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StandardSpecification for Design and Construction of Composition or Quality Constituent Measuring Devices or Systems[1]

This standard is issued under the fixed designation F2342/F2342M; 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 specification covers the requirements for design and construction of electronic devices or systems for measuring composition or quality constituents of live animals, livestock and poultry carcasses, and individual cuts of meat, or a combination thereof. Examples include, but are not limited, to half and whole carcasses, primals, subprimals, and boxed meat.

1.2 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

1.3 *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 requirements prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

F2463 Terminology for Livestock, Meat, and Poultry Evaluation Systems

3. Terminology

3.1 For definitions relating to livestock, meat, and poultry evaluation systems, see Terminology F2463.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *electronic device, n*—device operating by the principles of electronics, which may consist of one or more subassemblies and perform a specific function.

3.2.1.1 *Discussion*—Electronic devices may be complete measuring instruments (for example, pH meter, composition measuring device) or part of a measuring instrument (for example, measuring element, indicator).

3.2.2 *electronic system, n*—electronic device or group of electronic devices used to measure and record composition or quality constituents.

3.2.3 *fault condition, n*—abnormal condition that may cause a reduction in, or loss of the capability of, a functional unit to perform a required function.

3.2.3.1 *Discussion*—Principally, a fault is the result of an error in the data contained in or flowing through an electronic measuring device or system.

3.2.4 *inch-pound unit, n*—in ASTM standards, unit based on the inch and pound, commonly used in the United States of America and defined by the National Institute of Standards and Technology, including certain other units accepted for use with the units.

3.2.4.1 *Discussion*—Inch-pound, also known as US Customary Units, are one type of non-SI units. Another example of non-SI units is the centimetre gram second (cgs) system.

3.2.5 *indicating element, n*—element incorporated in a measuring device or system by means of which its output, relative to quantity or quality measurement, is displayed or "read" from the device itself as, for example, a digital indicator.

3.2.6 *meat, n*—all edible products and by-products harvested by the meat-packing industry.

3.2.7 *National Type Evaluation Program (NTEP), n*—program administered by the National Conference on Weights and Measures, Inc. (NCWM) in cooperation with the National Institute of Standards and Technology (NIST), state and local governments, and the private sector for determining, on a uniform basis, conformance of a type, with an applicable standard.

3.2.8 *recording element, n*—element incorporated in a measuring device by means of which its output, relative to quantity or quality measurement, is permanently recorded on a tape, ticket, card, electronic storage medium, or the like, in the form of a printed, stamped, punched, perforated representation, or a retrievable electronic record.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

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3.2.9 *reference material, n*—physical object used as a basis for comparison or calibration.

3.2.10 *SI unit, n*—in ASTM standards, unit of the International System of Units (SI) and other units specifically approved in IEEE/ASTM SI 10 as a unit for use with SI.

3.2.11 *units of measure, n*—for the purpose of this specification, the units of measure shall be the International System of Units (SI).

3.2.11.1 *Discussion*—SI units are divided into three classes: base units, derived units, and supplementary units.

4. Materials and Manufacture

4.1 *Indicators and Recording Elements*—All measuring devices or evaluation systems shall be provided with an indicating element, and all systems must include a recording element appropriate in design and adequate in amount for purposes of measuring, training, calibrating, and testing. The recording of measurements may be an electronic record. Primary indications and recorded representations shall be clear, definite, accurate, and easy to read during normal use and testing of the device.

4.2 The minimum character size of all indications necessary to the measurement process shall be not less than 4 mm and easy to read under any ambient condition.

4.3 Any measuring or evaluation device or system without a built-in recording element shall be provided with a communication interface that permits interfacing with a recording element.

4.4 All measuring or evaluation devices or systems must either (*1*) automatically maintain a ready-to-measure or evaluate condition, (*2*) automatically display a visual indication and record a fault condition, or (*3*) provide no indication of measurement or evaluation.

5. Physical Properties

5.1 *Units of Measure:*

5.1.1 All measuring devices or evaluation systems shall indicate, or record in the appropriate unit of measure for the technology applied.

5.1.1.1 The value of the smallest unit indicated or recorded shall not exceed 0.05 in. or 1.0 mm for devices providing a linear measurement, or 0.1 % of capacity for units measuring mass.

5.2 *Operating Temperature:*

5.2.1 All measuring devices or systems shall operate within applicable tolerance requirements over the normal ambient temperature range of –10 to 40°C [14 to 104°F] unless marked with a restricted temperature range. If the temperature range is narrower than –10 to 40°C [14 to 104°F], the ambient temperature at the time of device calibration shall be posted on the device. If a measuring device or system is marked with a restricted operating temperature range, the minimum operating temperature range shall be not less than 30°C [54°F].

5.2.2 A device or system shall not display or record any usable values until the operating temperature necessary for accurate measurements and a stable ready to measure reference point has been attained.

5.3 A device or system shall be designed to operate within prescribed tolerances when subjected to environmental disturbances normally found in the environment in which it is used. Examples of disturbances include but are not limited to Radio Frequency Interference (RFI), Electromagnetic Interference (EMI), acoustic changes, ambient light, and so forth.

5.3.1 If the measuring accuracy of a measurement device is adversely affected by the speed of operation, the device must be marked with a maximum number of measurements per hour.

6. Other Requirements

6.1 *Error Message(s):*

6.1.1 All measurement devices or systems shall be equipped with a mechanism that provides a visual and recorded fault indication or message if any condition causes an invalid measurement as defined by the manufacturer.

6.1.2 If the placement of the measurement device is critical to the accuracy of the measurement process for any measuring or evaluation device or system used for evaluating carcasses:

6.1.2.1 The device shall leave a placement mark or dot on the carcass being evaluated, or

6.1.2.2 The device or system shall not accept the measurement or shall indicate a fault condition if the device is inappropriately placed on a carcass that is properly presented for measurement or evaluation.

6.1.3 If the application pressure of the sensor is critical to the accuracy of the measurement or evaluation process for any measurement or evaluation device or system used for evaluating carcasses, the sensor shall automatically allow measurement or evaluation only when the application pressure is within the range prescribed by the manufacturer.

6.2 Prior to installation, the manufacturer of a measuring device or system must supply all manuals and checklists necessary for proper installation, operation, and maintenance of the device or system. Any manual updates or revisions shall be made available to the user by the manufacturer.

6.3 Prior to installation, the manufacturer of a measuring device or system must supply reference materials, after they are verified and documented with traceability to a national standard by an independent third party, for use in the initial setup and calibration of evaluating devices before use. These reference materials can be used as standards for ensuring accuracy. Reference materials shall be uniquely identified (for example, serial number) and shall be retained by the device or system owner for subsequent verification of device accuracy and calibration when required.

7. Product Marking

7.1 All measuring or evaluation devices or systems shall be permanently marked for the purpose of identification with the following information:

7.1.1 Name, initials, or trademark of the manufacturer or distributor.

7.1.2 Model designation that positively identifies the pattern or design of the device prefaced by the term “Model,” “Type,” or “Pattern.” These terms may be followed by the term “Number” or an abbreviation of that word. The abbreviation for the word “Number” shall, as a minimum, begin with the

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