June 21, 2019

**TO:**      WEIGHTS AND MEASURES OFFICIALS

**SUBJECT:**   Suitable Scales for Medical and Adult-Use Cannabis (Revised)

The Division of Measurement Standards (DMS) continues to receive inquiries regarding the proper selection of suitable scales and the nonuniformity of accepting or rejecting Accuracy Class III scales used in cannabis applications.

DMS recommends that Accuracy Class II (or Accuracy Class I) scales should be used for Medical and Adult-Use Cannabis applications based upon review of the requirements and recommendations in California Code of Regulations (CCR) Title 4, Division 9, § 4000, National Institute of Standards and Technology Handbook (NIST HB 44) paragraphs, including the Scales Code User Requirements (UR) Table 7a. Typical Class or Type of Device for Weighing Applications

Selecting a suitable device for Medical and Adult-Use Cannabis applications is in everyone's best interest. This Notice is intended to clarify the DMS recommendation about the suitability of scales used in these applications.

CCR Title 4, Division 9, § 4000, NIST HB 44 General Code paragraph G-UR.1.1. states in part:

*"Commercial equipment shall be suitable for the service in which it is used with respect to elements of its design, including but not limited to its weighing capacity (for weighing devices), . . . and the value of its smallest unit and unit prices."*

There is similar language in Scales Code, paragraph UR.1. Selection Requirements, which references number of scale divisions, value of the verification scale division, and minimum capacity. Additionally, Table 7a. in this paragraph lists the typical applications suitable for Accuracy Class II scales: *"laboratory weighing, precious metals and gem weighing, and grain test scales."*

For additional information, DMS has created a Cannabis webpage containing an informational brochure titled "Scale Selection Guidelines" and lists of type approved Accuracy Class I and II scales including manufacturer, Accuracy Class, the National Type Evaluation Program (NTEP)

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State of California
Gavin Newsom, Governor

Certificate of Conformance, and capacity. It should be noted that Accuracy Class II scales with capacities as high as 600 kg (~ 1,300 lb) are available for purchase. See the following link to access the DMS cannabis webpage: https://www.cdfa.ca.gov/dms/CannabisWM.html

Interested persons may also wish to search the entire list of scales with an active NTEP Certificate of Conformance on the National Conference on Weights and Measures' website at https://www.ncwm.net/ntep/cert_search.

If you have questions, please contact the Device Enforcement Program by email at dms@cdfa.ca.gov or by phone at (916) 229-3000.

Sincerely,

Kristin Macey
Director

Attachments

cc: Hyrum Eastman, County/State Liaison, CDFA
    Registered Service Agencies – Weighing Devices (Precision/Laboratory Balances and Light Industrial)
    Weighmasters Licensed in Cannabis-Related Activities

DMS recommends that potential scale buyers, service agents and weights and measure officials verify the following to determine suitability.
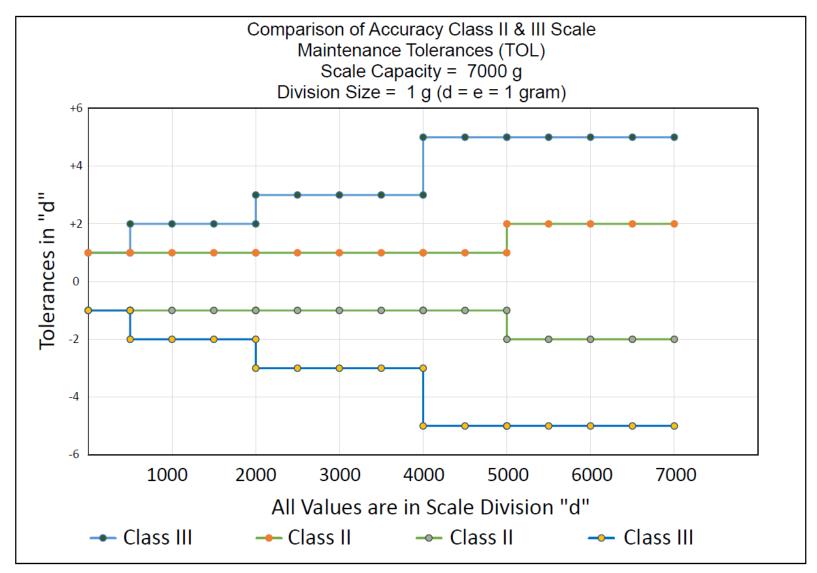
**Attachment 1. Suitability of Weighing Capacity and Minimum Scale Division (d):**

o  The Accuracy Class II scale capacity should be suitable for typical weighments.

o  Typical weighing should be greater than 15 - 20% of the scale capacity to reduce the error of a transaction and potential financial harm to the buyer or seller.

o  Scales should rarely be used to weigh amounts near the recommended minimum load specified in HB 44 Scales Table 8. to reduce large relative errors based on the indicated weight on the scale.

| Comparison of Accuracy Class II and III Scale Table of Relative Errors due to the Tolerance Error on a 7000 g capacity scale with a divisions size of 1 g (d = e, verification scale division value). | | | | | |
|---|---|---|---|---|---|
| Test load (g) | n (no. of d) | Tol. Class III | Tol. Class II | Relative Error Class III | Relative Error Class II |
| 20 | 20 [1] | 1 | 1 | 5.00% | 5.00% |
| 50 | 50 [2] | 1 | 1 | 2.00% | 2.00% |
| 100 | 100 | 1 | 1 | 1.00% | 1.00% |
| 150 | 150 | 1 | 1 | 0.67% | 0.67% |
| 500 | 500 | 1 | 1 | 0.20% | 0.20% |
| 501 | 501 | 2 | 1 | 0.40% | 0.20% |
| 1000 | 1000 | 2 | 1 | 0.20% | 0.10% |
| 2000 | 2000 | 2 | 1 | 0.10% | 0.05% |
| 2001 | 2001 | 3 | 1 | 0.15% | 0.05% |
| 3000 | 3000 | 3 | 1 | 0.10% | 0.03% |
| 4000 | 4000 | 3 | 1 | 0.08% | 0.02% |
| 4001 | 4001 | 5 | 1 | 0.12% | 0.02% |
| 5000 | 5000 | 5 | 1 | 0.10% | 0.02% |
| 5001 | 5001 | 5 | 2 | 0.10% | 0.04% |
| 6000 | 6000 | 5 | 2 | 0.08% | 0.03% |
| 7000 | 7000 | 5 | 2 | 0.07% | 0.03% |
| [1] 20 d HB 44 Scales, Table 8. Recommended Minimum Load - Class III [2] 50 d HB 44 Scales, Table 8. Recommended Minimum Load - Class II | | | | | |

**Attachment 2.**

Impact of Tolerances. Accuracy Class II tolerances are typically 50% or less than Accuracy Class III scale tolerances with loads above 500 scale divisions (e = d). As illustrated in this example, Accuracy Class III scale tolerances can be two to four times larger than Accuracy Class II scale tolerances.

**Attachment 3.**

**Suitability: Financial Impact of the Value of the Scale Division and Unit Price.** Be aware that the precision of the scale impacts the dollar value of a transaction as shown in the examples below.

| Example of Money Error on the Scale Division with a Unit Prices: $1,500 per lb, and $3,306.93 per kg | | | |
|---|---|---|---|
| Minimum Scale Division | Price per Scale Division | Minimum Scale Division | Price per Scale Division |
| 1 lb | $ 1,500.00 | 1.0 kg | $ 3,306.93 |
| 0.5 lb | $ 750.00 | 0.5 kg | $ 1,653.47 |
| 0.2 lb | $ 300.00 | 0.2 kg | $ 661.39 |
| 0.1 lb | $ 150.00 | 0.1 kg | $ 330.69 |
| 0.05 lb | $ 75.00 | 50 g | $ 165.35 |
| 0.02 lb | $ 30.00 | 20 g | $ 66.14 |
| 0.01 lb | $ 15.00 | 10 g | $ 33.07 |
| 0.005 lb | $ 7.50 | 5 g | $ 16.53 |
| 0.002 lb | $ 3.00 | 2 g | $ 6.61 |
| 0.001 lb | $ 1.50 | 1 g | $ 3.31 |
| 0.00005 lb | $ 0.08 | 0.5 g | $ 1.65 |
| 0.00002 lb | $ 0.03 | 0.01 g | $ 0.03 |

The following is based on the suitability criteria discussed above.

**QUESTION:** Pat is a CalCannabis licensed cultivator who weighs his cannabis and has a scale that can weigh up to 7,000 grams but the average amount typically weighed falls within the 2,000 grams to 6,000-gram range on a scale with a minimum division size of one gram. What should the Accuracy Class of Pat's scale be, Accuracy Class II or Class III?

**ANSWER:** An Accuracy Class II scale (*aka* balance) is the most suitable weighing device for Pat. The Accuracy Class II scale has much tighter accuracy tolerances, meaning that the amount of error allowed throughout the entire range of the scale (from 0 – 7,000 grams) is significantly smaller than an Accuracy Class III scale. Due to the larger tolerances, an Accuracy Class III scale will allow more error and provide less accurate readings, especially at lower weights.

If the cannabis produced by Pat is worth $15/gram and each gram represents one division on the scale, here are the permissible errors and consequential dollar values at various weights:

- If Pat weighs 550 grams on his scale, the Accuracy Class II scale will allow only one division error ($15) but the Class III scale allows two division errors ($30).

- If Pat weighs 2,500 grams on his scale, the Accuracy Class II scale will still allow only one division error ($15) but the Class III now allow three division errors ($45).

- If Pat weighs 5,500 grams on his scale, the Class II scale will still allow only two division errors ($30) but the Class III now allow five division errors ($75).

In summary, Pat could be losing an extra $30 to $75 dollars on each weighment when the quantity of cannabis ranges between 2,000 grams and 5,500 grams! These errors add up to large dollar amounts when a scale is used over a period of time.

**Environmental Considerations.** Be aware that Accuracy Class II scales are more sensitive to environmental factors such as wind, vibrations, and location since the minimum divisions are smaller than Class III scales of the same capacity [HB 44 Scales. Table 3 Parameters for Accuracy Classes (e.g. Class III d = 0.1 g vs. Class II d = 0.001 g)]. Additional environmental protections may be needed such as wind shields for balances and location away from sources of vibration and temperature changes (e.g., heaters, windows, direct sun, etc.).