

Artifact Submission Requirements

ATTENTION: Read this form in its entirety to avoid rejection of items submitted

Calibration Appointment Terms - Items submitted for calibration must comply with the requirements as defined in this form.

- **CALIBRATION SERVICE IS BY APPOINTMENT ONLY.**
 - **Do not ship any item without scheduling first. Unscheduled items will be immediately returned to sender.**
- Submit a Calibration Request form and wait until you receive an email/phone call from the laboratory, which will indicate acceptance along with the schedule date, time, and may include additional submission instructions.
- Invoices and calibration certificates are issued by email after calibrations are completed.
 - Please supply a contact email for all calibration service correspondence.
- Calibration expenses are set at an hourly rate of \$125 per hour per employee (one hour minimum). Includes but not limited to:
 - Creation of spreadsheets and data entry
 - Unload, load, unpacking, packing, setup, check standards, and any necessary cleaning.
 - Calibration of artifacts
 - Adjustment to the weights/provers when appropriate
 - Any work performed before rejection of an item.
- **The Missouri Department of Agriculture is not responsible for items left outside the building by the customer.**
- It is advisable to not schedule work during the scheduled calibration appointment. We may not be able to accommodate.
- Trucks will not be left overnight without prior authorization and available space.

Shipping of Test Items

Customers are responsible for making all shipping arrangements for test items. A prepaid return shipping label is a good option to pay for return shipping. Customers may use shipping accounts if they make all the arrangements for return with the shipping company, including scheduling pickup.

Mass Standard Requirements according to material type and tolerance and where noted in this form lab policy

For reference, see American Society for Testing and Materials (ASTM E617) and/or International Organization of Legal Metrology ([OIML R111](#)).

NOTE: ASTM E617 is a copyright standard.

CAST IRON

Tolerance; NIST Class F for standards in service prior to January 1, 2020; ASTM Class 4, 5, 6, 7 and OIML Class M1, M1-2, M2, M2-3, M3 for standards in service after January 1, 2020

- Standards need to be cleaned and lightly painted with a single coat of paint. Avoirdupois (pound) standards need to be painted silver. Metric standards need to be painted gold. Weight serial numbers need to be legible. Serial numbered weight groups should also include a list of all the serial numbers in the set for reference.
- **Weights will not be listed in numeric order on a calibration certificate unless specified and organized before delivery.**
- **NOTE: threaded sealing cavity plugs will not be accepted regardless of the in service date of the weight; when encountered the weight will be rejected for repair according to lab policy which is based on NIST HB105-1 (1990 Edition) Specifications and Tolerances for Reference Field Standards Weights and Measures, section 6 Adjustment Cavity Closure, subsection 6.1, The cavity shall have a recessed opening (counterbore), larger than the cavity hole, machined if necessary, to hold a backup disk and sealing cap. A weight having a threaded plug shall not be placed into service after the publication date of this standard.**
- **NOTE: cast iron weights 10 lb / 5 kg or less will not be accepted regardless of the in service date according to lab policy which is based NIST HB105-1 (1990 Edition), section 1. Material, sub section 1.4. Cast iron may only be used for weights 10 kg / 20 lb and larger.**
- **NOTE: true "as found" values require weights to be submitted before cleaning and painting and then resubmitting after.**

Do not deliver cast iron weights with fresh WET paint. The lab has sensitive analytical balances and does not want any artifact to alter the quality of the instruments it utilizes.

STAINLESS STEEL

Tolerance; NIST Class F for standards in service prior to January 1, 2020; ASTM Class 4, 5, 6, 7 and OIML Class M1, M1-2, M2, M2-3, M3 for standards in service after January 1, 2020 (10 lb/5 kg or less, usually in sets)

- Weights need to be cleaned with acetone or alcohol and any foreign material stuck to them removed. Weight surface finish abrasions or corrosion areas may need to be polished if they exceed HB105-1 surface finish requirements but only if the weight is adjustable or it may fail to make tolerance. Weight cases need to be cleaned inside and out and the foam liners replaced if the foam is starting to deteriorate. When necessary, cases need to be repaired (handles, hinges, latches, etcetera).
- **NOTE: These weights will be brought into a laboratory with clean room requirements therefore the weights and cases need to be thoroughly cleaned before submission.**

Stainless Steel: Tolerance; ASTM Class 2 & 3; OIML Class F1 & F2

For reference, see the ASTM E617 or OIML R111 standard, as applicable. [OIML R111](#)

- **Precision weight sets will not be calibrated the same day they are received.** The weights must equilibrate in the laboratory overnight. Weights should be submitted as they are; we will not clean them unless authorized by the customer. Original certificates from the manufacturer should also be included to ensure the correct density is used for the calibration. It should also be noted if any of the weights in a set have been replaced. Please include manufacturer information for all replaced weights. The material density information is required for precision calibration.
- **NOTE: Material densities are different between manufacturers and often change over time even if the weights are from the same manufacturer.**

WEIGHT CARTS

- Must be clean and free of mud or debris.
- No major damage to the tires or cart
- No fuel, oil, or hydraulic fluid leaks
- Must have a way to seal the hydraulic fluid, battery, and adjustment cavity.
- Must have the fuel filled to the zero mark.
- Must have a manufacturer's ID plate with serial number and nominal value.
- Must have a way to unload and load the cart.
- Lifting bars may need to be left by the customer if the Metrology Lab does not have a bar that fits the cart.
- Fuel correction kit.

<https://www.nist.gov/publications/nist-handbook-105-8-specifications-and-tolerances-reference-standards-and-field-0>

VOLUME STANDARDS

- For reference see NIST Handbook 105-3: 2010 Edition; Specifications and Tolerances for Graduated Neck Type Volumetric Field Standards and NIST Handbook 105-4: 2016 Edition; Specifications and Tolerances for Liquefied Petroleum Gas and Anhydrous Ammonia Liquid Volumetric Provers.
[NIST HB105-3](#) and [NIST HB105-4](#)

Standards submitted having NO identification plate from the manufacturer will not be accepted for calibration.

HANDHELD TEST MEASURES

- These measures need to be cleaned inside and out with soap and water including the bottom of the measure and the gauge scale plate and tube. If lab staff cannot see the meniscus to take a reading the test measure will be rejected. Water is the test medium used and hydrocarbons do not mix with water so the test vessel must be thoroughly cleaned. The same holds true for soap, so please make sure to thoroughly rinse the soap out after cleaning.
- **NOTE: Handheld test measures are brought into the lab for calibration. This is a clean room environment. The procedure requires handling the test measure and the lab standard for calibration. Our lab standard must be maintained and remain clean; therefore, we cannot handle a dirty test measure.**

LARGE VOLUME PROVERS

Prover Cleanliness

- Provers need to be cleaned inside and out with soap and water including the gauge scale plate and tube. Water is the test medium used and hydrocarbons do not mix with water so the test vessel must be thoroughly cleaned. The same holds true for soap so please make sure the soap is thoroughly rinsed out after cleaning. Drain times are critical so ensure that all drains and valves are clear of rust/sediment before delivering to the lab for calibration.

Prover Leveling

- Provers must have a leveling means. 5-gallon bottom drop test measures can have a bullseye level or two spirit levels perpendicular to one another. Provers larger than 5 gallons must have two spirit levels perpendicular to one another.

Prover Trailers

- Trailers with provers mounted on them must have at least three jacks to stabilize the trailer. Any trailer not considered stable by lab staff will be rejected.

Prover Piping

- Provers must have adequately sized piping for gravity draining. All prover piping between the prover body and the calibration valve MUST slope downward to the calibration valve at a minimum 15-degree angle.
- **NOTE: it is permitted to use the motor pump off system since it replicates use.**

Always check your equipment is properly tightened, drained, and/or reassembled when calibration is complete.

LPG PROVER Requirements *(the above requirements also apply when applicable)*

- LPG provers must be submitted empty and not under pressure.
 - **No LPG can be discharged in the parking area.**
- LPG provers need to be clean inside and out with soap and water **especially the bottom zero gauge**. If it is dark and not readable, please clean it before submitting. Without an accurate bottom zero there is a risk of the prover being rejected.
- Pressure gauges must be in good workable condition.
 - Cracked or obviously defective pressure gauges should be replaced prior to submitting it for calibration.
 - The pressure relief valve in the top must be removed.
- The pressure relief valve must also be submitted along with any special tool needed to reinstall it. The test requires pressurizing the prover to 200 psi by 50 psi increments so the pressure relief valve will need to be reinstalled.
- Bottom zero gauges must be clean and readily accessible with an unobstructed view.
- The valve used for calibration must also be easily accessible from a comfortable position in front of the bottom zero gauge.
- Inlet piping should have an excess flow valve installed so water can be drained out through it. A one-way valve will not permit this.
- All piping that is part of the bottom zero must be sloped downward from the bottom neck at a minimum 15-degree angle to prevent air entrapment otherwise all piping must be removed and a plug installed in the bottom neck before submitting.
- All piping must be schedule 80.

Always check your equipment is properly tightened, drained, and/or reassembled when calibration is complete.

Certificate Information

Please include detailed instructions for certificate issuance for each item tested such as a weight set, prover trailer, or group of weights to ensure you receive what you want.

WARNING: Failing to comply with the above submission requirements may result in the laboratory not accepting the item(s) for calibration. Items submitted must be in suitable condition for calibration.