Our Calibration System

Calibration & Traceability Philosophy

Troemner is the world's largest independent mass calibration company. Our philosophy is to provide the highest level of calibration quality by pursuing every measurement detail in order to achieve the most accurate and repeatable calibrations in the industry. We produce a precise measurement starting with a stable and tightly controlled environment, followed by using the finest equipment available, with highly trained personnel executing proven procedures. 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 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 Echelon I Laboratories and one Echelon II 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° C and maintained at 21.5 ± 1° C, with no more than a 0.5° 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.

Calibration Laboratory

Cutting Edge 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 are equipped with mass standards directly traceable to NIST and NPL (National Physical Laboratory).

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". Working in collaboration with Dr. Davis and Dr. Nava-Martinez (CENAM), Troemner metrologist, Joe Moran, has completed an inter-laboratory comparison with several internationally recognized metrology organizations to determine the effectiveness of the susceptometer which is summarized in the technical paper, "Intercomparison Between CENAM, BIPM, and Troemner to Determine the Volume Magnetic Susceptibility of a 100 g Weight". Both papers on magnetic susceptibility are available at www.troemner.com.

Robotic Comparator

Unmatched Standards

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

Weight Standards

Highly Trained Personnel & 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/IEC 9001 and ISO/IEC 17025 guidelines. Troemner's procedures utilize multiple standards during a calibration to assure the 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 an investigation is initiated to find the root cause of the failure.

Accreditation

Troemner's focus is to achieve the highest level 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.

Mass Comparator

Since 1995, Troemner's Mass Calibration Laboratories have been accredited by NVLAP+. Troemner offers NVLAP+ Accredited Mass Calibration Certificates for precision weights. Troemner can also provide you with NVLAP+ Accredited Magnetic Susceptibility Determination Calibration and NVLAP+ Accredited Density Determination Calibration for your one-piece precision weights.

The combination of a highly trained staff, controlled physical conditions, and precise equipment enables 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.

Additional Calibration Services Available

Troemner's detailed approach to mass calibration has led us to take our measurement control philosophy into other areas.

In order to fulfill our customers' needs we offer the following calibration services:

- NVLAP+ Accredited Pipette Calibration
- NVLAP+ Accredited Temperature Calibration
- NVLAP+ Accredited Humidity Calibration
- NVLAP+ Accredited Pressure Calibration
- NVLAP+ Accredited Thermal Mass Flow Calibration
- NVLAP+ Accredited Electrical Calibration
- NVLAP+ Accredited Dimensional Calibration
- NVLAP+ Accredited Time and Frequency Calibrations

Refer to www.troemner.com for the complete NVLAP+ Scope of Accreditation.

Robotic Comparators (Robot Row)

+NVLAP®
Accredited by the National Voluntary Laboratory Accreditation Program for the specific scope of Accreditation under Lab Code 105013-0