



Accredited Laboratory

A2LA has accredited

CORPORATE CONSULTING SERVICE & INSTRUMENTS INC.

Akron, OH

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 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 28th day of March 2016.



A handwritten signature in blue ink, reading "Jim C. Burt".

Senior Director of Quality and Communications
For the Accreditation Council
Certificate Number 1424.01
Valid to November 30, 2017

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

CORPORATE CONSULTING, SERVICE, & INSTRUMENTS, INC.
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CALIBRATION

Valid To: November 30, 2017

Certificate Number: 1424.01

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

I. Dimensional

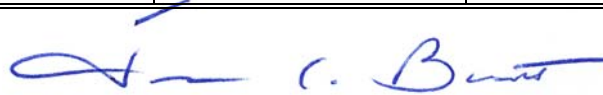
| Parameter/Equipment | Range | CMC ^{2,5} (±) | Comments |
|--------------------------------|-------------|------------------------|---|
| Micrometers – Outside Diameter | Up to 4 in | (64 + 4L) µin | Direct comparison with grade 2 gage blocks |
| Calipers | Up to 12 in | 330 µin | Direct comparison with grade 2 gage blocks |
| | | 360 µin | Master caliper checker |
| Thickness Gauge | Up to 3 in | 330 µin | Direct comparison with grade 2 gage blocks; ASTM D3767-03 (2014) parts 9 – 13; ASTM D5947-11 parts 6; 8; annex A1 |
| Cutting Dies | Up to 12 in | 540 µin 940 µin | Hand tools CMM |

II. Mechanical

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|---|--|---|---|
| Durometer ⁴ – Type O Type OO, OOOs Type OOO Microhardness Type A, B, O Type C, D, DO Indentor Geometry Length Diameter Angle Radius Extension (Digital) Display | (0 to 822) gf (0 to 180) gf (0 to 105) gf (0 to 79) gf (0 to 100) Duros Up to 1 in Up to 1 in (0 to 90)° Up to 0.5 in Up to 1 in (0 to 100) Duro | 0.33 Duros 0.36 Duros 0.35 Duros 0.35 Duros 0.35 Duros 0.35 Duros 0.00074 in 0.00072 in 0.14° 0.0002 in. 0.00094 in 0.06 Duros | ASTM D2240-15 parts (5 – 10) Triple beam balance Durocalibrator Optical inspection under magnification |
| Shore Hardness Test Blocks | All scales | 1.5 points | Certified durometer |
| Resiliometer, Resiliometer Spring | (0 to 100) points | 2.6 points | ASTM D2632-15 parts (5 – 11) |
| Mooney Viscometer – Compression | (0 to 200) Mooney units (20 to 370) °C (0 to 5) RPM (0 to 1000) lbf (1001 to 2000) lbf (2001 to 3000) lbf (3001 to 4000) lbf (4001 to 5000) lbf | 0.38 Mooney units 0.39 °C 0.3 RPM 4.8 lbf. 9.5 lbf 16.5 lbf 24.3 lbf 28.0 lbf | ASTM D1646-07 (2012) parts 6; 9; 10- 12; 14; 15 Direct verification |



| Parameter/Equipment | Range | CMC ^{2,5} (±) | Comments |
|--|---|--|--|
| Rheometers ³ – Oscillating Disc Moving Die Compression | (0 to 200) in·lbf (0 to 200) in·lbf (20 to 370) °C (0 to 100) RPM (0 to 1000) lbf (1001 to 2000) lbf (2001 to 3000) lbf (3001 to 4000) lbf (4001 to 5000) lbf | 0.46 in·lbf 0.46 in·lbf 0.39 °C 0.3 RPM 4.8 lbf 9.5 lbf 17 lbf 24 lbf 28.0 lbf | ASTM D2084-11, parts 6, 9-12 ASTM D5289-12, part 6, 8-10 Direct verification |
| Plastometer – Compression | Up to 1 in (0 to 25) lbf | 300 µin 0.012 lbf | ASTM D926-08 (2013) parts 5; 9; 10; 11 (plate parallelism and force) |
| Brittleness Point ³ and Temperature Retraction ³ | (0 to -90) °C Striker Radius Striker Speed (0 to -90) °C | 0.8 °C 540 µin 0.84 s 0.8 °C | ASTM D2137-15, part 5 and ASTM D746-14, part 6 for Brittleness Point direct verification with radius gauge and timed speed measurement ASTM D1329-08, part 5 for temperature retraction |
| Scales and Balances ³ | (0 to 1) g (0 to 200) g (0 to 1000) g | 0.26 mg + 0.6R 0.49 mg + 0.6R 9.8 mg + 0.6R | Direct comparison with OIML E2 weights |
| Abrader – RPM Vacuum Table TIR Weights | 72 rpm >0.81 in of H ₂ O 0.002 in (250 to 1000) g | 0.3 RPM 0.81 in of H ₂ O 330 µin 0.014 g | Manufacturer's instructions to ASTM D3389-15, part 5 |



| Parameter/Equipment | Range | CMC ^{2,5} (±) | Comments |
|--|---|--|---|
| Mass | Up to 1 g (>1 to 200) g | 0.26 mg 0.49 mg | Direct comparison with OIML E2 weights |
| | (>200 to 1000) g (>1000 to 6000) g | 9.8 mg 0.75 g | Direct comparison with Class 5 weights |
| Shore Durometric – A-Scale D-Scale | (0 to 822) g (0 to 4536) g | 0.6 Duros 0.6 Duros | NAVAIR 17-20MF-17 T-4 |
| Brookfield Viscometer | @1000 cP Nominal & @12500 cP Nominal | 18.0 cP 210.0 cP | ASTM D2196-15, part 5; 6; 7; 11; 15 & manufacturer's instructions |
| RPM – Contact/Optical Measure ³ | (1 to 999.9) rpm | 0.3 rpm | Direct Verification |
| Extensometer / Tensile Tester – Tension & Compression | (0 to 1000) lbf (1001 to 2000) lbf (2001 to 3000) lbf (3001 to 4000) lbf (4001 to 5000) lbf | 4.8 lbf 9.5 lbf 17 lbf 24 lbf 28 lbf | ASTM E4 -14, parts 7; 9; 10; 11; 12; 13; 14; 15; 16; 17; 18; 19; 20; 22; 23 E83 parts 4; 5 7; 8; |
| | Distance | Up to 12 in | 540 μin Manufacturer's instructions |

III. Thermodynamics

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|--|--|--|--|
| Oven Calibration ³ – Temperature Air flow vane anemometer Air flow hot wire anemometer | (20 to 370) °C (0 to 9999) cfm (0 to 9842) cfm | 0.39 °C 90 cfm 130 cfm | ASTM E145-94 (2011), part 4.1 ASTM D7969-16, parts 4; 5; 6; 7; X.1 |
| Ozone Monitors and Chambers ³ | (0 to 10) parts in 10 ⁹ (10 to 100) parts in 10 ⁹ | 0.11 parts in 10 ⁹ 1 part in 10 ⁹ | ASTM D4575-09 (2015), part 6; 7; 8; 9; 10; 15 X1; X2 ASTM D1149-07, parts 5; 7; 11; 15; 18; 21 field service available for chamber only |
| Temperature Measure ³ | (-90 to 0) °C (0 to 370) °C | 0.8 °C 0.39 °C | Direct verification |

IV. Time and Frequency

| Parameter/Equipment | Range | CMC ² (±) | Comments |
|-----------------------------|---------------|----------------------|--|
| Time – Measure ³ | Up to 2 Hours | 0.84 s | Direct verification D2240-15, part 5.1 operating stand rate of descent |

¹ This laboratory offers commercial and field calibration services.

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 Calibration is performed according to manufacturer specifications and measure in gram force.

⁵ In the statement of the CMC, L is the numerical value of the nominal length of the device measured in inches and R is the resolution of the device under test.

