



## **Instrument Assessment Systems for Livestock Carcasses and Carcass Products**

### **Specifications and Requirements for Instrument Implementation and Verification**

#### **BACKGROUND**

The Department of Agriculture (USDA), Agricultural Marketing Service (AMS), Livestock, and Seed (LS) Program will utilize carcass factors and measurements made by approved instruments. The LS Program will approve instrument assessment systems that meet specific performance requirements for accuracy, precision, and repeatability in the prediction of quality and yield factors and grades. Once an instrument has met the accuracy, precision, and repeatability requirements, the procedures for implementation, verification and operation of an instrument must be approved by the LS Program on a plant-by-plant basis.

The guidance for this document was based on Section 5.59, “Electronic Livestock, Meat, and Poultry Evaluation Systems and/or Devices - Tentative Code,” of the National Institute of Standards and Technology Handbook 44 (2008). In turn, Handbook 44 references consensus standards established by ASTM committee F10 on Livestock, Meat, and Poultry Evaluation Systems, a committee made up of members representing industry associations, packing companies, instrument manufacturers, and academia and government agencies.

#### **PURPOSE AND SCOPE**

This document provides the specifications and requirements for the design, manufacture, implementation, operation, and verification of instrument systems. The scope of this document encompasses instrument evaluation systems used in assessing quality and yield factors and grades of livestock carcasses and carcass products. An establishment must have written procedures and verifications that ensure accurate and precise determinations are made by properly calibrated and verified instruments that have been approved for carcass factor and grade assessment.

#### **REFERENCE DOCUMENTS**

1. Electronic Livestock, Meat, and Poultry Evaluation Systems and/or Devices - Tentative Code. Section 5.59. *Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices*. National Institute of Standards and Technology Handbook 44, 2008.
2. Standard Practice for User Requirements for Livestock, Meat, and Poultry Evaluation Devices or Systems. American Society for Testing Materials (ASTM) International Standard F 2341-05.
3. Standard Specification for Design and Construction of Composition or Quality Constituent Measuring Devices or Systems. ASTM International Standard F 2342-06.
4. Standard Specification for Developing and Validating Prediction Equation(s) or Model(s) Used in Connection with Livestock, Meat, and Poultry Evaluation Device(s) or System(s) to Determine Value. ASTM International Standard F 2340-05.

## **Instrument Implementation and Verification**

5. Standard Test Method for Livestock, Meat, and Poultry Evaluation Devices. ASTM International Standard F 2343-06.
6. Standard Terminology for Livestock, Meat, and Poultry Evaluation Systems. ASTM International Standard F 2463-06.

### **INSTRUMENT DESIGN AND MANUFACTURE**

The design and manufacture of instrument assessment systems for livestock carcasses and carcass products shall conform to ASTM International Standard F 2342-06. Any departure or exception to the standard specifications of F 2342-06 must be justified in writing and submitted to the LS Program for approval.

The LS Program must be notified prior to implementing any modification of the device, system or process that would affect one or more independent variables of a LS Program approved equation (see Section 5.2 ASTM International Standard F 2340-05; and, Section 5.3.3 ASTM International Standard F 2341-05).

### **INSTRUMENT TESTING AND VERIFICATION**

Instrument assessment systems shall be verified and documented for accuracy on each production day as specified by ASTM Standard F 2341-05. Testing and testing standards shall conform to ASTM International Standard F 2343-06. Standards shall cover each third of the normal operating range of the device for the approved quality and yield factor or grade (e.g., ribeye area, USDA Yield Grade, and marbling score).

### **OPERATIONAL REQUIREMENTS**

Instrument assessment systems shall be used, operated, inspected, and maintained as described in ASTM International Standard F 2341-05. The LS Program shall be provided:

1. Instrument installation, operator training, operation, verification, inspection and maintenance procedures when these processes do not conform to the manufacturer's requirements;
2. Documented alternate method in the event of equipment failure; and,
3. Any system change (hardware or software) prior to implementation.

Additional requirements that must be addressed include:

1. Approval by the LS Program of the manufacturer's manuals and documentation covering recommended installation, operator training, operation, verification, inspection and maintenance procedures;
2. A description of the linking of the assessed factor with carcass or carcass products and their associated variable values;
3. Procedure for factor or grade application and/or identification;
4. A list of essential devices and components of the instrument system including key hardware and software components (each essential hardware component shall be identified by a unique code); and,
5. A USDA cyber security evaluation and maintain documentation of this evaluation; and,
6. If required, procedures for the presentation of carcass and factor data to the grader(s) for review, in order for the grader(s) to determine eligibility, to accept or reject the data, and to determine the final grade.

## Instrument Implementation and Verification

The documented processes are monitored and validated on a continual basis by LS Program personnel.

Questions or comments shall be submitted to:

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