



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017  
& ANSI/NCSL Z540-1-1994

TROXLER ELECTRONICS LABORATORIES, INC.  
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CALIBRATION

Valid To: *See Footnote 6*

Certificate Number: 3260.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following calibrations<sup>1,5</sup>:

I. Dimensional

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments	Locations <sup>6</sup>
Calibration of 114.3 mm Nominal Height Standards Used for Gyrotory Compactor Calibration	(114.0 to 115.0) mm	0.013 mm	CMM	RTP
Calibration of Angle Fixture for Dynamic Angle Verification Kit (DAV)	-1.400° to 1.400°	2.3 x 10 <sup>-3</sup> °	CMM	RTP
Calibration of Dynamic Angle Verification Kit (DAV)	-1.380° to 1.380°	0.11°	Angle fixture for dynamic angle verifier	RTP
Calibration of Height Measurement System of the Gyrotory Compactor <sup>3</sup>	(113 to 115) mm	0.078 mm	Troxler gyrotory compactor height standard	RTP, HOU, ORL, RAN

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments	Locations <sup>6</sup>
Calibration of Angle Measurement System of the Gyrotory Compactor using the DAV <sup>3</sup>	1.0° to 1.3°	0.12°	Dynamic angle verifier	RTP, HOU, RAN
Calibration of Angle Measurement System of the Gyrotory Compactor using the RAM <sup>3</sup>	1.0° to 1.3°	2.1 x 10 <sup>-2</sup> °	RAM	RTP, HOU, ORL
Gyrotory Compactor Mold Internal Diameter <sup>3</sup>	(149.0 to 151.0) mm	1.0 x 10 <sup>-2</sup> mm	Bore micrometer	RTP, HOU, ORL, RAN
Gyrotory Compactor Ram Head and End Plate External Diameter <sup>3</sup>	(149.0 to 150.0) mm	1.8 x 10 <sup>-2</sup> mm	External micrometer	RTP, HOU, ORL, RAN
Gyrotory Compactor Mold Height	(245.0 to 255.0) mm	0.015 mm	CMM	RTP
Gyrotory Compactor Mold Wall Thickness	(7.0 to 8.0) mm	0.13 mm	CMM	RTP
Gyrotory Compactor Mold Inside Surface, Ram Head and End Plate Surface Rq Value	(0.00 to 5.00) μm	0.20 μm	Surface texture tester	RTP
AFLS1 Rapid Internal Angle Measurement Calibration Tube, Dihedral Angle	1.0° to 1.3°	1.0 x 10 <sup>-2</sup> °	CMM	RTP
Calipers <sup>3</sup>	Up to 12 in	1.1 x 10 <sup>-4</sup> in	Gage blocks	RTP, HOU, ORL, RAN
Micrometers <sup>3</sup>	Up to 12 in	1.1 x 10 <sup>-4</sup> in	Gage blocks	RTP, HOU, ORL, RAN

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments	Locations <sup>6</sup>
Concrete Type B Air Meter Measurement Bowl Volume	(0.20 to 0.30) ft <sup>3</sup>	8.8 x 10 <sup>-3</sup> % air in concrete	Equivalent water volume	ORL
Concrete Type B Air Meter Measurement Bowl Diameter-to-Height Ratio	0.75 to 1.25	3.9 x 10 <sup>-5</sup>	Caliper	ORL
Slump Mold Upper Opening Diameter	(3.74 to 4.25) in	1.3 x 10 <sup>-2</sup> in	Caliper	ORL
Slump Mold Base Opening Diameter	(7.75 to 8.25) in	1.5 x 10 <sup>-2</sup> in	Caliper	ORL
Slump Mold Height	(11.75 to 12.25) in	8.4 x 10 <sup>-3</sup> in	Caliper	ORL
Slump Mold Wall Thickness	(0.07 to 0.13) in	4.7 x 10 <sup>-3</sup> in	Micrometer	ORL

## II. Mechanical

Parameter/Equipment	Range	CMC <sup>2</sup> (±)	Comments	Location <sup>6</sup>
Calibration of Rotational Frequency of the Gyrotory Compactor <sup>3</sup>	(0 to 35) RPM	0.15 RPM	Laser tachometer	RTP, HOU, ORL, RAN
Density – Primary Density Blocks	(1760 to 2725) kg/m <sup>3</sup>	0.045 % rdg	CMM, weight determinations	RTP

Parameter/Equipment	Range	CMC <sup>2,4</sup> (±)	Comments	Location <sup>6</sup>
Density – Secondary Density Blocks <sup>3</sup>	(1760 to 2725) kg/m <sup>3</sup>	0.47 % rdg	Master gauge	RTP, HOU, ORL, RAN
Density – Trolox Tracker Portable Gauge Calibration System <sup>3</sup>	(1740 to 2620) kg/m <sup>3</sup>	$(1.0 \times 10^{-5}D^2 - 4.0 \times 10^{-3}D + 0.65)$ % rdg	Master gauge	RTP, ORL
Water Mass Per Unit Volume – Secondary Moisture Blocks	(370 to 823) kg/m <sup>3</sup>	7.3 % rdg	Master gauge	RTP
Water Mass Per Unit Volume – Tertiary Moisture Blocks <sup>3</sup>	(555 to 615) kg/m <sup>3</sup>	6.8% rdg	Master gauge	RTP, HOU, ORL, RAN
Water Mass Per Unit Volume – Trolox Tracker Portable Gauge Calibration System <sup>3</sup>	(110 to 375) kg/m <sup>3</sup>	8.3% rdg	Master gauge	RTP, ORL
Master Gauge Calibration, Density Measurement System	(1760 to 2725) kg/m <sup>3</sup>	0.11 % rdg	Primary density blocks	RTP
Master Gauge Calibration, Water Mass Per Unit Volume Measurement System	(373 to 804) kg/m <sup>3</sup>	7.4 % rdg	Secondary water blocks	RTP



Parameter/Equipment	Range	CMC <sup>2,4</sup> (±)	Comments	Location <sup>6</sup>
Client Surface Moisture/Density Gauges, Density Measurement System <sup>3</sup> –  Backscatter  Other Positions	(1740 to 2626) kg/m <sup>3</sup>  (1740 to 2626) kg/m <sup>3</sup>	1.3 % rdg  (1.3 x 10 <sup>-5</sup> D <sup>2</sup> - 0.0048D + 0.70) % rdg	Secondary density blocks	RTP, HOU, ORL, RAN
Client Surface Moisture/Density Gauges, Density Measurement System <sup>3</sup> –  Backscatter  Other Positions	(1850 to 2550) kg/m <sup>3</sup>  (1740 to 2620) kg/m <sup>3</sup>	1.3 % rdg  (-2.3 x 10 <sup>-3</sup> D + 1.8) % rdg	Troxler tracker portable gauge calibration system	RTP, ORL
Client Surface Moisture/Density Gauges, Moisture System <sup>3</sup>	(0 to 615) kg/m <sup>3</sup>	6.4 % rdg	Tertiary moisture blocks	RTP, HOU, ORL, RAN
Client Surface Moisture/Density Gauges, Moisture System <sup>3</sup>	(0 to 375) kg/m <sup>3</sup>	5.9 % rdg	Troxler tracker portable gage calibration system	RTP, ORL
Client Thin Layer Density Gauges <sup>3</sup> –  For Low Density Top Layer, High Density Bottom Layer  For High Density Top Layer, Low Density Bottom Layer	Density: (1740 to 2585) kg/m <sup>3</sup> Top Layer Thickness: (25.4 to 101.6) mm  Density: (1740 to 2585) kg/m <sup>3</sup> Top Layer Thickness: (25.4 to 101.6) mm	(0.0020T <sup>2</sup> - 0.18T + 7.8) % rdg  (-0.0012T <sup>2</sup> + 0.095T -0.21) % rdg	Secondary density blocks and primary thin layer plates	RTP, HOU, ORL, RAN

Parameter/Equipment	Range	CMC <sup>2, 3, 4</sup> (±)	Comments	Location <sup>6</sup>
Calibration of Load Cell for Gyrotory Compactor Pressure Calibration	(790 to 5010) lbf	7.1 lbf	Force gauge	RTP
Scales and Balances <sup>3</sup>	1500 g to 30 kg	0.000 29 % of applied load	ASTM E617 Class 1 mass standards	RTP, HOU, RAN
Scales and Balances <sup>3</sup>	Up to 5 kg	0.000 29 % of applied load	ASTM E617 Class 1 mass standards	ORL
Calibration of Pressure System of the Gyrotory Compactor <sup>3</sup>	(590 to 610) kPa	3.6 kPa	Load cell	RTP, HOU, ORL, RAN
Rockwell C Hardness of Gyrotory Mold, End Plate, and Ram	(45 to 70) Rockwell C Hardness	1.6 Rockwell C Hardness	Hardness meter	RTP
Calibration of Pressure System of the Concrete Type B Air Meter	(0 to 15) % air	0.12 % air	The pressure dial on the concrete air meter measures pressure, but is calibrated to correlate air content of the concrete specimen being measured to pressure.	ORL
Calibration of the Calcium Carbide Gas Pressure Tester (the "Speedy")	(0 to 20) % water content	0.038 % water content	The pressure dial on the Speedy measures pressure, but is calibrated to correlate water content of the soil specimen being measured to pressure.	ORL



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

<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 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.

<sup>4</sup> In the statement of CMC,  $D$  is the gauge measurement depth in millimeters,  $T$  is the top layer thickness in millimeters.

<sup>5</sup> This scope meets A2LA's *P112 Flexible Scope Policy*.

<sup>6</sup> The locations of the laboratories that can perform the calibration are given by a three-letter code with valid to dates given in the table below:

<b>Location</b>	<b>Code</b>	<b>Valid to Dates</b>
3008 E. Cornwallis Rd., Research Triangle Park, NC 27709	RTP	April 30, 2020
2500 Central Parkway, Suite L, Houston, TX 77092	HOU	July 31, 2019
2376 Forsyth Rd, Orlando, FL 32807	ORL	November 30, 2020
11300 Sanders Dr., Rancho Cordova, CA 95742	RAN	November 30, 2020





## Accredited Laboratory

A2LA has accredited

# TROXLER ELECTRONIC LABORATORIES, INC.

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 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 8<sup>th</sup> day of October 2018.

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

President and CEO  
For the Accreditation Council  
Certificate Number 3260.01  
Valid To: See Scope of Accreditation