

Instrument Installation Process

Instrument Grading Systems for Beef Carcasses

1. PURPOSE

The Department of Agriculture (USDA), Agricultural Marketing Service (AMS), Livestock and Poultry (LP) Program approves and utilizes beef carcass grade factors made by approved instruments in determining the official quality and yield grades of beef carcasses. The LP program approves instrument systems that meet specific requirements outline in LP document *Instrument Approval Process, Instrument Grading Systems for Beef Carcasses*. These performance attributes are tested in a “laboratory” environment under the requirements outlined in the above referenced procedure.

It has been shown that some instruments behave differently when they begin communications with facility specific information systems.

2. SCOPE

The purpose of this document is to provide a performance standard for objectively assessing conditionally approved instruments in the field setting. An instrument must be tested at each facility for which it is intended to be utilized. The instrument must demonstrate that it provides the same output at it did in the *Instrument Approval Process, Instrument Grading Systems for Beef Carcasses* approval process.

3. REFERENCES

[Instrument Approval Process - Beef | Agricultural Marketing Service \(usda.gov\)](#)

[QAD 500 - Beef, Bullock, and Bull Grading Methods and Procedures | Agricultural Marketing Service \(usda.gov\)](#)

[QAD 515 - Beef Carcass Instrument Grading Procedures | Agricultural Marketing Service \(usda.gov\)](#)

[Carcass Beef Standard December 2017 \(usda.gov\)](#)

[Packers and Stockyards Enforcement | Agricultural Marketing Service \(usda.gov\)](#)

4. IDENTIFICATION OF ESTABLISHMENT

The facility that intends to use an approved device will send a request for approval of use of an approved instrument to the LP Standards and Specifications Division (SSD). In this request, the facility will outline which technology (instrument and manufacturer) that it would like to utilize.

5. REPEATABILITY

5.1 Stationary

A minimum of 50 carcasses will be railed off for stationary measurement. The instrument will be connected to the facility's data network. All 50 carcasses will be imaged by the instrument. The facility will then provide AMS with both the image and data associated. The instrument will be disconnected from all outside data networks. The instrument will be used to image all 50 carcasses again. Images and data will be collected from the instrument and the facility.

A USDA Gold Standard Committee will evaluate and measure each carcass for ribeye area, fat thickness, and final yield grade. The Gold Standard Committee will include three LP experts from the following: National Meat Supervisor, Assistant National Meat Supervisor and Meat Supervisors from the Gold Standard Team. The Gold Standard Team is selected each year during correlation activities.

5.2 At Chain Speed

Expert marbling calls on a minimum of 500 carcass sides will be collected by the gold standard committee. The committee will be set up prior to or immediately following, the on-line evaluation by the instrument. Carcasses will be evaluated by the experts in an adequately illuminated (a minimum of 100-foot candle power) area. The Gold Standard Committee will independently evaluate the marbling score in accordance with the *Official United States Standards for Grades of Carcass Beef* (January 1997). Marbling score shall be recorded to the nearest 10 marbling score units.

The instrument used for this test will be connected to the facility's server and data network. No more than 70% of carcass sides used for this test will come from one side (i.e., right side or left side). Upon completion of sample collection, the facility will provide AMS with the images and associated data from the carcasses collected.

A mean expert marbling score (MEMS) will be calculated. If the mean expert marbling score is greater than 30 marbling units from any individual expert call, then data from that carcass will not be used.

5.3 PERFORMANCE REQUIREMENTS

Approval will be granted in accordance with the requirements below:

5.3.1 Stationary

- 95% of all carcass prediction residuals (difference between online and offline instrument) shall not exceed 10 marbling units
- 95% of all ribeye area measurement residuals shall not exceed 0.5 square inches
- 95% of all fat thickness measurement residuals shall not exceed 0.1 inches
- 95% of predicted final yield grade residuals shall not exceed 0.5 final yield grade
- The residual standard deviation (RSD) of final yield grade shall not exceed 0.25 yield grade units

5.3.2 At Chain Speed

- R^2 value of the marbling residuals (difference between USDA mean expert marbling score and the proposed facility instrument) ≥ 0.95
- The standard deviation of the marbling residuals between MEMS and proposed instrument (RSD) ≤ 20

This standard is subject to revision at any time by the LP Program.

Requests for approval shall be submitted to:

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