an out-of-balance indication whenever the scale is out of zero balance.			
6.13. If the system has the ability to "Print Screen," it shall not resemble a valid transaction when printed on a weight ticket.			
6.14. If the digital display uses only a portion of the most significant decade (MSD); i.e., the MSD is used for both the minus (-) sign and indicating the number "1", the device is required to meet one of the following two conditions:			
6.14.1. It must not simultaneously display the digit "1" and the minus sign in the MSD;			
6.14.2. There must be clearance between the "-" and the digit "1" in the MSD.			
6.15. A push-button zero may operate in the gross, net, or tare display mode if the gross load is zeroed and all other indications change to the proper value with respect to the new gross weight zero reference point.			
6.16. Any indication of function or condition shall not be represented in a manner that interferes with the interpretation of weight. For example, a "+" and "-" sign used as an over/under indication may not be placed adjacent to a weight value.			
7. Values Defined Graduations, indications, and recorded values that are intended to have specific values shall be adequately identified by a sufficient number of figures, words, and symbols. These defining terms shall be uniformly placed relative to the graduations, indications, and recorded values and as close as practical to them without interfering with their readability. When SI units are used, the symbols shall comply with those given in Table 1 (see page 37). Other symbols shall comply with the abbreviations given in Appendix C (General Tables of Units of Measurement) in National Institute of Standards and Technology Handbook 44. Exceptions are the abbreviation for carat (ct), U.S. short ton (ton or TN), and U.S. long ton (LT), and the grain.			

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	Yes	No	NA
<p>7.1. Indications or recorded representations shall be properly defined by figures, words, or symbols (e.g., lb, oz, kg, \$).</p> <p>Several examples are displayed on pages 34 to 35.</p>			
<p>7.1.1. Examples of acceptable indications of selected units for a single indicator with the ability to display pounds, kilograms, and ounces as individual units of weight or pounds and ounces together for postal applications. (See pages 34 to 35)</p>			
<p>7.2. Dual Indications.</p>			
<p>7.2.1. The lower case "kg" must be used on display panels and keys when the symbol for kilogram is used.</p>			
<p>7.2.2. The lower case "kg" should be used for printing when possible. The upper case "KG" is an acceptable symbol for kilogram only if the lower case "kg" cannot be printed. Uppercase KG is <u>not</u> acceptable for package labels.</p>			
<p>7.2.3. Any other metric symbols must comply with those given in Table 1 (see page 37).</p>			
<p>7.2.4. An indicator with an external lb/kg conversion switch must identify the weight units in which the display is indicating.</p>			
<p>7.2.5. Front panel mounted toggle switches must be adjacent to the weight display and must have the unit identified by a LED or other lighted annunciator. (The position of the toggle switch alone is not considered to be adequate identification of the unit in use.)</p>			
<p>7.2.6. When units are converted, the weight unit selector switch must convert both the weight display and tare values to the same weight unit.</p>			
<p>7.17. Occasionally, a weighing system will indicate in one weight unit and convert the weight value to another weight unit for billing and accounting purposes (e.g., indicate in pounds and convert to tons). When this is done, the following must be satisfied:</p>			
<p>7.17.1. Primary weight indications and recorded values must agree as specified in National Institute of Standards and Technology Handbook 44 and must be in the same unit of weight.</p>			
<p>7.17.2. Derived indications and recorded representations may be in other units of weight provided:</p>			
<p>7.17.2.1. they are mathematically correct and based on the General Tables of Weights and Measures found in National Institute of Standards and Technology Handbook 44:</p>			
<p>7.17.2.2. They are of equal resolution to the primary weight indication; and</p>			
<p>7.17.2.3. Rounding is not performed until the last mathematical operation.</p>			

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	Yes	No	NA
<p>8. Recorded Representations</p> <p>All recorded values must be permanent, legible, and printed in a digital format. Although National Institute of Standards and Technology (NIST) Handbook 44 does not require vehicle scales to print gross, tare, and net weight, California weighmaster laws require the printing of all three values.</p> <p>All recorded weight values must be clearly defined.</p> <p>The primary weight indication and the printed value must agree exactly as specified in NIST Handbook 44 and must be in the same unit of weight. Derived indications and recorded representations may be in other units of weight provided the following criteria are satisfied.</p> <p>a. They are mathematically correct. That is, they are based upon the values specified in the General Tables of Weights and Measures found in NIST Handbook 44.</p> <p>b. They are of equal resolution to the primary weight indication; and</p> <p>c. Rounding is not performed until the last mathematical operation.</p>			
<p>8.1. All weight values, such as gross, tare, net, or inbound shall be clearly defined. Other recorded information, such as time, date, scale identification, commodity, vehicle number, or memory register need not be defined since it is supplementary information. However, for clarity, a definition of this information is recommended.</p> <p>In the case of printers that issue labels for packages, requirements of the Fair Packaging and Labeling Act and the Uniform Packaging and Labeling Regulation apply. The labeling requirements for these types of label are included below.</p>			
<p>8.2. All recorded values shall be permanent, legible, and printed in a digital format.</p>			
<p>8.3. If a scale is equipped to externally select weight units, the printer must record the weight units with the weight values.</p> <p><i>Note: Preprinted weight tickets stating the weight unit are acceptable for indicators capable of displaying one weight unit or which have an internal lb/kg conversion switch.</i></p>			
<p>8.4. A printer must record the same value and number of decimal places as indicated in the display. Example: A digital indicator may display weight values to 0.01 lb and 0.005 kg. The printer must record a weight value in pounds to 0.01 lb; not to 0.010 lb.</p>			
<p>8.5. Derived values must be correct mathematical conversions from the indicated values with rounding performed at the last step of conversion to ensure mathematical agreement.</p>			
<p>8.6. Labels submitted with devices for type evaluation must meet the following requirements:</p>			
<p>8.6.1. The background color and design must be the same for the weight, unit price, and total price.</p>			
<p>8.6.2. The numbers cannot be printed on any background which consists of cross-hatching.</p>			
<p>8.6.3. The total price value may be highlighted by the size of the numbers and a colored border around the numbers.</p>			

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	Yes	No	NA									
<p>8.6.4. The symbol "\$" or the word "dollars" is required with the total price and may be printed by the device or pre-printed on the label. Defining the unit price in either manner is not necessary.</p>												
<p>8.7. Random Labels by Count.</p> <p>8.7.1. The quantity block must be headed with the words "Net Weight/Count". (The term "Net Weight" is optional). If the printer does not print the specific weight unit, the pre-printed label must include this information; for example, pound, lb, or kg.</p>												
<p>8.7.2. The count must be printed in the quantity block.</p> <p><i>Note: If there are no individual blocks for the printed information, and the printer prints a qualifying term such as "pieces" or a symbol such as "pcs" in a horizontal manner reading from left to right, and if there is little doubt as to the meaning of the label, then it is considered appropriate.</i></p>												
<p>8.7.3. The count must be printed as an integer without a decimal point and must be modified with the word or symbol for pieces (pcs) or count (ct) either in the heading or next to the number.</p>												
<p>8.7.4. The total package price must appear in the total price block.</p>												
<p>8.7.5. When labeled by count, the unit price block is to remain blank unless the unit price is valid.</p> <p>Examples are:</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th>Quantity</th> <th>Unit Price</th> <th>Total Price</th> </tr> </thead> <tbody> <tr> <td>6 pcs</td> <td>0.50</td> <td>\$3.00</td> </tr> <tr> <td>5 pcs</td> <td>5/.89</td> <td>\$0.89</td> </tr> </tbody> </table>	Quantity	Unit Price	Total Price	6 pcs	0.50	\$3.00	5 pcs	5/.89	\$0.89			
Quantity	Unit Price	Total Price										
6 pcs	0.50	\$3.00										
5 pcs	5/.89	\$0.89										
<p>8.8. Standard Weight Package Labels</p> <p>The requirements that apply to standard weight package labels may require that the package be present to determine compliance. Standard weight packages of cheese, cheese products, fresh fruits or vegetables labeled by count on scales used to weigh and label random weight packages are exempt from the requirements for type size, metric units, location, and free area of the Uniform Packaging and Labeling Regulation.</p>												

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	Yes	No	NA
<p>8.8.1. Location of Net Weight Declaration</p> <p>The net weight declaration is to appear in the lower 30 percent of the "principal display panel." The principle display panel is that part of a label that is designed to most likely be displayed, presented, shown, or examined under normal and customary conditions at display and purchase. Ordinarily, the principal display panel is understood to be an entire side of a box or bag. However, when a retail store is packaging products, the packaging into which they put the products are often devoid of any printed matter other than the label. This makes the label produced by a random-label printer a "spot" label. Therefore, the interpretations provided by the United States Food and Drug Administration concerning "spot" or "header" labels may be followed. These interpretations, permit some leeway in the placement of the net contents statement.</p> <p>If a spot label contains all of the required information (i.e., the rest of the package surface is devoid of any printed matter), then the spot label may be placed anywhere on the principal display panel. However, if any information (e.g., identity of the product or statement of responsibility) appears anywhere on the surface other than on the spot label, the entire surface becomes the principal display panel and the quantity declaration (label from scale) must appear in the lower 30 percent of the principal display panel. To reduce labeling violations, the net weight should be printed on the lower 30 percent of the label. (Please note that local packagers should be instructed to apply the label in the lower 30 percent of the container if other mandatory information is printed on the container.)</p>			
<p>8.8.2. Type Size</p> <p>Type size does not depend upon the size of the printed label, but on the size of the surface to which it is applied. In the case of a rectangular box, for example, the entire side or front of the box is considered to be the principal display panel, the area being the product of the height times the width. For the minimum height of numbers and letters in the net weight declaration refer to Table 2 (see page 37).</p>			
<p>8.8.3. Free Area</p> <p>There must be "free area" (no other printed information) equivalent to the height of the letters and numbers in the net weight statement above and below the net weight statement. In addition, free area to the left and right of the net weight declaration must be equivalent to twice the width of the capital letter "N" of the style and size of the type used in the net weight declaration.</p>			
<p>9. Money Values - Mathematical Agreement</p> <p>All indicated and recorded digital money values shall be in mathematical agreement with their associated quantity representations to the nearest one cent. Table 3 (on page 38) are suggested weight and unit prices provided for evaluating computing scales and point-of-sale systems.</p>			

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	Yes	No	NA								
<p>10. Recorded Representations of Gross, Tare, and Net Weight</p> <p>There are two primary requirements concerning the printing of weight values. First, the recorded values must be mathematically correct. Second, the recorded values must agree with the indicated values. Two situations provide the greatest potential for noncompliance with these requirements. One is when push-button tare is taken to the internal resolution of the scale and the scale indicates and records gross, tare, and net weight. In the second, a scale sums the analog signal from two or more weighing elements and the scale indicates and records gross, tare, and net weight.</p>											
<p>10.1. Test Method 1</p> <p>Use this method when tare is taken to the internal resolution and the scale prints gross, tare, and net weight.</p>											
<p>10.1.1. Place a load on the scale that results in a scale indication that is just below the zone of uncertainty (i.e., "upper edge" of the scale division) and press the push-button tare key (i.e., "upper edge" of the scale division) and press the push-button tare key.</p>											
<p>10.1.2. Add more weight to the scale so the gross load is just above the zone of uncertainty (i.e., "lower edge" of the scale division).</p>											
<p>10.1.3. Compare the indicated or recorded values for the gross, tare, and net weight. They must be in mathematical agreement.</p> <p>Example of possible noncompliance: Capacity 120 000 x 20 lb</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Load perceived by the scale to the internal resolution</th> <th>Recorded Value</th> </tr> </thead> <tbody> <tr> <td>45011 lb gross</td> <td>45020 LB G</td> </tr> <tr> <td><u>20009 lb tare</u></td> <td><u>20000 LB T</u></td> </tr> <tr> <td>25002 lb net</td> <td>25000 LB N</td> </tr> </tbody> </table>	Load perceived by the scale to the internal resolution	Recorded Value	45011 lb gross	45020 LB G	<u>20009 lb tare</u>	<u>20000 LB T</u>	25002 lb net	25000 LB N			
Load perceived by the scale to the internal resolution	Recorded Value										
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<u>20009 lb tare</u>	<u>20000 LB T</u>										
25002 lb net	25000 LB N										
<p>10.2. Test Method 2</p> <p>Use this method to test the sum of analog signals from two weighing elements.</p>											
<p>10.2.1. Place a load on each weighing element that results in a weight indication just below the zone of uncertainty (i.e., "upper edge" of the scale division) or just above the zone of uncertainty (i.e., "lower edge" of the scale division).</p>											

Software Scales

<p>10.2.2. Compare the indicated or recorded values for the individual scales and the summed indications. They must be in mathematical agreement.</p> <p>Example of possible noncompliance: Capacity 300 x 0.1 lb</p> <table border="1" data-bbox="212 453 1198 705"> <thead> <tr> <th></th> <th>Load to internal resolution</th> <th>Displayed Values</th> <th>Load to internal resolution</th> <th>Displayed Values</th> </tr> </thead> <tbody> <tr> <td>Scale 1</td> <td>25.04</td> <td>25.0</td> <td>25.06</td> <td>25.1</td> </tr> <tr> <td>Scale 2</td> <td>25.04</td> <td>25.0</td> <td>25.06</td> <td>25.1</td> </tr> <tr> <td>Sum</td> <td>50.08</td> <td>50.1</td> <td>50.12</td> <td>50.1</td> </tr> </tbody> </table>		Load to internal resolution	Displayed Values	Load to internal resolution	Displayed Values	Scale 1	25.04	25.0	25.06	25.1	Scale 2	25.04	25.0	25.06	25.1	Sum	50.08	50.1	50.12	50.1			
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Scale 2	25.04	25.0	25.06	25.1																			
Sum	50.08	50.1	50.12	50.1																			
<p>10.3. The recorded values of the gross, tare, and net weight shall be mathematically correct, that is, gross weight = net weight + tare weight.</p>																							
<p>10.4. The recorded values shall agree with the indicated values.</p>																							
<p>11. General Considerations</p> <p>To prevent the indication or recording of erroneous weight values, the following requirements must be met.</p>																							
<p>11.1. Manipulation of the power cord or printer cable must not influence the indicated or recorded weight values.</p>																							
<p>11.2. Operation of nearby electronic equipment, whether or not associated, must not affect digital indications.</p>																							
<p>11.3. Use of any operational functions or options shall not facilitate fraud.</p>																							
<p>11.4. The equipment, through its characteristics and design, shall not facilitate fraudulent operation.</p>																							
<p>11.5. For systems having the weigh-in/weigh-out feature, but interfaced with a separate indicating element, the separate indicating element must indicate in the gross weight mode only. The tare and net features must be deactivated to restrict weight input to the weigh-in/weight-out feature to be gross weight only. The system must only accept weight values when the scale indicator is in the gross weight display mode. (Gross weight scale indicators without external lb/kg conversion may be used.)</p>																							
<p>12. Manual Weight Entries</p> <p>12.1. Manual entries of gross weights are permitted for use in only the following applications: (1) POS systems when giving credit; (2) when generating labels for standard weight packages; (3) postal and package shipping scales when generating manifests for pick-up at a later time; and (4) on livestock scales to correct erroneous tickets.</p> <p>12.2. The scale must be at gross-load zero and the scale indication must be at zero in the gross weight display mode before manual weight entries are permitted and;</p>																							

Software Scales

	Yes	No	NA
<p>12.3. Except for systems generating labels for standard weight packages, recorded manual gross weight values must be adequately defined so it is clear that the gross weight values are manual gross weight entries. Recorded weight values must be identified as MAN WT, MANUAL WT, MAN WEIGHT, or similar statement.</p> <p>The use of a symbol to identify multiple manual weight entries is permitted, provided that the symbol is defined on the same page on which the manual weight entries appear and the definition of the symbol is automatically printed by the recording element as part of the document.</p>			
<p>12.4. Manual tare entries shall not interact with a feature that compares one weight value to another to identify the larger weight as the gross weight.</p>			
<p>12.5. Manual tickets may be entered from scales that are not interfaced (physically connected) to the system provided it is clearly stated on the ticket.</p> <p>Note: The use of a “hot key” or other means to selectively interrupt communication with the scale is not permitted.</p>			
<p>12.6. In the normal weighing mode, when scale to computer communications exist, manual gross and net weights cannot be entered for a new (not voided) ticket. Manual gross and tare weights can be entered for new tickets if scale communication is lost. Scale reading errors such as motion, below zero, over capacity, wrong display units are <u>not</u> considered a loss of communication with the scale.</p> <p>A conspicuous message must be printed on the ticket that this is a manual generated weigh-ticket.</p>			
<p>13. Display of negative values.</p> <p>A display of negative weight values is required in the <u>net</u> display mode when the gross weight is less than the tare value. This assumes that the gross weight is zero or positive. If the gross weight is negative (behind zero-balance condition), and if blanking the display is used to indicate a behind-zero-balance condition, the gross and net display may blank.</p>			
<p>13.1. Blanking the display</p> <p>This method <u>cannot be used</u> to indicate a negative balance condition if the device also: (1) blanks the display to indicate over-capacity and (2) the load condition of the load-receiving element is not evident to the operator (e.g., a hopper scale where the operator cannot see the load condition, empty or full, of the hopper).</p> <p>If blanking is used, it is recommended that the indicator also have an annunciator to indicate "power on," so the operator does not think that power has been lost when the display is blank.</p>			
<p>13.2. Display of a symbol which cannot be interpreted as a quantity value (e.g., -, ---, EEEE, E S-1) is acceptable, however, the display of complements are not acceptable, and flashing zeros or a minus sign preceding a zero or zeros cannot be used.</p>			

Software Scales

	Yes	No	NA
<p>14. Facilitation of Fraud - Appropriate Design</p> <p>Power Interruptions</p> <p>After a momentary (up to ten seconds) power interruption, an indicating element shall either return to zero, display an accurate weight value (gross or net) that is within one division of the value that was displayed before the power failure (relative to the gross load zero reference that existed prior to the power interruption and assuming no change in load) display an error signal, or display meaningless information that cannot be interpreted as a weight value and which requires operator intervention to return the scale to operation. Examples of meaningless information are: ---, EEE, 6CE1, etc. Information stored in non-volatile memory, (e.g., inbound weights and uncompleted transactions shall not be lost during a power failure or when system is restarted.</p>			
<p>Test Method</p> <p>If the scale is equipped with push-button zero or an automatic zero setting mechanism, zero off several divisions of weight. Place a load on the scale and note the displayed weight. Simulate a power failure by pulling the power plug. Do not interrupt the power for more than ten seconds. Return power to the device after which the scale returns to operation. This test also applies to battery-powered devices where the battery is replaceable or rechargeable.</p> <p>Repeat the test by using the power switch to interrupt the power and record the manner in which the scale returns to operation.</p>			
<p>14.1. After a power interruption initiated at the power plug, one of the following conditions must be met (check the appropriate result). The display:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Returns to zero. <input type="checkbox"/> Returns to an accurate weight value (within 1d of previous value). <input type="checkbox"/> Displays a meaningless output or error signal which requires operator intervention. 			
<p>14.2. After a power interruption initiated at the power switch, one of the following conditions must be met (check the appropriate result). The display:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Returns to zero. <input type="checkbox"/> Returns to an accurate weight value (within 1d of previous value). <input type="checkbox"/> Displays a meaningless output or error signal which requires operator intervention. 			
<p>14.3. Information stored in memory (e.g., inbound weights and uncompleted transactions) shall not be lost during a power failure or when restarting the system.</p> <p>Note: This requirement does not apply to an uncompleted transaction where information had not been stored in non-volatile memory at the time of the power failure or the restarting of the system.</p>			
<p>15. Damping Means</p> <p>The weight indications on a digital scale shall stabilize shortly after a load is applied to the scale. Its indications shall not significantly oscillate or update so slowly that intermediate weight values are misinterpreted as the final stable weight value.</p>			
<p>15.1. The device shall be equipped with an effective means for damping oscillations.</p>			

Software Scales

	Yes	No	NA
<p>16. RFI/EMI Environment</p> <p>The equipment shall be suitable for the environment in which it is intended to be used, including resistance to electromagnetic and radio-frequency interference generated by electromechanical equipment, portable hand-held radio transmitters and citizen's band transmitting equipment (if normally used at the site of installation), the printer, etc. (NCWM/SMA RFI/EMI Field Test Procedures to be used where applicable).</p>			
<p>17. Installation Requirements</p> <p>17.1. The device must be installed in accordance with the manufacturer's instructions.</p>			
<p>17.2. If the device is installed in a fixed location, neither its operation nor its performance shall be adversely affected by any characteristic of the foundation, supports, or any other installation detail.</p>			
<p>18. Computing Scales With Multiple Sales Accumulation Capability</p> <p>Computing scales with <i>both</i> multiple sales accumulation and price-look-up capability are considered to be electronic cash registers. They must meet all requirements applicable to electronic cash registers and issue a similar sales receipt.</p> <p>If a computing scale with <i>only</i> multiple sales accumulation capability issues an itemized sales receipt for the customer, the requirements for the displayed information are less stringent. For example, when an itemized receipt is provided, the scale need not display the number of items accumulated in customer subtotal or total prices. It may display the item price of a nonweighed item after it has been added into the accumulated total. If a scale does not issue an itemized receipt, then the scale display must indicate the number of items accumulated along with customer subtotal or total prices, and may not indicate any weight values when the customer subtotal or total prices are displayed.</p> <p>Note: <i>The number of items accumulated is the actual count (i.e., 18 items at 6 for \$1.00 = 18 items, not 3 items).</i></p>			
<p>18.1. A computing scale with multiple sales accumulation capability shall either:</p>			
<p>18.1.1. Issue an itemized receipt for the customer, or</p>			
<p>18.1.2. If an itemized receipt is not provided, the scale shall:</p>			
<p>18.1.2.1. Indicate the number of items accumulated in the customer's subtotal or total prices whenever they are displayed, and</p>			
<p>18.1.2.2. Not indicate any weight values when there is a display of accumulated subtotal or total prices.</p>			
<p>18.2. Non-weighed items may not be entered when there is a load on the platform.</p>			
<p>18.3. If the device can simultaneously accumulate transactions for more than one customer, operator identification must be displayed if it is not equipped to record.</p>			

Software Scales

	Yes	No	NA
18.4. If the device can simultaneously accumulate transactions for more than one customer, operator identification must be printed if it is equipped to record. (If the operator identification is recorded, it is not necessary to display the operator identification.)			
19. Computing Scales Without Multiple Sales Accumulation Capability			
19.1. Printing of non-weighed items by count shall either:			
19.1.1. Operate only under no load condition, or			
19.1.2. Cause the display blank.			
20. Computing Scales With Multiple Item Entry Feature			
Computing scales with a multiple item entry feature must require the numeric entry in multiple item transactions before the "For" command is entered. Example: PLU, 3, For, print means 3 for \$.50 where the \$.50 came from the PLU. Incorrect: PLU, For, print gave 50 at \$.50 for a total of \$25. This should result in an error message.			
20.1. A computing scale with the multiple item entry feature must require the numeric entry in multiple item transactions before the "For" command is entered.			
21. Computing Scales That Continue To Display Values After Load Removal			
For digital price computing scales that continue to display computed price information following removal of the load:			
21.1. Computed price information may not be held following load removal for more than 15 seconds.			
21.2. The computing scale must automatically return to its zero reference.			
21.3. The computing scale must automatically return to a "non-hold" or active mode at any time a new unit-price is entered during a "hold" period.			
21.4. If the scale initiates label printing or a "print command" is given during the "hold" period, the scale must automatically return to an active mode and print the correct weight and price information for the current load conditions.			
22. Multiple Tare Memory Registers			
Microprocessors have made it possible to enter several tare values into a digital indicator by keyboard entries or by using push-button tare. The proper operation of an indicator having multiple tare memory registers depends upon whether or not the indicator is used in direct or indirect sales and whether or not a printer is used in these situations. In normal circumstances, the indicator will be able to show the gross, tare and net values. A distinction will be made between tare entries during normal weighing operations and tare values that are entered in a separate programming operation.			

Software Scales

	Yes	No	NA
<p>22.1. Direct Sale -- No Printer - Tare Entries in Normal Weighing Operation</p> <p>In this configuration the display may automatically return to the gross or net mode after a time delay.</p>			
<p>22.1.1. The tare values may be entered only when the display is in the tare display mode so the entries can be verified.</p>			
<p>22.1.2. Each tare value must be recallable for verification in the event the customer wishes to verify the tare value.</p>			
<p>22.2. Direct Sale -- Printer - Tare Entries in Weigh-In/Weigh-out Operations</p> <p>22.2.1. The printer must print the gross, tare and net values as a continuous sequence so the values are documented and verifiable.</p>			
<p>22.2.2. If the gross or tare weight is obtained by weighing the inbound weight of a vehicle, the inbound weight shall be recorded at the time of the inbound weighing to provide a correlation with the weight recalled from memory.</p>			
<p>22.3. Direct Sale -- Printer or No Printer - Preprogrammed Tare</p> <p>This applies to computing scales having preprogrammed tare incorporated with price look-up capabilities. The scale is not required to display or print the gross or tare weight provided the net weight is displayed or recorded. The rationale for this is that the weights and measures official can verify the accuracy of the preprogrammed tare weights during inspections.</p> <p>Programmed tare weights may be entered only when the scale is in a limited access programming mode.</p>			
<p>22.4. Indirect Sale -- Printer or No Printer - Tare Entries in Normal Weighing Operation</p> <p>The display may automatically return to the gross or net mode after a time delay. Once selected, the tare weight may be retained and used without reverification for all the weighing operations requiring the selected tare weight. The tare weight may be retained until it is replaced when a new tare value is recalled.</p>			
<p>22.4.1. The tare values may be entered only when the display is in the tare display mode so the entries can be verified.</p>			
<p>22.4.2. Each tare value shall be recallable so it may be verified before being used for the first time in a series of weighing operations.</p>			
<p>22.5. Indirect Sales -- Printer or No Printer - Preprogrammed Tare</p> <p>Each tare value shall be verified before being used for the first time in a series of weighing operations. This can be achieved by displaying the tare value as a negative net weight when the gross load on the scale is zero. Once selected, the tare weight may be retained and used for all weighing operations requiring the selected tare weight. The tare weight may be retained until it is replaced when a different tare value is recalled.</p>			

Software Scales

	Yes	No	NA
<p>23. Multiple Load-Receiving Elements</p> <p>If indicators or printers are connected to two or more weighing elements, information from one weighing element must not interfere with the indication or printing of information from the other elements(s). When multiple weighing elements are connected to a single indicator or printer, the weighing element in use shall be automatically indicated and recorded.</p> <p>This does not prohibit scales from providing summed indications for more than one weighing element, but the indicated and recorded values must clearly indicate that the weight value is a summed value and which weighing elements were in use to obtain the summed value. An exception to this requirement is given to mechanical bench and counter scales because the weighing elements and the indicator are generally in close proximity. Consequently, a customer can see which weighing element is in use and the associated weight values being indicated.</p> <p>Can the indicating or recording element be coupled to two or more load-receiving elements with independent weighing systems?</p> <p>If yes, then the following conditions must be met:</p>			
<p>23.1. The system shall prohibit the activation of any load-receiving element not in use.</p>			
<p>23.2. The recording element shall automatically record which weighing element is in use for each weight value and identify the recorded information as the scale identification. If numbers are used to identify the scales, they must result in an erroneous weight reading. (Example of unacceptable indication: Scale 114 000 lb.)</p>			
<p>23.3. The indicating element shall provide a clear and automatic indication of which load-receiving element is in use.</p>			
<p>23.4. The weighing elements must be marked to correspond to the display indications.</p>			
<p>23.5. If a scale also serves as an indicator for a separate weighing element, then the indicator function must meet the influence factors requirements at 0.7 times the scale tolerance.</p> <p>A weighing system may have a single indicating element for two or more weighing elements. The weight values for the weighing elements may be displayed individually or as a summed value for two or more elements. These conditions may exist for vehicle scales utilizing three elements to determine axle loads or on combinations of wheel-load weighers. When a system can display weights for individual elements, the number of scale divisions for a "scale" is based upon the capacity and division value for each individual weighing element. When only a summed weight value is displayed, the number of scale divisions in the scale is based upon the summed indication. The proper operation and capacity marking of these systems is described below:</p>			
<p>23.6. An indication of a summed weight value shall include an over-capacity indication and a behind-zero indication whenever any of the weighing elements are in either of these conditions. This applies whenever any or all of the weighing elements are empty or loaded, but not to indicated negative values for a behind-zero balance condition.</p>			

Software Scales

	Yes	No	NA
23.7. There must be means for setting each weighing element to a zero balance indication. The zero-setting mechanism shall not operate independently on a summed weight indication when values for individual weighing elements can be displayed.			
23.8. The capacity, by scale division value, shall be marked adjacent to the weight display in a manner dependent upon the particular scale installation as follows:			
23.8.1. When all weighing elements have the same capacity and the load on each can be displayed independently and summed, the marking shall be the capacity and scale division value of an individual weighing element and the summed capacity.			
23.8.2. When all weighing elements have the same capacity and only the summed weight values can be displayed, the capacity and scale division value for the summed capacity shall be marked.			
23.8.3. When a summed value for all weighing elements and a summed value from any two elements can be displayed independently, the capacity and scale division value shall be marked for both the total summed capacity and the capacity of the two elements.			
23.8.4. When the weighing elements have different capacities and the load on each can be displayed independently, the capacity of each shall be marked.			
24. Weigh-In/Weigh-Out Systems A weigh-in/weigh-out system is typically a vehicle scale in which an in-bound truck is weighed either loaded or empty; the inbound weight is stored; the truck is then emptied or loaded. The outbound truck is weighed, and the larger of the two weights (outbound or stored weight) is printed as the gross weight. The other printed as the tare weight and the difference computed as the net weight. In-bound weights, recalled weight values, and gross, tare, and net weights must be identified to clearly document the transaction. The storage, recalling, and printing actions are limited so they do not facilitate fraud.			
24.1. Any in-bound weight values shall be recorded and automatically identified as such. If in-bound weights are not printed at the time the weigh-in operation is performed, then the in-bound weight information shall not be lost during a power interruption			
24.2. The gross, tare, and net weight values shall be recorded in an automatic sequence when the out-bound weight value is obtained.			
24.3. The recorded gross weight value is not required to be automatically identified as a gross weight value, provided that the other two weight values are clearly and automatically identified as net and tare.			
24.4. If a device can indicate and/or record in two or more weight units, all gross, tare and net weight values shall be automatically recorded in the same weight units. This condition must be met regardless which weight unit is being displayed.			
24.5. Any weigh-in/weigh-out memory register shall automatically clear and not be retained in memory after a complete transaction of gross, tare, and net has been recorded.			

Software Scales

	Yes	No	NA
24.6. Any recorded weighing value from the memory register shall be automatically identified and defined.			
24.7. Tare values shall not be stored as negative values. (Negative numbers shall not be accepted.)			
24.8. Keyboard tare entries shall not be accepted into weigh-in/weigh-out memory registers.			
24.9. If the system is equipped with a tare memory register for weighing gross, tare, and net separate from the weigh-in/weigh-out feature, the tare weight shall not interact with the weigh-in/weigh-out feature.			
24.10. The data processing system performing the weigh-in/weigh-out operation will only accept weight values when the scale indicator is in the gross mode or give an error signal.			
25. Livestock and Animal Scale Systems Livestock scale systems under the jurisdiction of the USDA Packer and Stockyards Administration (P&SA) must meet Handbook 44 requirements. They also have specific interpretations of NIST Handbook 44 applicable to livestock auction scales. Some operations are acceptable for these systems although not obvious from Handbook 44. These requirements and acceptable operations are summarized below so that they can be uniformly applied in prototype examinations.			
25.1. If the scale is behind zero, the system must be capable of performing one of the following operations. The capabilities are listed in the order of preference to P&SA.			
25.1.1. Display and print the negative value, or			
25.1.2. Display the negative weight and inhibit printing, or			
25.1.3. Blank the weight display and inhibit printing, or			
25.1.4. Print meaningless symbols (e.g., EEEEE).			
25.2. The scale must record the weight values (e.g., a weighbeam must be a type-registering beam; dials and digital scales must have a printer). The number of head for each transaction or, if multiple drafts are involved, the number of head for each draft, must be recorded on the weigh ticket. It is not mandatory for the scale to record the number of head; it may be handwritten. If the transaction includes multiple drafts, then the total weight must be recorded by the weighing system. However, the total number of head need not be recorded since it is recorded for each draft.			
25.3. If the scale system has a memory capability and the weight and head count values for each draft cannot be changed after they are stored in memory, all draft values and totals may be printed after the transaction is completed.			
25.4. It is <u>not acceptable</u> to weigh a draft of animals, then weigh some of the animals in the draft, and then subtract the weight of the latter group of animals from the total draft to print only the difference in weight. Each draft must be printed.			

Software Scales

	Yes	No	NA
25.5. The total weight and head count for multiple draft weighing must be in mathematical agreement with the recorded draft values. The total weight of several drafts must be accumulated automatically by the scale system. The total head count may be a manual entry.			
25.6. If the system is capable of computing prices or average weight, the system must inhibit these operations if the displayed weight value is negative.			
25.7. Average weight values must be automatically calculated by the system and rounded to the nearest displayed scale division for the scale.			
25.8. It is important that all scale tickets be accountable in livestock auction operations. If a scale system prints ticket numbers sequentially and is also capable of aborting a ticket printing operation, the system must void the scale ticket automatically or be voided manually by the operator. The ticket number must be incremented so that two scale tickets cannot get the same number during normal continuous operation.			
25.9. Livestock and animal scale systems often have additional features or operations to facilitate the auction process. If any of the following are present, the acceptable operation is described.			
25.9.1. The system may be equipped with a feature that locks a weight value on the customer's "billboard" display. A weight value may be retained on the customer's display even after the animals have been removed from the scale.			
25.9.2. If the price per head and price per hundred weight are displayed to customers, annunciators are not needed on the customer's display since the price basis is understood from the auctioneer and the price itself.			
25.9.3. The symbols HD and WT or H and W are acceptable on the printed ticket for defining the sale by head or by weight. Other symbols may be acceptable if approved by P&SA.			
25.9.4. It is recommended that the customer's display indicate the weight and number of head of the current draft. The customer's display may display the total weight and total number of head of the accumulated totals from the individual drafts.			
25.9.5. A system is not required to retain the totals of a multiple draft transaction during a power failure provided that each draft is printed after weighing. It is recommended that a system have a memory capability to retain, during a power failure, all totalized draft and current draft information to eliminate the possibility of having to reweigh livestock that may be penned with livestock from previous transactions.			
25.9.6. If a livestock auction system has a memory for holding information on a transaction, all information may be cleared from memory provided that no part of the scale ticket has been printed with an error, otherwise the ticket must be voided and retained and the draft of livestock reweighed.			
25.9.7. Manual gross weight entries are permitted to correct tickets issued in error provided the following conditions are met:			
25.9.7.1. The erroneous ticket must be printed.			

Software Scales

	Yes	No	NA
25.9.7.2. This ticket must be voided and identified as such on the ticket. The information must be removed from the memory or identify that the information was voided, if retained in memory.			
25.9.7.3. A conspicuous message must be printed on the ticket that it has been corrected in clear terms. "Manual Wt" or "Manual Weight" are recommended. Abbreviations such as "M", "keyed" or "MW" are not acceptable.			
25.10. Neither a tare capability nor a net display feature are permitted on livestock and animal scales.			
25.11. The range of AZSM must not exceed 0.6 d.			
25.12. If a weighing system can reset the sequential ticket number to a specific number, then the system must record the time and date of a transaction on each weigh ticket.			
25.13. A "hold" feature, that is, a feature that locks a weight value into the display and permits the printing of multiple tickets, is not permitted. However, weight values may be stored into memory for scoreboard, CRT, or other nonadjustable memory if the animals are weighed prior to entering the sales ring and the weight values may be recalled when the animals enter the ring.			
<p>26. Capacity Indication</p> <p>A noncomputing scale shall not indicate or record weight values when the <u>gross</u> load exceeds 105 percent of the nominal scale capacity. This requirement applies regardless of how the scale is manipulated to achieve this condition.</p> <p>An electronic computing scale shall not display more than 9 scale divisions over its rated capacity; however, the scale may zero up to 5 percent of capacity and still indicate to capacity.</p> <p>Flashing weight values are <u>not</u> acceptable as an overload indication.</p> <p>Record nominal system capacity.</p> <p>Pounds _____ Kilograms _____ Other Units (identify units _____)</p> <p>Determine compliance for both indicated and recorded weight values for all weight units under the conditions below.</p>			
<p>26.1. Starting with the scale at zero load, record the last value displayed and printed before blanking or giving an overload indication. This must not exceed 105 percent of nominal capacity.</p> <p>Pounds _____ Kilograms _____ Other Units: Specify unit _____</p>			

Software Scales

	Yes	No	NA
26.2. Electronic computing scales are limited to displaying the nominal capacity plus 9 scale divisions. Does the device indicate an overload condition at nominal capacity plus 10 divisions (or less).			
26.3. Enter the maximum tare value permitted. The scale must give an overload indication within the specified gross load limit.			
26.4. A scale must not indicate or record weight values if the load receiving element rests on its protective movement limiting stops.			
26.5. If the scale can zero loads up to scale capacity, zero a load that exceeds 5 percent of the scale capacity. The scale must give an overload indication within the specified gross load limit.			
26.6. If the scale limits the amount that can be zeroed with a semi-automatic zero setting but the operation can be repeated several times, zero the maximum weight possible equal to or under 5 percent of the scale capacity. The scale must give an overload indication within the specified gross load limit. <i>Note: Electronic computing scales could display capacity plus 9 scale divisions for this test.</i>			
26.7. If the scale zeroes itself after a power interruption caused by operating the power switch (excluding the initial zero-setting mechanism), place a load on the scale that will be zeroed and interrupt the power. Under this new zero, the scale must give an overload indication within the specified gross load limit.			
26.8. The system shall either correctly record negative numbers or shall not record weight values when the scale is behind zero or the load exceeds the display capacity of the scale. The system shall indicate:			
26.8.1. An error condition when the weight indication is behind zero or record the negative value.			
26.8.2. An error condition (or blank the display) and not record any value when the load exceeds the display capacity of the system.			

Software Scales

	Yes	No	NA
<p>27. Zero-Load Adjustment - General</p> <p>To prevent fraudulent or inappropriate adjustments of the zero setting mechanism, it shall either be operable or accessible only by a tool that is separate from the scale, enclosed in a cabinet, or is equipped with motion detection that limits its operation. A motion detection capability is not required on the power-switch zero scales equipped with a "count down" or display checking feature, considered to be an adequate indication to a customer that something "different" is happening. To reduce the potential for weighing errors, a stored tare weight must not be cleared when the scale is zeroed unless the "clearing" of tare is distinctly indicated. For the same reason, a scale must zero the entire load on the scale, not just part of the load, when the zeroing operation is performed.</p> <p>Indicate the zero load adjustment method provided.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Tool operated zero-load adjustment. (Manual zero-setting mechanism) <input type="checkbox"/> Push-button zero-load adjustment. (Semi-automatic zero-setting mechanism) <input type="checkbox"/> Power switch zero-load adjustment. 			
<p>27.1. The zero adjustment mechanism is operated by a tool or has motion detection.</p>			
<p>27.2. A stored tare weight value shall not be cleared when the scale is "zeroed" using a semi-automatic (push-button) zero key, unless there is a clear indication that the tare value has been cleared and any weight indication is not a net weight value (e.g., "net" and "tare" annunciators not lighted).</p>			
<p>28. Zero Indication</p> <p>A digital electronic scale must indicate or record a zero balance condition. An out-of-zero-balance indication on both sides of zero is required. The zero balance indication may be a continuous digital zero indication or indicated by some other means, provided the scale either automatically inhibits the scale operation or returns to a digital weight indication when an out-of-zero-balance condition exists. The alternative zero indication must be defined on the front of the device.</p> <p>A digital zero balance indication shall represent zero within 0.5 scale division (0.5 d). A digital indicating scale shall either automatically maintain a "center-of-zero" condition to 0.25 d or less (through AZSM) or have a supplemental center-of-zero indicator that defines the zero-balance condition to 0.25 d or less. The center of zero requirement applies to the gross load zero, but the center of zero indication may also be operational at the net load zero.</p> <p>Neither a + or - sign may appear with the zero indication. Appropriate indications for the zero balance and out-of-zero balance conditions are specified.</p> <p>If the scale is equipped with an initial zero-setting mechanism (IZSM), then the scale must be tested for compliance with the influence factors with the maximum load zeroed through the IZSM. This is mandatory if the range of the IZSM exceeds 20 percent of the scale capacity.</p> <p>Is the scale equipped with an IZSM?</p> <p>If yes, then what is the range of the IZSM?</p>			

Software Scales

	Yes	No	NA
<p>28.1. The scale defines zero within 0.5 d by a continuous zero indication.</p> <p>Record the type of weight unit, (e.g., lb/kg) selection.</p> <p style="padding-left: 40px;"><input type="checkbox"/> External <input type="checkbox"/> Internal <input type="checkbox"/> N/A</p> <p>Record the actual zero width in d (note whether avoirdupois, metric, or other unit).</p> <p style="padding-left: 40px;">Avoirdupois ___ d Metric ___ d</p> <p style="padding-left: 40px;">Other Units: Specify Unit _____ ; _____ d</p>			
<p>28.2. For indicators without a continuous zero indication, an automatic means inhibits the weighing operation or returns the device to a continuous digital indication when the scale is in an out-of-balance condition.</p>			
<p>28.3. A + or - sign must not appear when the scale is indicating zero in any of the available weight units.</p>			
<p>28.4. The device automatically maintains the "center of zero" to 0.25 d, or</p>			
<p>28.5. If the device does not automatically maintain the "center of zero", then there is a center of zero indicator that defines zero within 0.25 d scale division.</p>			
<p>28.6. If provided, the "center of zero" indicator is inhibited at all displayed positive weight values other than zero.</p>			
<p>29. Tare</p> <p>The tare mechanism shall operate only in the backward direction, which means, in a manner such that it results in a net weight that is less than (or, in the event the tare weight is zero, equal to) the gross weight. For all scales except monorail scales with digital indications, the value of the tare division shall be equal to the value of the displayed scale division. (Compliance with this requirement is determined under the code references for the General Code.) This does not preclude a scale equipped with semi-automatic (push-button) tare from taking tare to the internal resolution of the scale provided there is still mathematical agreement between the gross, tare, and net indications. For those scales designed to automatically clear a tare value after a weighing, the scale shall be designed to prevent the automatic clearing of tare until a complete transaction has been indicated. To test if the tare operates in the forward direction (which would violate the requirements), use the following test procedure. This test procedure applies only to the push-button tare capability because all other methods of tare entry result in positive numbers being taken as tare values.</p>			
<p>29.1. Test Method (Push-button Tare)</p>			
<p>29.1.1. Place a small weight in excess of the AZSM range on the scale platform and zero the scale.</p>			
<p>29.1.2. Remove the weight. This will result in a behind-zero indication.</p>			

Software Scales

<p>29.1.3. Attempt to take this value as tare using the push-button tare capability. It should not be accepted as tare. The tare mechanism shall operate only in the direction of under-registration (i.e., a negative number should not be taken as tare).</p>			
<p>29.2. The tare mechanism shall operate only in a backward direction.</p>			
<p>29.3. On a device designed to automatically clear any tare value entered, means shall be provided to prevent the clearing of tare until a complete transaction has been indicated.</p> <p><i>Note: On a computing scale, this requires the input of a unit price and the display of the unit price and a computed positive total price at a stable and readable indication. On other devices, it requires a complete weighing operation, including a tare, net, and gross weight determination.</i></p>			
<p>29.4. The tare value shall be equal to the value of the displayed scale division (except as described above for semi-automatic tare) for all methods of tare entry.</p>			
<p>30. Tare Operation - Facilitation of Fraud</p> <p>Numerous requirements establish the proper operation of the tare features depending upon the type of tare capability provided in the scale. These requirements are based upon the broad requirement that no device or feature shall facilitate perpetrating of fraud. The perpetration of fraud is interpreted to apply both to intentional actions and inadvertent actions. Because tare capabilities have a significant potential to facilitate fraud if not properly designed, the type evaluation criteria are extensive. It is recommended that the video display terminal that is the primary indicator simultaneously display GROSS, TARE, and NET weights on the display when the NET weight value has been determined. Record the type of tare capability available:</p> <p> <input type="checkbox"/> NO TARE CAPABILITY <input type="checkbox"/> PUSH-BUTTON TARE <input type="checkbox"/> KEYBOARD <input type="checkbox"/> DIGITAL <input type="checkbox"/> PROGRAMMABLE <input type="checkbox"/> OTHER </p>			
<p>30.1. Devices equipped with a tare capability, except for electronic cash registers, are required to provide a clear indication that a tare value has been entered. This indication may be GROSS and NET indications (display modes), or a lighted legend or annunciator such as TARE ENTERED. A computing scale shall not override a keyboard tare entry unless there is a separate display of the tare. If the tare is set to zero, there must be a clear indication that tare has been removed. A pre-programmed tare stored with a PLU is not required to be displayed before the item is weighed, but the pre-programmed tare cannot replace a manually entered tare without obvious indication. A scale may give an error signal and permit a pre-programmed tare entry to proceed only if the tare value in the transaction memory register is set to zero prior to the entry of the PLU. If the tare value can be cleared when a load is on the platform, a clear indication that the tare value has been eliminated must be provided. There are several options for complying with this requirement. At least one of the following methods must be used to indicate that a tare value has been entered. Indicate which method is used.</p>			

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	Yes	No	NA
30.1.1. A separate continuous display of tare.			
30.1.2. The device has selectable GROSS, TARE, and NET weight display modes with proper descriptors for this information.			
30.1.3. The device has selectable GROSS and NET weight display modes with proper descriptors for this information.			
30.1.4. The display indicates only the net weight and a NET legend or annunciator appears when a tare weight is entered. Gross weight is displayed when the tare weight entry is zero and the NET legend or annunciator is off.			
30.1.5. A lighted legend or annunciator of TARE ENTERED or similar statement is used to indicate that a tare value has been entered and the display indicates the net weight.			
30.2. An entry of "zero" tare should not activate the TARE ENTERED annunciator or cause the display to automatically switch to the NET display mode. (Scales equipped with a continuous tare display or tare display mode will indicate zero when the tare weight entry is zero; however, the entry of zero tare must not cause the display to automatically switch to the NET mode.)			
30.3. If a system is equipped with push-button tare and keyboard tare, the entry of either tare value shall reject or automatically clear any previous tare entry (i.e., they cannot be additive).			
30.4. The tare weight plus the net weight must always equal the gross weight.			
30.5. When in the net mode, the system shall indicate negative net weight values (within the capacity of the display) when the gross weight is less than the tare weight.			
30.6. When units are converted, the weight unit selector switch must convert both the weight display and tare values to the same weight unit.			
<p>31. Push-button Tare</p> <p>The following restrictions on push-button tare are required to limit the potential of accidental error or intentional fraudulent manipulation. There must be a clear indication that tare has been taken. The weight display being set to zero in the net mode is a sufficient indication.</p> <p>For informational purposes, indicate whether or not push-button tare operates to the maximum indicated weight values for the scale.</p> <p>If no, record tare capacity _____.</p> <p>For informational purposes, test to determine if the push-button tare value is taken to the internal resolution of the scale.</p>			

Software Scales

	Yes	No	NA
<p>Test Method</p> <p>Apply a load to the scale so that the scale indication is on the upper edge of the displayed weight division but below the zone of uncertainty. It will probably be necessary to use weights of less than one scale division to achieve this condition.</p> <p>Take this weight as tare by pressing the push-button tare key.</p> <p>Test to determine if the net weight zero reference point is in the center of the displayed net zero indication. If it is, the scale takes tare to the internal resolution of the scale. If the net zero reference point is still on the upper edge of the net zero division, tare is taken to the displayed scale division.</p> <p>Is tare taken to the internal division?</p>			
<p>31.1. If the tare capacity is less than the maximum displayed value of the scale, then the push-button tare must not function when the gross weight exceeds the tare capability. Example: If the scale can only take 9.99 lb as tare, when a gross load of 10.00 lb is placed on the scale, tare should not be taken when the tare key is pressed.</p>			
<p>31.2. If the device has a gross/net switch or gross/tare/net switch, the push-button tare must be inhibited when the gross weight is displayed, unless the display switches automatically to the net mode.</p>			
<p>32. Keyboard and Programmable Tare</p> <p>Keyboard and programmable tare entries must be visible at some point in the transaction so the entry can be verified.</p> <p>Keyboard and programmable tare shall be operable only with no load on the platform unless there is (1) a separate display of tare values, (2) the tare values are recallable and verifiable, or (3) the tare or net values are recorded.</p>			
<p>32.1. One of the following conditions must be met for keyboard and programmable tare entries.</p>			
<p>32.1.1. The device has a tare display, separate from the weight display, that continuously indicates the entered tare weight.</p>			
<p>32.1.2. The device has a selectable tare display mode activated by key or switch.</p>			
<p>32.1.2.1. Tare values may be entered only when the tare mode is selected.</p>			
<p>32.1.2.2. Tare values may be recalled and verified at any time.</p>			
<p>32.1.3. Entries are permitted only when there is no load on the platform.</p>			
<p>32.1.4. The device indicates gross weight only with the tare or net weight on a printed weight ticket.</p>			

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	Yes	No	NA
32.2. Keyboard and programmable tare value entries shall be consistent with the displayed scale division in all weight units.			
If a tare value that is not consistent with the displayed scale division can be entered, then one of the following conditions must be met:			
32.2.1. A tare value that is not consistent with the displayed scale division is automatically rejected, or			
32.2.2. The tare weight entry must be rounded to the nearest displayable scale division.			
32.3. If a device will accept a tare entry in excess of scale capacity, a net weight indication must be a negative value, or the net display must be blank or display an error symbol.			
33. Digital Tare A digital tare capability takes one displayed scale division as tare each time the digital tare key is pressed.			
33.1. The digital tare division equals the displayed scale division.			
33.2. The digital tare entry may automatically clear any previous tare entry.			
33.3. The digital tare entry may add to a push-button or keyboard tare entry.			
33.4. Digital tare entries are permitted only under the conditions described in Keyboard and Programmable Tare, item 32.			
33.5. Which condition listed under Keyboard and Programmable Tare, item 32, is met? (Circle) 1. 2. 3. 4.			
34. Stored Tare Stored tare is the tare for a vehicle or a container that is retained in the memory of the scale or attached device and is repeatedly used for multiple weighing operations. Stored tare may not be acceptable in some jurisdictions and is not acceptable in all applications. The suitability of this operational feature is determined by the enforcement policy of each jurisdiction. Each tare value shall be verified before being used for the first time in a series of weighing operations. It is recommended that the time and date the tare was taken also be recorded.			

Software Scales

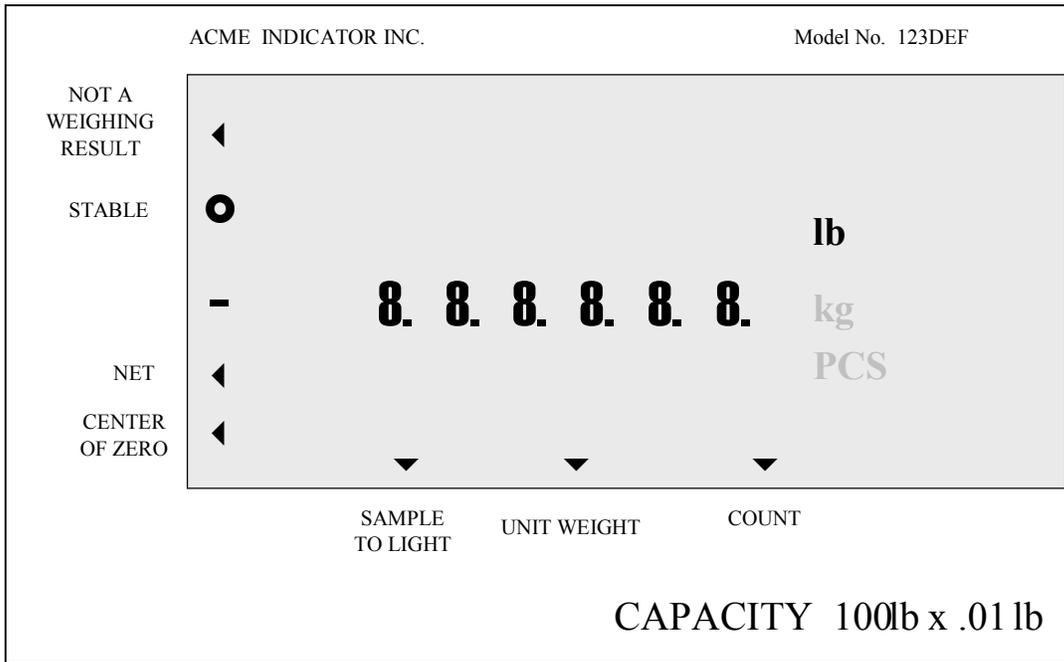
	Yes	No	NA
<p>35. Motion Detection</p> <p>A digital electronic device must have a motion detection capability that prevents the device from zeroing (push-button zero) or taring (push-button tare) part of a load when the semi-automatic zero or tare key is activated at the same time that a load is added, changed, or removed from the scale.</p> <p>A digital electronic scale equipped with a printer must have a motion detection capability that prevents the scale from printing weight values before the weight display has stabilized within specified limits. This reduces the possibility of recording incorrect weight values. The limits for motion detection are:</p> <ul style="list-style-type: none"> (a) plus or minus 3 scale divisions for axle load, railway track, vehicle scales, and hopper (other than grain hopper) scales with a capacity exceeding 22 000 kg (50 000 lb); and (b) plus or minus 1 scale division for all other scales. <p>The test procedure given below is used to test the effectiveness of motion detection for printing, push-button zero, push-button tare, and storing a weight value in a memory register.</p>			
<p>Test Procedure</p> <p>Small Capacity Scales</p> <p>Place a load within the weighing range on the scale platform and allow time for the scale indication to stabilize. Disturb the load by hand to induce "motion" to the scale indications to a peak magnitude greater than 10d. While disturbing the load, attempt to activate the zero operation and allow the oscillations to settle out. The scale may eventually zero the load or may reject the command. Under no circumstances may the zeroed value differ from the value obtained under static conditions (zero) by more than 1d. This test should be repeated at least five times for small loads and for loads near capacity.</p> <p>Repeat the above test procedure for the print key, tare key(s), and any stored weight keys.</p> <p>In addition to hand manipulation of the load, a load of at least 10d may be applied or removed as a step function while activating the zero, tare, memory, or print keys when the weight is added or removed.</p>			

Software Scales

	Yes	No	NA
<p>Intermediate and Large Capacity Scales</p> <p>For higher capacity scales, it may not be convenient or practical to disturb the load by hand. A load of greater than 15d may be applied or removed while activating the zero, tare, stored weight, or print keys. It is important to insure that peak oscillations of greater than 15d are induced. These tests can usually be performed as test weights are being placed on or removed from the scale platform.</p> <p>Since this is primarily an instrument test, a low capacity load cell may be connected to the instrument and a weight applied to the load cell in a convenient manner. The instrument, load cell, and weight must be chosen to allow the convenient application of weights to the load cell representing a low, middle, and full instrument display. Push-button zero, push-button tare, memory, other stored weight keys, and print key tests will be conducted as described before, insuring peak disturbances of greater than 15d. Indicated and recorded values must be within 3 divisions (3d) of the value obtained under static conditions for scales of more than 2000 kg (5000 lb) capacity. Indicated and recorded values must be within 1d of the value obtained under static conditions for all other scales. All recorded values shall be within applicable tolerances.</p>			
35.1. Push-button zero complies with motion detection requirements.			
35.2. Push-button tare complies with motion detection requirements.			
35.3. Stored weight key(s) comply with motion detection requirements.			
35.4. Recorded (printed) values comply with motion detection requirements.			

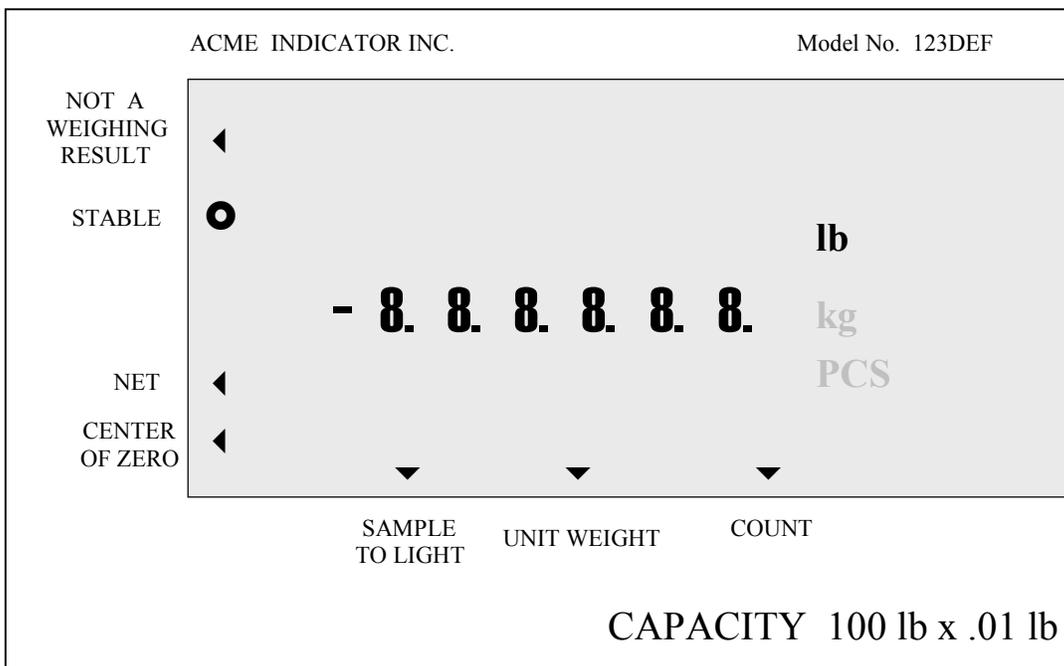
Software Scales

Example 1: Not an acceptable format. Negative sign is mixed in with other annunciators.



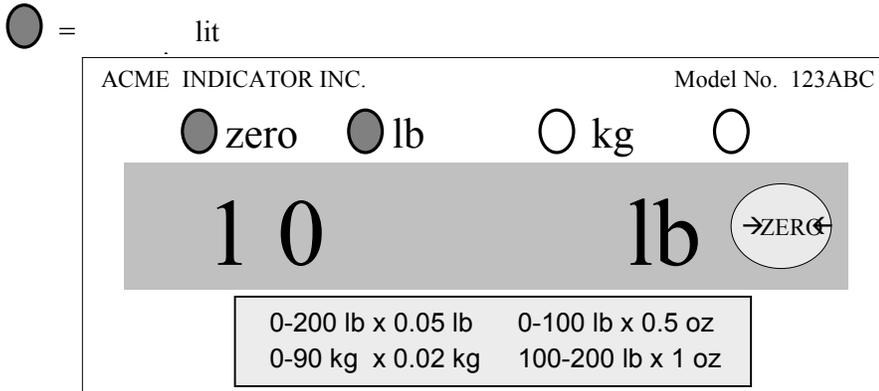
Example 2: Acceptable Format. Negative sign adjacent to most significant digit.

Note: There may be other acceptable formats, such as the negative sign being a different color.

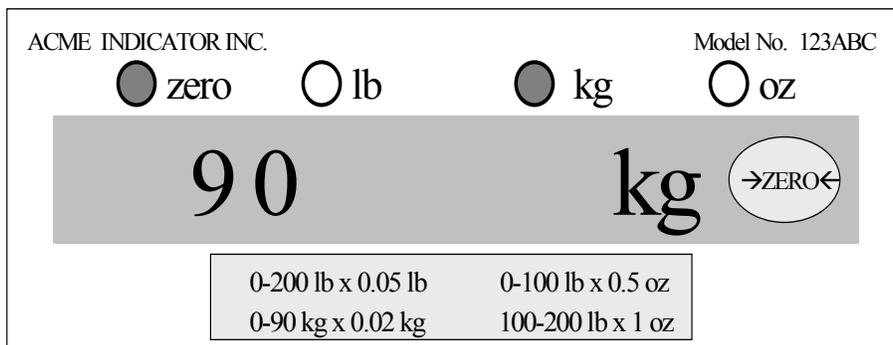


Software Scales

Example 1: Display in single unit of weight – pounds

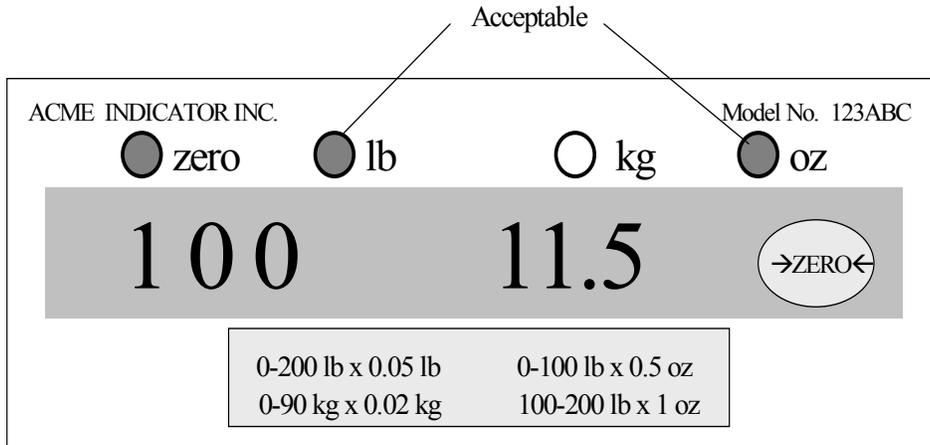


Example 2: Display in single unit of weight – kilograms

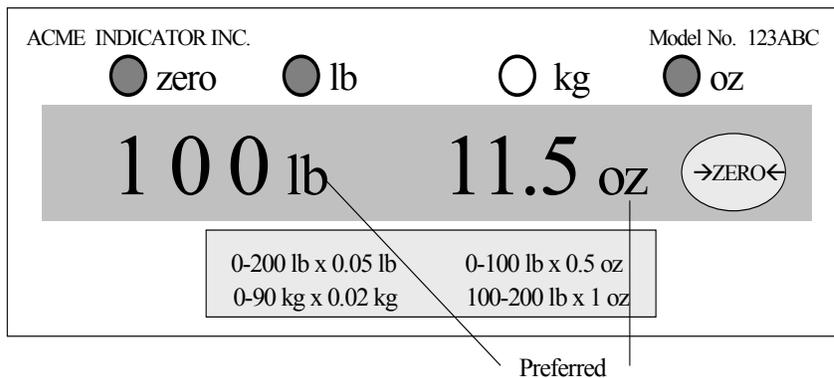


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Example 3: Display in dual unit (lb-oz) mode – acceptable



Example 4: Display in dual unit (lb-oz) mode – preferred



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Table 1 Representation of Units				
Name of Unit	International Symbol (common use symbol)	Representation		
		Form I	Form II	
		(double case)	(single case lower)	(single case upper)
Base SI units				
Meter	M	M	m	M
Kilogram	Kg	Kg	kg	KG
Derived SI units				
Newton	N	N	n	N
Pascal	Pa	Pa	pa	PA
Watt	W	W	w	W
Volt	V	V	v	V
degree Celsius	°C	°C	°c	°C
Other units				
liter	l or L	L	L	L
gram	G	G	g	G
metric ton	T	T	tne	TNE
bar	Bar	Bar	bar	BAR

Table 2. Minimum Height of Numbers and Letters		
Area of principal display panel	Minimum height of numbers and letters	Minimum height: label information blown, formed, or molded on surface on container
≤ 32 cm ² (5 sq in)	1.6 mm (1/16 in)	3.2 mm (1/8 in)
> 32 cm ² (5 sq in) ≤ 161 cm ² (25 sq in)	3.2 mm (1/8 in)	4.8 mm (3/16 in)
> 161 cm ² (25 sq in) ≤ 645 cm ² (100 sq in)	4.8 mm (3/16 in)	6.4 mm (1/4 in)
> 645 cm ² (100 sq in) ≤ 2581 cm ² (400 sq in)	6.4 mm (1/4 in)	7.9 mm (5/16 in)
> 2581 cm ² (400 sq in)	12.7 mm (1/2 in)	14.3 mm (9/16 in)
Symbols: Means less than or equal to: ≤ means less than; > means greater than Note: The type size requirements specified in this table do not apply to the "e" mark.		

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Table 3

Net Weight	Unit Price	Total Price	Correctly Rounded	Net Weight	Unit Price	Total Price	Correctly Rounded
0.04 lb	\$.12	\$.0048	\$.00				\$198.23
0.04 lb	\$.13	\$.0052	\$.01	2.54 lb	\$.79	\$2.0066	\$2.01
0.045 lb	\$.11	\$.00495	\$.00	2.54 lb	\$.86	\$2.1844	\$2.18
0.045 lb	\$1.01	\$.04545	\$.05	2.54 lb	\$3.99	\$10.1346	\$10.13
0.10 lb	\$.04	\$.0040	\$.00	2.54 lb	\$4.25	\$10.7950	\$10.79 or \$10.80
0.10 lb	\$.05	\$.0050	\$.00 or \$.01				
				2.54 lb	\$99.99	\$253.9746	\$253.97
0.10 lb	\$.15	\$.0150	\$.01 or \$.02	12.54 lb	\$2.25	\$28.2150	\$28.21 or \$28.22
				12.54 lb	\$99.99	\$1253.8746	\$1253.87
0.31 lb	\$.85	\$.2635	\$.26	12.545 lb	\$1.99	\$24.96455	\$24.96
0.31 lb	\$.89	\$.2759	\$.28	12.545 lb	\$2.89	\$36.25505	\$36.26
0.315 lb	\$2.49	\$.78435	\$.78	15.03 lb	\$1.83	\$27.5049	\$27.50
0.315 lb	\$3.00	\$.94500	\$.94 or \$.95	20.67 lb	\$.59	\$12.1953	\$12.20
				24.51 lb	\$.89	\$21.8139	\$21.81
				1.00 lb	3 lb/\$1.00	\$.33333	\$.33
0.32 lb	\$.83	\$.2656	\$.27	2.00 lb	3 lb/\$1.00	\$.6666	\$.67
0.32 lb	\$.89	\$.2848	\$.28	3.00 lb	3 lb/\$1.00	\$1.00000	\$1.00
1.51 lb	\$.07	\$.1057	\$.11	1.00 lb	3 lb/\$.89	\$.29666	\$.30
1.51 lb	\$.70	\$1.057	\$1.06	2.00 lb	3 lb/\$.89	\$.59333	\$.59
1.51 lb	\$7.00	\$10.570	\$10.57	3.00 lb	3 lb/\$.89	\$.89000	\$.89
2.50 lb	\$.69	\$1.725	\$1.72 or \$1.73	4.09 lb	2 lb/\$1.89	\$3.86505	\$3.87
				4.10 lb	2 lb/\$1.89	\$3.87450	\$3.87
2.50 lb	\$79.29	\$198.225	\$198.22				