SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
& ANSI/NCSL Z540-1-1994

UNITED TESTING SYSTEMS, INC.
5171 Exchange Drive
Flint, MI 48507
Kerry C. Shaffer Phone: 810 732 2800

CALIBRATION

Valid until: December 31, 2017 Certificate Number: 1404.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations of hardness, force, and torque testing equipment[1]:

I. Mechanical

Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers[3]	HRA: (80 to 84) HRA (70 to 78) HRA (20 to 65) HRA HRBW (80 to 100) HRBW (60 to 79) HRBW (40 to 59) HRBW HRC (60 to 65) HRC (35 to 55) HRC (20 to 30) HRC HRD (71 to 75) HRD (51 to 67) HRD (40 to 48) HRD HREW (93 to 100) HREW (84 to 90) HREW (70 to 79) HREW	 0.19 HRA 0.31 HRA 0.29 HRA 0.39 HRBW 0.30 HRBW 0.42 HRBW 0.31 HRC 0.38 HRC 0.40 HRC 0.18 HRD 0.31 HRD 0.27 HRD 0.49 HREW 0.49 HREW 0.49 HREW	Indirect verification per ASTM E18 & NIST traceable test blocks

Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers[3] (cont)	HRFW (94 to 100) HRFW (80 to 90) HRFW (60 to 75) HRFW HRGW (80 to 94) HRGW (55 to 75) HRGW (30 to 50) HRGW HRHW (96 to 100) HRHW (80 to 94) HRHW HRKW (85 to 100) HRKW (65 to 80) HRKW (40 to 60) HRKW HRLW HRMW HRPW HRRW HRSW HRVW HR15N (90 to 92) HR15N (78 to 88) HR15N (70 to 77) HR15N HR30N (77 to 82) HR30N (55 to 73) HR30N (42 to 50) HR30N HR45N (66 to 72) HR45N (37 to 61) HR45N (20 to 31) HR45N	 0.45 HRFW 0.44 HRFW 0.28 HRFW 0.43 HRGW 0.29 HRGW 0.82 HRGW 0.36 HRHW 0.46 HRHW 0.25 HRKW 0.36 HRKW 0.54 HRKW 0.20 HRLW 0.54 HRMW 0.36 HRPW 0.23 HRRW 0.35 HRSW 0.79 HRVW 0.53 HR15N 0.43 HR15N 0.41 HR15N 0.52 HR30N 0.47 HR30N 0.42 HR30N 0.23 HR45N 0.27 HR45N 0.59 HR45N	ASTM E18

Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers[3] (cont)	HR15TW (87 to 93) HR15TW (81 to 86) HR15TW (74 to 80) HR15TW HR30TW (70 to 83) HR30TW (57 to 69) HR30TW (43 to 56) HR30TW HR45TW (53 to 73) HR45TW (33 to 52) HR45TW (13 to 32) HR45TW HR15WW HR30WW HR45WW HR15XW HR30XW HR45XW HR15YW HR30YW HR45YW	 0.29 HR15TW 0.39 HR15TW 0.41 HR15TW 0.36 HR30TW 0.29 HR30TW 0.66 HR30TW 0.43 HR45TW 0.40 HR45TW 0.70 HR45TW 0.26 HR15WW 0.56 HR30WW 0.31 HR45WW 0.19 HR15XW 0.26 HR30XW 0.76 HR45XW 0.22 HR15YW 0.43 HR30YW 0.24 HR45YW	ASTM E18
Indirect Verification of Vickers Hardness Testers[3] Verification of Stage Travel[3]	(100 to 249) HV (250 to 600) HV >600 HV (0 to 1) in	3.6 HV 3.0 HV 5.9 HV 0.001 in	Indirect verification per ASTM E384 & ASTM E92 Digital indicator

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Indirect Verification of Knoop Hardness Testers[3]	(100 to 249) HK (250 to 600) HK >600 HK	4.4 HK 7.1 HK 8.3 HK	Indirect verification per ASTM E384 & ASTM E92
Verification of Stage Travel[3]	(0 to 1) in	0.001 in	Digital indicator
Indirect Verification of Brinell Hardness Testers[3] at Test Conditions –			
HBW 10/3000/15	(100 to 250) HBW (251 to 600) HBW	3.7 HBW 4.3 HBW	Indirect verification method per ASTM E10
HBW 10/1500/15	(60 to 200) HBW (201 to 450) HBW	1.6 HBW 6.2 HBW	
HBW 10/500/15	(50 to 100) HBW (101 to 158) HBW	1.1 HBW 2.6 HBW	
Force[3] – Tension & Compression	(1 to 100) lbf (50 to 1000) lbf	0.20 % IV 0.20 % IV	ASTM E4
	(1000 to 10 000) lbf (10 000 to 30 000) lbf (30 000 to 400 000) lbf	0.18 % IV 0.20 % IV 0.21 % IV	Load cells, dead weights
Direct Verification of Brinell Hardness Testers[3] –			ASTM E10
Verification of the Device for Measuring Indentation Diameters	(0 to 7) mm	0.061 mm	Stage micrometer

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Torque[3] –			
Transducers	(1 to 2500) in·lbf	0.18 % IV	Manufacturer's specifications, torque arm & weights torque transducers
Wrench	(1 to 2500) in·lbf	0.30 % IV	
Tensile Testers[3] –			
Static Alignment	(0.2 to 100) % bending	9.1×10^{-5} mV	ASTM E1012
Displacement	(0.1 to 20) in	0.0011 in	ASTM E2309
Crosshead Speed	Up to 20 in/min	0.21 % IV	Digital indicator & digital timer ASTM E2658
Extensometer[3]	(0 to 1) in (0 to 20) in	120 µin 210 µin	ASTM E83

II. Thermodynamic Quantities

Parameter/Equipment	Range	CMC[2] (±)	Comments
Temperature Chambers[3]	Up to 2282 °F Up to 1250 °C	2.3 °F 1.4 °C	Multimeter & Type K thermocouple

[1] This laboratory offers commercial calibration service and field calibration service.

[2] Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMCs represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

[3] Field calibration service is available for this calibration and this laboratory meets A2LA *R104 – General Requirements: Accreditation of Field Testing and Field Calibration Laboratories* for these calibrations. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

[4] In the statement of CMC, "% IV" represents a percentage of indicated value.

Accredited Laboratory

A2LA has accredited

UNITED TESTING SYSTEMS INC.

Flint, MI

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the requirements of ANSI/NCSLI Z540-1-1994 and any additional program requirements in the field of calibration. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).

Presented this 17th day of December 2015.

President & CEO
For the Accreditation Council
Certificate Number 1404.01
Valid to December 31, 2017

For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.