SD AND CVD -

MEASURES OF MICRON VARIATION

What is SD?

SD stands for **S**tandard **D**eviation.

Standard deviation is a statistic which measures the degree of variation of fibre fineness above and below the average fibre diameter. The higher the SD, the more variable is the fleece sample. The concept of SD assumes that the Fibre Diameter Distribution is normal (i.e. bell shaped). Therefore:

- Sixty-eight% of fibres fall within one SD either side of the average; and
- Ninety-five% of fibres fall within two SD's either side of the average.

Example:	**Mean Fibre Diameter is 20.0 microns** **Standard Deviation is 4.0 micron**
	68% of all fibres measured are between 16 and 24 microns
	95% of all fibres measured are between 12 and 28 microns
	Remember, these are individual fibre measurements and wool fibres can easily vary between 8 and 80 microns!

What is CVD?

CVD stands for the Coefficient of Variation of fibre Diameter.

It is a measure of the variation in fibre diameter within a fleece sample, relative to the average (or mean) fibre diameter. The higher the CVD, the more variable is the fleece sample (for the same average fibre diameter).

It is calculated using the average fibre diameter and the standard deviation and is expressed as a percentage:

CVD = (standard deviation ÷ average fibre diameter) x 100

Example:	**Mean Fibre Diameter is 20.0 microns** **Standard Deviation is 4.0 micron**	
	CVD = (4.0 ÷ 20.0) x 100 **= 20.0%**	
Therefore:	**18.0 micron wool with SD of 3.6, and**	
	22.0 micron wool with SD of 4.4	**both have a CVD of 20.0%**

Why are SD and CVD important?

Both SD and CVD provide valuable information on the variability of fibre diameter of fleeces. They are different ways of looking at the same thing.

Although the average fibre diameter is the major price determinant for wool, the degree of fibre diameter variation in fleeces can also have an effect on wool processing. In particular, wools with higher average fibre diameters and lower CVD's have been found to produce yarns with properties similar to wools with lower average fibre diameters and higher CVD's:

Example:	**A wool with an average diameter of 21.0 micron and a CVD of 20% has been found to produce yarns with properties similar to 20.0 micron wool with a CVD of 25%**

This is the so called "5% rule" - a change of 5% is equivalent to a 1 micron change in average diameter.

For the wool producer, reducing the CVD by itself is not easy. The SD can be reduced simply by reducing the average fibre diameter of the flock (as SD decreases with average micron). It should also be remembered that the SD and CVD of sale lots will be higher than individual fleece results, simply because sale lots are combinations of many fleeces together (increasing variation).

Example:	**It is common for 19 micron fleece samples to have CVD's of 19%. Corresponding sale lots of 19 microns generally have CVD's of around 21%. Indeed, the average CVD of all Australian farm lots is very close to 21%, irrespective of the Mean Fibre Diameter.**

CVD has one other valuable use for the wool producer. Research has shown that CVD is well correlated genetically with wool strength, so the CVD may be able to be used to improve wool strength within a flock.

FURTHER INFORMATION

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