



## Accuracy and precision of mean fibre diameter measurement at SGS Wool Testing Services

SGS WTS performs diameter measurements for the wool and animal fibre industry in New Zealand, on samples from both within New Zealand and from around the world. The laboratories are accredited by IANZ against ISO 17025 and Licensed by IWTO to issue IWTO certificates. Our business model depends totally on the accuracy and precision of our measurements.

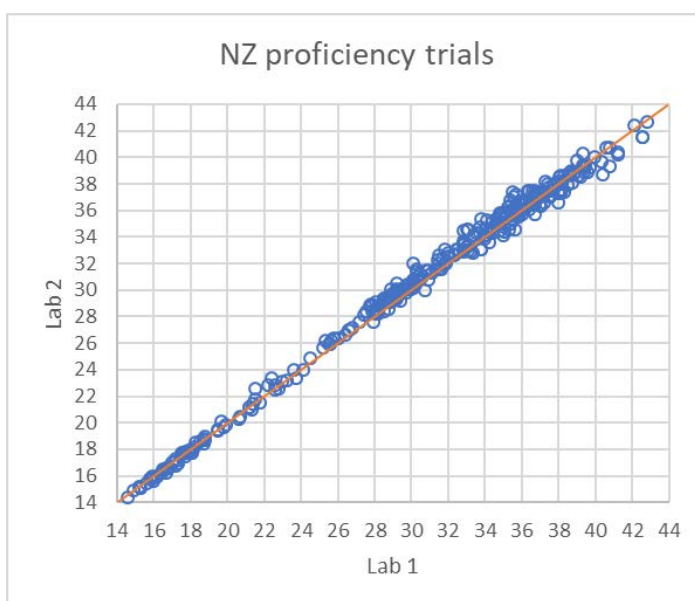
Our diameter equipment inventory includes: projection microscopes (2), airflow instruments (4), Laserscans (4), OFDA100 (4), and OFDA 2000 (6).

Some major elements of quality control and assurance on diameter measurements at SGS include:

- Routine calibration and validation of every instrument using current Interwoollabs IH tops, with supplementary ultrafine tops
- Participation in Interwoollabs round trials twice annually. These international trials include ~30 laboratories using airflow, ~40 using OFDA and ~30 using Laserscan.\*\* see below
- Daily checks on all instruments in use using both wool and polyester validation specimens
- Ongoing comparisons between instrument types: airflow, OFDA and Laserscan
- Retesting of retained samples – carried out on a daily basis
- Comparisons between the fleece testing laboratory (Timaru) and the certification laboratory (Wellington)
- Weekly interlaboratory trials with NZWTA
- Periodic interlaboratory comparisons with other IWTO and independent laboratories

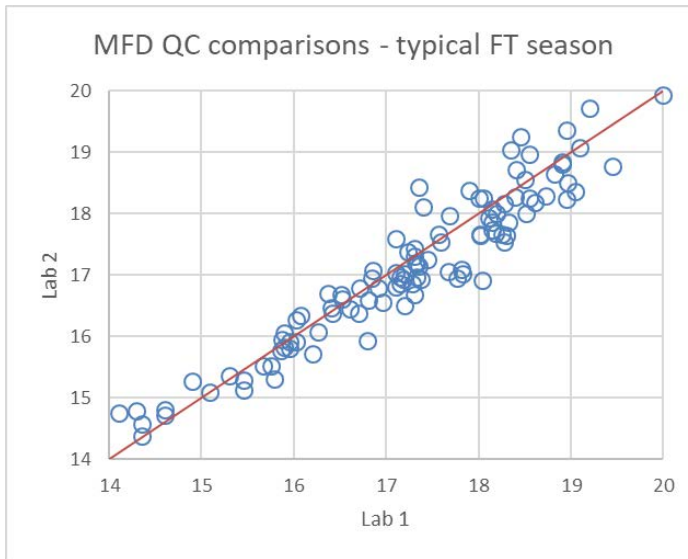
Some examples of these diameter comparisons are shown below. It should be recognised that the level of scatter varies depending on the type of sample being used for the comparisons – IWTO certification on greasy core samples is much more precise than measurements on midside fleece samples, and comparisons between different instrument types may include slight biases due to the measurement technology.

- A. Interlaboratory trials with NZWTA, latest data 2019-20 season, covers both airflow and Laserscan measurements (Laserscan is usually used below 26  $\mu\text{m}$ ), greasy wool core samples:

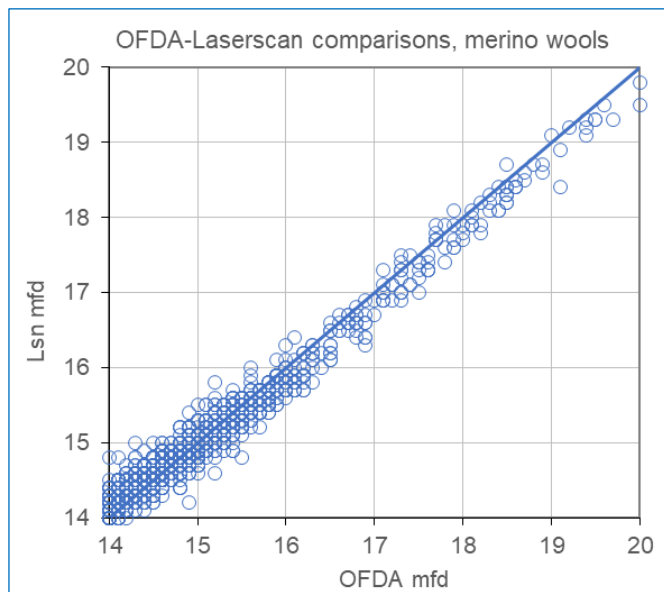


- B. Internal laboratory QC comparisons between Fleece Testing (Timaru) and Wellington laboratories, using midside fleece samples (note that precision of fleece testing is lower than

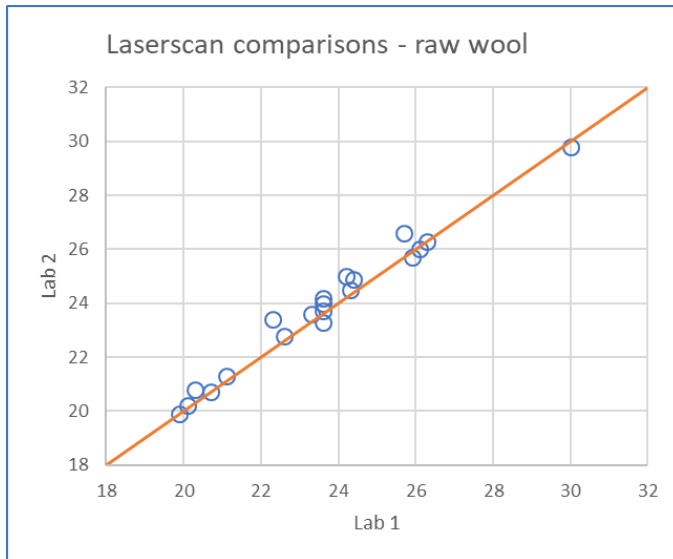
greasy wool core testing because smaller samples are used and less measurements are undertaken):



C. Comparisons between OFDA and Laserscan results on merino wools (greasy core samples):



D. Comparisons between Yocom McColl laboratories and SGS using US core samples, measurements on Laserscan:



Further typical comparisons between the results from different instruments can be seen on our webpages ([www.wooltesting.sgs.com](http://www.wooltesting.sgs.com)). A good place to start is with the Infobulletins, which cover a wide range of topics in 1 to 2 pages, including mean fibre diameter measurement, quality assurance, accuracy and precision, etc.:

<https://www.sgs.co.nz/-/media/local/new-zealand/documents/technical-documents/technical-bulletins/wool-testing-info-bulletins/sgs-agri-index-a4en14v4.pdf>

There are also many in-depth technical papers on these subjects:

<https://www.sgs.co.nz/-/media/local/new-zealand/documents/third-party-documents/third-party-technical-and-research-papers/sgs-agri-technical-publication-a4-en-v1.pdf>

\*\*Some indication of the level of performance required in the Interwoollabs trials can be seen in this plot taken from their current report to IWTO. The bars cover the range of individual lab deviations from the trial mean for each sample for the ~40 labs participating in this trial:

