The American Association for Laboratory Accreditation

World Class Accreditation

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/NCSL 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 21st day of January 2010.

President & CEO
For the Accreditation Council
Certificate Number 1404.01
Valid to December 31, 2011

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

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, 2011 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]	HRC-63 HRC-45 HRC-25 HRB-85 HRB-65 HRB-45 HRA-83 HRA-73 HRA-63 HRE-100 HRE-90 HRE-82 HRF-99 HRF-90 HRF-80	0.32 HRC 0.32 HRC 0.47 HRC 0.48 HRB 0.64 HRB 1.0 HRB 0.2 HRA 0.27 HRA 0.2 HRA 0.32 HRE 0.32 HRE 0.47 HRE 0.32 HRF 0.33 HRF 0.47 HRF	ASTM E18 & NIST traceable test blocks ASTM E18

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Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers[3] (cont)	HR15N-92 HR15N-83 HR15N-72 HR30N-80 HR30N-65 HR30N-47 HR45N-70 HR45N-49 HR45N-25 HR15T-88 HR15T-82 HR15T-75 HR30T-80 HR30T-65 HR30T-45 HR45T-56 HR45T-37 HR45T-17 HR15W-92 HR15W-83 HR15Y-100 HR15Y-90 HR30Y-100 HR30Y-85 HR45W-100 HRD-73 HRD-63 HRD-44 HRG-87 HRG-49 HRG-10	0.20 HR15N 0.20 HR15N 0.20 HR15N 0.27 HR30N 0.27 HR30N 0.42 HR30N 0.27 HR45N 0.27 HR45N 0.42 HR30N 0.28 HR15T 0.27 HR15T 0.92 HR15T 0.27 HR30T 0.27 HR30T 0.42 HR30T 0.27 HR45T 0.27 HR45T 0.58 HR45T 0.20 HR15W 0.22 HR15W 0.56 HR15Y 0.27 HR15Y 0.42 HR30Y 0.27 HR30Y 0.2 HR45W 0.32 HRD 0.32 HRD 0.47 HRD 0.32 HRG 0.32 HRG 0.47 HRG	ASTM E18

Parameter/Equipment	Range	CMC[2] (±)	Comments
Indirect Verification of Rockwell & Rockwell Superficial Hardness Testers[3] (cont)	HRH-63 HRH-25 HRH-46 HRK-100 HRK-80 HRK-60 HRL-100 HRL-80 HRM-108 HRM-100 HR15X-92 HR15X-83 HR45X-98 HR45X-92 HRR-120 HRS-100 HRV-100	0.39 HRH 0.5 HRH 0.32 HRH 0.32 HRK 0.32 HRK 1.25 HRK 0.32 HRL 0.32 HRL 0.32 HRM 0.32 HRM 0.2 HR15X 0.2 HR15X 0.20 HR45X 0.20 HR45X 0.36 HRR 0.54 HRS 0.33 HRV	ASTM E18
Indirect Verification of Brinell Hardness Testers[3]	(100 to 450) HBW	6.1 HBW	ASTM E10
Indirect Verification of Vickers Hardness Testers[3] –			
(1 to 50) kgf	(100 to 800) HV	13 HV	ASTM E92
(1 to 1000) gf	(100 to 800) HV	30 HV	ASTM E384
Indirect Verification of Knoop Hardness Testers[3] –			
(1 to 1000) gf	(92 to 822) HK	11 HK	ASTM E384

Parameter/Equipment	Range	CMC[2, 4] (±)	Comments
Force[3] – Tension & Compression	(1 to 100) lbf (50 to 1000) lbf (1000 to 10 000) lbf (10 000 to 30 000) lbf (30 000 to 400 000) lbf	0.2 % IV 0.24 % IV 0.17 % IV 0.2 % IV 0.21 % IV	ASTM E4 Proving rings, load cells, dead weights
Direct Verification of Brinell Hardness Testers[3] –			ASTM E10
Verification of the Test Force	(62.5 to 3000) kgf	0.18 % IV	Load cells and dead weights
Verification of the Device for Measuring Indentation Diameters	(0 to 7) mm	0.16 mm	Stage micrometer
Torque[3] –			Manufacturer's specifications torque arm & weights torque transducers
Transducers	(1 to 2500) in·lb	0.23 % FS	
Wrench	(1 to 2500) in·lb	0.29 % IV	
Tensile Testers[3] –			
Static Alignment	(0.2 to 100) % bending	1% IV	ASTM E1012
Displacement	(0.1 to 20) in	0.00074 in	ASTM E2309
Crosshead Speed	Up to 20 in/min	0.21 % IV	Digital indicator & digital timer
Extensometer[3]	(0 to 1) in (0 to 20) in	110 µin 980 µin	ASTM E83
Direct Verification of Durometers[3] –			
Force Indenter Shape & Extension	(130 to 4500) gf (0 to 0.25) mm	1 % IV 0.6 mm	ASTM D2240

II. Thermodynamic Quantities

Parameter/Equipment	Range	CMC[2] (±)	Comments
Temperature Chambers[3]	Up to 1280 °C	1.4 °C	Multimeter & Type K thermocouple

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

[2] Calibration and Measurement Capability (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. Calibration and Measurement Capabilities 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, "% FS" represents a percentage of full-scale reading and "% IV" represents a percentage of indicated value.