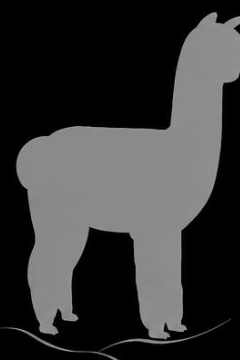


GENETIC FOCUS FIBRE TESTING



PRECISION
FIBRE
ANALYSIS



Art of
Fibre
FIBRE ANALYSIS
LABORATORIES

PARTNERING TO BRING YOU

GENETIC FOCUS FIBRE TESTING

 FOCUS ON WHAT MATTERS Isolating the genetically influenced 'across fibre' variation.	 MORE ACCURATE RESULTS Removing the environmental 'along fibre' variation.	 IMPROVE BREEDING OUTCOMES Better data. Better decisions. Better fleece.	 POWERED BY EXPERTISE Advanced OFDA technology and specialist know-how.
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Precision Fibre Analysis and Art of Fibre – working together to deliver the most meaningful fibre data for your breeding program.

Most breeders of fibre animals would be aware of the influence that fibre diameter has on the eventual end-product created from their fleeces.

However, too often when we look at fibre diameter, we talk in terms of the average midside micron diameter. BUT.... the average diameter is only part of the equation. The other half is the range in diameter - that is, how much difference there is between the finest fibres and the coarsest fibres.

WHY FIBRE VARIATION MATTERS

The same average diameter can hide very different fleeces

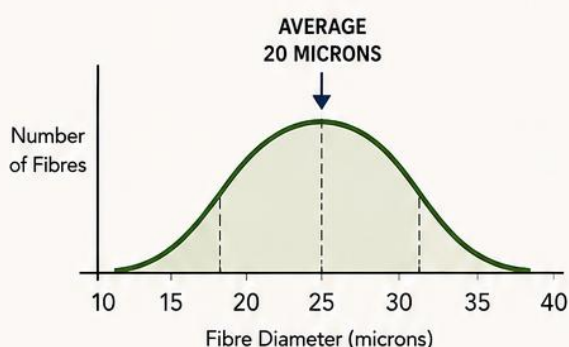


To make the point, let's imagine two fleeces both with midside tests showing an average diameter of 20 microns.



FLEECE 1 – LOW VARIATION

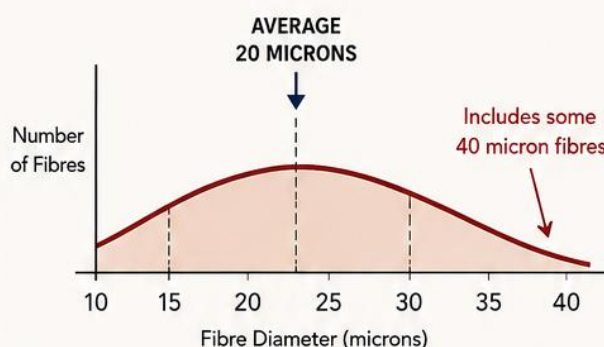
Fibres from 15 microns to 30 microns



Suitable for 'next to skin' wear (such as base layers, shirts, socks)

FLEECE 2 – HIGH VARIATION

Fibres from 10 microns to 40 microns



Relegated to average outer-wear (such as jumpers) due to the small number of coarse (40 micron) fibres



The issue here is that the first fleece will be suitable for 'next to skin' wear, while the small number of 40 micron fibres in the second fleece will relegate it to average outer-wear such as jumpers.

Hence, we have two fleeces with the same average diameter, but suitable for two different markets due to the difference in the range of diameter.



The range in diameter not only has an impact on processing/spinning performance and end-product, but it also has an impact on breeding outcomes in that the higher the variation in fibre diameter of a breeding animal, the lower the predictability of the fleece quality of the progeny.

IMPACT ON PROCESSING & END-PRODUCT



High variation fleeces are harder to process and spin efficiently.



Leads to more yarn faults, inconsistent yarn quality and lower yield.



Results in inferior end-product performance and appearance.

IMPACT ON BREEDING OUTCOMES



The range in diameter has an impact on breeding outcomes in that the higher the variation in fibre diameter of a breeding animal, the lower the predictability of the fleece quality of the progeny.



Lower variation = Better quality, better performance, better predictability.
Focus on consistency, not just the average.

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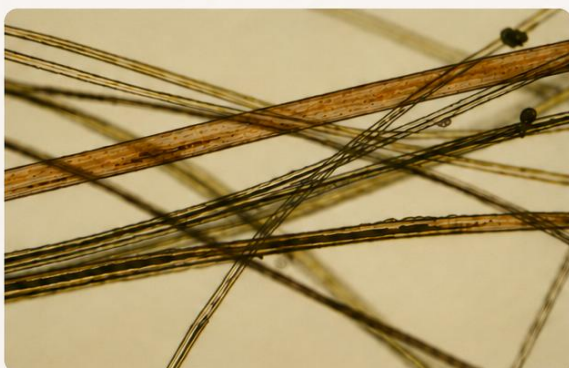
When we describe the range in diameter of fibres, we refer to its 'standard deviation of fibre diameter' or SD for short.

HOW FIBRE SAMPLES ARE MEASURED

When we measure fibre samples, the testing device, the **OFDA2000**, takes a series of **measurements across the sample** at every **5 millimetre** interval.

MEASURING ACROSS THE SAMPLE

Every 5 mm



The OFDA2000 measures at **every 5 mm** interval, across the fibre sample.

WHAT THIS MEANS



Normally, this results in about
2000 – 3000
measurements
across the entire sample.



AVERAGE DIAMETER
is calculated from all
measurements.



STANDARD DEVIATION (SD)
is calculated from all
measurements.



This large number of measurements
provides a **highly accurate and reliable**
picture of the fibre sample.



Measuring across the sample at every 5 mm interval gives us thousands of data points, ensuring accurate calculation of the **average diameter** and **SD**.

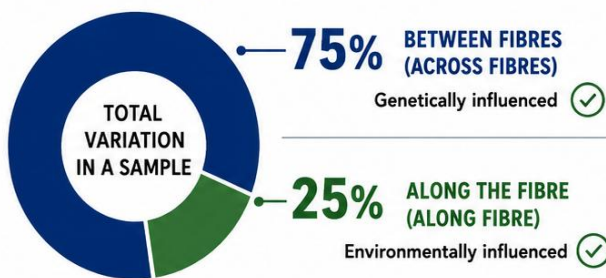
GENETIC FOCUS FIBRE TESTING

In saying that, measuring for SD of animal fleeces has its limitations.

UNDERSTANDING VARIATION IN FIBRE TESTS

WHERE VARIATION COMES FROM

Most variation in a fibre test is normally the variation in diameter between fibres. This generally accounts for about **three quarters** of the variation in a sample.



TWO FORMS OF VARIATION

1 ALONG FIBRE VARIATION (Environment)



- Variation in diameter along the length of the same fibre
- Caused by factors external to genetics (e.g. season, feed, health)

2 BETWEEN FIBRES VARIATION (Genetics)



- Variation in diameter between different fibres
- Influenced by the animal's genetics

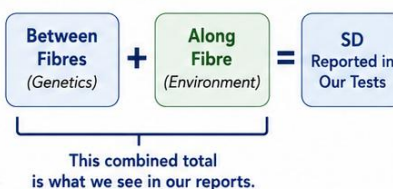
WHAT THIS MEANS FOR OUR REPORTS AND BREEDING



The range in diameter or SD reported in our tests reflects the **overall variation in the sample** – both between fibres (genetic) and along the fibres (environmental).



Since the along-fibre variation is caused by environmental factors, it adds “**excess baggage**” that can mask the true genetic potential of an animal.



A high SD might be due to highly varied diameter along the fibres (*environmental*) – and could well **disguise a superior breeding animal**.



Focus on reducing variation **between fibres** – the **genetically influenced** part – to achieve more predictable fleece quality and better breeding outcomes.



Which leads us to.....

GENETIC FOCUS FIBRE TESTING

THE EVOLUTION OF 'ACROSS FIBRE' VARIATION TESTING

From outdated methods to modern, genetic focus testing.

1 THE OLD WAY: 'BUTT TEST'

In the past, attempts to isolate the genetically influenced 'across fibre' variation from the environmentally influenced 'along fibre' variation used the unfortunately termed, 'butt test' whereby only a **5 millimetre snippet** from the sample was tested.



THE PROBLEM

This only tested a tiny part of the sample and did not effectively provide the full range of data.

2 MODERN ADVANCES: OFDA TECHNOLOGY

Modern advances in the OFDA technology now enable us to report on 'across fibre' variation without the baggage of the 'along fibre' variation.

The OFDA device does this by:



Collecting the SD at each measurement interval across and along the sample.



Calculating an average of all the 'across sample' SD measurements.



Giving an overall 'SD Across' figure for the sample.



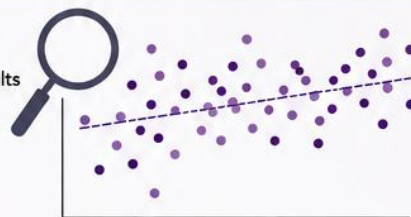
The figure is not affected by 'along fibre' variation.

3 EARLY RESULTS: NOT PERFECT

This seemed to be perfect news, however, when looking at a number of 'SD Across' figures for a range of samples, we found the results did not produce a satisfactory degree of repeatability (precision).

THE CHALLENGE:

Good potential, but results lacked the repeatability (precision) needed.



4 OUR RESPONSE: IMPROVING REPEATABILITY

Given the potential that 'across fibre' measurement technology offered to genetic improvement towards fleece quality, we decided to carry out trials aimed at improving the repeatability of the test to acceptable levels.

These trials focused on:



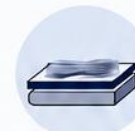
Perfecting methods to improve fibre alignment during testing.



Increasing the number of fibres being measured.



Developing a specially devised method for preparing fibre samples before testing.



Creating a revised amount of sample placed on the testing platform.



A METHOD DELIVERING HIGHER REPEATABILITY AND PRECISION

5 THE SOLUTION: SD ACROSS TESTING WITH BENCHMARKING



We are now in a position to offer the 'Across fibre SD' testing using the devised method of sample preparation.



Because 'Across SD' figures mean little to breeders until a high degree of familiarity develops...



Art of Fibre will collate SD Across measurements to provide customers with a guide as to the relative ranking of their results.



This provides meaningful context through our SD Across benchmark database.

6 THE OFFER: GENETIC FOCUS FIBRE TESTING PACKAGE

This package we are calling '**Genetic Focus Fibre Testing**', and will be provided as an adjunct to our normal testing service.



The extra labour costs will be recouped through a nominal fee charged for each such test.



The fee includes analysis and research findings derived from the SD Across benchmark database.



Giving breeders the best possible tool to focus on genetically influenced variation and improve fleece quality.



GENETIC FOCUS FIBRE TESTING – FOCUS ON WHAT MATTERS. IMPROVE WHAT'S HERITABLE.

Better data. Better decisions. Better fleece.