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Inspecting and Testing Electronic Carcass Evaluation Devices

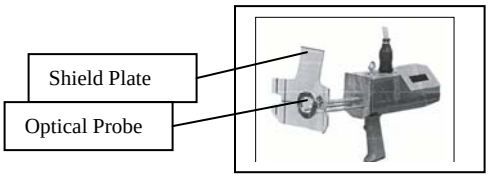
By Dick Suiter

This is the second in a series of articles intended to familiarize weights and measures field officials and administrators with electronic carcass evaluation device standards, operation, inspection, and testing.

The first article, which appeared in the November 2005 Weights and Measures Quarterly, discussed the four documentary standards applicable to electronic carcass evaluation devices during inspection and testing in the field.

Since the 2006 edition of NIST Handbook 44 includes a new tentative code Section 5.59. Electronic Livestock, Meat, and Poultry Evaluation Systems and/or Devices-Tentative Code, it is important that field officials begin evaluating these devices to determine if any changes are needed to the tentative code.

The original Fat-O-Meat'er™, built by SFK Technology Inc., was the first device used by the U.S. pork packing industry for measuring back fat and depth of the loin eye, and from a technology standpoint it is probably the most prevalent and simplest device in use today. The Fat-O-Meat'er™ is an "optical device" that uses a light source and sensor to determine the depth of the back fat and the loin eye on a hog carcass. The light source and sensor are located near the end of a probe that is constructed with a knife point on the end used to penetrate the carcass between the 3rd and 4th ribs, 7 cm (2.76 inches) from the centerline.

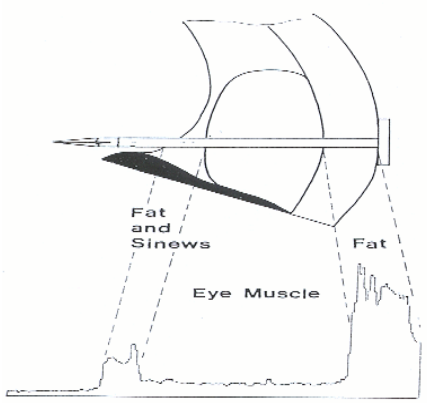


Fat-O-Meat'er

The shield plate of the device is placed on the carcass and the probe is pushed into and out of the carcass. As the probe travels through the carcass on its way out, the amount of light detected by the sensor changes as the probe moves through the loin eye and the back fat. At the same time the probe moves through the different tissues, the thickness of the loin eye and back fat is measured by the internal electronic elements within the device. The display on the device indicates a linear measurement value for both of these tissue measurements. All of these measurements are used to determine a ratio of the amount of back fat compared to the depth of the loin eye. That ratio, expressed as a lean percent for each carcass, is used to determine an adjustment to the base price paid to the supplier of the processed hogs.

Fat-O-Meater in use

Testing of the device is a relatively simple process of conducting linear measurements using a "test block" that was developed by the device manufacturer. The test blockconsists of a rectangular block of a plastic-like material that has slots on one or more sides. Each slot has areas of white and black material of a prescribed length. The probe of the device is passed through the slot(s) of the test block, and the readings on the device are compared to the designated values for the test block. For example, the block in the photo below shows two of the four different measuring slots available on this particular test block. On the slot facing front on the photo, the white area at the left is 7 mm long, the dark area in the middle has a length of 60 mm, and the light at the right is 23 mm in length.



Optical probe passing through the carcass (back fat and <u>loin</u> eye)

Test block (reference standard) used for calibration and testing of a Fat-O-Meater

The following is a proposed Standard Test Method for Livestock, Meat, and Poultry Evaluating Devices to be added to the ASTM Standard F2343-05.

7.3 Fat-O-Meat'er Test Procedures
7.3.1 Push the morning control button.
7.3.2 Take 10 measurements with the test block (reference material) for each required measurement.
7.3.3 Record the test results.
7.3.4 The measurement results can be cancelled by pushing the pistol button or accepted by pushing the morning control button on the terminal. When the morning control button is activated, no transmission is sent to the scale terminal.

The device user is required to maintain a test block with the device and is required to perform this procedure at the beginning of each production day. The weights and measures official may elect to witness such testing on a periodic basis or may choose to conduct his own test using either his own standards or the standards maintained on site by the device user.

The standards maintained on site by the device user are required to meet the NIST Handbook 44 Fundamentals Section 3. Testing Apparatus. The user of the device is also required to have the accuracy of the test block verified on an annual basis with traceability to a national standard. The USDA Packers and Stockyard Program has several of these test blocks for their own use and recently had them calibrated by the Minnesota Weights and Measures Laboratory with traceability to NIST standards of length.

Subsequent articles in this series will provide information on other technologies used to make measurements of various carcass constituents.

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