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Testing the Counting Feature on a Prescription Scale
By Rick Harshman

The counting feature was first recognized as a legal-for-trade feature on January 1, 2004; however, the use of the feature in legal-for-trade applications was restricted to Class I and Class II scales used to fill prescriptions. A number of new requirements pertaining to the counting feature on these devices were introduced in the 2004 edition of NIST Handbook 44 (HB-44). WMD has received several inquiries regarding the proper application of many of these new requirements and the proper procedures for testing this feature on a scale.

This article outlines the correct procedures for conducting a performance test on the legal-for-trade counting feature of a prescription scale. Separate performance tests of the weighing and counting modes of operation are required. Since the accuracy of a counting feature is dependent upon the ability of a scale to weigh accurately, a scale's accuracy should first be verified by completing the performance test in the weighing mode of operation. The performance test on the counting mode of operation should only be conducted after it has been verified that the scale is weighing within prescribed tolerance limits.

Overview of a Counting Feature Performance Test

The counting feature performance test requires a minimum of four basic verifications:

> 1. *Minimum Sample Piece Count*
>   - The counting feature must reject the entry of a *minimum sample piece count* when the entry is less than the *minimum sample piece count* value marked on the device.
> 2. *Minimum Individual Piece Weight*
>   - The counting feature must reject the entry of a *minimum individual piece weight* when the entry is less than the *minimum individual piece weight* value marked on the device.
> 3. Tests of Count at Tolerance Breakpoints
>   - The counting feature performs to within accuracy requirements when tested at or near each tolerance breakpoint for count.
> 4. Test of Count Near Maximum Counting Capacity
>   - The counting feature performs to within accuracy requirements when tested near the maximum counting capacity of the scale.

The accuracy requirements for the counting feature are found in HB-44, Table T.N. 3.10.

Table T.N.3.10. Maintenance and Acceptance Tolerances in Excess and in Deficiency for Count	
Indication of Count	Tolerance (piece count)
0 to 100	0
101 to 200	1
201 or more	0.5%

Minimum Sample Piece Count* and *Minimum Individual Piece Weight

HB-44, Scales Code, Section N.1.10. requires a counting feature to reject the entry of a sample when either the *minimum sample piece count* or the *minimum individual piece weight* is less than the minimum values that are marked on the device. However, before either of these verifications can be performed, the minimum sample weight must be determined for the scale being tested. The following formula is used to calculate the minimum sample weight:

Minimum sample weight = *minimum sample piece count* x *minimum individual piece weight*

It is important to note that the values for *minimum sample piece count* and *minimum individual piece weight* are required to be marked on the device in accordance with HB-44, Scales Code, Section S.6.6. Additionally, HB-44, Scales Code, Section S.1.2.3. requires the *minimum sample piece count* to be greater than or equal to 10 pieces and the *minimum individual piece weight* to be greater than or equal to 3 times the value of the verification scale division (3 e).

To verify that the counting feature rejects the entry of a *minimum sample piece count* that is less than the minimum value marked on the device, perform the following procedures:
- Apply a sufficient load to the load-receiving element of the scale to cause the displayed indication to equal the minimum sample weight;
- While the minimum sample weight is being displayed, attempt to enter a sample piece count less than the minimum marked on the device;
- The counting feature must reject the entry .

To verify that the counting feature rejects the entry of a *minimum individual piece weight* that is less than the minimum value marked on the device, the following procedures should be performed:

- Apply a sufficient load to the load-receiving element of the scale to cause the displayed indication to be slightly less than the minimum sample weight;
- Attempt to enter the *minimum sample piece count*;
- The counting feature must reject the entry.

Verifying the Accuracy of the Counting Feature at Tolerance Breakpoints

The procedures for verifying the accuracy of a counting feature at tolerance breakpoints are as follows:

- Determine the minimum sample weight for the scale being tested;
- Apply a load to the load-receiving element of the scale, sufficient in amount to cause the scale to display the minimum sample weight <u>exactly;</u>
- Enter the value of the *minimum sample piece count* as marked on the device, *via* the scale's keypad or other available means, to cause the scale to calculate the *minimum individual piece weight*;
- Remove the load from the load-receiving element of the scale that was applied in the above step;
- Apply test standards equivalent to 100 times the marked *minimum individual piece weight*
  - This test load is equivalent to the first tolerance breakpoint shown in Table T.N.3.10.
  - Table T.N.3.10. permits no error for test loads of 0 to 100, thus the scale must indicate a piece count of 100 for the test load applied;
- Apply test standards equivalent to 200 times the marked *minimum individual piece weight*
  - This test load is equivalent to the second tolerance breakpoint shown in Table T.N.3.10.
  - Table T.N.3.10. permits an error of +/- 1 piece at a test load of 200, thus, the scale must indicate a piece count of 199, 200, or 201.

Verifying the Accuracy of the Counting Feature Near Maximum Counting Capacity

The procedures for verifying the accuracy of a counting feature near the maximum counting capacity are as follows:

- Determine the maximum counting capacity for the scale being tested by dividing the scale's marked nominal capacity by the marked *minimum individual piece weight* and truncating the result.
- For example, if scale capacity were marked 610g and the *minimum individual piece weight* were marked as 0.03g, the highest possible count for the scale would be calculated as: 610g divided by 0.03g = 20,333.33333 (truncated = 20,333)
- Select a "near maximum" counting capacity test point that is slightly below the scale's highest possible count, for example, 20,200
- Convert the test point selected to a weight value by multiplying it by the *minimum individual piece weight*. For example, 20,200 x 0.03g = 606g

- Apply test standards equal to the "near maximum" counting capacity test point in weight (606g)
- Verify that the count indication displayed is within count tolerances
- Table T.N.3.10. specifies the tolerance as 0.5%
- To calculate the count tolerance, multiply 20200 by 0.5%. That is, 20,200 x 0.5% = 101 pieces. Therefore, at a test load of 606g (20,200 pieces) the scale must indicate to within plus or minus 101 pieces, i.e., 20099 to 20,301, to be within permissible tolerance limits.

Additional Notes

- For States that require an NTEP CC, the counting feature on a prescription scale manufactured before January 1, 2004, cannot be used until the counting feature has been evaluated by NTEP and an NTEP certificate issued.
- To recognize the use of the counting feature on the scale, prescription scales that are equipped with a counting feature that does not comply with existing Handbook 44 requirements must be marked on both the customer and operator sides with the statement "The counting feature is not legal for trade."
- A prescription scale equipped with a legal-for-trade counting feature must be appropriately marked with the statement "Counting Feature for Prescription Filling Only."

For additional information on prescription scales equipped with a counting feature, contact Rick Harshman (NIST) by e-mail at richard.harshman@nist.gov or by phone at 301-975-8107.