



Calibration Certificate 15061

Missouri Department of Agriculture
 Weights, Measures & Consumer Protection Division, Metrology Laboratory
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Certificate Expires
 July 2019



FarmChem Corporation; 616 Madison St; Floyd, IA 50435; Phone:
 Customer Number: 708; Submission Date: 7/7/17; Calibration Date: 7/11/17

Test Item(s) Description

1 - lb weight set; Material: stainless steel; Manufacturer: Rice Lake; Serial: 4BXA; Condition: good; Range: 5 lb to 1 oz

Method and Traceability

The SI unit for mass is the kilogram (kg) 1 lb = 0.45359237 kg

National Institute of Standards and Technology (NIST) IR 6969 modified substitution standard operating procedure (SOP) 8 compares a standard and an unknown weight once to determine the difference. The Missouri metrology laboratory has demonstrated measurement proficiency through training and interlaboratory comparisons compliant to NIST Handbook 143 - Program Handbook for State Weights and Measures Laboratories (ISO/IEC 17025:2010): Laboratory standards used for comparison are traceable to the international system of units (SI) through NIST.

Uncertainty

[OIML R111](#)

[NIST SOPs](#)

[NIST Handbooks](#)

The uncertainty is the root sum square of the uncertainty of the standard, the standard deviation of the process (obtained using a check standard which characterizes balance performance), a component for balance sensitivity and drift, and an uncorrected systematic error for lack of buoyancy corrections, multiplied by a coverage factor (k)¹ from the Student's t distribution table according to the measurement degrees of freedom² associated with a 95.45 % confidence interval. (k) was calculated using the Excel TINV function [two tailed probability 0.0455, TINV(0.0455,df)].

Magnetism was not included in the uncertainty evaluation.

Environmental Conditions During Test: Temperature 19.2 to 19.3 (°C); Relative Humidity 47 to 47 (%).

Calibrated by: Kevin Hanson

Lab Manager: *Kevin Hanson*

Date Calibrated: 7/11/17

Weights are not checked for magnetism or material hardness with this procedure. The weight surface finish was visually inspected with a Flexbar surface finish comparator and the finish is considered adequate for the tolerance class listed unless otherwise noted in the "Remarks" section. This document shall not be reproduced except in full or used to claim product endorsement by this laboratory without written approval from the Missouri Metrology Lab. The results listed in this report only apply to the items calibrated.

NIST Handbook 105-1 Class F Tolerances For Field Standard Weights: Tables 2, 3, 4, & 5 respectively

FarmChem Corporation Cert No. 15061 Serial: 4BXA

Nominal Value	Standard Serial/ID	As Found Value	Value If Adjusted	± Tolerance NIST Class F	± Measurement Uncertainty	¹ t Table k factor	² Degrees of Freedom
5 lb		60 mg		230 mg	29 mg	2.02	136
5 lb		61 mg		230 mg	29 mg	2.02	136
5 lb		74 mg		230 mg	29 mg	2.02	136
5 lb		63 mg		230 mg	29 mg	2.02	136
5 lb		62 mg		230 mg	29 mg	2.02	136
2 lb		38 mg		91 mg	11 mg	2.02	136
1 lb		19.7 mg		70 mg	8.6 mg	2.02	136
1 lb		25.9 mg		70 mg	8.6 mg	2.02	136
1 lb		22.2 mg		70 mg	8.6 mg	2.02	136
1 lb		28.7 mg		70 mg	8.6 mg	2.02	136
1 lb		10.8 mg		70 mg	8.6 mg	2.02	136
8 oz		14.0 mg		45 mg	5.4 mg	2.02	136
4 oz		7.3 mg		23 mg	2.2 mg	2.02	136
2 oz		3.3 mg		11 mg	1.1 mg	2.02	136

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United States Department of Commerce

National Institute of Standards and Technology

Certificate of Metrological Traceability For:

Missouri

This laboratory has demonstrated evidence of an unbroken chain of metrological traceability of its standards to the international system of units (SI), documented measurement uncertainties, uses documented measurement procedures, successfully completed training and proficiency tests, documented calibration intervals, submitted a quality management system, and demonstrated suitable measurement assurance for the Scope listed on this certificate.

The Office of Weights and Measures Program assesses laboratories to NIST Handbook 143 - Program Handbook for State Weights and Measures Laboratories and ISO/IEC 17025:2005.

Scope

- | | |
|-------------------------|----------------------------|
| Mass Echelon II | Weight Carts |
| 30 kg to 1 mg | 6500 lb to 2000 lb |
| 50 lb to 0.001 lb | Railroad Test Cars |
| 4 oz to 0.03125 oz | 110 000 lb to 80 000 lb |
| Mass Echelon III | Volume Transfer, II |
| 250 kg to 1 mg | 1500 gal to 5 gal |
| 6500 lb to 0.001 lb | 100 gal to 25 gal LPG |
| 4 oz to 0.03125 oz | Grain Moisture |
| | 19 % to 8 % |



2017 to 2018

A handwritten signature in black ink, appearing to read "Georgia L. Harris".

Georgia L. Harris, Acting Chief
NIST Office of Weights and Measures

Effective Dates: 2017-01-01 to 2018-12-31