



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

CORPORATE CONSULTING SERVICE & INSTRUMENTS, INC.

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CALIBRATION

Valid To: November 30, 2027

Certificate Number: 1424.01

In recognition of the successful completion of the A2LA evaluation process (including an assessment of the organization's compliance with R205 – A2LA's Calibration Program Requirements), accreditation is granted to this laboratory to perform the following calibrations<sup>1,6</sup>:

I. Dimensional

| Parameter/Equipment                               | Range       | CMC <sup>2,5</sup> (±) | Comments                                                                                                    |
|---------------------------------------------------|-------------|------------------------|-------------------------------------------------------------------------------------------------------------|
| Micrometers                                       | Up to 4 in  | (64 + 4L) µin          | Direct comparison with ASME Grade 0 gauge blocks & optical flats.<br>ASTM D5947-11 Parts 6; 8; Annex A.1.   |
| Calipers<br>(Outside, Inside, Depth Measurements) | Up to 12 in | 320 µin                | Direct comparison with ASME Grade 0 gauge blocks                                                            |
|                                                   | Up to 6 in  | 410 µin                | Master caliper checker                                                                                      |
| Thickness Gauges <sup>3</sup>                     |             |                        | ASTM D3767-03 (2014) parts 9 – 13; ASTM D1056-14 Part 15.3.2;<br>ASTM D751-06 Part 9.1; ISO 815-1 Part 4.4: |
| Length                                            | Up to 3 in  | 140 µin                | Direct comparison with ASME Grade 0 gauge blocks                                                            |
| Total Mass Applied                                | Up to 700 g | 290 mg                 | Direct measurement with electronic balance.                                                                 |

| Parameter/Equipment                           | Range              | CMC <sup>2</sup> (±) | Comments                                          |
|-----------------------------------------------|--------------------|----------------------|---------------------------------------------------|
| Cutting Dies                                  | Up to 12 in        | 670 µin              | With caliper                                      |
|                                               | Up to 20 in        | 400 µin              | With CMM                                          |
| Surface Roughness of Sample Preparation Molds | Ra: (18 to 40) µin | 2.2 µin Ra           | ASTM D3182 with surface finish measuring machine. |

## II. Mechanical

| Parameter/Equipment       | Range         | CMC <sup>2</sup> (±) | Comments                                                                                        |
|---------------------------|---------------|----------------------|-------------------------------------------------------------------------------------------------|
| Durometers <sup>4</sup> – |               |                      | ASTM D2240-15 parts (5 – 10)<br>Triple beam balance                                             |
| Type OO,                  | Up to 113 gf  | 0.29 Duros           |                                                                                                 |
| Type OOO                  | Up to 113 gf  | 0.26 Duros           |                                                                                                 |
| Type OOO-S                | Up to 197 gf  | 0.29 Duros           |                                                                                                 |
| Type M                    | Up to 79 gf   | 0.27 Duros           |                                                                                                 |
| Type A, B                 | Up to 822 gf  | 0.36 Duros           | DuroCalibrator                                                                                  |
| Type O, E                 | Up to 4436 gf | 0.36 Duros           |                                                                                                 |
| Type C, D                 |               | 0.36 Duros           |                                                                                                 |
| Type DO                   |               | 0.36 Duros           |                                                                                                 |
| Indenter Geometry         |               |                      | Optical comparator measurements under magnification 50x overlays (in or out of tolerance check) |
| Length                    | Up to 1 in    | 770 µin              |                                                                                                 |
| Diameter                  | Up to 1 in    | 750 µin              |                                                                                                 |
| Angle                     | (0° to 90°)   | 0.14 °               |                                                                                                 |
| Radius                    | Up to 0.5 in  | 750 µin              |                                                                                                 |
| Extension                 | Up to 1 in    | 940 µm               |                                                                                                 |

| Parameter/Equipment                | Range                | CMC <sup>2</sup> (±)               | Comments                                                              |
|------------------------------------|----------------------|------------------------------------|-----------------------------------------------------------------------|
| IRHD Hardness Testers              | Up to 0.300 mm       | 140 µin (0.0036 mm)<br>0.94 points | ASTM D1415-06<br>ISO 48-9                                             |
| Micro IRHD                         | (0.005 to 1) N       | 0.000 15 N                         | With force gauge                                                      |
| Minor Force on Ball                | (0.0078 to 0.0088) N | 0.000 15N                          | Type M force calculation by differential indentation                  |
| Major Force on Ball                | (0.1450 to 0.1460) N |                                    |                                                                       |
| Total Force on Ball                | (0.152 to 0.154) N   |                                    |                                                                       |
| Force on Foot                      | (0.232 to 0.238) N   |                                    |                                                                       |
| Dimensions:                        |                      |                                    |                                                                       |
| Ball Diameter                      | (0.39 to 0.40) mm    | 330 µin (0.0084 mm)                | Direct measurement/ verification with certified calipers & micrometer |
| Foot OD                            | (3.20 to 3.50) mm    |                                    |                                                                       |
| Foot ID                            | (0.85 to 1.15) mm    |                                    |                                                                       |
| IRHD Hardness Testers <sup>4</sup> | Up to 1.8 mm         | 140 µin (0.0036 mm)<br>0.53 points | ASTM D1415-06<br>ISO 48-9                                             |
| Type N & S2                        | (0.005 to 1) N       | 0.000 15 N                         | With force gauge                                                      |
|                                    | (1 to 10) N          | 0.0006 N                           | With force gauge                                                      |
| Minor Force on Ball                | (0.27 to 0.31) N     | 0.000 15 N                         | Type N & S2 force calculation by differential indentation             |
| Major Force on Ball                | (5.39 to 5.41) N     | 0.0006 N                           |                                                                       |
| Total Force on Ball                | (5.67 to 5.73) N     |                                    |                                                                       |
| Force on Foot                      | (8.15 to 8.45) N     |                                    |                                                                       |
| Dimensions:                        |                      |                                    |                                                                       |
| Ball Diameter                      | (2.49 to 2.51) mm    | 330 µin (0.0084 mm)                | Direct measurement/ verification with certified calipers & micrometer |
| Foot OD                            | (19 to 21) mm        |                                    |                                                                       |
| Foot ID                            | (5 to 7) mm          |                                    |                                                                       |
| Durometer Hardness Test Blocks     | All scales           | 1.5 points                         | Certified durometer                                                   |
| IRHD Hardness Test Blocks          | Type M               | 1.2 points                         | Certified durometer                                                   |
|                                    | Type S2 / N          | 1.1 points                         |                                                                       |
| Resiliometer                       | (0 to 100) points    | 1.7 points                         | ASTM D2632-15 parts (5 – 11)                                          |

| Parameter/Equipment                                                                                                                                               | Range                                                                                                                                                                                                         | CMC <sup>2</sup> (±)                                                                                        | Comments                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| Mooney Viscometer <sup>3</sup> –<br>Temperature<br>Rotational Speed<br>Force – Compression<br>Torque                                                              | (0 to 100) Mooney units<br>(20 to 375) °C<br>Up to 5 RPM<br>Up to 1000 lbf<br>(1001 to 2000) lbf<br>(2001 to 3000) lbf<br>(3001 to 4000) lbf<br>(4001 to 5000) lbf<br>Up to 73.5 lbf·in<br>(100 Mooney units) | 0.38 Mooney units<br>0.39 °C<br>0.18 RPM<br>4.8 lbf<br>9.5 lbf<br>17 lbf<br>25 lbf<br>28 lbf<br>0.28 lbf·in | ASTM D1646 15<br>(2012) parts 6; 9; 10-12; 14; 15         |
| Rheometers <sup>3</sup> –<br>(Oscillating Disc Cure Meters, Rotorless Cure Meters/Moving Die type)<br>RPM<br>Torque<br>Temperature<br>Closing Force — Compression | Up to 5 RPM<br>(12 to 43) lbf·in<br>(20 to 375) °C<br>Up to 1000 lbf<br>(1001 to 2000) lbf<br>(2001 to 3000) lbf<br>(3001 to 4000) lbf<br>(4001 to 5000) lbf                                                  | 0.18 RPM<br>0.46 lbf·in<br>2.6 °C<br>4.8 lbf<br>9.5 lbf<br>17 lbf<br>24 lbf<br>28 lbf                       | ASTM D2084-11, parts 6, 9-12, ASTM D5289-12, part 6, 8-10 |
| Plastometer –<br>Plate Distance<br>Force – Compression                                                                                                            | Up to 1 in<br>Up to 25 lbf                                                                                                                                                                                    | 300 µin<br>0.012 lbf                                                                                        | ASTM D926-08 (2013) parts 5; 9; 10; 11.                   |

| Parameter/Equipment                                                                                                                                                             | Range                                                                                 | CMC <sup>2,5</sup> (±)                                                              | Comments                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Brittleness Point Tester <sup>3</sup> &<br>Temperature Retraction<br>Tester <sup>3</sup><br><br>Bath Temperature<br>Striker Radius<br><br>Bath Temperature<br>Length Indication | <br><br>(0 to -90) °C<br>Up to 25.4 mm (1 in)<br><br>(0 to -90) °C<br>(150 mm, 50 mm) | <br><br>0.8 °C<br>780 µin<br><br>0.80 °C<br>320 µin                                 | ASTM D2137-15, part 5 &<br>ASTM D746-14, part 6 for<br>brittleness point direct<br>verification with radius<br>gauge<br><br>ASTM D1329-08, part 5<br>for temperature retraction<br>& direct comparison with<br>length standards |
| Scales & Balances <sup>3</sup>                                                                                                                                                  | Up to 500 mg<br><br>(1 to 2000) g                                                     | 0.31 mg<br><br>0.0072 g                                                             | ASTM E898<br><br>with OIML E2 weights                                                                                                                                                                                           |
| Mass                                                                                                                                                                            | (>1 to 500) mg<br>(>1 to 200) g<br>(>1 to 2000) g                                     | 0.059 mg<br>0.42 mg<br>12 mg                                                        | Direct comparison with<br>OIML E2 weights                                                                                                                                                                                       |
| Rotary Platform –<br>Abraser <sup>3</sup> (Abrader)<br><br>RPM<br>Vacuum<br>Table TIR<br><br>Weights                                                                            | 72 RPM<br>(40 to 80) in H <sub>2</sub> O<br>0.002 in<br><br>250 g<br>500 g<br>1000 g  | 0.18 RPM<br>1.6 in H <sub>2</sub> O<br>580 µin<br><br>0.014 g<br>0.014 g<br>0.014 g | ASTM D3389-15, part 5;<br>manufacturer's<br>instructions                                                                                                                                                                        |
| Shore Durometric –<br><br>Shore A Scale<br>Shore D Scale                                                                                                                        | Up to 8.05 N<br>Up to 44.45 N                                                         | 0.026 N<br>0.028 N                                                                  | NAVAIR 17-20MF-17<br>Comparison with weights                                                                                                                                                                                    |

| Parameter/Equipment                                                                | Range                                                                                                                                                                        | CMC <sup>2</sup> (±)                                                                                                                    | Comments                                                                           |
|------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Brookfield Viscometer <sup>3</sup><br><br>~ 23 °C                                  | @ 10 cP nominal<br>@ 1000 cP nominal<br>@ 5000 cP nominal<br>@ 12 500 cP nominal<br>@ 100 000 cP nominal                                                                     | 0.38 cP<br>13 cP<br>67 cP<br>200 cP<br>1100 cP                                                                                          | ASTM D2196-15, part 5; 6;<br>7; 11; 15 with CRMs                                   |
| RPM – Contact/Optical <sup>3</sup>                                                 | (1 to 999.9) rpm                                                                                                                                                             | 0.18 rpm                                                                                                                                | Direct measurement with<br>tachometer                                              |
| Tensile Testing<br>Machines <sup>3</sup> –<br><br>Force – Tension &<br>Compression | (25 to 250) lbf<br>(250 to 1000) lbf<br>(1001 to 2000) lbf<br>(2001 to 3000) lbf<br>(3001 to 4000) lbf<br>(4001 to 5000) lbf                                                 | 1.1 lbf<br>4.8 lbf<br>9 lbf<br>16 lbf<br>24 lbf<br>28 lbf                                                                               | ASTM E4 -16, parts 7; 9; 10;<br>11; 12; 13; 14; 15; 16; 17;<br>18; 19; 20; 22; 23. |
| Extensometer <sup>3</sup> –<br><br>Distance                                        | Up to 12 in                                                                                                                                                                  | 620 µin                                                                                                                                 | ASTM E83-16 parts 4; 5 7;<br>8.                                                    |
| Torque Wrenches                                                                    | 4 lbf·in to 600 lbf·ft                                                                                                                                                       | 0.79 % rdg                                                                                                                              | ASME B107.300                                                                      |
| Pressure Gages                                                                     | (0 to 6) psig<br>(>6 to 30) psig<br>(>30 to 100) psig<br>(>100 to 500) psig<br>(>500 to 1000) psig<br>(>1000 to 5000) psig<br>(>1000 to 3000) psig<br>(>5000 to 15 000) psig | 0.02 psi<br>0.1 % rdg + 0.1 psi<br>0.18 psi<br>0.1 % rdg + 0.8 psi<br>2.0 psi<br>0.1 % rdg + 0.78 psi<br>5.3 psi<br>0.1 % rdg + 2.3 psi | ASME B40.100                                                                       |

### III. Thermodynamics

| Parameter/Equipment                    | Range                                                                                       | CMC <sup>2</sup> (±)                                           | Comments                                                                                                                                      |
|----------------------------------------|---------------------------------------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Oven Calibration <sup>3</sup> –        |                                                                                             |                                                                | ASTM E145-94 (2011), part 4.1, ASTM D7969-16, parts 4; 5; 6; 7; X.1 using digital survey recorder with Type K thermocouple;                   |
| Temperature                            | (68 to 707) °F                                                                              | 1.3 °F                                                         |                                                                                                                                               |
| Air Flow Velocity                      | (10 to 500) ft/min                                                                          | 1.5 ft/min<br>+ 1.4 % rdg                                      | Vane anemometers                                                                                                                              |
| Air Flow Velocity                      | Up to 5 m/s<br>Up to 10 m/s<br>Up to 30 m/s<br>Up to 45 m/s                                 | 0.11 m/s<br>0.39 m/s<br>0.69 m/s<br>0.79 m/s                   | Hot wire anemometer                                                                                                                           |
| Ozone Monitors & Chambers <sup>3</sup> | Up to 10 parts in 10 <sup>8</sup> (pphm)<br><br>(10 to 100) parts in 10 <sup>8</sup> (pphm) | 0.11 parts in 10 <sup>8</sup><br><br>1 part in 10 <sup>8</sup> | ASTM D4575-09 (2015), part 6; 7; 8; 9; 10; 15 X1; X2<br>ASTM D1149-07, parts 5; 7; 11; 15; 18; 21<br>field service available for chamber only |
| Temperature – Dry Well Calibrators     | (-90 to 0) °C<br>(0 to 375) °C                                                              | 0.36 °C<br>0.36 °C                                             | Direct measurement                                                                                                                            |
| Temperature – Measuring Equipment      | (25 to 100) °C<br>(101 to 375) °C                                                           | 0.37 °C<br>0.6 °C                                              | Dry well temperature calibrator                                                                                                               |

### IV. Time & Frequency

| Parameter/Equipment                              | Range       | CMC <sup>2</sup> (±) | Comments                                                   |
|--------------------------------------------------|-------------|----------------------|------------------------------------------------------------|
| Testing Machines – Time Measurement <sup>3</sup> | Up to 2 h   | 0.84 s               | Direct measurement & verification                          |
|                                                  | Up to 120 s | 0.84 s               | ASTM D2240-15, part 5.1<br>operating stand rate of descent |

<sup>1</sup> This laboratory offers commercial and field calibration services.

<sup>2</sup> 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.

<sup>3</sup> Field calibration service is available for this calibration. 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.

<sup>4</sup> Calibration is performed according to manufacturer specifications and measured in units of gram force.

<sup>5</sup> 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.

<sup>6</sup> This scope meets A2LA's *P112 Flexible Scope Policy*.





## 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 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets 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 21<sup>st</sup> day of November 2025.

A blue ink signature of Mr. Trace McInturff.

Mr. Trace McInturff, Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 1424.01  
Valid to November 30, 2027

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