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Markings and Tolerance Application for Weight Classifiers

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NIST frequently receives questions about the differences between normal rounding scales (weighing instruments) and weight classifying instruments. The following discussion will help inspectors identify the type and apply technically correct inspection and test procedures for these instruments.

Normal weighing instruments display weight using a breakpoint, which is midway between scale intervals. A weight that falls between the scale intervals may round up or down to the nearest scale interval. Weight classifiers are specialized weighing instruments for shipping and postal applications. The breakpoint for displayed weight on a weight classifier is at the scale interval rather than between scale intervals. Any partial unit of resolution above a given weight is rounded up to the next scale interval (loads at the breakpoint can display either the next lower or next higher scale interval). For example:

Normal rounding instruments with e = d = 0.1 will indicate:
1.0 if the load is 0.96 to 1.04, and
1.1 if the load is 1.06 to 1.14.

Postal or shipping weight classifier instruments with e = d = 0.1 will indicate:
1.0 if the load is 0.91 to 1.00, and
1.1 if the load is 1.01 to 1.10.

Weighing instruments used in weight classifying and postal weighing appli-cations have metrologically significant features that make them unsuitable for normal weighing transactions. There-fore, Handbook 44 Scales Code Table S.6.3.a. Marking Requirements and Table S.6.3.b. Notes for Table S.6.3.a. requires these special types of weighing instruments to be marked with a special application statement similar to the following:

- Normal rounding weighing instru-ments that have “pound and ounce” scale intervals are marked with a statement such as “Postal Use Only.”
- Weight-classifying weighing instruments that have “pound and ounce” scale intervals are marked with a statement such as “Postal (or Shipping) Weight Classifier.”
- Weight-classifying instruments that display only pound, ounce, or kilogram scale intervals are marked with a statement such as “Weight Classifier” or “Shipping Rate Determination.”

All remaining marking requirements for these instruments are the same as normal rounding weighing instruments.

NIST Handbook 112, *Examination Procedure Outline (EPO) for Commercial Weighing and Measuring Devices*, addresses recommended test procedures for normal rounding weighing instruments. However, the EPO and the training courses do not address special application marking requirements, test procedures, and the application of tolerances for weight classifiers.

WMD has provided the following tolerance determination guidelines based upon the procedures developed by WMD and the Maryland Department of Agriculture, Weights and Measures Program. These procedures and guidelines can be used for increasing/decreasing-load and shift tests and are appropriate for applying main-tenance tolerances and acceptance tolerances that are in terms of whole scale intervals.

1. Add error weights to the instrument equal to or greater than the maximum tolerance in Handbook 44 Section 2.20. Scales code paragraph T.N.3 Tolerance Values.
2. Zero the instrument.
3. Place loads on the instrument as recommended in the test portion of the applicable EPO and observe or record the indicated weight value.
4. The instrument is within tolerance if it indicated weight is the same as the test load (Test load = Indication).
5. If the indicated weight value is higher than the test load, but less than the sum of the test load plus the tolerance for that load, the instrument is within tolerance (Test Load < Indication < Test Load + Tolerance).
6. If the indicated weight value is less than the test load and greater than the difference of the test load minus the tolerance for that test load, the instrument is in tolerance (Test Load > Indication > Test Load - Tolerance).
7. If the indicated weight value is equal to or greater than the sum of the test load plus the tolerance, remove an amount of weight equivalent to the tolerance at that load. The weight indication must return to the value equal to the test load (or alternate between the test load and the next higher scale increment). If not, the instrument is not in tolerance (Indication $\geq$ Test load + Tolerance).

8. If the indicated weight value is equal to or less than the difference of the test load minus the tolerance for that test load, add an amount of weight equivalent to the tolerance for that load. The weight indication must return to the value equal to the test load (or alternate between the test load and the next higher scale increment). If not, the instrument is not in tolerance (Indication $\leq$ Test load - Tolerance).

If you have any questions regarding these procedures, contact Steve Cook, 301-975-4003 or by email at steven.cook@nist.gov.