INSTRON®

The difference is measurable®

FORCE CALIBRATION

Instron Professional Services

Instron's calibration services not only meet industry and international regulatory standards, but also routinely exceed them. As the leading provider of high accuracy instruments and the first materials testing company to use strain gauge load cell technology, we take pride in knowing that our calibrations are of the highest quality.

CALIBRATION STANDARDS

ASTM E4 and ISO 7500-1 are the two internationally recognized standard methods for verifying the force measuring capability of materials testing machines. Verifying equipment to either of these standards is a low-risk way to assure that their force transducers have been calibrated properly and to reduce the risk of providing inaccurate results from the instrument.

ASTM E4

ASTM E4 specifies that the testing machine be accurate to 1% of reading over the verified range (typically 1% to 100% of the transducer capacity) and meets all repeatability requirements. North American verifications are generally completed to ASTM E4 although multinational organizations or companies providing products globally often will calibrate to ISO 7500-1 as well.

ISO 7500-1

ISO 7500-1 defines several accuracy classes ranging from 0.5 to 3. This is very different from 1% of full-scale, which is how some test system suppliers specify their instruments. Most materials testing machines are calibrated to Class 1, which is similar to the ASTM E4 requirement of 1.0%. ISO 7500-1 is an internationally recognized standard for force calibrations, but ASTM E4 is also frequently used.

CALIBRATION CERTIFICATES

Calibration certificates contain crucial evidence of test system's integrity and validity of it's calibration. Specifically, Instron's calibration certificates provide a detailed report of the testing system's attributes, calibration data, calibration errors, statements of conformance, and a comprehensive assessment of measurement uncertainty which provide full confidence in any audit situation.

Quality compliant and carry unique certificate number and date to meet program requirements.

Accredited to ISO 17025 by NVLAP under Lab Code 200301-0, a program administered by NIST.

Full description of equipment being verified including system's identification as well as transducer used and ranges.

All scopes of work for types of calibration can be found on listed accrediting agency's website.

Method of conformance to relevant quality standards clearly stated for risk reduction during audits and other regulatory evaluations.

Enhanced or Extended Calibrations can provide error calculations as low as 0.1% (1/1000th) of transducer's capacity on some systems.

NVLAP symbol and the Accredited Laboratory Combined ILAC MRA Mark provides international recognition and acceptance.

Each readout device classified pass/fail on the certificate.

Maintain 6 years of factory backup data.

All uncertainties are reported at each test level per guidelines established by the ILAC P-14.

All calibration standards used provide metrological traceability to National Standards (e.g. NIST, NPL, etc).

Calculated errors will determine the ISO standard class or conformance to ASTM guidelines.

CERTIFICATE OF CALIBRATION

ISSUED BY: INSTRON CALIBRATION LABORATORY

DATE OF ISSUE: 30-Mar-2020

CERTIFICATE NUMBER: **516033020095921**

NVLAP CALIBRATION
NVLAP Lab Code 200301-0

ilac-MRA

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APPROVED SIGNATORY

Jeremy Watson

Digitally signed by Jeremy Watson
Date: 2020.04.02 09:36:12 -04'00'

Type of Calibration: **Force**
Relevant Standard: **ISO 7500-1:2018**
Date of Calibration: **30-Mar-2020**

*** * * CALIBRATION RESULTS * * ***

System ID: 5985B12345 **Transducer ID:** 2580-250KN/123456
Customer Asset No.: 12-3456-789-00-M / Z-12345

Indicator 1. - Service Port (kN)
PASSED Class 0.5: 100% Range in Tension mode (0.2573 to 248.8555)
PASSED Class 0.5: 100% Range in Compression mode (-0.25424 to -249.5248)

System Class for a range is derived from assessment of the following: error, repeatability, return to zero, resolution, proving device classification, and reversibility if applicable.

Customer		Temperature	
Name:	Customer USA	Minimum Temperature:	71.0 °F
Location:	6834 Materials Testing Street Norwood, MA 02062	Maximum Temperature:	72.8 °F
Country:	USA		
P.O./Contract No.:			
Contact:	Joe Bloggs		
Email:	Joe.Bloggs@customer.com		

Machine		Transducer	
Manufacturer:	INSTRON	Manufacturer:	INSTRON
Type:	Electro-Mechanical Single Range	Capacity:	250 kN
		Type:	Tension/Compression
Year of Mfg.:	2018		

Methodology

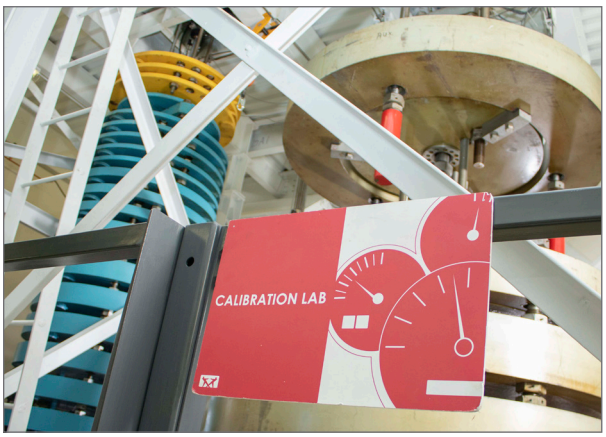
The assessment of the testing machine was conducted on site at the above customer location in accordance with ISO 7500-1:2018 "Metallic materials -- Calibration and verification of static uniaxial testing machines -- Part 1: Tension/compression testing machines -- Calibration and verification of the force-measuring system" using Instron procedure ICA-8-19. The Simple Acceptance decision rule has been agreed to and employed in the determination of conformance to the identified metrological specification.

Instron CalproCR Version 3.42

Data Summary - Indicator 1. - Service Port (kN)

TENSION

% of Range	Relative error of (%) Indication Run 1	Run 2	Run 3	Repeatability Error (%)	Error Class	Resolution (± kN)	Standard Class
100% Range (250 kN)							
0 Return	0.001	-0.003	-0.014		0.5	0.000625	
0.1	-0.078	0.037	-0.015	0.115	0.5	0.000625	0.5
0.2	-0.153	-0.027	-0.025	0.128	0.5	0.000625	0.5
0.4	-0.138	-0.060	-0.059	0.079	0.5	0.000625	0.5
0.7	-0.114	-0.068	-0.063	0.051	0.5	0.000625	0.5
0.7	-0.147	-0.094	0.110	0.257	0.5	0.000625	0.5
1	-0.087	-0.125	0.062	0.187	0.5	0.000625	0.5
2	-0.048	-0.097	-0.014	0.083	0.5	0.000625	0.5
4	-0.017	-0.088	-0.099	0.082	0.5	0.000625	0.5
7	0.009	-0.097	-0.066	0.106	0.5	0.000625	0.5
10	0.029	-0.096	-0.074	0.125	0.5	0.000625	0.5
10	0.301	0.255	0.239	0.062	0.5	0.000625	0.5
20	0.272	0.241	0.218	0.054	0.5	0.000625	0.5
40	0.290	0.268	0.252	0.038	0.5	0.000625	0.5
60	0.312	0.289	0.280	0.032	0.5	0.000625	0.5
80	0.338	0.312	0.296	0.042	0.5	0.000625	0.5
100	0.354	0.338	0.324	0.030	0.5	0.000625	0.5



BENEFITS OF INSTRON CALIBRATION

Instron's accredited calibrations cover a wider range of forces than other providers, enabling usage of test systems to both lower forces and higher forces without the need for changing transducers or purchasing new. Our accreditation by NVLAP under Lab Code 200301-0 to ISO/IEC 17025 ensures that Instron has proven technical competence and necessary quality systems in the place to ensure consistently delivered calibrations which maximize customer confidence.

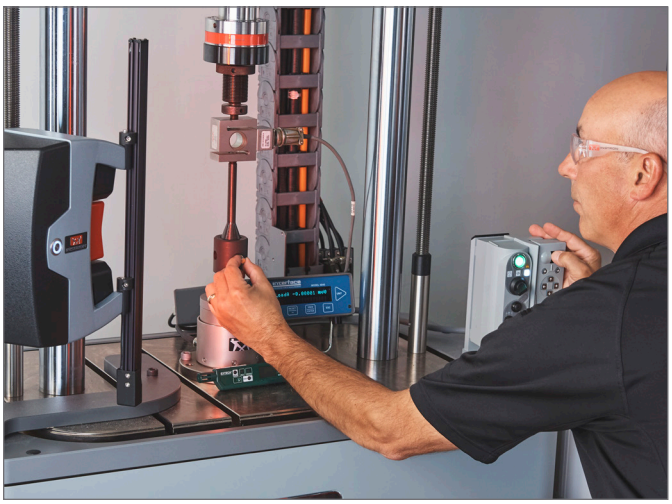
- All global calibration laboratory procedures follow latest versions of ISO or ASTM calibration standards.
- Instron maintains the largest NIST-traceable commercial deadweight stack in North America. With a primary force standard capability of 130,000 lbf, Instron is able to provide the highest levels of accuracy and the lowest measurement uncertainty available in the calibration service market.
- Field service engineers around the globe use Calpro CR software which has been developed and validated to ensure compliance with calibration standards and eliminate common data transfer errors.
- Our field calibration kits are carefully monitored by our global calibration laboratory for expiration to ensure the integrity of your data.
- All field service engineers are audited in accordance with our accreditation to ISO 17025 from NVLAP under Lab Code 200301-0 which is a signatory of the ILAC (International Laboratory Accreditation Cooperation) MRA.

WHAT SYSTEMS CAN INSTRON SERVICES VERIFY ON SITE?

Instron can verify a wide variety of test systems, including, Satec™, Dynatup®, Wilson® Instruments, WolpertTM, Schenk®, MTS®, Instron IST, Tinius Olsen, Bose, TA Instruments, Zwick, United, Lloyds Instruments, Mayes, Dennison, Shimadzu®, Rhiele, Baldwin®, ATS, Mecmesin, Galdabini, Servotest, Hegewald & Peschke, and more.

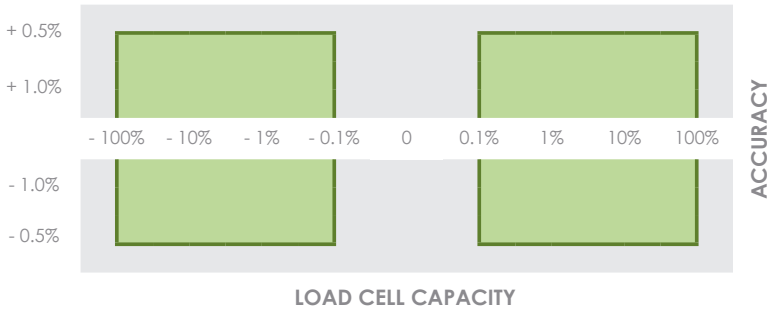
WHAT IS THE DIFFERENCE BETWEEN CALIBRATION AND VERIFICATION?

- Calibration is a comparative measurement between a reference standard and a testing machine which provides a value that represents the difference between the two, commonly referred to as the "error."
- Verification is the assessment of the testing machine's calibration results against the requirements of a standard such as ASTM E4 or ISO 7500-1.



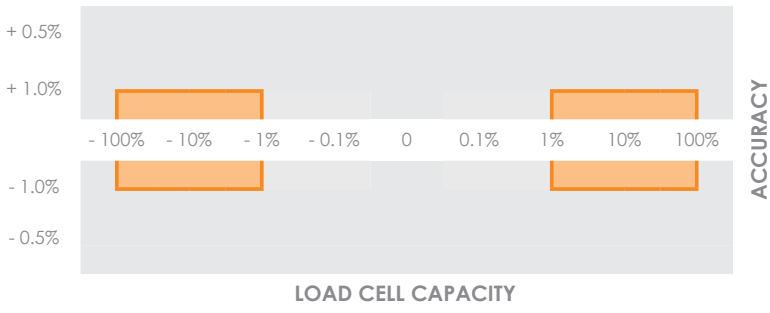
ENHANCED AND EXTENDED FORCE VERIFICATION

Instron test systems are manufactured with extended accuracy ranges designed to optimize the usefulness of the system. Our Enhanced or Extended Force Verification service provides a +/-0.5% accuracy at installation and +/-1.0% at subsequent calibration dates, all the way down to the system's lowest specification limit. For example, with the appropriate transducers and systems, verification can be provided down to 1/1000th (0.1%) of the load cell's capacity. That translates to an incredibly broad range of testing capabilities beyond the typical verification ranges for ASTM E4 and ISO 7500-1 services.



STANDARD FORCE VERIFICATION

If meeting the standard is your primary concern, our Standard Force Verification service conforms to all ASTM E4 and ISO 7500-1 standards. This service typically verifies accuracies of 1.0% for ASTM and ISO. The accuracy is verified down to 1/100th (1.0%) of the load cell's capacity for ASTM and, typically, down to 1/50th (2.0%) for ISO.



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