

Precision and Accuracy of the OFDA 2000

All methods of measurement involve errors generated in the sampling and preparation of specimens as well as errors in the measurement itself. These are not mistakes, simply statistically-predictable variations. All measurement methods include some random errors generated by variables outside the control of the measurement method - these affect the precision of the method. Measurements may also include systematic errors, sometimes as a result of calibration difficulties, and these affect the accuracy of the method. In many cases in wool metrology, sampling and preparation give rise to greater errors than the measurement instrument itself.

Precision

Precision is an indicator of how repeatable a measurement is. The smaller the number, the more precise the measurement. Precision of the OFDA 2000 measurement system is affected by a number of variables, but under standard conditions of use, measurement of the mean fibre diameter of a single midside or pinbone sample from a single animal should be as repeatable as a typical midside test carried out by a fleece testing laboratory.

Accuracy

Accuracy is the ability to obtain a result that is similar to a reference method. In the case of the OFDA 2000, one may regard accuracy as the closeness to an equivalent result obtained by core tests using a certified method. Again, the smaller the difference the more accurate the method. In the case of the OFDA 2000, the average results obtained on midside samples should be within 0.2 to 0.3 μm of a core test measurement taken on the same wools.

When fleece tests are used to class fleeces into diameter ranges (objective classing), the overall flock average by fleece testing and by core testing of all the bales should generally be very close. However, individual lines may show bigger differences, especially if individual fleece weights have not been used to obtain a weighted-average estimate of the mean of the line. Additionally, the finest line will always tend to measure somewhat coarser than anticipated when core tested, and the coarsest line will tend to measure slightly finer when core tested. This will happen irrespective of which method is used to measure the fleeces.

Two typical examples of outcomes from objective classing using the OFDA 2000, from both sides of the Tasman, are as follows:

Example 1, Tasmania

No. of bales	3 (Hog)	4 (Hog)	3 (Hog)	1 (Hog)	3 (2thW)	5 (2thW)	5 (2thW)	2 (2thW)	Total 26
Classing range	< 15.0	15.0-15.9	16.0-16.9	17.0-17.9	< 17.0	17.0-17.9	18.0-18.9	19.0-19.9	Avg. 16.9
Core test (Lsn)	15.2	15.7	16.6	17.3	16.9	17.5	18.2	18.6	Avg. 17.0

Example 2, Otago, New Zealand

No. of bales	1	3	7	5	19	7	13	10	Total 65
Classing range	15.7-16.1	16.2-16.7	16.8-17.3	17.4-17.9	18.0-18.7	18.0-18.7	18.8-19.3	19.4-19.9	Avg. 17.9
Core test (OFDA)	16.3	16.7	17.2	18.0	18.3	18.6	19.1	19.5	Avg. 18.0

In both cases the growers were very happy with the outcomes, and many others are repeating these successes either by objective classing fleeces directly off the table in the shed, or by pre-selecting sheep in the race prior to shearing. Throughput rates of up to 1200 sheep per day have been achieved in New Zealand with both methods.