

# Towards standardised classing in Australia

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There are currently 10 classing facilities in Australia, nine of which are members of the CCAA and agreed to participate in the testing program. In

addition the CSIRO Division of Plant Industry has also agreed to participate in some aspects of the program. Table 1 lists the facilities participating in the program.

## BACKGROUND

There is a consensus both locally and internationally that the measurement of cotton grade (that is, colour and trash), by traditional subjective classing should be replaced with objective instrument measurements. All instrument measurements currently utilised by the Australian cotton industry are from High Volume Instrument (HVI) systems. There are currently 26 instruments installed in Australia, that class about 40 per cent of the crop.

Of these, 24 are manufactured by Uster Technologies Incorporated and comprise four models: 900 Automatic (DOS based); 900 Semi-Automatic (DOS based); 900 B (CPM based); and, Spectrum (Windows based). Two instruments are manufactured by Motion Control (CPM based). Considering the wide range in model age, model type and operating system, it is understandable that a number of technical and operating issues need to be overcome before objective instrument measurement of fibre properties is accepted with confidence by the cotton trade.

If Australia is to maintain its reputation as a consistent supplier of high quality cotton it will need to ensure that merchants/classing facilities in Australia consistently specify their cotton. To do this the Australian Industry will need to allow its cotton classing sector to be assessed independently so that individual classing facilities can correct technical and operational shortcomings in their practices.

To this end, the Cotton Classers Association of Australia (CCAA) has decided to conduct a program that entails formalised and rigorous instrument colour trials, check testing and auditing of classing facilities to determine compliance to Best Management Practice (BMP) for classing, with independent analysis, interpretation of results and auditing conducted by CSIRO Textile and Fibre Technology (CTFT).

The aim of this program is to identify and remedy significant differences between classing facilities so the industry can work towards more consistent and transparent measurement of Australian fibre quality.

This article gives a summary of all the activities conducted during 2005.



Cotton fibre properties being tested on an HVI instrument.

## CHECK TESTING

The check test program involves forwarding two samples of cotton, collected by a classing facility at random from a bale or gin run, to the classing facilities for testing (both subjectively and objectively) on a weekly basis during the ginning season. The main aim of the check test is to determine the long term reproducibility of each HVI measuring instrument. If an instrument is found to be out of tolerance, the classing facility is notified and corrective action can be taken.

This year 14 check test samples were sampled and tested according to CCAA procedures.

The reproducibility of the instruments are judged using the following tolerances as recommended by the CCAA;

- Length +/- 0.02 inches;
- Uniformity index +/- 1.0 per cent;
- Micronaire +/- 0.1 units
- Strength +/- 1.5 gpt
- Rd +/- 1.0 units; and.
- b+ +/- 0.5 units.

These tolerances are a lot tighter than the ones used by the USDA and suggested internationally — the reason being that the crop in Australia is considered to be more uniform.

The results for the 2005 crop continue the trends of the past four years. Average values for micronaire, length, length uniformity and strength fall within the set tolerances with the results for colour being

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TABLE 1: Details of facilities participating in the program

Facility	Location
Auscott Limited	Sydney
Australian Classing Services	Wee Waa
Dunavant Australia	Brisbane
Paul Reinhart (Australia)	Toowoomba
Queensland Cotton	Brisbane
Weil Brothers Cotton(Aust.)	Toowoomba
Volcot Australia*	Moree
Carrington Cotton Classing	Goondiwindi
ProClass	Goondiwindi
CSIRO Plant Industry	Wee Waa

\* No installed instruments

somewhat more variable. Feedback has been given to the classing facilities on the performance of their individual instruments.

### INSTRUMENT COLOUR TRIALS

As an initial step, the industry has proposed that the traditional method of subjective classing of colour and trash be replaced by objective instrument measurement by the relevant instruments in HVI lines.

Before the industry can change to objective testing there are some issues that need to be attended to. The main technical issue is gaining agreement between the different models irrespective of colorimeter and camera type used in the instruments. The main operational issue is the way the instruments are operated from calibration through to routine maintenance and the way the instrument results are reported.

To this end, two instrument colour trials were conducted by the CCAA and analysed by CTFT in August 2004 and December 2004 to determine and measure the significance of any differences between classing facilities for instrument



The author (centre) discussing sample size and preparation with Peter Bunce and Tim Marshall of ACS during the audit.

colour and trash results. These trials were conducted only on instruments manufactured by Uster Technologies Inc. which are DOS based or have Windows operating systems.

The initial colour trial, conducted during August 2004, found that there were significant differences in colour — that is, percentage reflectance (Rd) and percent-

age yellowness (b+) — results between classing facilities rather than between instruments. A follow up trial conducted during December 2004, which included formal checks on instrument operating software and calibration procedure by an Uster technician (with trash measurements included) showed an improvement in the

colour results obtained by these instruments although individual classing facilities still need to correct technical shortcomings of their instruments to ensure that the industry as a whole can work towards a more consistent prediction of Australian colour by instrument measurement.

The trash results indicated that there are significant differences in the three trash measurement results (percentage area, trash grade and trash count) as recorded by the instruments.

### AUDITING

The audit of the nine classing facilities was conducted in May 2005 by CTFT via an initial formal audit to determine their compliance to the draft BMP for Classing Handbook — compiled by the CCAA with reference to the International Textile Manufacturers Federation (ITMF) HVI User Guide and USDA recommendations.

#### Items audited were:

- **Sample size**  
Samples delivered to classing facilities have to be of a standard size and wrapped in a particular way to protect the samples and ensure safe working conditions for its personnel.
- **Sample conditioning and humidity management**  
Before testing, samples need to be conditioned to ensure that the moisture content is within 6.75 – 8.25 per cent. Of the nine classing houses audited, eight condition samples before testing. Of the eight, four rely exclusively on rapid conditioning equipment (for example, RapidCon) to condition their samples. The other classing houses use passive conditioning (storing of samples for 24 hours before testing in controlled conditions: relative humidity of 65 per cent +/- 3 and temperature of 21°C +/- 1.5) to condition their samples.
- **Sample retention**  
Every classing house has its own policy regarding sample retention, which is influenced by their clients and the space available for storing the samples.
- **Wall colour**  
The paint stipulated to be used on the walls is Dulux paint called 'Ghost Gum' which is a light grey colour.
- **Lighting**  
The illumination in lux (the SI derived unit of illuminance or illumination) at the working surface of the classing tables should be a minimum of 860 lux and measured using a National Digital

Lux meter BN-2000 LTE instrument. All the classing facilities must have light fixtures installed containing the recommended GE Chroma 75 fluorescent lights to provide the lighting required. The interior of all light fixtures must have a white finish and all light fixtures must have glass/perspex panes in place to diffuse the light.

- **Equipment — set up, calibration and use**  
All classing facilities with instruments must calibrate every morning using USDA calibration cotton and then recheck their instruments on a regular basis throughout the day, using check test cotton to ensure instruments are reading accurately. If an instrument fails a check test, the instrument is recalibrated using USDA calibration cotton. All the classing houses use Upland calibration cotton to calibrate their instruments with the exception of two classing facilities that use Extra Long Staple (ELS) cotton (long strong). A number of classing facilities have ELS calibration cotton in stock which is used to calibrate the instruments when testing Pima cotton.
- **Testing frequency**  
All classing houses generally test every second or third sample in a module. This frequency can be changed on request if the quality of a particular module is found to be borderline.
- **Use of agreed standard — USDA**  
Classing facilities must use current USDA Standard Grade boxes to class cotton. The classing facilities only need the most relevant grade boxes applicable to Australian cotton, which tend to be boxes describing grades 11, 21, 31, 41 and 51 and spotted grade boxes describing grades 23, 33, 34, 43 and 53.
- **Check testing**  
It is a requirement that all members of the CCAA participate in the check testing program and include all their measuring instruments in this program. Classing facilities are also encouraged to participate in the USDA and Bremen Round Tests.
- **Data transfer**  
There is a minimum requirement for data transfer.

### RESULTS

The initial audits show that all the classing facilities generally comply with the requirements of the classing handbook. A more in-depth follow up audit/s will deter-

mine whether classing facilities will be certified as BMP Classing facilities.

### MODULE AVERAGING

Module averaging was introduced in Australia in the mid 1990s as a means of improving the accuracy of instrument readings for strength, micronaire, length and length uniformity and to compensate for the natural variability of cotton. Three module averaging systems were in use in Australia and as part of the standardisation of classing program, the Australian cotton industry needed to adopt a single module averaging system. The three systems have been assessed and a recommendation by the CCAA on a single module averaging system was endorsed by CEAC and will be implemented for the 2006 crop.

### INTERNATIONAL COLLABORATION

Many cotton growing countries are addressing similar issues as the world moves more towards objective instrument based cotton classing systems despite only 30 per cent of the world's cotton being instrument classed. The International Cotton Advisory Committee (ICAC) recently established a task force on the Commercial Standardisation of the Instrument Testing of Cotton (CSITC).

This move, aimed at achieving international standardisation, has the strong support of the International Textile Manufacturers Federation (ITMF), the International Cotton Association (ICA), and major trading countries including Australia. A successful outcome will reduce commercial risk to all links in the cotton market chain.

Four Australian classing facilities have just participated in a CSITC pilot trial that seeks to review accuracy and precision levels in current instrument testing procedures. This work was supervised by USDA and the Bremen Fibre Institute and provides a further example of Australia's effective international collaboration.

This program of check testing, instrument trials and auditing will continue in 2006 to ensure that all classing facilities in Australia consistently and accurately specify our cotton to the benefit of the grower and spinner.

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