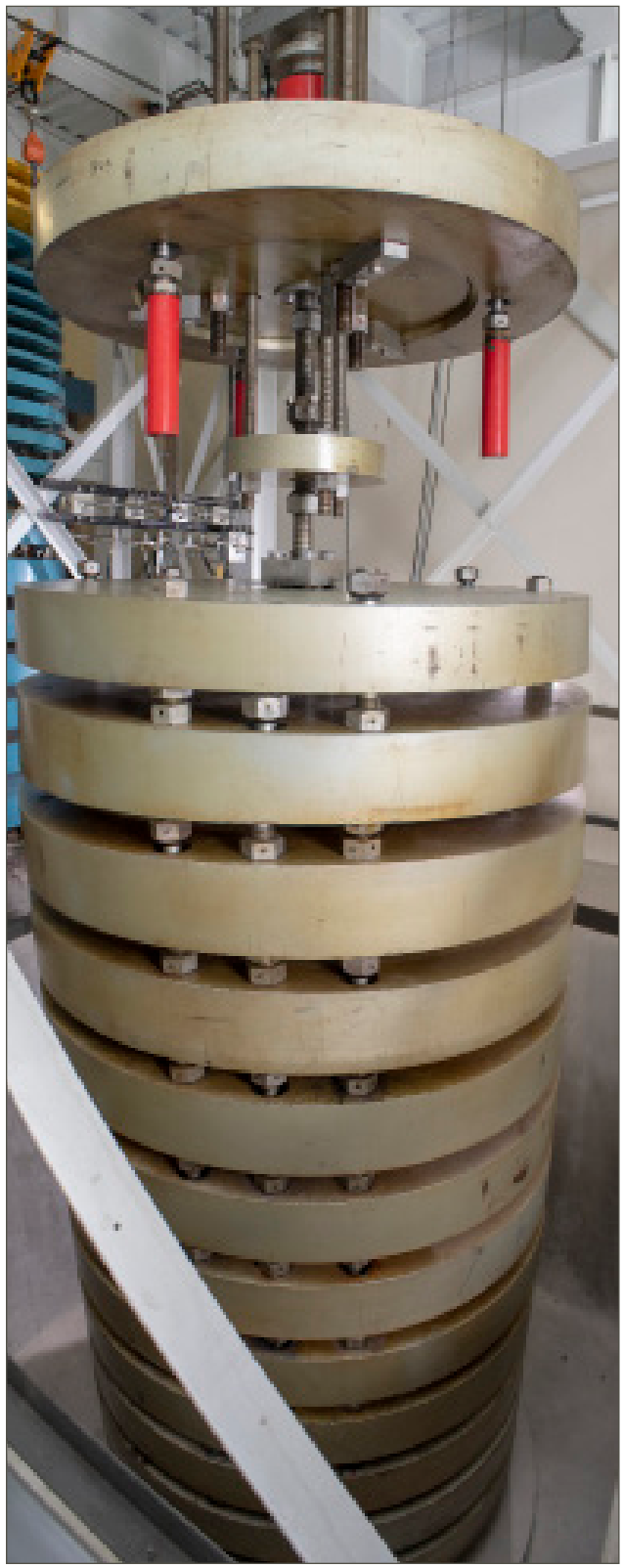
INSTRON®

The difference is measurable®

INSTRON'S DEADWEIGHT STACK

Meeting the Challenge of Wide Range and Accurate Force Measurements

Today's strict international standards require all laboratory measurements to be highly accurate. To help our customers meet the challenges that these standards impose, Instron has invested in a certified deadweight stack to ensure that our calibration services provide the greatest possible accuracy. Because of this commitment to accuracy, Instron's calibration services not only meet internationally accepted standards, but also routinely exceed them.



Internationally Accepted

The Instron Global Calibration Laboratory is accredited to ISO/IEC 17025 by the National Voluntary Laboratory Accreditation Program (NVLAP) under Lab Code 200301-0, a program administered by the National Institute of Standards and Technology (NIST). NVLAP's status as a signatory to the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Agreement (MRA) is internationally recognized and supports the confidence and acceptance of accredited calibration reports worldwide.

Highest Levels of Accuracy

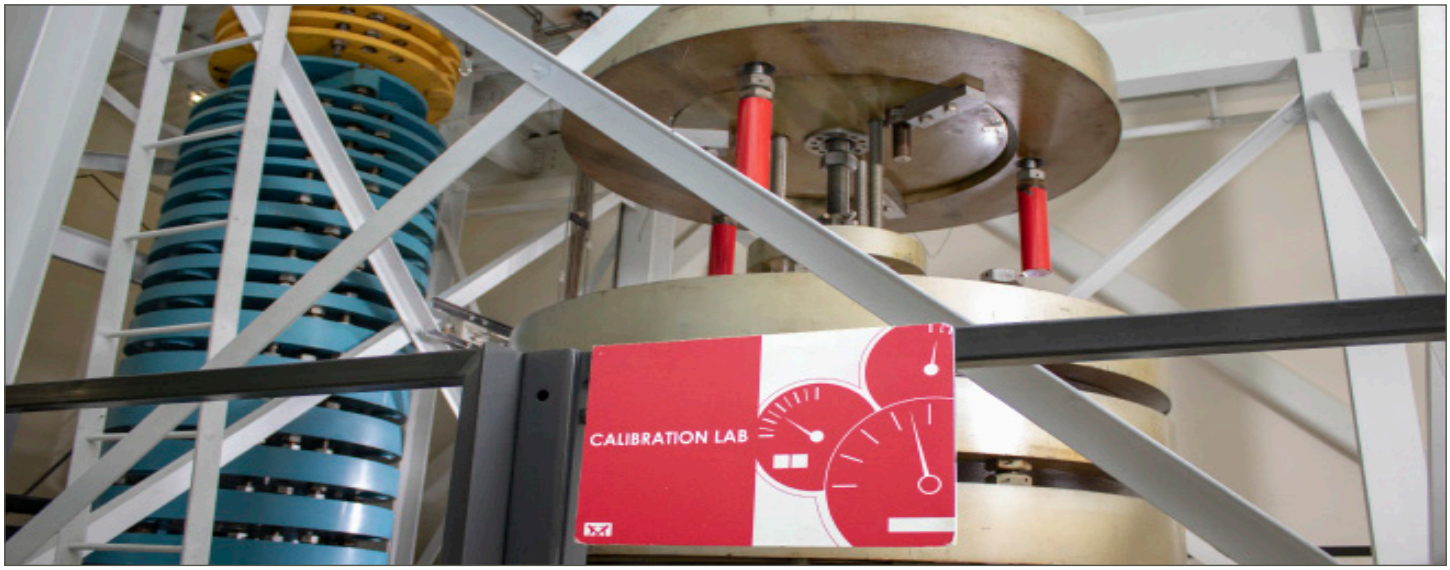
Instron's laboratory houses the largest commercial deadweight stack in North America. This stack gives us the ability to precisely calibrate load cells up to 240,000 lbs and enables us to provide calibrations to ASTM E74 Class AA and ISO 376 Class 00 and 0.5. It also allows us to calibrate your testing machine at installation to an accuracy of 0.5% with appropriate verification products.

Measurement Traceability & Uncertainty

One fundamental requirement of laboratory accreditation is that the lab's measurements be traceable back to the foundation measurements recognized by the International System of Units (SI). All measuring instruments used in the calibration of your testing machine carry documentation that show traceability to the SI through a National Metrological Institute (NIST in the USA, NPL in the UK, etc.) Using these traceable masses and standards shortens the traceability chain and significantly reduces the total accumulated uncertainty of the materials test results produced by your system.

Calibration Services

Instron offers both Enhanced and Standard force verification services. Standard verification provides both accuracy and measurement ranges in compliance with ASTM E4 and ISO 7500-1. Enhanced verification provides expanded measurement ranges that validate even lower force measurements that typically match the performance specifications of your testing system.

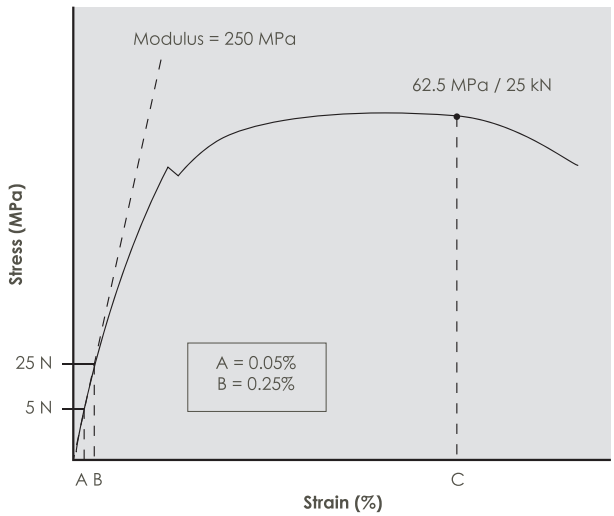


CASE STUDY: What force accuracy range means to customers and their testing

Testing a wide range of materials often requires a wide range of force measurements. Older load cells and electronics had limited measurement ranges which meant that users frequently needed to change cells when measuring different materials. Changing load cells is time consuming and increases the risk of damaging the load cells (particularly with low force cells). On machines that need to be accurately aligned, it can also require that the machine alignment be reset and recertified.

An example of the need for large measurement ranges is a typical ISO 527 plastics tensile test for a customer. The test is comprised of a plastic specimen with a cross sectional area of 40 mm (Type 1A, 4 × 10 mm). The test system is using 5 kN load cell. The required calculated results are modulus and peak load. Referencing the graph, we determine that:

- Modulus = 250 MPa
- For this customer, ISO 527 specifies that the modulus is determined between 0.05% (A) and 0.25% (B) strain where the corresponding loads are 5 N to 25 N
- The 5N load at the lower modulus point is 1/1000th of the load cell's capacity
- Peak Load = 2.5 kN (C)
- ISO 527 specifies that the force measurement shall comply with ISO 7500-1 class 1



In the case of this material test, which requires a 1000:1 measurement range, the need for a large range becomes obvious. In order to calculate all results in a single test with a single load cell, this expanded accuracy range is required. The combination of Instron designed load cells and Instron advanced digital electronics on properly configured Instron test systems are able to achieve accuracies of +/0.5% over a range of 1000:1 This eliminates the need to change load cells in the majority of testing situations.

Achieving a 1000:1 measurement range requires careful attention to the load cell design and manufacture. In order to achieve such a wide range it is necessary to minimize any zero drift of the load reading due to temperature effects. Instron load cells are individually compensated and tested to ensure that they have a temperature coefficient of less than 0.001% of full output / degree C. Instron's Deadweight Stack plays a critical role in the production of calibration standards that are used to verify working load cells at these types of enhanced accuracies and ranges.

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