

Wool Testing Services Info-bulletin

Fibre length

Introduction

Several instruments are available for measuring and expressing the length of wool fibres. IWTO lists 5 methods that may give rise to different results, depending on the method of sample preparation (and how much tension is applied to the individual fibres during preparation and measurement). Only 2 are now full test methods:

- IWTO DTM 1 Comb sorter (combed sliver)
- IWTO DTM 16 WIRA Fibre diagram machine (ditto)
- IWTO-17 Almeter (ditto)
- IWTO-30 Staple length and strength (greasy wool)
- IWTO DTM 5 Single fibre length (yarns & fabrics only)

Additionally New Zealand scoured wool is certified with the LAC test method (NZS 8719), which utilises IWTO-17.

It is therefore vital that the test method be specified for any length measurement required or specified. This bulletin will focus on length results in general, and specifically those obtained using IWTO-17, IWTO-30, and NZS 8719, since these are the only methods that can be certified for trade. Bulletins 1.1 and 1.2 cover L & S and LAC.

Hauteur and Barbe

Combed wool is usually measured for mean fibre length in terms of Hauteur. Semi-worsted and carding wools are often measured in terms of Barbe.

Hauteur (H) is the mean length biased by cross-section (linear density) of the fibres.

Barbe (B) is the mean length biased by fibre weight.

Hauteur and Barbe are both measured in millimetres and are mathematically related:

$$B = H (1 + (CvH/100)^2)$$

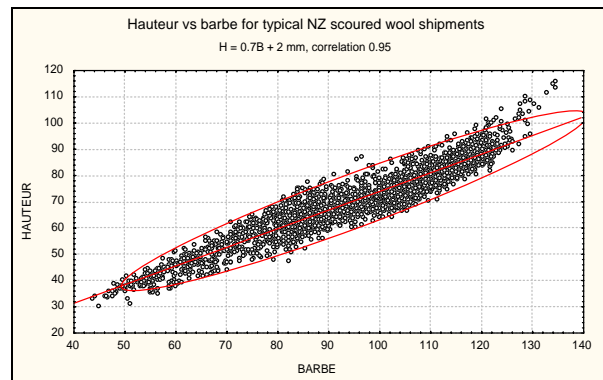
Where CvH is the coefficient of variation of Hauteur in %

Barbe was chosen for the length measurement in the LAC method because it allows simplified calculations when blending lots. The LAC method is calibrated for Barbe measurement only, and the additional information concerning Hauteur is therefore not certifiable.

The upper plot shown opposite indicates a relationship between H and B for approximately 2000 consignments of NZ scoured wool measured for LAC.

Length variability

Both Hauteur and Barbe have their own measures of variability in CvH and CvB, since the respective distributions of length are different. CvH may be predicted from staple length and strength determined by IWTO-30, using the TEAM equation or some proprietary software (e.g. Sirolan TopSpec).



Yarn strength and evenness can be affected by the proportions of long and short fibre in the sliver. This information is most reliably taken directly from the fibre length distribution data, or very indirectly indicated by the coefficient of variation of length. CvH figures measured on commercial tops on average tend to range from 30% to 60% with an overall mean of about 50%. CvH figures measured on NZ scoured wool consignments tend to be higher (partly because the wool has not been combed) and range from 40 to 80%, with an overall average of 60%. However, recent research suggests that CvH and CvB are poor indicators of spinning performance.

Greasy staple length and scoured Barbe

During the development of the LAC test method the NZ Wool Board carried out monitoring of the relationship between assessed greasy staple length and measured Barbe of the scoured product. This work showed a high degree of consistency between the two for pre-lamb shorn fleece and autumn second shear, although it was less consistent in post-lamb shorn categories, especially when any degree of tenderness was noted.

Nevertheless, some general guidelines evolved which have stood the test of time, and these are summarized in the following plot:

