

SGS Wool Testing Services

Info-bulletin

Typical CvD and Comfort Factors for NZ merino wool

Introduction

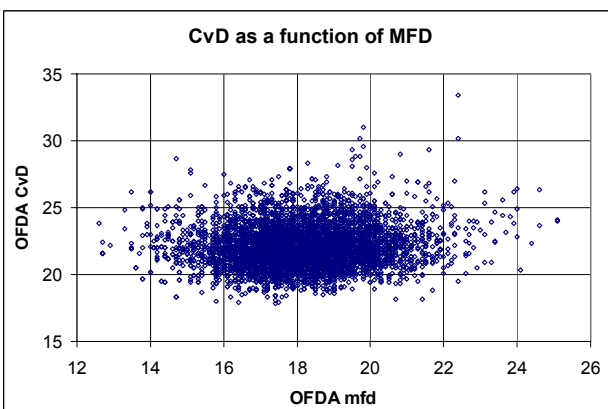
Wool traders sometimes encounter specifications that include limits on fibre diameter variability. This may take several forms, but commonly either the coefficient of variation of fibre diameter (CvD), or Comfort Factor (CF) are the parameters of interest.

Coefficient of variation of diameter (CvD)

CvD is an indication of total fibre diameter variability in a sample. Worsteds mills generally prefer lower CvD values because they usually produce more even yarns. Low CvD values are also associated with higher staple strength.

Whilst the sample diameter standard deviation (SD) measures the actual variability about the mean diameter in microns, this value generally increases as the MFD increases, and it is therefore difficult to get a 'feel' for. CvD normalises this by dividing SD by mean fibre diameter (MFD) and expressing the result as a percentage. The CvD is reasonably similar for typical MFD values obtained on merino wool.

The plot below shows the results of almost 6000 CvD measurements undertaken on NZ merino wool in the 2002-03 season.



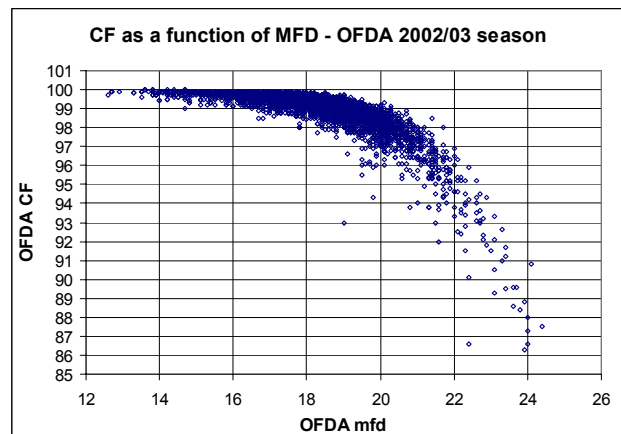
It can readily be seen that most NZ merino farm lots will have CvD values of between 20% and 25%, irrespective of the MFD. It also shows that most NZ merino wool falls between 16 and 21 μm in diameter. Whilst this plot relates to OFDA measurements, similar values are obtained using Laserscan.

Comfort Factor (CF)

Comfort factor is the proportion of fibres in the diameter distribution that are less than 30 μm . This figure was chosen because it has been shown that when the individual fibre

diameter exceeds 30 μm , this is when the skin "prickle" sensation begins to be felt. Until recently the term "prickle factor" (PF) was often used - this is simply the percentage of fibres above 30 μm , so that $\text{PF} = 100 - \text{CF}$.

Comfort factor is related to MFD and SD (or CvD) in a relatively complex manner, but in essence, as the mean fibre diameter increases, the CF decreases, and at a fixed MFD, an increase in SD or CvD also decreases the CF value.



The plot above shows the range of CF values encountered in the 2002-03 season on NZ merino wool.

It can be seen that the range of probable CF values increases as the diameter increases. In the ultrafine range, most of the values exceed 99%. For the superfines, the values range from 98% to 100%. Above 20 μm it is most improbable that lots will be encountered with CF values exceeding 99%, and the CF values fall off quite steeply thereafter.

Fibre ends fineness index (FEFI)

FEFI is the subject of a recent IWTO draft test method (DTM-60). Depending on the original raw wool fibre diameter-length profile (see Info-bulletin 1.5), the ends of fibres in tops could have a higher or lower fibre diameter than the mean fibre diameter. Tops with fibre ends lower in diameter than the MFD should have a higher actual comfort factor than normal diameter distribution measurements would suggest. Whilst the handle or drape of these fabrics might be no different to others with the same MFD, the next-to-skin comfort could be significantly enhanced. Experimental tops have been manufactured with fibre ends up to 2 μm finer than the MFD.

The FEFI measurement is undertaken on tops by aligning the fibre ends and measuring the fibre diameter of just the ends. FEFI is an index relating the measured fibre ends diameter to the fibre ends diameter that would normally be expected. FEFI values are generally within the range -1 to +1. FEFI can be measured automatically on the new OFDA4000 instrument, currently being trialed by an IWTO working group.

Currently there is no recommended method for predicting FEFI from raw wool data. However, the OFDA2000, which measures diameter and length characteristics on greasy staples, now includes an FEFI prediction algorithm which may be used for guidance on an individual animal basis.