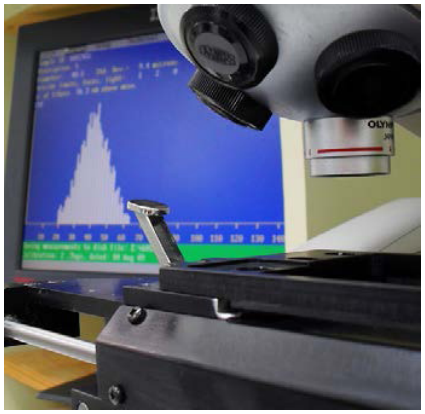
OFDA (OPTICAL FIBRE DIAMETER ANALYSER)



OFDA100 Instrument

WHAT IS OFDA?

OFDA stands for Optical Fibre Diameter Analyser. The instrument was initially developed in Australia in the early 1990's. It is essentially an automated microscope specifically designed to measure either individual fibers, or fibre snippets spread over a glass slide, at upwards of 2000 measurements/minute.

Whilst SGS in the past had significant input to the standardisation processes connected with OFDA, they have no commercial involvement with the manufacture or supply of the equipment.

The original OFDA 100 was solely a laboratory instrument. Newer models operating under Microsoft Windows, the OFDA 2000, has been available since 2000. This is also capable of measuring greasy wool in staple form on-farm.

The OFDA4000 was introduced in 2002 to measure both fibre length distribution and fibre diameter distribution simultaneously on a sample of sliver.

OFDA DIAMETER MEASUREMENTS

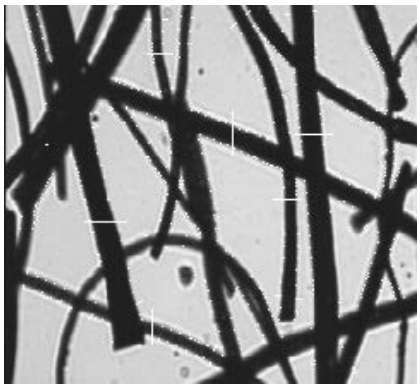
The OFDA was designed to provide a rapid, precise and accurate measurement of the mean fibre diameter and fibre diameter distribution of samples of wool.

In order to perform this function, in the original mode, 2 mm snippets of representative subsamples of clean fibre are spread over a large microscope slide. The slide is placed on the OFDA stage, where it is rapidly moved through the field of view of a low-powered microscope. At each slide position a video system captures an image which is then analysed in real time to detect and measure fibre image widths. The image widths are converted to diameter measurements via a calibration equation derived from measurements on the industry-standard IH wool calibration tops, or the IMA standard tops for mohair.

The measurement system has been standardised for wool and other animal fibres, and the test method is documented in IWTO-47, which was ratified by IWTO in Dec. 1995.

OFDA MEDULLATION MEASUREMENTS

Early in 1994 it was announced that the OFDA, with some modification, could be used to measure fibre opacity, from which medullation can be estimated.



Typical OFDA image with measurement points

Medullated fibres are those where the core of the fibre contains air and are consequently opaque. Whilst this can produce desirable effects for some uses, on the whole medullation is seen as a fault for garment end-uses, since medullated fibres do not take dye in the same manner as normal fibres.

Medullation is traditionally measured using the projection microscope. The method is slow and often relatively inaccurate. Alternative systems have been developed by WRONZ, including the medullameter and a method based on near infra-red analysis (NIRA). Neither technique has been widely used.

Interest in the use of OFDA for medullation measurement was driven from both South Africa (where users wanted a rapid method for measuring "objectionable medullated fibres" in mohair, at levels of a few parts per 10,000), and from New Zealand, which needed a rapid method for assessment of crossbred wools.

International round trials were carried out, and in consequence there is now an IWTO test method (IWTO-57) available. There are, however, no applicable sampling regulations, so medullation results cannot yet be certified.

OFDA CURVATURE MEASUREMENTS

At the same time as the medullation system was being developed, software was also made available to allow the OFDA to measure fibre curvature.

Fibre curvature is a measure of fibre crimp, which is closely related to staple crimp. Crimp has been shown to be an important factor in the "spinnability" of wool, as well as an indicator of "handle" or bulk.

Considerable development work was done in the early 2000's to standardize curvature measurements on the Laserscan and OFDA, and in 2008 curvature was added to the properties measured under IWTO-47.

Bulk is seen as an important parameter by many spinning mills, although to date there has been a disappointing take-up of the core bulk test, which has been available in New Zealand for some time. This interest was confirmed when SGS presented an introductory paper on the use of OFDA for estimating bulk at the 1996 Capetown IWTO conference.

Bulk can now be routinely estimated using the OFDA2000, and OFDA100 following standardization of the curvature preparation method. OFDA Along-fibre measurements

A later addition to the OFDA software has been the Along-fibre menu. This includes measurement of along-fibre variation in diameter, as well as two measures of "blobs". The "blobs" are measures of non-uniform profile asperities and adhering matter. They have been shown to be useful in predicting extractable matter content, and are therefore indicative of fibre cleanliness. This suit of measurements has also been used in discriminating between different types of fibres, and preliminary work has been published on estimating fibre mixture composition (eg. wool-cashmere).

ARE THERE ANY SIGNIFICANT ISSUES?

On average, all four methods give similar answers for mean fibre diameter, especially on processed wool. The newer instruments are capable of being calibrated with internationally-traceable standards of metrology (rather than with wools measured on the projection microscope). However, until the anomalies between these calibrations and the reference method are resolved, it will not be possible to move away from a wool-based calibration process.

The methods all give slightly different answers on some wool types, especially for raw wool. For these types it is important to identify the test method which is used to avoid any confusion. In general terms the two newer methods and the projection microscope tend to be in better agreement on tops than any combination with the airflow (see also Info-bulletins 3.3 and 3.5). However, the airflow remains the method used for trading certification for most coarse wools.

Australia took the decision to move towards implementing the Laserscan system as the default diameter measurement from the beginning of the 2000 wool season. Both airflow and OFDA certificates are also available.

New Zealand subsequently adopted the Laserscan as default, for merino wools only, and then South Africa for all wools in 2006. Other countries are moving slower because in general they cover wider ranges of wools than are generally available in Australia, and the issues are less well defined.

FOR ENQUIRIES

Email us at NZ.wool@sgs.com
Or contact us at:
48 Kemp Street, Kilbirnie
PO Box 15062
Wellington, New Zealand
Tel: + 64 4 387 8565
Fax: + 64 4 387 8651
www.sgs.com/agriculture

© 2014 SGS. All rights reserved. The information contained herein is provided "as is" and SGS does not warrant that it will be error-free or will meet any particular criteria of performance or quality. Do not quote or refer any information herein without SGS' prior written consent. Any unautho-rized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.