



Steve Troxler
Commissioner

**North Carolina Department of Agriculture
and Consumer Services**
Standards Division
Standards Laboratory

Stephen Benjamin
Director

NC Standards Laboratory Calibration Certificate

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| Submitted by: Porter Scales 1721 Lake Wheeler Rd. Raleigh, NC 27603 | Date of Test: 4/24/2017 Test Number: NC1704-153-W P.O. Number: 17148 Page Number: 1 of 4 |
|--|---|

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|---|
| General Description: One set of 25 weights |
| Set Serial Number: LB 003 |
| Manufacturer: Rice Lake |
| Material: Stainless Steel |

| Item(s) Tested and Approved: | | | | | | |
|------------------------------|---------|-------------|--------------|-------------------------|--------------------------|---|
| # of Items | Nominal | Description | Tolerance | Measurement Uncertainty | <i>k</i> Coverage Factor | Serial Number(s) (Listed alphabetically) |
| 14 | 2 lb | Weights | NIST Class F | 12 mg | 2.02 | A, B, C, D, E, F, G, H, I, J, K, L, M, N |
| 2 | 1 lb | Weights | NIST Class F | 9.2 mg | 2.02 | plain, single dot |
| 1 | 8 oz | Weight | NIST Class F | 6.7 mg | 2.01 | none |
| 1 | 4 oz | Weight | NIST Class F | 2.7 mg | 2.01 | none |
| 1 | 2 oz | Weight | NIST Class F | 1.3 mg | 2.01 | none |
| 1 | 1 oz | Weight | NIST Class F | 0.64 mg | 2.01 | none |
| 1 | 1/2 oz | Weight | NIST Class F | 0.34 mg | 2.01 | none |
| 1 | 1/4 oz | Weight | NIST Class F | 0.22 mg | 2.01 | none |



NVLAP Lab Code 200495-0

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Form No.: NCM03

Revision Date: 1/5/17

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Filename: H:\Standlab\FILESYS\WB_PORTE2017\NC1704-153-W.docx



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| Item(s) Tested and Approved: | | | | | | |
|------------------------------|---------|-------------|--------------|-------------------------|-------------------|---|
| # of Items | Nominal | Description | Tolerance | Measurement Uncertainty | k Coverage Factor | Serial Number(s) (Listed alphabetically) |
| 1 | 1/8 oz | Weight | NIST Class F | 0.17 mg | 2.01 | none |
| 2 | 1/16 oz | Weights | NIST Class F | 0.13 mg | 2.03 | plain, single dot |

Tolerance: At the time of test, the above weights fall within the tolerance listed. Compliance to design specifications only applies to the tolerance class listed above.

Traceability: This certificate has been issued under the authority of the North Carolina Department of Agriculture & Consumer Services, Standards Division, pursuant to Chapters 81A and 119 of the General Statutes of the State of North Carolina. The items described above have been compared with the standards of the State of North Carolina, and are traceable to the National Institute of Standards and Technology, NIST via the test number above, and to the SI via NIST. All tests were performed at the North Carolina Standards Laboratory, 4040 District Drive, Raleigh, North Carolina 27607. Environmental conditions are maintained at a temperature of 18 °C to 27 °C and a relative humidity of 50 % ± 10 %.

Test Data: Actual test results for this calibration are reported on the attached NCDA&CS Standards Laboratory Test Data Sheet Supplement for NC Test Number NC1704-153-W. The complete report must include both this certificate and the data sheet supplement. The reported test results apply only to the items listed above.

Uncertainty Statement: The measurement uncertainty is calculated according to JCGM 100:2008, GUM 1995 with minor corrections, First edition, September 2008, "Evaluation of measurement data – Guide to the expression of uncertainty in measurement." The uncertainty reported is *k* (refer to the table above for *k* value) times the root sum square of the type A and B uncertainties, which represents a confidence level of 95.45 %. Uncertainty components evaluated include balance standard deviations, mass standard uncertainties, drift uncertainties, sensitivity uncertainties, bias, and absence of air buoyancy corrections.

Magnetism: These weights have not been tested for magnetic properties. Since the effects are difficult to quantify, no magnetism components are included in the uncertainty budget. Weights are screened for magnetism only if erratic balance behavior is observed during calibration. If a significant magnetic field is found, the weight is rejected.

Condition of Item(s) Upon Receipt:

| | |
|------|---|
| Good | Artifacts display some wear or other degradation. |
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Test Method Used:

NC SOP 8, *Medium Accuracy Calibration of Mass Standards by Modified Substitution (August 2016 Ed)*, based on NISTIR 6969, *“Selected Laboratory and Measurement Practices and Procedures to Support Basic Mass Calibrations (2014 Ed)”*- SOP No. 8, *Medium Accuracy Calibration of Mass Standards by Modified Substitution (June 2015 Ed)*.

*Any deviations from or additions to the SOP have been reviewed and approved for use by laboratory management. These deviations are documented and filed in the laboratory files.

Standards Used:

Standards are continuously monitored by a measurement control program. Artifacts are recalibrated if drift, damage, wear or other detrimental condition is noted. Balances are used for comparisons only. No calibration is required.

| Working Standard | Working Standard Set Serial Number | Working Standard Test Number | Working Standard Calibration Date | Balance Used |
|------------------|------------------------------------|------------------------------|-----------------------------------|--------------|
| 2 lb ws | NCDA 258 | NC1701-018-WD | 1-26-2017 | CCE5003 |
| 1 lb ws | NCDA 258 | NC1701-021-WD | 1-26-2017 | CCE5003 |
| 8 oz ws | NCDA 258 | NC1701-017-WD | 1-13-2017 | CCE5003 |
| 4 oz ws | NCDA 258 | OBS 17-0699 | 12-19-2016 | AX205 |
| 2 oz ws | NCDA 258 | OBS 17-0699 | 12-19-2016 | AX205 |
| 1 oz ws | NCDA 258 | OBS 17-0699 | 12-19-2016 | AX205 |
| 1/2 oz ws | NCDA 258 | OBS 17-0699 | 12-19-2016 | AX205 |
| 1/4 oz ws | NCDA 258 | OBS 17-0699 | 12-19-2016 | AX205 |
| 1/8 oz ws | NCDA 258 | OBS 17-0699 | 12-19-2016 | AX205 |
| 1/16 oz ws | NCDA 258 | OBS 17-0699 | 12-19-2016 | UMT5/6 |



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Next Appointment Scheduled for:

4/25/2018

We would appreciate feedback on your recent experience with our laboratory. Please complete our short online survey at www.ncagr.com/standard/survey.


Metrologist

4/24/2017
Date


Approved By



Laboratory Manager: Sharon Woodard Quality Manager: Robert Rogers
Metrologists: Van Hyder, Ashley Lessard, Sherry Teachey, Nicholas Cercone

Original Certificate has the NCDA Seal Embossed Above


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NCA&CS Standards Laboratory Test Data Sheet Supplement for the Test Number Listed Below



Company Name: Porter Scales
 Address: 1721 Lake Wheeler Rd.
 City, State, Zip: Raleigh, NC 27603
 General Description: One set of 25 weights
 Representative: Tommy Albright
 Set Serial Number: LB 003
 Material: Stainless Steel
 Condition of Weights: Good

NC Test No: NC1704-153-W
 Purchase Order No: 17148
 Date Scheduled: April 21, 2017
 Date Received: April 24, 2017
 Date Tested: April 24, 2017
 Date Returned: April 24, 2017
 Next Appointment: April 25, 2018

Manufacturer: Rice Lake
 Phone: (919) 828-1750
 Return Via: p/u
 Ship Charges: \$0.00

| Environmental Conditions at Time of Test | | |
|--|-----------|--------|
| | Beginning | Ending |
| Temperature (°C) | 20.9 | 21.5 |
| Relative Humidity (%) | 55 | 55 |
| Barometric Pressure (mmHg) | 746.7 | 746.7 |

| Line No | Weight Information | | Tolerance Information | | Balance Readings | | | Approximate Error | | | | Uncertainty | Working Standard | Wk Std Cal Date | Balance Used | Standard Correction |
|---------|--------------------|--------------|-----------------------|----------------|-------------------|------------------|----------|-------------------|----------|---------------|---------|-------------|------------------|-----------------|--------------|---------------------|
| | Serial Number | Nominal Mass | Tolerance Class | Full Tolerance | Before Adjustment | After Adjustment | As Found | In Tol? | As Left | In Tolerance? | | | | | | |
| 1 | A | 2 lb | NIST Class F | 0.091 g | -0.079 g | --- | -73 mg | Appd | -73 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 2 | B | 2 lb | NIST Class F | 0.091 g | 0.017 g | --- | 23 mg | Appd | 23 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 3 | C | 2 lb | NIST Class F | 0.091 g | -0.025 g | --- | -19 mg | Appd | -19 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 4 | D | 2 lb | NIST Class F | 0.091 g | -0.015 g | --- | -9 mg | Appd | -9 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 5 | E | 2 lb | NIST Class F | 0.091 g | -0.044 g | --- | -38 mg | Appd | -38 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 6 | F | 2 lb | NIST Class F | 0.091 g | -0.019 g | --- | -13 mg | Appd | -13 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 7 | G | 2 lb | NIST Class F | 0.091 g | -0.012 g | --- | -6 mg | Appd | -6 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 8 | H | 2 lb | NIST Class F | 0.091 g | -0.062 g | --- | -56 mg | Appd | -56 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 9 | I | 2 lb | NIST Class F | 0.091 g | -0.049 g | --- | -43 mg | Appd | -43 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 10 | J | 2 lb | NIST Class F | 0.091 g | -0.017 g | --- | -11 mg | Appd | -11 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 11 | K | 2 lb | NIST Class F | 0.091 g | -0.026 g | --- | -20 mg | Appd | -20 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 12 | L | 2 lb | NIST Class F | 0.091 g | -0.028 g | --- | -22 mg | Appd | -22 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 13 | M | 2 lb | NIST Class F | 0.091 g | -0.086 g | --- | -60 mg | Appd | -60 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 14 | N | 2 lb | NIST Class F | 0.091 g | 0.047 g | --- | 53 mg | Appd | 53 mg | Approved | 12 mg | 2 lb ws | 1-26-2017 | CCE5003 | 6.33219 mg | |
| 15 | plain | 1 lb | NIST Class F | 0.07 g | -0.044 g | --- | -40.5 mg | Appd | -40.5 mg | Approved | 9.2 mg | 1 lb ws | 1-26-2017 | CCE5003 | 3.48757 mg | |
| 16 | single dot | 1 lb | NIST Class F | 0.07 g | -0.021 g | --- | -17.5 mg | Appd | -17.5 mg | Approved | 9.2 mg | 1 lb ws | 1-26-2017 | CCE5003 | 3.48757 mg | |
| 17 | none | 8 oz | NIST Class F | 0.045 g | 0.012 g | --- | 13.6 mg | Appd | 13.6 mg | Approved | 6.7 mg | 8 oz ws | 1-13-2017 | CCE5003 | 1.62743 mg | |
| 18 | none | 4 oz | NIST Class F | 0.023 g | 0.00760 g | --- | 8.8 mg | Appd | 8.8 mg | Approved | 2.7 mg | 4 oz ws | 12-19-2016 | AX205 | 1.21031 mg | |
| 19 | none | 2 oz | NIST Class F | 0.011 g | 0.00633 g | --- | 7.0 mg | Appd | 7.0 mg | Approved | 1.3 mg | 2 oz ws | 12-19-2016 | AX205 | 0.71715 mg | |
| 20 | none | 1 oz | NIST Class F | 0.0057 g | 0.00067 g | --- | 0.98 mg | Appd | 0.98 mg | Approved | 0.64 mg | 1 oz ws | 12-19-2016 | AX205 | 0.31108 mg | |
| 21 | none | 1/2 oz | NIST Class F | 0.0028 g | 0.00065 g | --- | 0.82 mg | Appd | 0.82 mg | Approved | 0.34 mg | 1/2 oz ws | 12-19-2016 | AX205 | 0.16504 mg | |
| 22 | none | 1/4 oz | NIST Class F | 0.0017 g | -0.00018 g | --- | -0.08 mg | Appd | -0.08 mg | Approved | 0.22 mg | 1/4 oz ws | 12-19-2016 | AX205 | 0.10352 mg | |
| 23 | none | 1/8 oz | NIST Class F | 0.0013 g | 0.00017 g | --- | 0.22 mg | Appd | 0.22 mg | Approved | 0.17 mg | 1/8 oz ws | 12-19-2016 | AX205 | 0.05486 mg | |
| 24 | plain | 1/16 oz | NIST Class F | 1.1 mg | 0.1911 mg | --- | 0.58 mg | Appd | 0.58 mg | Approved | 0.13 mg | 1/16 oz ws | 12-19-2016 | UMT5/6 | 0.38488 mg | |
| 25 | single dot | 1/16 oz | NIST Class F | 1.1 mg | 0.0161 mg | --- | 0.40 mg | Appd | 0.40 mg | Approved | 0.13 mg | 1/16 oz ws | 12-19-2016 | UMT5/6 | 0.38488 mg | |

