



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

MTS FIELD SERVICE
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Eden Prairie, MN 55344
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CALIBRATION

Valid To: September 30, 2018

Certificate Number: 1145.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations¹:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Linear Displacement ³	(0.04 to 80) in (0.004 to 2) in	(100 + 200L) μin (50 + 100L) μin	ASTM E2309 Linear encoder
Extensometers ³ – Gage Length Displacement	(0.5 to 2) in (0.0015 to 36) in	(65 + 200L) μin 0.13 % IV + 35 μin	ASTM E83, ISO 9513 ASTM E83, E399, ISO 9513
Angular Displacement ³	Up to 1200°	0.25 % IV + 0.005°	Rotary encoder

II. Electrical – DC/Low Frequency

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
DC Voltage ³ – Generate	(0.002 to 20) V	0.025 % IV	Yokogawa GS200

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
DC Voltage ³ – Generate and Measure	(-10 to 75) mV	0.13 % IV + 10 μV	Fluke 714
DC Voltage ³ – Measure	(5 to 100) mV >100 mV to 1 V (>1 to 10) V (>10 to 100) V (>100 to 1000) V	38 μV/V + 0.9 μV 25 μV/V + 2 μV 24 μV/V + 40 μV 35 μV/V + 0.5 mV 41 μV/V + 7 mV	Keithley 2010
AC Voltage ³ – Measure (1 to 10) kHz	(0.5 to 10) V	0.05 % IV	Keithley 2010
Resistance ³ – Generate and Measure	(200 to 2350) Ω	0.055 % IV	Fluke 712
Electrical Simulation of RTDs ³ – PT 385, 100 Ω PT 3916, 100Ω PT 3926, 100Ω	(-200 to 100) °C (100 to 300) °C (300 to 600) °C (600 to 800) °C (-200 to 100) °C (100 to 300) °C (300 to 630) °C	0.27 °C 0.38 °C 0.49 °C 0.62 °C 0.27 °C 0.38 °C 0.49 °C	Fluke 712
Electrical Simulation of Thermocouples ³ – Type J Type K Type T	(-210 to 0.0) °C (0.0 to 800) °C (800 to 1200) °C (-200 to 0.0) °C (0.0 to 1000) °C (1000 to 1372) °C (-250 to 0.0) °C (0.0 to 400) °C	0.72 °C 0.5 °C 0.62 °C 0.97 °C 0.62 °C 0.88 °C 1.1 °C 0.49 °C	Fluke 714



Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Electrical Simulation of Thermocouples ³ – (cont)			
Type E	(-250 to -100.0) °C	1.1 °C	Fluke 714
Type R	(-100.0 to 1000) °C	0.51 °C	
Type S	(-20 to 0.0) °C (0.0 to 1767) °C	2.4 °C 1.7 °C	
	(-20 to 0.0) °C (0.0 to 1767) °C	2.4 °C 1.7 °C	

III. Mechanical

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Force Transducers ³			ASTM E4, ISO 7500-1
	(1 to 25 000) lbf	0.1 % IV	Load cells
	(>25 000 to 1 000 000) lbf	0.25 % IV	
	(0.002 to 100) lbf	0.05 % IV	Deadweight
Torque ³			
	(4 to 750 000) in·lb	0.25 % IV	Torque transducer
	(0.15 to 200) in·lb	0.25 % IV	Deadweight & torque arm
Pressure ³			
Hydraulic	(4 to 50 000) psi	0.25 % IV	Pressure transducer
Pneumatic	Up to 300 psig	0.06 psi	Precision hand pump & gage
Testing Machines ³ –			
Crosshead Speed	(0.002 to 500) in/min	0.1 % IV	Magneto-restrictive linear transducer



Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Fatigue Testing Machines ³ –			
Static Alignment	Up to 50 % bending	0.5 % of indicated bending + 2μϵ	ASTM E1012, NASM 1312B μϵ = micro-strain
Dynamic Verification	100 lbf to 500 kipf 0.1 Hz to 1 kHz	0.5 % of maximum force indication IV	ASTM E467, NASM 1312B
Vibration ³	20 Hz to 2.5 kHz (2.5 to 5) kHz (5 to 10) kHz (3 to <100) Hz (100 to 500) Hz	2.0 % IV 3.0 % IV 4.0 % IV 1.6 % IV 1.3 % IV	Endevco 28959F Bruel & Kjaer 3629
RPM ³	(5 to 10 000) RPM	0.033 % IV of tachometer	Optical tachometer

IV. Thermodynamics

Parameter/Equipment	Range	CMC ² (±)	Comments
Temperature ³ – Measure	(-200 to 660) °C	0.05 °C	Fluke reference PRT & meter
Temperature ³ – Measuring Equipment	(-5 to 660) °C	0.085 °C	Fluke bath/drywell, Fluke reference PRT & meter

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, *L* represents the Length in inches; “IV” represents Indicated Values (displacement = length as well).





Accredited Laboratory

A2LA has accredited

MTS FIELD SERVICE

Eden Prairie, MN

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 2006 and R205 – Specific Requirements: Calibration Laboratory Accreditation Program. 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 3rd day of February 2017.

A handwritten signature in black ink, written over a horizontal line.

President and CEO
For the Accreditation Council
Certificate Number 1145.01
Valid to September 30, 2018
Revised September 05, 2017

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