

# Troemner's Laboratories and Calibration System

*Precision & Balance Matched Only By Nature.*



## **Troemner's Philosophy Toward Calibration and Traceability**

Troemner is the country's largest independent mass calibration company. Our philosophy is to provide the highest level of quality calibration by pursuing every measurement detail in order to achieve the most accurate and repeatable calibrations in the industry. Starting with a stable and tightly controlled environment, followed by using the finest equipment available, with highly trained personnel executing proven procedures, we produce a precise measurement. Our goal is to provide our customers with the lowest measurement uncertainties achievable.

## **World Class Calibration Facilities**

The backbone of our calibration capabilities is the design, construction, and operation of our physical facilities. Troemner's Mass Calibration Laboratories were constructed to meet the strict environmental guidelines listed in NIST/NVLAP Handbook 150-2. Please visit our website at

[www.troemner.com](http://www.troemner.com) for more information on these requirements. In order to maintain the strictly controlled environment, the Mass Calibration Laboratories were designed and constructed as a building within a building. Within Troemner's corporate headquarters, three Level I Laboratories and one Level III Laboratory sit upon separate 30" foundations that are isolated from the rest of the building with layers of sand and concrete to eliminate vibration. The walls are 12" thick and provide a temperature and vapor barrier to the outside. The climate in each of the Mass Calibration Laboratories is strictly monitored and controlled with each laboratory having its own HVAC system. Temperature in the laboratory is measured to 0.05 degree C and maintained at 21.5 ±1 degree C, with no more than a 0.5 degree C change per hour. Humidity is measured to ± 2% and maintained within 40-50%, with no more than a 5% change per hour. Barometric pressure is measured to 0.01 mm Hg. Although the temperature and humidity are tightly measured and controlled, the design of the air handling system allows for minimal air velocity, so air currents are kept to a minimum.

## **State-of-the-Art Equipment**

All mass comparators used in Troemner's Mass Calibration Laboratories are state-of-the-art with the highest precision possible. Troemner can measure as precisely as 0.0001 mg. Each comparator rests on a marble table to reduce effects from vibration and has its

own temperature probe mounted within the weighing chamber to measure the temperature at the time of calibration. The comparators are interfaced to a host computer outside the laboratory for processing calibration data. Troemner's custom software programs ensure the accuracy of the data collection and calculation process. Troemner's staff of metrologists and calibrators is equipped with mass standards directly traceable to NIST.

Troemner's precision weights are sampled regularly throughout the manufacturing process to determine the magnetic properties of the material. Stainless steel is tested for magnetic permeability and for magnetic susceptibility. Once Troemner's two-piece weights are machined and polished, they are checked using a Gaussmeter prior to the calibration. Troemner's stainless steel one-piece weights are all individually tested for magnetic susceptibility using a state-of-the-art susceptometer. Troemner's susceptometer procedure is based on Dr. Richard Davis's paper, "Determining the Magnetic Properties of 1 kg Mass Standards." Troemner has completed an interlaboratory comparison with several internationally recognized metrology organizations to determine the effectiveness of the susceptometer. The results of this interlaboratory comparison and Dr. Davis's paper are available at [www.troemner.com](http://www.troemner.com).



## **Unmatched Standards**

Troemner's traceability back to nationally recognized standards is guaranteed. Direct traceability to NIST is achieved and maintained through the use of several standards that are not only returned to NIST on a regular schedule, but also are intercompared in our laboratories to monitor their stability.

# Laboratories and Calibration System

## Highly Trained Personnel and Proven Calibration Procedures

World-class metrology facilities and state-of-the-art calibration equipment are only as good as the people who manage the measurement process. Troemner has an excellent staff of certified metrologists and NIST trained calibrators who adhere to strictly established metrology practices in order to provide low statistical uncertainties second only to NIST. Our weighing instruments and mass standards are continually maintained according to the NIST Mass Measurement Assurance Program (MMAP) procedures and to ISO 9001 and ISO 17025 guidelines. Troemner's procedures utilize multiple standards during a calibration to assure accuracy of the process and to validate the standards. If a measurement does not pass statistical tests calculated during each calibration, then the measurements are repeated and investigation is initiated to find the root cause of the failure.

## Accreditation

Troemner's focus is to achieve the highest levels of accreditations for weights, mass standards and calibration services. Third party accreditations by internationally recognized organizations provide critical, regularly scheduled and unbiased assessments of Troemner's quality programs and technical capabilities. Accreditations assure our customers that Troemner meets and maintains the most rigorous testing and manufacturing standards. Since 1995, both NVLAP and UKAS have accredited Troemner's Mass Calibration Laboratories. Troemner offers either NVLAP or UKAS calibration for precision weights. Troemner can also provide you with NVLAP Magnetic Susceptibility Determination Calibration and NVLAP Density Determination Calibration for your one-piece precision weights.

The combination of a highly trained staff, controlled physical conditions and precise equipment enable Troemner's Mass Calibration Laboratories to produce mass

measurements with very small uncertainties. For more information on Troemner's Mass Calibration Laboratories, including photos, please visit [www.troemner.com](http://www.troemner.com).

## Additional Calibration Services Available from Troemner

Troemner's detailed approach to mass calibration has led us to take our measurement control philosophy into other areas. In order to fulfill more of our customers' needs we now offer the following calibration services:

- NVLAP accredited Pipette Calibration
- NVLAP accredited Temperature Calibration
- NVLAP accredited Humidity Calibration
- NVLAP accredited Pressure Calibration
- Thermal Mass Flow Calibration in an ISO/IEC 17025 compliant laboratory
- Electrical, Time and Frequency Calibrations in an ISO/IEC 17025 compliant laboratory

## Traceability Chart for Troemner Weights

