

	<b>DEPARTMENT OF COMMERCE</b> National Institute of Standards and Technology National Voluntary Laboratory Accreditation Program	<b>ISSUE DATE:</b> December 4, 2019
	<b>LAB BULLETIN</b>	<b>NUMBER:</b> LB-115-2019
		<b>LAP:</b> Construction Materials Testing
<b>SUBJECT:</b> Clarification of Calibration Requirements for Nuclear Density Gauges		

The purpose of this lab bulletin is to clarify how NVLAP interprets “calibration” in ASTM D6938, *Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)*, and ASTM D7759/D7759M, *Standard Guide for Nuclear Surface Moisture and Density Gauge Calibration*.

ASTM D6938-17a section 8.1, on calibration says, “Gauge calibration shall be performed in accordance with Guides D7013 and D7759.” ASTM 7759/7759M-14 section 9, Density Systems Calibration, is obviously applicable. This section describes the process for determining the calibration constants or curve for a gauge. Section 10, Density Systems Verification, describes the process for determining if the existing calibration constants or curve are still applicable to the gauge. Is section 10 considered a calibration or is “verification” something less than a calibration?

[\*JCGM 200 \(VIM3\): International Vocabulary of Metrology\*](#) defines calibration as:

operation that, under specified conditions, in a first step, establishes a relation between the quantity values with measurement uncertainties provided by measurement standards and corresponding indications with associated measurement uncertainties and, in a second step, uses this information to establish a relation for obtaining a measurement result from an indication.

NOTE 1 A calibration may be expressed by a statement, calibration function, calibration diagram, calibration curve, or calibration table. In some cases, it may consist of an additive or multiplicative correction of the indication with associated measurement uncertainty.

NOTE 2 Calibration should not be confused with adjustment of a measuring system, often mistakenly called “self-calibration”, nor with verification of calibration.

NOTE 3 Often, the first step alone in the above definition is perceived as being calibration.

The process described in section 10 of ASTM D7759/7759M meets the definition of “calibration” as defined in VIM3. Section 9, Standardization, of ASTM D6938 is more consistent with “verification” as defined in ISO/IEC 17025:2017, *General requirements for the competence of testing and calibration laboratories*, section 3.8 or “intermediate check” as described in section 6.4.10 of ISO/IEC 17025.

Either process, calibration, section 9, or verification, section 10, as described in ASTM D7759/7759M must meet NVLAP traceability requirements defined in NIST Handbook 150 Annex B, Implementation of Traceability Policy in Accredited Laboratories. Sections 9.6 and 10.2 of ASTM D7759/7759M apply only if in compliance with Annex B of Handbook 150.

This clarification is for the purposes of NVLAP assessment and accreditation. Other specifiers may have requirements that differ.

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