



SCOURED WOOL TESTS

Background

Most New Zealand wool is exported as scoured wool. Originally, scoured wool testing consisted of a Condition test only so that the moisture content could be established and this was used to calculate the certified commercial mass. The Comprehensive Scoured Wool Package (CSWP) was first introduced to the wool industry by NZWTA in 1987 and was regarded as a significant step towards full objective description of scoured wool.

The Comprehensive Scoured Wool Package consists of:

- A condition test (IWTO-33);
- A yield test (IWTO-19, including Ethyl Alcohol- extractable matter percent, Ash percent and Vegetable Matter Base);
- A Residual Grease test using Dichloromethane as the solvent.
- A Mean Fibre Diameter by Airflow (IWTO-28) (see NZWTA Airflow fact file)
- A Colour test (IWTO-56) (see NZWTA Colour fact file)

All results are displayed on one certificate.

This package of tests provides a wide scope of information for the wool buyer about the product they are receiving. It also enables savings to be made on the total cost of the tests and reduces the previously large number of individual Certificates required for a single sale transaction. The major test components appearing on the Certificate are described below

Condition Test (IWTO-33)

Wool is a very hygroscopic fibre picking up and losing moisture as the atmospheric conditions change. At 65% relative humidity, wool will hold 14-15% of its own weight in moisture. It will absorb more than 30% moisture before it begins to feel wet. This large variation in moisture can cause similarly large variations in the weight of a consignment.

For many years' consignment weights have been corrected to take account of these variations. Usually an invoice weight is expressed at an agreed standard regain, most commonly 16% or 17%. Two separate operations are involved in establishing the actual moisture level in a consignment.

The first, SAMPLING, is covered by the IWTO Condition Testing Regulations for Scoured and Carbonised Wool. This sets out precisely who is allowed to conduct the sampling, the methods and procedures to be used, and the number of samples to be drawn from each bale. Every bale in a consignment must be sampled and each bale must have the same number of samples taken from it. This is usually carried out by core sampling and provides a minimum sample of 500g.

The second, TESTING, is covered by IWTO-33. The test method is quite specific as to what procedures are to be used in determining the moisture level in the wool. This ensures uniformity between all laboratories performing this test. NZWTA Ltd has three condition testing laboratories in New Zealand and trials are conducted between these laboratories to maintain the quality and integrity of the results produced.



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The method requires that the whole sample be tested. The sample is weighed on receipt at the laboratory and split into at least two accurately weighed sub-samples. These sub-samples are dried in a suitable oven at 105+ 2° C. Thereafter the sub samples are reweighed after further drying at intervals at no less than five minutes until their weight is constant. This indicates that the sub-samples are completely dry. After taking into account the relative humidity of the air used to dry the sub-samples, the differences between the original sample weight and the combined dry weight is used to determine the amount of moisture present in the sample. This can be expressed in two different ways which sometimes cause confusion.

The purpose of the condition test is to establish the true weight of the consignment at a specified moisture regain. This is equitable to both the buyer and seller.

- a) Moisture Content This is an expression of moisture as a percentage of the original sample weight. For example, if the sample weight equals 4632.60g and the combined dry sub-samples weights equals 4015.52g then:

$$\begin{aligned}\text{Moisture Content} &= \frac{(\text{Original Weight} - \text{Oven Dry weight}) \times 100}{\text{Original Weight}} \\ &= \frac{(4632.60 - 4015.52) \times 100}{4632.60} \\ &= 13.32\%\end{aligned}$$

- b) Regain This indicates the amount of moisture that the oven dry wool has regained at the time of testing. Using the same example values for moisture content as above, then:

$$\begin{aligned}\text{Regain} &= \frac{(\text{Original Weight} - \text{Oven Dry weight}) \times 100}{\text{Oven Dry Weight}} \\ &= \frac{(4632.60 - 4015.52) \times 100}{4015.52} \\ &= 15.37\%\end{aligned}$$

To establish the corrected weight of wool in consignment from the tested results, the oven dry percentage (OD%) is calculated.

$$\begin{aligned}\text{OD\%} &= \frac{4015.52 \times 100}{4632.60} \\ &= 86.68\%\end{aligned}$$

The agreed standard regain (R) is then incorporated.

$$\begin{aligned}\text{Standard Regain} &= \frac{\text{OD\%} \times (100 + R)}{100} \\ &= 100.55\% \text{ (when R \% = 16)}\end{aligned}$$



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As this result is greater than 100%, it represents a calculated gain due to the wool containing moisture less than 16%, i.e. 15.37% as calculated above.

Finally, this percentage (100.55%) is applied to the nett weight of the consignment tested and the corrected weight will be invoiced to the seller and paid by the buyer.

In the example this would be:

$$\begin{aligned}\text{Corrected Weight} &= \frac{100.55 \times 32732\text{kg (Nett Weight)}}{100} \\ &= 32912\text{kg}\end{aligned}$$

In order to achieve a contract weight the shipper may need to combine two or more condition tests. This is permitted using an additional procedure outlined in IWTO-33 and produces a Combined Condition Test Certificate. Simply put, the conditioned weights of each component are added together then expressed as a percentage of the total nett weight of the consignment. Conversely, there may be a need to withdraw some bales in a consignment to comply with a maximum weight limit. IWTO-33 allows for Combined Certificates by Subtraction. The weight of wool removed must not exceed 5% of the nett weight of the original Certificate. The bales removed must be re-sampled and tested separately and their condition weight deducted from their conditioned weight of the original consignment.

The condition test provides information of the amount of moisture present in consignment. Other tests conducted in the Comprehensive Scoured Wool Package provide valuable additional information.

YIELD TEST

The yield test is performed as described in the YIELD FACT SHEET. The major difference between testing greasy and scoured wool for yield is that the scoured wool is not re-scoured. This enables additional information such as alcohol extractable matter and Ash Content to be shown on the certificate.

Most importantly, a VEGETABLE MATTER BASE result is produced which is therefore available to the buyer, as are the Calculated Commercial Yields and Weights.

It should be noted that a discrepancy usually exists between the IWTO Scoured Wool at 16% or 17% regain calculated from the yield data and the conditioned weight at 16% or 17% calculated from the condition test. This is primarily due to that fact that the condition test only measures the moisture levels in the wool. Also, the actual residuals in the scoured wool (ash and fatty matter) may differ from the standard residuals agreed to by IWTO which are used in Commercial Yield Calculations.

In real terms, this means that inferior wools or wools not cleanly scoured show a lower clean weight in the yield test as compared to the conditioned weight calculated from the conditioned test. However, the converse is true that superior wools or well scoured wools will show a higher clean weight in the yield test.



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RESIDUAL GREASE

It is important for wool processors to know the amount of oils and fat present in the raw scoured product they purchase. These are derived mainly from the wool grease occurring naturally in raw wool, detergent picked up during the washing and scouring process and other oils or agents added.

Traditionally, the levels of residual grease are determined by extracting the grease using Dichloromethane solvent. The use of Dichloromethane must be strictly controlled as it is a hazardous chemical and requires care to avoid contamination prior to testing.

For further information, please contact **NZWTA** on **+64 6 835 1086** or email: testing@nzwta.co.nz