MARCH 2007

Inspecting and Testing Electronic Carcass Evaluation Devices

By Dick Suiter

This is the fourth in a series of W&M Quarterly articles intended to familiarize weights and measures field officials and administrators with electronic carcass evaluation device standards, operation, inspection, and testing. Previous articles (November 2005, June 2006, and September 2006 editions) may be found on the WMD website at http://ts.nist.gov/WeightsAndMeasures/newsletterarchive.cfm.

This article and subsequent articles in the series will describe additional devices or systems currently in use commercially and others currently being used in non-commercial applications, but which have the potential of commercial use. For each device or system the articles will provide an overview of the base technology utilized and how the equipment functions, as well as test methods and reference material or physical standards currently available for use in conducting accuracy verification.

In this article we will look at the Ultra Fom™ (Figure 1) built by SFK Technology, Inc., and the handheld ultrasonic unit built by Animal Ultrasound Services (AUS) (Figure 2). These handheld devices utilize ultrasonic energy of sound waves for measuring back fat and depth of the loin eye.

Figure 1

Figure 2

The Ultra Fom™ uses an array of 64 ultrasound transducers to measure fat and lean meat thickness over a 5-cm-wide cross section near the centerline and the 3rd and 4th ribs next to last rib of the carcass. From those measurements the Ultra Fom™ provides a display on the device of the thickness of fat over a range of 5 mm to 30 mm and the thickness of muscle over a range of 30 mm to 80 mm at the measurement point. From those measurements the device can also calculate and display the percentage of lean meat for the carcass measured.

The AUS device uses similar technology with approximately 100 measuring elements that make up the measuring surface of the device. The AUS device provides a two dimensional image of the measurement on the device as shown in figure 3. The system

also provides a digital display of the measurement of fat, lean, and lean percent on an indicator adjacent to the measurement station on the carcass line.

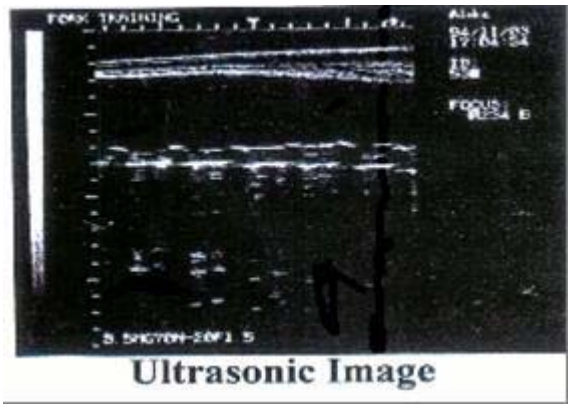

Figure 3

Testing of these devices is a relatively simple process of conducting linear measurements using a "calibration standard."

An example of a test standard developed by one of the manufacturers is shown in Figures 4 and 5. This test block is made of a temperature-stable material and is intended to provide measurements very similar to those taken from an actual carcass.

Figure 4

Figure 5

The United States Department of Agriculture (USDA) performs tests of the device by placing the standard on the measuring face of the handheld unit and comparing the readings shown on the display with the calibrated values for the test block. This procedure verifies both accuracy and repeatability

Similar, but more detailed test procedures for the handheld ultrasonic devices have been developed by one of the manufacturers and a ballot for adding this test procedure to ASTM Standard-F2343-061 will be posted later this spring.

If these devices are used commercially, the device user is required to maintain a test standard with the device and is required to perform this procedure at the beginning of each production day. Weights and measures officials may elect to witness the daily testing on a periodic basis or may choose to conduct their own test using either their 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 NIST Handbook 44, Appendix A, Fundamental Considerations, Section 3. Testing Apparatus. The user of the device is also required to have the accuracy of the test standard verified on an annual basis for traceability to a national standard.

Look for subsequent W&M Quarterly articles in this series for information on other technologies used to make measurements of various carcass constituents. For further information or questions related to this article, contact Dick Suiter (NIST) by e-mail at rsuiter@nist.gov or by phone at 301-975-4406.

NOTE: [1]For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org.