

SGS Wool Testing Services

Info-bulletin

Residual Grease on Scoured Wool

What is Residual Grease?

Residual grease (RG) is the fatty matter or grease left on the fibres after scouring. Refined recovered grease becomes lanolin. The amount of RG will depend on the wool type, the season, and the scour performance. The variation in RG level throughout a scourment will depend on the scour's level of quality control.

What effect does it have?

High RG levels are usually undesirable because they cause major problems in carding. Highly variable RG levels, like excessive variation in any other parameter, are highly undesirable since they can make processing a nightmare. Many contracts quote a maximum RG level, some define an acceptable range, but few state the test method to be used.

What is the reference test method?

Within the IWTO trading environment, the standard test is IWTO-10. This method was originally designed for tops, sliver, and processed products. It requires the use of dichloromethane (DCM) in a very carefully controlled extraction process lasting 4 hours. It is carried out on conditioned wool when in sliver form. Whilst the method is inconvenient for routine testing, it is the standardised method used in Europe and many other parts of the world.

Traditional QC test methods

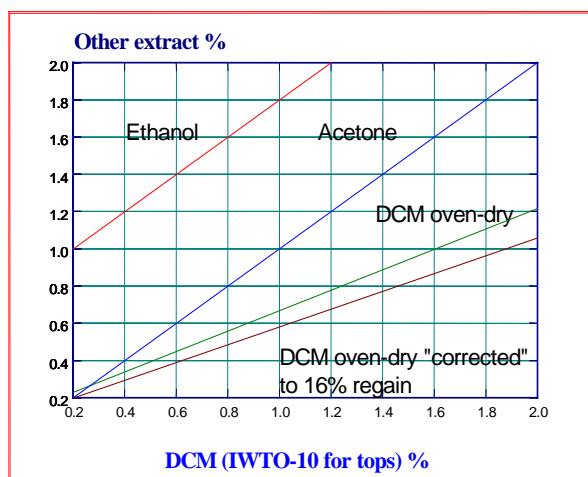
In mill quality control environments, a number of rapid tests have been used for many years, and some of these were utilised by the New Zealand scouring industry. Examples include the WIRA rapid grease test, the Soxtec test, and the WRONZ rapid grease test. All are suitable for QC work, but may give significantly different results to the IWTO-10 method.

Southern Hemisphere test methods

Within New Zealand, Australia and South Africa, the commercial test houses used their own in-house methods for reporting on scoured wool for many years. These were based on the principles in ASTM D1574. The methods differed from the traditional IWTO-10 method in that they are carried out on dry wool (after the condition test), and used reduced extraction times.

The results from the in-house test methods were significantly lower than those produced by IWTO-10, as can be seen in the plot. There is plenty of documented evidence to suggest that the principal reasons for this are the use of dry rather than conditioned specimens, and the reduced extraction time.

IWTO has now accepted a standardised version of this method for inclusion in IWTO-10 specifically for scoured wool. **At this stage, however, it means that there are still 2 different methods giving different answers, albeit now within one standard.**



Extractables comparisons

Alternative solvent extraction methods

Some years ago, New Zealand proposed to IWTO that a method based on ethanol (ethyl alcohol) extraction would be most appropriate for scoured wool, since this is the method used for determining the residual grease in the laboratory woolbase test on greasy wool. A draft test method was agreed but never taken to conclusion.

Subsequently the Europeans started to become concerned at the reported carcinogenic properties of dichloromethane, and commenced a search for an alternative solvent. Ethanol was discounted because it was known to extract material from the core of the wool fibre (which is why ethanol extract results are generally about 0.8% higher than DCM extracts).

The German research institute DWI carried out a number of investigations using different solvents on a scientific basis, with the end result that a method based on extraction using acetone was proposed in 1994. This was not heartily endorsed by the Southern hemisphere laboratories, since, whilst the amount of extract obtained is similar to that from DCM, acetone vapour is explosive, and in many people's view, unsuited to a commercial laboratory environment.

High technology methods

Over a decade ago New Zealand pioneered the use of Near InfraRed Analysis (NIRA) for determining regain and RG in scours. The method is indirect, in that it must be calibrated against a reference method, but once this is done, the technique is reliable and accurate. IWTO has accepted its use for ethanol determinations as part of the IWTO-19 yield test method. Following international round trials, IWTO has now also accepted a draft test method, based on NIRA, for DCM extractables.

New Zealand has also carried out research more recently with a method that utilises very high pressure carbon dioxide as the solvent in an extraction process that is also safe, reliable and accurate. The method has received only lukewarm interest because of the high capital cost of the equipment.