

## COLOUR STABILITY

### PERCEPTIONS OF YELLOW

Perceptions of colour differences vary from person to person. If two scoured wool samples are placed side by side, some people will just be able to discern a difference in brightness (Y) of 2 units, and a difference in yellowness (Y-Z) of 1 unit. Differences of 4 units in brightness and 2.5 units in yellowness would be obvious to most people with normal colour vision.

Compare these figures with the precision of the test method: differences between test results are not considered cause for invalidating a certificate unless they exceed 3.3 units in brightness or 1.4 units in yellowness. These differences would be perceptible only if the two samples were side by side.

Greasy wools are harder to evaluate. They may contain yellow portions that are scourable as well as some that are not. Yellow pieces are not usually evenly distributed across a grab sample, and the eye is frequently misled into thinking that they are yellower and more frequent than in reality. Subjectively, the effects of yellow pieces are often over-estimated. This is well illustrated by some typical checktesting statistics for colour of greasy wool:

This plot shows that requests for checktests are at their lowest when the colour of the wool received into store is at its best (see Info-bulletin 2.1), and they rise quite rapidly as more yellow wools predominate. The lower plot shows a virtually constant error rate by our laboratory, averaging about 6 tests

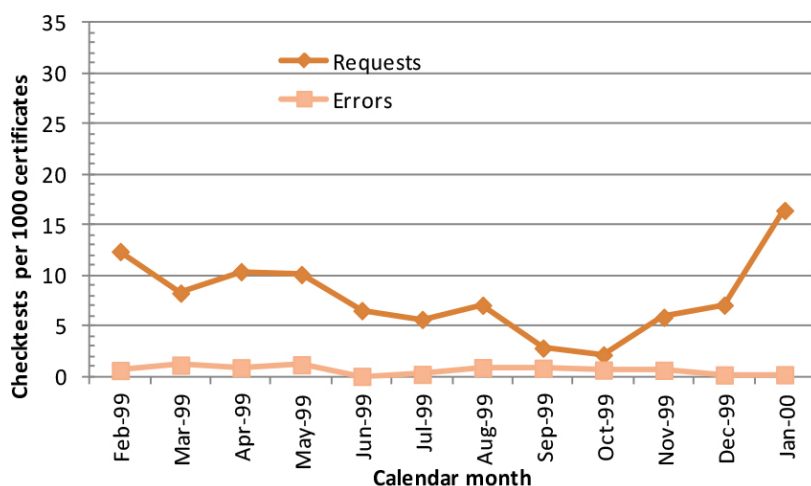
in 10,000 (which should be compared with the statistical expectation of 1 in 20 being outside the quoted test precision). Most of these are due to sample identity mis-match rather than laboratory errors.

The difference between the two lines is an indication of how difficult it is to subjectively judge whether the yellowness in the greasy wool is likely to be scourable, or whether it's significant.

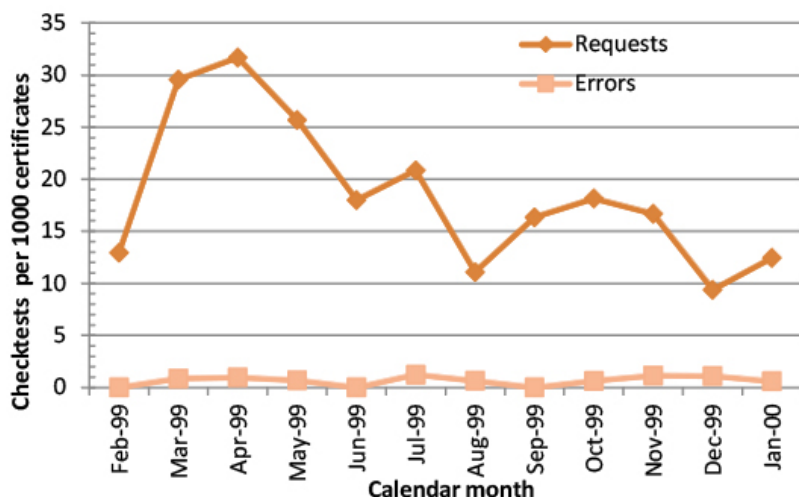
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An additional difficulty for traders is that the colour of wool in the grease may not be stable. The degree of stability depends on a number of factors, and, unfortunately, for some wools, changes may take place within days rather than weeks. The biggest problems occur with crossbred fleeces, rather than merino wools or crossbred 2nd shears or lambs. IWTO Regulations allows colour certificates to be valid for 2 years on greasy or scoured merino wool, but only 6 months for greasy and 12 months for scoured crossbred wool. We have data to show that in some cases these periods may be too long.

Buyers are sometimes aware of which clips might be more susceptible to yellowing, and will discount these. However, in other cases, they get caught with a lot that deteriorates rapidly, and this can be exacerbated if the wool is stored greasy for a long time before scouring.



An indication of the magnitude of the problem can be seen in some checktesting statistics for scoured wool, as shown below.



Here it can be seen that whilst the true error rate remains at the same minimal figure on average as for greasy wool, the gap between perception and reality has widened significantly. The peak in checktest requests coincides with the poorer wools having progressed through lot building and into scouring.

The colour of scoured wool depends on process parameters such as the amount of suint in the wool, the pH and temperature of the liquor, the wool and liquor iron content, the residual grease and dirt levels, the amount of protein contaminant, and the drying temperatures and dwell times.

However, most of the problems we see relating to scoured wool colour can be attributed to:

- Unscourable yellow (canary yellow)
- Uneven distribution of yellow pieces in the samples
- Colour deterioration between greasy sampling and scouring

Some of these problems can be offset by bleaching in the scour. However, this introduces a new range of problems, because bleached colour is also unstable – generally it improves after baling and storage; but then it deteriorates during subsequent processes such as dyeing, yarn re-scouring, decatising and steam setting, sometimes more than for unbleached wool.

### DEVELOPING CONFIDENCE IN COLOUR TESTING

The colour test method is highly repeatable. However, there is often a lack of appreciation of the factors that result in colour deteriorating. This needs to be addressed. There are tests for determining which greasy wools might deteriorate. These tests need standardising before they can be used on a widespread basis, but this requires industry agreement and investment.

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