Designation: D 5720 – 95 (Reapproved 2002)

Standard Practice for Static Calibration of Electronic Transducer-Based Pressure Measurement Systems for Geotechnical Purposes[1]

This standard is issued under the fixed designation D 5720; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers the procedure for static calibration of electronic transducer-based systems used to measure fluid pressures in laboratory or in field applications associated with geotechnical testing.

1.2 This practice is used to determine the accuracy of electronic transducer-based pressure measurement systems over the full pressure range of the system or over a specified operating pressure range within the full pressure range.

1.3 This practice may also be used to determine a relationship between pressure transducer system output and applied pressure for use in converting from one value to the other (calibration curve). This relationship for electronic pressure transducer systems is usually linear and may be reduced to the form of a calibration factor or a linear calibration equation.

1.4 The values stated in SI units are to be regarded as the standard. The inch-pound units in parentheses are for information only.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific precautionary statements are given in Section 7.

2. Referenced Documents

2.1 *ANSI/ISA Standards:*

S37.1 (R1982) Electrical Transducer Nomenclature and Terminology[2]

S37.3 (R1982) Specifications and Tests For Strain Gage Pressure Transducers[2]

S37.6 (R1982) Specifications and Tests For Potentiometric Pressure Transducers[2]

S37.10 (R1982) Specifications and Tests For Piezoelectric Pressure and Sound-pressure Transducers[2]

3. Terminology

3.1 Terms marked with "(ANSI, ISA-S37.1)" are taken directly from ANSI/ISA-S37.1 (R1982) and are included for the convenience of the user.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *absolute pressure*—pressure measured relative to zero pressure (vacuum) (ANSI, ISA-S37.1).

3.2.2 *accuracy*—ratio of the error to the full-scale output or the ratio of the error to the output, as specified, expressed in percent (ANSI, ISA-S37.1).

3.2.3 *ambient conditions*—conditions (pressure, temperature, etc.) of the medium surrounding the case of the transducer (ANSI, ISA-S37.1).

3.2.4 *best straight line*—line midway between the two parallel straight lines closest together and enclosing all output versus measurand values on a calibration curve (ANSI, ISA-S37.1).

3.2.5 *bonded*—permanently attached over the length and width of the active element (ANSI, ISA-S37.1).

3.2.6 *bourdon tube*—pressure-sensing element consisting of a twisted or curved tube of non-circular cross section that tends to be straightened by the application of internal pressure (ANSI, ISA-S37.1).

3.2.7 *calibration*—test during which known values of measurand are applied to the transducer and corresponding output readings are recorded under specified conditions (ANSI, ISA-S37.1).

3.2.8 *calibration curve*—graphical representation of the calibration record (ANSI, ISA-S37.1).

3.2.9 *calibration cycle*—application of known values of measurand, and recording of corresponding output readings, over the full (or specified portion of the) range of a transducer in an ascending and descending direction (ANSI, ISA-S37.1).

3.2.10 *calibration record*—record (for example, table or graph) of the measured relationship of the transducer output to the applied measurand over the transducer range (ANSI, ISA-S37.1).

3.2.11 *calibration traceability*—relation of a transducer calibration, through a specified step-by-step process, to an instrument or group of instruments calibrated by the National Institute of Standards and Technology (ANSI, ISA-S37.1).

[1] This practice is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.95 on Information Retrieval and Data Automation.

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[2] Available from Instrument Society of America, P.O. Box 12277, Research Triangle Park, NC 27709.

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