

WORKSHOP REPORT GINNING FOR QUALITY – BMP

SUMMARY OF GINNING BEST PRACTICES

On 21st November, at Narrabri, over forty Workshop participants, mostly ginners, developed and discussed the following introductory Best Management Practice for the Australian Cotton Ginning Industry. The Workshop supported the scope and format proposed by the Australian Cotton Ginners Association (ACGA). This involved the setting of "Minimum Standards or Goals", and the development of "requirements to demonstrate compliance". These will form the basis of an initial draft of a ginning best practices document that will then be distributed to all members of the ACGA for discussion and comment.

The Workshop also generated significant comments, supporting or qualifying the above, and these are included later in the full Report. Potential areas for further research and development were also identified, and these are noted in the report.

1. MOISTURE MANAGEMENT

Standards (Goal)

The goal regarding moisture management is to have moisture sufficiently high to protect the fibre and conserve energy during ginning and pressing, and yet to avoid excess and uneven moisture in the bale.

The maximum ceiling for bale moisture shall be 7.5%, measured as near as practicable to the point of initial weighing

General Principles

Over-drying cotton during the ginning process shall be avoided.

Other Aspects

Notification of 'Wet Modules' is required prior to delivery to the gin. [NOTE: This issue along with those relating to module protection, covering and transport; and the avoidance of contamination and spindle twist, is covered in the "Harvest BMP", currently being developed.]

BMP's to help achieve goal

- Moisture measuring equipment is regularly checked; and is calibrated as per manufacturers recommendations regarding frequency and methodology. Records of this to be kept.
- Cooperation to enable moisture measurement equipment and methodology; as well as moisture application systems; to be independently assessed - as determined by ACGA.
- The moisture level of at least one bale per module is recorded on the shift report, or other relevant document.
- Records of heating and drying cotton, referenced to modules and bales, to be kept on the shift report, or other relevant document.
- Bale scales are calibrated and certified at least annually by the appropriate State Authority, and evidence of this retained.
- Bale scales are checked against tared certified check weights by each gin shift and evidence of this retained (e.g., shift report).

Demonstrating Compliance (Record keeping)

- Appropriate records of practices listed above maintained
- Records of communications with farmers regarding 'wet modules' are to be kept, along with records of consequential action.
- Records of communications from Cotton Classers, and merchants, regarding moisture related problems to be kept, along with records of consequential action.

2. COVERING, CONTAMINATION, COUNTRY DAMAGE

Standards (Goal)

Objective is to achieve no contamination of or damage to the bale

General Principles

No bale covering, which in the opinion of ACGA is unduly prone to damage or contamination, will be used to wrap bales

BMP's to help achieve goal

- Bales with damaged covering shall be redressed before despatch from the gin.
- The protocols (developed by CQCGA) for eliminating sticky cotton shall be observed.
- The module yard and bale holding area will be constructed and managed to minimise the risk of weather and other damage.

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- Modules and bales will be likewise handled.
- Bale holding and loading areas are concreted and are quick draining. Evidence of improvement, e.g., roofing, (or of planned improvement), where warranted.
- Non containerised loads of bales leaving the gin shall be securely tied down and fully tarped
- A clear and uncluttered workplace is maintained in and around the gin to reduce in house contamination risks.
- Effective training and induction programs with a focus on work procedures to prevent machinery parts, tools, and other contaminants, including hydraulic oil, entering the cotton stream
- Pre-season and in-season communication/protocols systems in place for discussing contamination issues with farmers.
- Records kept of contamination found in the gin, and any resulting downtime (as per CSIRO-TFT forms).
- Contamination claims and country damage reports are traced back and claims confirm improvement.

Demonstrating Compliance (Record keeping)

Other Aspects

ACGA regularly reviews adequacy of coverings in use, and recommends (and members implement) rejection of inadequate coverings. Records of sub-standard covers being returned to supplier.

3. FIBRE QUALITY - ENVIRONMENT

Standards (Goal)

The objective is to manage ginning procedures, including the use of heat for drying, to preserve fibre quality, conserve energy and protect the environment.

General Principles

Cleaning equipment will be used as little as possible to achieve appropriate and acceptable leaf grades.

BMP's to help achieve fibre quality goals

- The appropriate operational and machine speeds and settings, to minimise fibre and seed damage, and to safeguard fibre quality, will be used.
- The condition of the seed cotton, lint and cottonseed will be continuously monitored, and appropriate adjustments made to settings and operations.

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- The condition of cottonseed, motes and lint shall be regularly checked to ensure that there is no undue seed damage, nor seed coat fragments in the lint, nor excessive lint on the seed, or otherwise lost.

BMP's to help achieve environmental quality goals

- Trash, dust and noise shall be regularly monitored; and operations adjusted should these exceed acceptable limits.
- The gin, module yard, bale holding area and their surrounds, will be managed and kept in such a manner as not to create environment, fire or safety hazards.
- The requirements of State Authorities and insurers regarding safety, fire, and environment protection shall be fully observed.

Other Aspects

Classing samples will be taken, packaged and despatched to the relevant Classing Facility in accordance with Cotton Classing BMP requirements.

Demonstrating Compliance (Record keeping)

- Records kept (e.g., gin run control sheets) of all operations, including heat use, moisture levels at key points, cleaning procedures and equipment used, trash levels (ISO trash tester, box comparisons, or visual), operational adjustments made, and other relevant observations; keyed to modules and bales
- Records kept of inspections made of seed cotton, lint, cotton seed, motes, trash, dust and noise (including regular air testing); together with notations of relevant adjustments made.
- Evidence that the gin, module yard, bale holding area and surrounding areas, are maintained in conditions that will not create safety, fire and environmental hazards.
- Evidence that trash is managed in an acceptable manner, and which demonstrates duty of care.
- Feedback evidence from Cotton Classers and Merchants regarding the absence of seed coat fragments. Similar and timely feedback evidence regarding significant fibre quality matters; and evidence of timely operational adjustments where warranted.
- Feedback evidence from those receiving white cottonseed, regarding seed moisture, seed damage and residual lint; and evidence of remedial action where warranted.
- Records of compliance with the requirements of Statutory Authorities and insurers, regarding OH&S, Environment

Protection and fire matters. Evidence of appropriate actions beyond these requirements where considered prudent or warranted.

- Confirmation from Cotton Classers that their Classing BMP requirements have been observed.

4. IMPLEMENTATION.

The preceding 'Code of Best Practice' will be drafted into a Best Management Practice document so that it can be introduced in time for the coming ginning season. This work will be co-ordinated by CRDC to ensure that it meshes into the overall "EMS Pathways" program. However, further input from, and collaboration with, ACGA; and 'endorsement' by ACIC, are essential to achieve the desired outcomes.

It is advocated that personnel from CSIRO-TFT would be ideally suited to performing an independent monitor/audit role regarding compliance with the proposed Ginning BMP. At the same time they could interact with ginners on technical and research related matters.

FULL WORKSHOP REPORT

INTRODUCTION and CONTENTS

The preceding summary of ginning BMP's forms part of this Report, and is not repeated.

Scene setting comments to the Workshop by Bruce Finney appear as an appendix (1); as do comments regarding Production BMP and Classing BMP, presented by Allan Williams (2).

Projected data used by Stuart Gordon during the Workshop, and the Discussion Paper and Agenda prepared for the Workshop, are excluded- but are obtainable from CRDC.

The main content of the following covers significant supporting or qualifying comments made during each of the four sessions, as well as research related matters.

(A) MOISTURE – WORKSHOP COMMENTS

1. Dry cotton fibre is brittle and more susceptible to damage.
2. Cotton fibre in the 6-7% moisture range appears less prone to damage, and gins, cleans and presses satisfactorily.
3. Lint that is drier than the above is more difficult to press and more energy is required,
4. Over the last 4 or 5 harvests the moisture % in seed cotton modules has often been very low, especially early in the season (e.g.2%). Similarly the Relative Humidity of the air used to convey cotton through the gin has been very low. Under these conditions it is difficult to get the moisture up to 6-7% using current humidification equipment.
5. Moisture restoration is usually required before the bale press. Aiming at up to 7% or less is prudent to reduce the risk of some bales reaching or exceeding the 7.5% maximum ceiling.
6. It was noted that bales containing over 7.5% moisture are deemed 'unmerchantable' by some international shippers.
7. Moisture can be introduced into the airstream conveying the cotton between the different stages of ginning, and is best introduced as steam, highly humidified air, or microfine mist- rather than as coarse water droplets.
8. Sprayers which add water to one side of the cotton bat in the lint slide, and which are not geared to the actual flow of cotton, are undesirable. If or where they still exist, they should be phased out.

9. Following on from the above it is reasonable to assume that, because of the 'folding' of the bat in the press, the moisture in the bale may be 'striped' and not evenly distributed- but may even up over time ?
10. Vomax moisture measurement technology (microwave) is widely used and well regarded. However because of speeds and variability no system appears to exist that could be regarded as definitive.
11. Under low humidity conditions, moisture loss from bales commences immediately after pressing – a reduction of 2% moisture, and a corresponding apparent weight loss is not uncommon in several days. When returned to a humid environment these bales will regain moisture/weight, but this appears to be a slower process than moisture/weight loss.
12. There is ample evidence that colour deterioration is more likely to occur in bales where the bale moisture is 7.5% or higher.
13. Cavitoma is highly undesirable (and unacceptable to spinners) and results from microbial degradation of the fibre. It is more likely to occur in cotton which has been weather damaged before picking, coupled with persistent high moisture in the stored bales.
14. There is also ample evidence of grade loss and fibre deterioration in wet modules – whether they were picked wet, or became wet after picking. Problems seem to be worst where excess green bolls and leaf, and spindle twist, are involved. 'Such modules should be express ginned' before they heat up or deteriorate further.

(B) COMMENTS ON CONTAMINATION, COUNTRY DAMAGE AND BALE COVERINGS

1. Following a scare some years ago, the CQCGA developed an effective protocol to prevent the occurrence of sticky cotton.
2. ITMF surveys and work by CSIRO-TFT confirm that Australian cotton is less contaminated than foreign growths- but there was agreement that Australia needed to improve to remain ahead.
3. By weight the most common contaminant found in Australian cotton by an Indonesian mill was 'metallic' (farm and gin tools, picker transporter and gin parts). However significant quantities of fibrous contaminants were also found- parts of tarps, tie down ropes, rags, hair etc.
4. Rene Van Der Sluijs (CSIRO-TFT) confirmed the above and noted that ropes were more common as contaminants in the 77,000 modules surveyed than expected. Mobile phones, cotton cloth and feathers also rated a mention.

5. There was general agreement that a focus on preventing contamination in the gin must be part of any effective training and induction program – and that the message needs to be regularly reinforced.
6. In the Harvest BMP module currently being developed, the need for the farmer and contractor to minimise contamination, should be highlighted.
7. Some bale holding and loading facilities are covered and there is a trend towards this. But even when the facility is covered some light external discolouration will probably occur if the floor is damp when bales are handled.
8. Australian bales are all externally bagged-i.e., ties and bands are on the inside of the covering. This, and the fact that Australian bales are generally handled less before containerised shipment, suggest that lighter bagging should be adequate (e.g., 7.5 oz hessian).
9. CSIRO-TFT has conducted a comparison of various covering, and this indicates that cotton covering has some advantages. Price differences between cotton and jute are becoming smaller.
10. ACGA plans to monitor damage to coverings, and if a trend emerges, could be expected to recommend against continued use of any damage prone covering. Similarly market forces could determine whether the industry collectively moved to cotton covering in the foreseeable future.
11. One processor spoke in support of plastic/poly covers, but the idea lacked broad support.
12. In general there appears to be good feedback from shippers regarding claims and problems regarding contamination and country damage.
13. The management of suspect fire bales was raised, and was considered outside the scope of the Workshop. While no position was reached on how fire bales should be handled, it was noted that gins had a responsibility to notify merchants of the presence of potential fire bales. Nonetheless it is an important issue and should be pursued by ACGA.

**(C) FIBRE QUALITY and ENVIRONMENTAL ISSUES
COMMENTS**

1. Because of the dry condition of the cotton in recent years, gins reported that they were able to achieve satisfactory grades (and improved overall fibre quality) with very little heat use and reduced use of lint cleaners. Significant moisture had to be introduced during the process.

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2. Ginners reported that ginning and lint cleaning in the 6 to 7% moisture range was desirable.
3. These conditions also contributed to apparent high gin Out Turn, as cotton 'gained moisture' during ginning. Ginners felt that efforts should be made to better inform farmers of the factors which determine Out Turn.
4. Neps and Short Fibre have not been a significant issue in recent years- probably reflecting the above, as well as the full maturity of the fibre and appropriate ginning.
5. Ginners agreed with CSIRO studies identifying lint cleaners as significant sources of fibre damage (see Research Comments)
6. Seed damage is occasionally higher than desirable and variety is sometimes suspected as contributing to this.
7. Although some literature states that residual lint on the seed can be as high as 12%, and seed damage can also be as high as 12%, Australian ginners feel that efforts should be made to keep both down closer to 8%.
8. At over 12 % seed damage there are questions regarding viability, if the seed is being saved for delinting as planting seed. Apart from this, damaged parts of the seed are likely to be seen in the lint as seed coat fragments.
9. At 12 % residual lint seed becomes difficult to handle- clogs ductwork, bridges hoppers etc. It also suggests a lower than necessary gin Out Turn, and that the owner of the seed cotton is being deprived of some lint.
10. Most gins have been able to conserve energy through reduced use of heat and the adequate restoration of moisture before pressing.
11. State requirements regarding OH&S are very stringent. To comply, and exceed minimum requirements, gins have modified equipment, procedures and facilities at considerable cost.
12. Similarly improvements to dust minimisation, noise reduction and trash handling have been implemented, and most gins are well above minimum requirements. The categorising of cotton trash as non-hazardous has helped some gins that are involved in 'composting' trash.
13. Participants were aware of emerging consumer trends towards cotton that is produced (and ginned) sustainably. They also recognise that the premium paid for Australian cotton is largely due to its reputation for consistent quality and absence of contamination. They support current efforts that seek to combine Fibre Quality and EMS considerations, to further differentiate 'Australian cotton'.
14. Feedback from Cotton Classers regarding fibre quality is important and efforts need to be made to speed up

communication so that the ginner can get 'real time' guidance. Some gidders regularly check trash against standard boxes, or with an Iso Tester, but the required quality information also extends to other parameters.

15. Participants also felt that training and induction programs should give greater attention to protecting fibre quality and also to environmental considerations.

(D) THE WAY FORWARD - GENERAL COMMENTS AND OTHER ISSUES FOR CONSIDERATION

1. Gidders stated their commitment, as individuals and as ACGA, to implementing a Ginning BMP. There was an expectation that such a program could be introduced for the coming ginning season.
2. There is an expectation that the Ginning BMP program should dovetail with Farm Production BMP (especially the 'Harvest module'), and with the Cotton Classing BMP.
3. Gidders would be comfortable with CSIRO-TFT personnel (particularly Rene Van Der Sluijs) overseeing the program and monitoring or auditing compliance.
4. Areas like transportation and warehousing may fall slightly outside the ambit of the Ginning BMP, but the principles could be extended to these activities. There may be a need to detail the legislative responsibilities regarding loading and restraining bale transport trucks.
5. There may be merit in ACGA initiating discussions with ACSA and warehouse operators with a view to developing appropriate protocols for the chain of custody responsibilities regarding transporting of cotton bales from the gin-yard
6. The issue of uneven shaped bales was raised, but no position was reached on how to manage the issue.
7. The ACGA role in regularly reviewing the program and taking the lead on such matters as acceptable or preferred covering should be incorporated into the design of the program.
8. ACGA should continue to have input into fine-tuning the prototype design and be responsible for final endorsement.
9. ACIC should be updated on progress and should, on behalf of the full industry, also endorse the program.
10. Some gins are already involved in various Safety and Environmental Programs, e.g., ISO 9000, and any additional Ginning BMP requirements should be compatible with these activities.
11. It was noted and agreed that the industry as a whole would benefit from a coordinated effort to ensure a good understanding of the factors that affect gin turn-out

(E) RESEARCH MATTERS

Dallas Gibb from CRDC gave a comprehensive summary of current cotton research of interest to the Workshop audience. This covered the 'field to fabric' area, as well as areas of future research, including seed and fibre biotechnology.

Specific Research & Extension Recommendations

1. CSIRO-TFT research into lint cleaner design and operation has targeted an acknowledged deficiency area, and should be supported
2. Researchers could seek to determine the best moisture levels at each stage of the ginning process – particularly seeking how to best protect the fibre (length, uniformity, neps, SFC, etc) –as well as achieving acceptable grade and throughput. In addition to 'moisture management', the work could evaluate different technologies to introduce moisture at different stages in the process. This work would need to be done over several seasons to cover a range of fully mature/low humidity and immature/weather damaged combinations.
3. There was active discussion on the need for better, and more standardised induction procedures for new gin employees. It was suggested that ACGA, in collaboration and consultation with Moree TAFE and CRDC, should investigate the development of DVD's to help the industry in education, training and induction programs. The range of topics could include 'cotton sampling and bale handling', 'contamination prevention –for ginners and farmers', 'picking wet cotton, securely covering and managing modules- for farmers and ginners', and ' Ginning BMP procedures'.
4. ACGA should meet with CRDC to also consider the development of proposals to provide information to the industry on the factors affecting turn-out
5. It was noted that many issues extend beyond ginning and will need to be addressed collectively with ACSA, for example notification and management of fire suspect bales and bale size variation.

(F) OTHER GENERAL COMMENTS

The following comments were drawn from the various Workshop sessions.

- Australian cotton gins use American machinery and American technology. The principles of ginning are universal.

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- In the past, gin manufacturers and the USDA Ginning Research Laboratories have apparently given more attention to other considerations, than to preserving inherent fibre quality.
- Australian cotton is of generally better quality than that of the 'average' cotton for which the gin was designed. Quality considerations, and environment and energy conservation issues, are relatively more important to the Australian industry.
- Australian research should address these 'quality related' ginning technology deficiencies. However we do not have a vast reservoir of experience in this area, and it is important that we redress this. In addition it is important that research fund applicants should assess all relevant published and unpublished overseas research to avoid duplication, define gaps, and unearth leads and contacts.
- The CSIRO-TFT study of bale coverings should provide data to ginners for them to make considered judgements.
- The factors affecting bale moisture loss and regain are relatively well understood, but there may be value in reviewing the data and 'testing' it under Australian conditions.
- Inexpensive and simple moisture atomising equipment is used successfully in some gins. Others use Samuel Jackson and other sophisticated equipment, some seek to implement some of the principles of Intelligin, and yet others appear to be under equipped in this area.
- Towards the end of the session the meeting also discussed Case and John Deere developments, incorporating module building capabilities onto cotton pickers. Some participants were worried by the potential handling and plastic contamination issues associated with the John Deere developments.
- Others felt that if the modules are not compacted and dense enough, they are likely to create handling problems. In Australia such modules would need to satisfy our transportation, module feeder and overall handling requirements. To be acceptable such developments needed to improve efficiency and reduce total costs- not merely shift cost from one sector to another. There was an expectation that various 'industry people' at the Workshop would convey these concerns to the two manufacturers.

R.S. 30.11.2006 // 1.12.2006

GINNERS BMP WORKSHOP

Bruce Finney, CRDC

LET US REFLECT ON THE STATUS OF OUR INDUSTRY

- Worlds Highest Cotton Yields
- World leading Fibre Quality
- Worlds Best Environmental Practice
- Worlds Best Research and Researchers
- Worlds Best Growers, Ginnners, Merchants
- Low Prices and reduction in premiums
- Drought Impacts and Climate Change
- Water Reform and Public Pressure on Water Use
- Skilled Labour Shortages
- Rising Costs
 - o finance, energy, water, labour, compliance
- Changing Markets and Increasing Competition
 - o China, India, Brazil, Fibremax

ITS OBVIOUS THE INDUSTRY IS UNDER SIGNIFICANT PRESSURE INSPITE OF THE INCREDILBE ACHIEVEMENTS IN PRODUCTIVITY GAINS, TECHNOLOGY ADOPTION AND SUSTAINABILITY IMPROVEMENTS.

WILL DELIVERING AND OPERATING THE SAME BE ENOUGH TO ADDRESS THE CHALLENGES?

ARE WE TRANSLATING THE MARKET SIGNALS EFFECTIVELY BETWEEN RETAILERS, SPINNERS, MERCHANTS, GINNERS & GROWERS?

THERE IS NO ROOM FOR COMPLACENCY IN ADDRESSING OUR INDUSTRY CHALLENGES. WE ALL HAVE A ROLE TO PLAY.

WHAT CAN THE AUSTRALIAN COTTON GINNERS ASSOCIATION AND ITS MEMBERS DO?

Developing a Brand for Australian Cotton
Allan Williams
Project Officer
Australian Cotton Growers Research Association
Ginning Workshop 21 November 2006

Overview

- Background on EMS Pathways Project
- Overview of current cotton BMP Programs

EMS Pathways

Project Aims:

- Develop the framework for delivering a branded product
- Enhance the overall ability to supply an assured product
- Enhance demand for Australian cotton
- Greater adoption of sustainable NRM practices
- Solid uptake of BMP Program
- Increased pressure on quality parameters
- Increased competition
- Differentiation via a brand?

An Australian Brand?

- Two points of distinction:
 - ✓ Quality
 - ✓ Environment
- Need:
 - ✓ Development of BMP's for all relevant sectors of the supply chain
 - ✓ Robust chain-of-custody of bales

Cotton BMP Programs

- ✓ On-farm, environmentally focused
- ✓ Classing
- ✓ Voluntary
- ✓ Summarises existing legal responsibilities
- ✓ "Pass" level not necessarily the highest ranking (1)
- ✓ Content built up gradually

APPLICATION OF PESTICIDES — WORKSHEET 9

Date Completed: _____

Objective 4 (cont.): *Apply pesticides during appropriate weather conditions* (pages 11 – 14 of the Application Booklet).

	Rank 1	Rank 2	Rank 3	Rank 4	Your Ranking
Application of pesticides in appropriate conditions and use of buffer zones on downwind boundary of fields near sensitive areas	Pesticides are only applied in appropriate weather conditions for the application method being used	Pesticides are applied in appropriate weather conditions for the application method being used	Pesticides are applied in appropriate weather conditions but no buffer zones are used	<i>Pesticides applied irrespective of weather conditions</i>	<input style="width: 50px; height: 50px;" type="text"/>
	Applications only take place when the wind direction is away from sensitive areas	Some applications take place when the wind direction is towards sensitive areas, but appropriate buffer zones are used			
	<i>Records: Pesticide application management plan, farm map, weather monitoring records</i>				

Objective 5: *Appropriate product selection and use* (pages 14 – 15 of the Application Booklet).

Use of pesticides that take into account the risks associated with the site being treated	All product selections take into account the potential for off-target damage and (for insecticides) the resistance management strategy	Most product selections take into account the potential for off-site damage and (for insecticides) the resistance management strategy	Some product selections take into account the potential for off-site damage and (for insecticides) the resistance management strategy	Product selections are made without taking into account potential for off-site damage or (for insecticides) the resistance management strategy	<input style="width: 50px; height: 50px;" type="text"/>	
	When considering potential off-site damage, the following should be taken into account:					
	<ul style="list-style-type: none"> • neighbouring land uses • properties of the pesticide such as its persistence in the environment, toxicity, odour, volatility and effect on beneficial insects 					
<i>Records: Application order forms, insect check sheets, pesticide application management plan</i>						

Also voluntary

- ✓ Tried rankings approach but not used in final version
- ✓ Critical (pass-fail level identified) versus non-critical
- ✓ Benefits gained

Sample Management

Sample size – delivery

Samples received from the gin shall meet the following requirements:

Length	800 – 900mm
Diameter	400 – 500mm
Weight	5 – 8kg
Capacity	50 – 70 samples

Samples should be well and securely wrapped, and wrapped in numerical order.

Sample size – testing

Test samples shall have the following dimensions:

Face (approx.)	140mm x 220mm
Combined Weight	100 – 170 grams.

Each sample requires an identification tag.

Sample conditioning

Samples shall either be conditioned by RapidCon **OR** for 24 hours before being tested.

Sample retention

All samples shall be kept in accordance with the agreement between the classing facility and the client.



Classing room

Wall & ceiling colour

Walls should be light grey. Suitable paint colours include Dulux "Ghost Gum" and "Ash". Tinting references for a 4 litre, Dulux white base low sheen acrylic paint for these colours are:

<i>Ghost Gum</i>	<i>Ash</i>
B10 (black)	B6 (black)
L4 (raw umber)	V2 (magenta)

Lighting

Rows of lights should be installed to provide not less than 100 foot candles or 860 lux of illumination at the working surface of the classing table.

Each light fixture should be of the following type:

- F40T12 type Macbeth Norlite D7500; or
- GE Chroma 75; or
- Duro Test Colour Classer D7500.

The interior of each light fixture shall have a polished aluminium (Alztec) reflector or be finished with baked white enamel, permanent white finish.

Each fixture shall have a glass or perspex prismatic lens panel to enclose it and diffuse the light.

The panel should be spectrally neutral and provide better than 90% light transmission over the visible spectrum.