

Length After Carding

Background

During the 1980's and the early 1990's the New Zealand Wool Board funded research into objective measurement and certification of the important properties of scoured wool. Length is clearly one of the most important processing parameters. A test was required to overcome the difficulties in estimating average carded length from subjective greasy staple length assessments.

One of the outcomes was the development by WRONZ of the Length After Carding (LAC) test. After international round trials, the test became a full New Zealand Standard in 1992 (NZS 8719). It became available commercially in 1993. The method is being converted into a joint AS/NZS standard with a view towards progressing to an IWTO method.

Sampling

As with all test methods, the results are only as representative as the sampling allows. Samples have to be taken uniformly throughout a scourment, and to achieve this a special sampling spear was developed that can be operated either on conventional bales or in the pre-compression box of a high density press.

If the test is required for certification, the samples must be drawn using the specified mechanical equipment. Tests used only for information may, however, be based on uniform manual sampling throughout the scourment. In the former case, since it may be impossible to resample the consignment once it has been pressed or dumped, three samples are taken at the scour, to provide spares for independent re-testing in the event of a dispute.

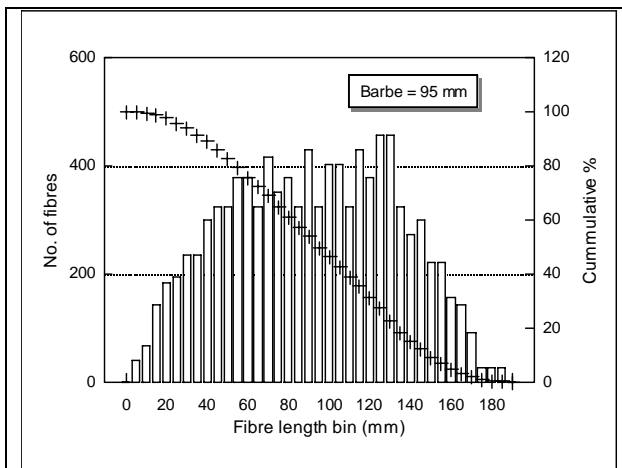
Since all the sample is processed in the test, there is both a minimum (500g) and a maximum (1000g) size for each of the three samples, and therefore care has to be taken in selecting the grab frequency for each consignment.

Test method

The test method is designed to simulate semi-worsted carding under standardized conditions. The sample is conditioned and lubricated at a pre-set application rate, before being fed to a calibrated card. SGS use a Memmingham sample card with a 1 m swift. The carding opens and disentangles the fibres, and in the process introduces a degree of breakage which is of a similar order to that encountered on a commercial card.

The carded web is gilled 3 times in a Mackie gillbox before hank specimens are prepared. The hanks are further conditioned before being prepared in a Fibroliner for measurement on an Almeter.

The Fibroliner mechanically aligns individual fibres using a needle bed, and assembles a representative sample with all the leading ends aligned. The Almeter then measures the prepared "beard" of fibres using a capacitance system to give the distribution of fibre lengths in the specimen. Checks are



Fibre length distribution histogram

carried out to ensure that the result averaged from the appropriate number of specimen hanks is of the required precision.

The test line has been calibrated against the reference line at WRONZ. Calibration differences between the 2 lines have been consistently less than ± 2 mm. The precision of the test is better than ± 4 mm for Barbe values of 80 mm or less, and ± 6 mm for Barbe values above 80 mm.

Use of the results

The test was originally designed to provide certifiable length measurements on scoured wool for trading purposes. The National Council of NZ Wool Interests has published Regulations to cover sampling, testing, and checktests and retests. The original aim has been accomplished admirably, and LAC is now specified by an increasing number of mills.

Apart from the use of mean Barbe (the weight-biased mean length) in certification, the LAC test also produces much useful additional data.

The measurement process gives the full distribution of fibre lengths in the sample. However, because of the limitations of the calibration mechanism, it is not possible to certify all the additional information. This information is, however, no less valuable to a mill. With knowledge of the fibre length distribution, mills are able to accurately characterize the wools which run best on their equipment.

Additional measurements are also possible to give a standardized card waste value, which allows mills to estimate card yields for their process.

The test method has now been extended to cover greasy wool lots. Crossbred wools, particularly tippy wools, cannot be measured reliably by the greasy staple length method. Using a calibrated scouring system, conventional grab samples can be converted to scoured form, and then measured on the LAC line. This gLAC test, whilst not yet published as a test method, is in increasing demand and shows much promise as a system for accurately predicting the carding length of greasy lines.