FACT SHEET

SCOURED & CARBONISED WOOL

Service Summary

AWTA Ltd is able to perform the certified testing of scoured and carbonised wool for Wool Base, Vegetable Matter Base and Mean Fibre Diameter. A further, separate test method or Condition Test is used to determine the oven dry mass and calculated invoice weight of a batch of scoured or carbonised wool.

The purpose of a Condition Test is to determine the average moisture content, or regain, of batches of scoured or carbonised wool. An IWTO Conditioning Certificate is issued that certifies the invoice mass that the batch of wool would have if its average regain were of a specified standard value.

Background

Scouring is the process of preparing and washing a batch raw sheep's wool to remove impurities such as grease, dirt and suint. The first stage involves the preparation of the raw wool by emptying bales into machines called openers that are designed to loosen the compressed mass of wool. The loose wool is then blended to ensure that a consistent product is obtained. The blended wool then passes through a series of bowls, usually six, that contain hot water and detergent. The temperature of the water and the concentration of detergent in the bowls decreases progressively. The wool is floated through the bowls, assisted by the gentle mechanical action of a series of rakes. As the wool moves from one bowl to the next it passes through squeeze rollers that flush water and impurities from the wool. Once the wool has left the final bowl it passes through a dryer before the clean, scoured wool is pressed into bales ready for shipment and further processing.

The carbonizing process is a similar but more involved method of preparing and washing raw sheep's wool than the scouring process. It is used for wool that has high levels of vegetable matter or grass seed content that would otherwise be difficult to remove mechanically. Raw wool is scoured first and then passed through additional bowls containing dilute sulphuric acid before being dried in baking ovens where the vegetable matter becomes brittle. The wool is then passed through rollers that crush the brittle vegetable matter, turning it to dust which can then be removed by beating. The wool then continues through a further series of bowls that neutralize the acid and rinse the wool before it is dried and packed in the same way as scoured wool.

Sampling of Scoured and Carbonised Wool

A representative global sample is obtained by taking one or more core samples from every bale in a batch of scoured or carbonised wool. The sample is immediately placed inside two sealed plastic bags to ensure no change in moisture content occurs prior to testing. A security seal is placed on the sample before the sample is dispatched to the nearest AWTA laboratory for testing.

The total net mass of the wool in a batch is accurately determined by weighing each individual bale at the time of sampling on a suitable set of calibrated and endorsed scales.

The independent sampling and weighing of bales is conducted or supervised by Sampling Officers who are employees of AWTA Ltd.

Testing of Scoured and Carbonised Wool

Conditioning Test

A Conditioning Test reports the Regain, Moisture Content, Oven Dry Weight and Invoice Weight of scoured and carbonised wool.

The global sample, or subsamples of the global sample, is completely dried in a specially designed drier and its oven-dry mass is determined by weighing on a suitable balance. The difference between the oven-dry mass and the initial mass of the sample is the mass of moisture which the sample contained at the time of core or hand sampling. This mass of moisture, expressed as a percentage of

the sample's oven-dry mass, represents the average regain of the entire lot of wool at the time of sampling and weighing of the bales.

A simple calculation determines what the nett mass of the entire lot would be if its regain was some specified standard value (e.g. 17%) and this is called the Calculated Invoice Mass of the lot.

Yield & Micron Test

A Yield & Micron test is often conducted in conjunction with a Conditioning Test. A Conditioning Certificate doesn't quantify the contents of a batch as accurately as a Yield Certificate because it measures only the moisture content whereas the absolute clean dry fibre (Wool Base) and Vegetable Matter Base are measured when a yield test is conducted.

To determine the Wool Base the amounts of three residual components that remain in the scoured or carbonised wool must be determined and subtracted. These are:

1. Residual Wool Grease - A small amount of grease is left in the wool after scouring. The amount is determined by washing the grease from a sub-sample using hot alcohol. The alcohol is collected in a flask and after distillation the solid grease left behind is dried and weighed.
2. Residual Ash - As with grease, almost all the dirt is removed by the scouring process but a small amount remains. This residual dirt or mineral content is determined by packing a sub-sample in a crucible and burning the sample in an oven at $800^{O}C$ for 2-3 hours. All the organic matter is burned off, leaving only the mineral content in the ash which is then weighed.
3. Vegetable Matter Base - A sub-sample of the scoured wool is dissolved in a 10% solution of hot caustic soda, leaving the Vegetable Matter (VM) behind to be dried and then weighed. The VM sample is then dissected into three categories, namely:
    - Burrs (B)
    - Seed and Shive (S)
    - Hard Heads and Twigs (H)

Having accounted for all the residual components in the original scoured wool, the amount of clean, dry fibre or Wool Base (WB) can now be calculated. The WB is calculated by expressing the weight of wool with the impurities removed as a percentage of the original scoured wool weight.

The mean fibre diameter is measured using the Lasercan instrument; results are reported as micrometers (microns). A conditioned sample is mini-cored to produce a sub-sample consisting of snippets of fibre. The snippets are dropped into a bowl containing water and mixed before the water containing the suspended snippets is released and flows in tubing through a measurement cell containing an array of lasers. As the snippets move through the laser beams in the measurement cell the size of the shadow cast by the individual fibres is recorded.

For a standard test samples are measured on four separate Laserscan instruments and 1,000 individual fibres are measured on each machine. The combined results from all four instruments, 4,000 snippets in total, is then used to calculate the Mean Fibre Diameter result. Because measurements are made on individual fibres, a distribution of the diameters in the sample can be accumulated and from this, the Coefficient of Variation of Diameter (CVD) can be calculated. In addition, the certificate will show the Fibre Curvature of the fibres in the sample and the Comfort Factor of the sample. Mean Fibre Diameter can also be measured on air-flow apparatus by request. This test does not provide CVD, Fibre Curvature or Comfort Factor results.

Documents available for download:

LASERSCAN - A Quick Tour.pdf

Fibre Curvature - What's All The Fuss About.pdf

SD and CVD - Measures of Micron Variation.pdf

CONTACT US

For more information on this service contact **AWTA Raw Wool** on:

Melbourne Laboratory:	+61 3 9371 2100	or	lab.mel@awta.com.au
Fremantle Laboratory:	+61 8 9418 5333	or	lab.fre@awta.com.au