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

MTS FIELD SERVICE
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CALIBRATION

Valid To: September 30, 2020 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 calibrations[1, 5]:

I. Dimensional

Parameter/Equipment	Range	CMC[2, 4, 6] (±)	Comments
Linear Displacement[3]	(0.04 to 80) in (0.004 to 2) in	(100 + 200*L*) µin (50 + 100*L*) µin	ASTM E2309 Linear encoder
Extensometers[3] –			
Gage Length	(0.5 to 2) in	(65 + 200*L*) µin	ASTM E83, ISO 9513
Displacement	(0.0015 to 36) in	0.13 % IV + 35 µin	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, 6] (±)	Comments
DC Voltage[3] – Generate	(0.005 to 20) V	0.025 % IV	Yokogawa GS200

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Parameter/Equipment	Range	CMC[2, 4, 6] (±)	Comments
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 + 6 mV	Keithley 2010
AC Voltage[3] – Measure (1 to 10) kHz	(0.5 to 10) V	0.05 % IV	Keithley 2010
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, 6] (±)	Comments
Electrical Simulation of Thermocouples[3] – (cont.)			
Type E	(-250 to -100.0) °C (-100.0 to 1000) °C	1.1 °C 0.51 °C	Fluke 714
Type R	(-20 to 0.0) °C (0.0 to 1767) °C	2.4 °C 1.7 °C	
Type S	(-20 to 0.0) °C (0.0 to 1767) °C	2.4 °C 1.7 °C	

III. Mechanical

Parameter/Equipment	Range	CMC[2, 4, 6] (±)	Comments
Force Transducers[3]			ASTM E4, ISO 7500-1
	(1 to 25 000) lbf (>25 000 to 1 000 000) lbf	0.1 % IV 0.25 % IV	Load cells
	(0.002 to 100) lbf	0.05 % IV	Deadweight
Torque[3]			ASTM E2624
	(4 to 750 000) in·lb	0.25 % IV	Torque transducer
	(0.15 to 200) in·lb	0.1 % 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] –			ASTM E2658
Crosshead Speed	(0.002 to 500) in/min	0.1 % IV	Magneto-restrictive linear transducer

Parameter/Equipment	Range	CMC[2, 4, 6] (±)	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 klbf 0.1 Hz to 1 kHz	0.5 % of maximum force indication IV	ASTM E467, NASM 1312B
Impact Testing Machines (Plastics)			ASTM D256, D6110; ISO 179-1, 180, 13802
Level	0.1° of Arc	0.055°	
Center of Percussion timing	(15 to 30) s	0.025 s	
Pendulum length	(300 to 400) mm	0.1 mm	
Shaft play	(0 to 0.5) mm	0.06 mm	
Free hanging distance	(0 to 25) mm	0.1 mm	
Pendulum weight	(160 to 4000) g	0.25 % of applied weight	
Vice to clamp height difference	(0 to 0.5) mm	0.03 mm	
Izod striker centered	(0 to 3.0) mm	0.12 mm	
Epoxy replicate	(0.2 to 10.0) mm	0.05 mm	
Line of impact above spec holder	(21.00 to 23.00) mm	0.03 mm	
Charpy striker centered	(0.1 to 1) mm	0.12 mm	
Charpy anvil spacing	(58 to 102) mm	0.2 mm	

Parameter/Equipment	Range	CMC[2, 4, 6] (±)	Comments
Vibration[3]	10 Hz to 5 kHz (>5 to 10) kHz (3 to <100) Hz (100 to 500) Hz	2.0 % IV 3.0 % IV 1.6 % IV 1.3 % IV	Modal Shop 9110D Bruel & Kjaer 3629
RPM[3]	(5 to 10 000) RPM	0.033 % IV of tachometer	Optical tachometer

IV. Thermodynamics

Parameter/Equipment	Range	CMC[2, 6] (±)	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

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[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).

[5] This scope meets A2LA *P112 – Flexible Scope Policy*.

[6] The type of instrument or material being calibrated is defined by the parameter. This indicates the laboratory is capable of calibrating instruments that measure or generate the values in the ranges indicated for the listed measurement parameter.

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 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 April 2017*).

Presented this 31st day of October 2018.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1145.01
Valid to September 30, 2020
Revised November 18, 2019

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