



OHIO METROLOGY LABORATORY POLICY STATEMENT

Instruction Sheet for Submission of Test Equipment

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The State of Ohio Weights and Measures Metrology Laboratory is open for calibration of test equipment. Since the laboratory is the calibration center for the entire State of Ohio, we feel it is imperative that we point out certain guidelines for testing. We therefore offer an outline of requirements for laboratory calibration.

The Ohio Metrology Laboratory adopts all requirements of the NIST Handbook 105 series for commercially used standards. Owners of commercially used standards should familiarize themselves with these publications in order to be aware of any requirements not covered in detail in this policy. The NIST 105 series of standards can be found at <http://www.nist.gov/pml/wmd/pubs/handbooks.cfm>

1. **Scheduling Work – By Appointment Only.** Before sending any work to the Ohio Metrology Laboratory, you must first contact the lab and make your initial request. All work will be scheduled as soon as possible after the initial request, depending on the schedule of the lab. After the lab has determined the amount of time needed to process your request, you will be provided a calibration date. If you need to ship any items to the lab, please make sure they arrive prior to your scheduled calibration date. Include any specific requirements with the artifacts such as, but not limited to:
 - Physical address to be listed on certificate
 - Billing address to which certificate and invoice will be mailed
 - Purchase Order
 - End user company name and address (If different than company submitting artifacts)

You can telephone or email the laboratory for scheduling. (614) 728-6290 or weights@agri.ohio.gov

NOTE: Invoice(s) and Certificate(s) will be mailed to the billing address provided.

NOTE: Dropped off artifacts that do not have an appointment will fall to the end of the laboratory test queue and typically have a 30 day turnaround.

2. **Re-Scheduling.** Scheduled appointments may have to be re-scheduled due to unforeseen circumstances. These may include, but not limited to, illness, jury duty or an emergency. Each metrologist individually prepares their schedule. Therefore, scheduled items may still be dropped off, however, they may not be done at the original time expected. All efforts by the laboratory staff will be made to contact the scheduled customer and determine if they would like to re-schedule or drop off the items and have them worked back in to the schedule.
3. **Fees.** The fee for testing is \$100.00 per hour. A quote can be provided upon request. Fees must be paid by money order, check, or credit card. Credit card payments can be made by calling (614) 728-6290 once you receive the invoice. If any of the conditions in this policy are not met and no certificate can be issued for the item submitted, there will still be a charge involved for setup and scheduling time (minimum ½ hour).
4. **Due Dates.** It is not the responsibility of the Ohio Metrology Laboratory to modify the schedule in order to accommodate artifacts that are near or past the calibration due date. It is the owner of the artifacts responsibility to make sure they are scheduled far enough in advance of the expiration date.



5. **Calibration Intervals.** Field standards used by Ohio Weights and Measures officials are required to be tested once every three years. Field standards used by registered servicepersons are required to be tested at least once every two years. These requirements are in accordance with Ohio Revised Code Section 1327.50 (H) and Rule 901:6-8-01.
6. **Shipping Items To Lab.** All items shall be securely packed before shipping. Any item ten (10) lbs or larger should be shipped in wooden crates, not cardboard. The Ohio Metrology Laboratory is not responsible for items shipped improperly. Cardboard shipments are accepted for smaller items, but larger items should be double boxed and secured. Items should be individually wrapped or protected with appropriate packing materials. **Foam peanuts are not acceptable.**
NOTE: Handheld weight kits shall be secured in the closed position with latches, rubber bands, tape, boxes, or bags. Small weights can be lost if the kit is not securely closed.
NOTE: Weights 25 kg (50 lb) and larger, whether shipped or delivered, should be stacked on full size pallets whenever possible. A forklift is available for pallet delivery but no loading dock is available.
NOTE: The laboratory **will not accept** items shipped freight collect or C.O.D.
7. **Return Shipping.** Return shipment of small boxes (150 lb or less) will be shipped via UPS Ground. Return shipment of large items (greater than 150 lb) will be shipped via UPS LTL Freight. Current UPS shipping and insurance charges will be prepaid by the Ohio Metrology Laboratory and added to the invoice along with the calibration charges.
NOTE: It is the customer's responsibility to advise the laboratory of the appropriate monetary value for insurance amounts. This value should include the cost to replace the artifacts as well as the cost of recalibration. If an insurance value is not provided by the customer, the laboratory reserves the right to make a judgment on the value of which to insure the package. The Ohio Metrology Laboratory assumes no liability in excess of the insured amount.
NOTE: Arrangements for return shipping of items on pallets (LTL Freight) or shipments utilizing customer's shipping account (freight collect) should be made with the laboratory during scheduling or initial delivery.

CONDITION OF ARTIFACTS

We believe the testing and repair work in the weights and measures field cannot be any better than the equipment used. It is to the advantage of the individual or company to make certain their standards are kept in excellent condition at all times. National Institute of Standards and Technology (NIST) 105 Series Handbooks, ASTM E617 Standard, and policy outlined in this document are used by the Ohio Metrology Laboratory as suitability criteria for test equipment. Equipment submitted to the laboratory in good condition and ready for immediate calibration will result in more rapid service.

All Items Submitted:

8. **Cleanliness.** Artifacts submitted must be cleaned of all foreign matter, such as but not limited to: dirt, rust, concrete, adhering debris, loose paint, grease, oil, marks, films, or hydrocarbons. Foreign matter must be removed with water, mild detergent, mild solvent, or isopropyl alcohol before submission.
9. **Temperature of Artifacts.** The Ohio Metrology Laboratory requires that all artifacts' structural mass is at a temperature that will not affect the accuracy of the calibration process. Artifacts will be held in the laboratory's environment until this thermal equilibrium is obtained. Mass calibration procedures dictate the equilibration time for test weights based on the weight's nominal value, classification, and temperature when received. See Appendix B of this policy for minimum equilibration times for weights. Additional time may be required to address condensation.



Volume Standards:

10. **Cleanliness.** Test measures and provers must be cleaned of all foreign matter and rinsed out until there are no strong odors or evidence of hydrocarbons. Any vessels with obvious residues will be thoroughly cleaned by the Ohio Metrology Laboratory before being tested and additional charges will apply. Items that require extensive cleaning may be refused. Volume standards must also meet the cleanliness requirements found in paragraph 8 of this policy.
11. **Dents.** Dents must be removed and all leaks repaired.
12. **Corrosion.** Vessels with badly corroded interiors will not be tested.
13. **Painting.** All test measures not made of stainless steel must have a dried fresh coat of paint. This does not apply to items that have never been used.
14. **Condition.** Gauge tubes, valves, reading scales and other test measure and prover components must be in working order and in a reasonably good state of repair. No cracks can be present in gauge tubes.
15. **Non-Commercial Vessels.** Five gallon test measures called “non-reference” or “station standards” do not meet the requirements of NIST Handbook 105-3 and cannot be tested. These are generally identified with a glass plate set right in the neck of the test measure.
16. **Other NIST 105-X Requirements.** The Ohio Metrology Laboratory adopts all requirements of the NIST Handbook 105 series for commercially used standards. Owners of commercially used standards should familiarize themselves with these publications in order to be aware of any requirements not covered in detail in this policy. The NIST 105 series of standards can be found at <http://www.nist.gov/pml/wmd/pubs/handbooks.cfm>

Mass Standards:

17. **Painting.** Cast iron test weights must be cleaned and freshly painted with a **light** coat of an approved paint, unless they are brand new, just prior to submission. Clean and paint all sides and bottom of each weight. A light coat of sprayed-on flat aluminum paint is recommended. Epoxy paint or plated surfaces are not acceptable. Cast iron metric and avoirdupois field standards shall be color coded (i.e., gold for metric and silver for avoirdupois) to differentiate the weights. The Ohio Metrology Laboratory reserves the right to refuse weights that have not been properly cleaned prior to painting. Paint applied over dirt, grease, or any other adhering debris is not acceptable. Contact the laboratory for questions regarding painting.
18. **Serial Numbers.** Individual weights not part of a handheld kit should be identified with a permanent stamp or serial number into the surface of the weight. Serial numbers shall not be placed on the bottom of the weight. Identifying stickers are not allowed and will be removed from the surface of any weights submitted. Identification numbers or letters applied with paint or ink will not be accepted. Handheld weight kits may have one serial number to cover all contents of the kit. In the case that multiple weights of the same nominal value are contained within the kit, each weight of the same nominal value should have a permanent, unique stamp or mark into the surface of the weight to differentiate from other weights of the same nominal value in the kit. The Ohio Metrology Laboratory may elect to stamp weights appropriately if not done so prior to submission. Serial numbers must be legible, this is especially important for cast iron weights that have been painted prior to submission.
19. **Cleanliness.** Interior of handheld weight kit cases should be wiped down or vacuumed to remove any foreign material. All weights shall meet the cleanliness requirements outlined in Paragraph 8 of this policy. A lint free cloth dampened with non-denatured ethyl alcohol works well for cleaning stainless steel weights. The Ohio Metrology Laboratory staff may elect to clean stainless steel weights at the owner’s expense if a minimal amount of cleaning is needed. Items that require extensive cleaning may be refused.



20. **Precision Weights.** Precision weights must arrive at least 24 hours in advance to acclimate to the laboratory's environment prior to testing. Handle your precision weights carefully; tolerances are small, so dirt, abuse, or improper handling can cause out of tolerance conditions.
21. **Same Day Calibrations.** The Ohio Metrology Laboratory may elect to perform same day calibrations of weights during seasons of the year that allow weights to be at an appropriate temperature at time of delivery. These tests must be scheduled in advance with the laboratory. Customers must be at the lab and ready to unload by 8:00 am on the scheduled calibration day. The minimum equilibration times found in Appendix B of this policy will be applied prior to beginning calibrations. Additional time may be required to address condensation.
22. **Fabricated Weights.** Fabricated weights (consisting of a steel case filled with various material) not previously submitted will not be accepted. Fabricated weights already certified are to be submitted at intervals not to exceed one year to insure their stability. Fabricated weights that are unstable will be rejected and should be replaced with weights made of metal of uniform density, such as cast iron.
23. **Brass / Laminated Weights.** A brass or laminated weight will not be certified as NIST Class F. This applies to weights used to test commercial weighing devices.
24. **Small Cast Iron Weights.** Cast iron weights 5 kg (10 lb) and smaller are not permissible for use as commercial field standards. To meet the requirements of NIST Class F found in NIST Handbook 105-1, weights of these sizes must be constructed of materials such as iron, steel, or stainless steel, having a hardness of Rockwell B 80 or greater, and be resistant to abrasion, corrosion, denting and chipping. For customers not performing testing of commercial weighing devices, cast iron weights 5 kg (10 lb) and smaller can be certified by the laboratory as ASTM Class 7 weights. Certificates issued for these weights will clearly state that they are not approved for testing of commercial weighing devices.
25. **Carrying Case.** Field standard weights up to and including 5 kg (10 lb) shall be carried in a rigid covered case designed to restrict movement and prevent damage to the weights. Separate pockets shall be lined with nonabrasive, noncorrosive material (e.g., soft, non-shredding plastic, wood). A separate box may be inserted into the larger box to house smaller denomination weights (e.g., 8 oz to 1/32 oz). This requirement also applies to Weight Carts' correction weight kits.
26. **Other NIST 105-X Requirements.** The Ohio Metrology Laboratory adopts all requirements of NIST Handbook 105 series for commercially used standards. Owners of commercially used standards should familiarize themselves with these publications in order to be aware of any requirements not covered in detail in this policy. The NIST 105 series of standards can be found at <http://www.nist.gov/pml/wmd/pubs/handbooks.cfm>



Field Standard Weight Carts:

27. **Fuel Level Error Weights (Correction Weights).** Correction weight kits shall accompany any weight cart submitted for calibration. These kits shall be comprised of sufficient 0.5 lb (8 oz) error weights (housed in a separate carrying case) to compensate for the fuel tank capacity visible on the tank's sight gauge. The correction weight kits must meet all requirements of NIST Class F found in NIST Handbook 105-1.
28. **User Modifications.** User modifications of weight carts are discouraged. Any modifications must be permanent changes to the weight cart structure and will require recalibration prior to use. Any maintenance process performed between calibrations which alters the mass of the weight cart (e.g., changing the battery, wheels, hydraulic pump, etc) invalidates the previous calibration certificate and requires recalibration prior to use. **Removable clevises are not allowed. These must be permanently attached to the weight cart.**
29. **Finish / Cleanliness.** Weight carts must be kept clean at all times. Weight carts must be wire brushed and power washed prior to submission. A fresh coat of paint must be applied and dried (top to bottom) prior to submission. The nominal (empty weight) value must be clearly labeled on each side of the weight cart.
30. **Maintenance Log.** A maintenance log must be established and present with each weight cart. The maintenance log must contain a detailed record of all maintenance performed on the weight cart.
31. **Delivery to the Lab.** The Ohio Metrology Laboratory cannot unload weight carts from a customer's truck or trailer. It is the customer's responsibility to unload the weight cart to ground level at the time of delivery to the laboratory.
32. **Other NIST 105-X Requirements.** The Ohio Metrology Laboratory adopts all requirements of NIST Handbook 105 series for commercially used standards. Owners of commercially used standards should familiarize themselves with these publications in order to be aware of any requirements not covered in detail in this policy. The NIST 105 series of standards can be found at <http://www.nist.gov/pml/wmd/pubs/handbooks.cfm>. Appendix A of this policy provides some general examples of retroactive and non-retroactive requirements for weight carts based on date of manufacture.



APPENDIX A: NIST Handbook 105-8 Requirements (general examples)

Requirements for New Weight Carts (Manufactured after Sept. 2003)	Requirements for Carts In-service (Manufactured prior to Sept. 2003)
<ul style="list-style-type: none"> ◆ Weight value in 500 lb increments ◆ ID Plate with: Weight of cart, Max. gross wt., Name & address of manu., Model no., Serial no., Date of manu., Statement “Meets HB 105-8, Rev. ___” ◆ Metallic tubing is to be used where possible to minimize use of rubber hoses ◆ Calibrated fuel tank <ul style="list-style-type: none"> - 1 gal or less - vertical sight gauge with at least 0.72 gal visible in gauge, graduated in 0.25 lb increments - 0.5 lb fuel error weight kit must be provided - cylindrical shape - top of tank below top edge of cart - identified with a serial no. - constructed of a low carbon or corrosive resistant steel - light in color ◆ Hydraulic fluid system must have a sight gauge, marked reference level, fill and drain caps must be sealed ◆ Engine oil must be maintained at reference level ◆ Tires: must be smooth (no tread) and insure max. 200 lb/in² point load concentration ◆ Designed to drain water from inside cart ◆ Must have a parking brake ◆ Battery: non maintenance type and must be sealed to the cart (battery replacement requires recalibration) ◆ Must have an adjusting cavity with a min. capacity of 150 lb, adjusting cavity must be sealed to the cart and adjusting cavity opening must be sealed ◆ Weight cart maintenance log is required 	<ul style="list-style-type: none"> ◆ Weight value in 100 lb increments ◆ Calibrated fuel tank <ul style="list-style-type: none"> - 1 gal or less - vertical sight gauge with at least 0.72 gal visible in gauge, graduated in 0.25 lb increments - 0.5 lb fuel error weight kit must be provided - cylindrical shape - top of tank below top edge of cart - identified with a serial no. - constructed of a low carbon or corrosive resistant steel - light in color ◆ Engine oil must be maintained at reference level ◆ Tires: must be smooth (no tread) and insure max. 200 lb/in² point load concentration ◆ Designed to drain water from inside cart ◆ Must have an adjusting cavity, adjusting cavity must be sealed to the cart and adjusting cavity opening must be sealed ◆ Battery: non maintenance type and must be sealed to the cart (battery replacement requires recalibration) ◆ Weight cart maintenance log is required



Appendix B: Minimum Laboratory Equilibration Time For Weights**

ΔT^*	Nominal Mass	OIML F1 ASTM 2 (time in hours)	OIML F2 to M3 ASTM 3 to 7 NIST F (time in hours)
$\pm 20\text{ }^\circ\text{C}$ ($\pm 36\text{ }^\circ\text{F}$)	1000 kg to 2500 kg (2000 lb to 5000 lb)	79	5
	100 kg to 500 kg (200 lb to 1000 lb)	33	4
	10 kg to 50 kg (20 lb to 100 lb)	12	3
	1 kg to 5 kg (2 lb to 10 lb)	6	2
	100 g to 500 g (0.2 lb to 1 lb)	3	1
	10 g to 50 g (0.02 lb to 0.1 lb)	1	1
	1 mg to 10 g (0.001 lb to 0.02 lb)	1	0.5
$\pm 5\text{ }^\circ\text{C}$ ($\pm 9\text{ }^\circ\text{F}$)	1000 kg to 2500 kg (2000 lb to 5000 lb)	4	1
	100 kg to 500 kg (200 lb to 1000 lb)	4	1
	10 kg to 50 kg (20 lb to 100 lb)	4	1
	1 kg to 5 kg (2 lb to 10 lb)	3	1
	100 g to 500 g (0.2 lb to 1 lb)	2	1
	1 mg to 100 g (0.001 lb to 0.2 lb)	1	1
$\pm 2\text{ }^\circ\text{C}$ ($\pm 4\text{ }^\circ\text{F}$)	1 mg to 2500 kg (0.001 lb to 5000 lb)	1	0.5
$\pm 0.5\text{ }^\circ\text{C}$ ($\pm 1\text{ }^\circ\text{F}$)	1 mg to 2500 kg (0.001 lb to 5000 lb)	0.5	0.5

* ΔT = Initial difference between weight temperature and laboratory temperature. Laboratory temperature maintained at 20 °C (68 °F).

**Additional equilibration time may be needed to address problems with condensation and frozen surfaces. Weights must be completely dry prior to calibration.

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