CERTIFICATE OF CALIBRATION

ISSUED BY: INSTRON CALIBRATION LABORATORY

DATE OF ISSUE:
See signature

CERTIFICATE NUMBER:
062031425113826

NVLAP CALIBRATION
NVLAP Lab Code 200301-0

Instron
825 University Avenue
Norwood, MA 02062-2643
Telephone: (800) 473-7838
Fax: (781) 575-5750
Email: service_requests@instron.com

APPROVED SIGNATORY

Mike Spuzzillo

Digitally signed by Mike Spuzzillo
Reason: I attest to the accuracy and integrity of this document
Date: 2025.03.14 13:24:37 -07'00'

Type of Calibration: **Speed**
Relevant Standard: **ASTM E2658-15(2023)**
Date of Calibration: **14-Mar-2025**

Customer Requested Due Date: **14-Mar-2026**

* * * VERIFICATION RESULTS * * *

System ID: 34SC1B32396

- **PASSED Class A:** 10 mm/min in Ascending direction
- **PASSED Class A:** 10 mm/min in Descending direction
- **PASSED Class A:** 20 mm/min in Ascending direction
- **PASSED Class A:** 20 mm/min in Descending direction
- **PASSED Class A:** 40 mm/min in Ascending direction
- **PASSED Class A:** 40 mm/min in Descending direction

Customer

Name:	Evergreen State College
Address:	Science Support Center - NIST 2713 McCann Plaza Drive NW Olympia, WA 98505 United States
Contact:	Carri LeRoy
Email:	leroyc@evergreen.edu
Service Order No.:	SV2412100254@@1

Machine

Manufacturer:	Instron
Serial No.:	34SC1B32396
Condition:	Good

Temperature

Starting Temperature:	67.4 °F
Ending Temperature:	67.6 °F

Methodology

The assessment of the testing machine was conducted on site at the above customer location in accordance with ASTM 2658-15(2023) "Standard Practices for Verification of Speed for Material Testing Machines" (Start and Stop Method) using Instron procedure ICA-8-07.

The system was calibrated in the 'As Found' condition with no adjustments or repairs carried out. This is also the 'As Left' condition.

Prior to verification, a pre-calibration inspection was conducted. During the inspection, the testing system was found to be in Good condition.

Three calibration tests were made with the testing machine in the vertical position.

Instron CalproCR Version 3.58

The results indicated on this certificate and the following report relate only to the items calibrated. If there are methods or data included that are not covered by the NVLAP accreditation it will be identified in the comments. Any limitations of use as a result of this calibration will be indicated in the comments. This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government. This report shall not be reproduced, except in full, without the approval of the issuing laboratory.

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System Classification

The calibration and equipment used conform to a controlled Quality Assurance program which meets the specifications outlined in ANSI/NCSL Z540.1-1994, ISO 10012:2003, ISO 9001:2015, ISO/IEC 17025:2017.

The speed setting system has been verified for the speeds indicated using equipment calibrated within the requirements of ASTM E2658-15(2023).

The Simple Acceptance decision rule has been agreed to and employed in the determination of conformance to the identified metrological specification.

Classifications based upon ASTM E2658 Table 1.

Classification	Percent Error / Repeatability	Classification	Percent Error / Repeatability
Class A	+/- 0.5	Class D	+/- 5.0
Class B	+/- 1.0	Class E	+/- 10
Class C	+/- 2.0	Class F	+/- 20

Data Summary

ASCENDING

Speed Setting	Run 1 Error		Run 2 Error		Run 3 Error		Repeat Error			Uncertainty of Measurement*	
(mm/min)	(%)	Class	(%)	Class	(%)	Class	(%)	(mm/min)	Class	Relative %	(+/- mm/min)
10	-0.050	A	-0.031	A	-0.117	A	0.086	0.0086	A	0.11	0.011
20	-0.210	A	-0.100	A	-0.045	A	0.165	0.033	A	0.15	0.031
40	-0.077	A	-0.102	A	-0.052	A	0.050	0.020	A	0.11	0.044

Data Summary

DESCENDING

Speed Setting	Run 1 Error		Run 2 Error		Run 3 Error		Repeat Error			Uncertainty of Measurement*	
(mm/min)	(%)	Class	(%)	Class	(%)	Class	(%)	(mm/min)	Class	Relative %	(+/- mm/min)
10	-0.168	A	0.007	A	-0.048	A	0.175	0.0175	A	0.19	0.019
20	-0.045	A	-0.085	A	-0.010	A	0.075	0.015	A	0.11	0.022
40	-0.082	A	-0.122	A	-0.005	A	0.117	0.047	A	0.11	0.044

** The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor, k = 2, providing a level of confidence of approximately 95%.*

The uncertainty stated refers to values obtained during the calibration and makes no allowances for factors such as long-term drift, temperature and alignment effects - the influence of such factors should be taken into account.

Data

ASCENDING

Speed Setting	Run 1			Run 2			Run 3		
(mm/min)	Displacement (mm)	Time (sec)	Actual Speed (mm/min)	Displacement (mm)	Time (sec)	Actual Speed (mm/min)	Displacement (mm)	Time (sec)	Actual Speed (mm/min)
10	16.2718	97.582	10.0050	6.8386	41.019	10.0031	5.8300	34.939	10.0117
20	10.6788	31.970	20.042	10.6184	31.824	20.020	10.7882	32.350	20.009

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Data

ASCENDING

Speed Setting (mm/min)	Run 1 Displacement (mm)	Run 1 Time (sec)	Run 1 Actual Speed (mm/min)	Run 2 Displacement (mm)	Run 2 Time (sec)	Run 2 Actual Speed (mm/min)	Run 3 Displacement (mm)	Run 3 Time (sec)	Run 3 Actual Speed (mm/min)
40	20.9974	31.472	40.031	21.2560	31.851	40.041	24.0828	36.105	40.021

Data

DESCENDING

Speed Setting (mm/min)	Run 1 Displacement (mm)	Run 1 Time (sec)	Run 1 Actual Speed (mm/min)	Run 2 Displacement (mm)	Run 2 Time (sec)	Run 2 Actual Speed (mm/min)	Run 3 Displacement (mm)	Run 3 Time (sec)	Run 3 Actual Speed (mm/min)
10	-4.7436	28.414	10.0168	-5.8504	35.105	9.9993	-5.2862	31.702	10.0048
20	-12.9134	38.723	20.009	-15.6882	47.024	20.017	-12.3478	37.040	20.002
40	-21.2046	31.781	40.033	-20.6594	30.951	40.049	-21.1178	31.675	40.002

Calibration Equipment

The measurement results produced with Instron standards are traceable to the SI (The International System of Units) through internationally recognized National Metrology Institutes (NIST, NPL, PTB, Inmetro, etc.).

Manufacturer/Model	Serial No.	Description	Cal Date	Cal Due	Certificate Ref.
Instron LDS (280/287)	051613C (ASTM)	disp. indicator	04-Jun-2024	04-Jun-2026	INS051613C
Instron TIC-SD	TR050718E	time interval counter	20-Feb-2025	20-Feb-2026	TIC5022025133108
Extech 445580	1103444	temp. indicator	25-Jul-2024	25-Jul-2025	2024016106

The class of the calibration equipment was equal to or better than the class to which this testing machine has been calibrated.

Calibration Equipment Usage

Measurement Type	Serial No.	Direction	Speed Setting	Accuracy (+/-)
Displacement	051613C (ASTM)	Ascending	10/ 20/ 40	0.0002 in
		Descending	10/ 20/ 40	0.0002 in
Time	TR050718E	Ascending	10/ 20/ 40	0.01 sec
		Descending	10/ 20/ 40	0.01 sec
Temperature	1103444	All	All	1.8 °F

The accuracy of the calibration equipment used was equal to or better than the accuracy indicated in the table above.

The Standard Reference Speed ("Actual Speed") is derived from the combined effect of the Displacement and Time references with a Performance Specification of +/- 0.125% of reading.

Comments

New Installation

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Performed by: Mike Spuzzillo
Field Service Engineer

Note: Clause 12 of ASTM E2658 states that: It is recommended that speed measuring systems be verified annually. In no case shall the time interval between verifications exceed 18 months (except for machines in which a long-time test runs beyond the 18-month period). In such cases, the machine shall be verified after completion of the test. Speed measuring systems shall be verified immediately after repairs (this includes new or replacement parts, or mechanical or electrical adjustments) that may in any way affect the operation of the speed measuring systems, or the values displayed.