



Final Report

Off Farm Series | Cotton Research & Development Corporation

*If you are participating in the presentations this year, please provide a written report and a copy of your final report presentation by 31 October.
If not, please provide a written report by 30 September.*

Part 1 - Summary Details

Please use your TAB key to complete Parts 1 & 2.

CRDC Project Number: CTFT0002

Project Title: Standardisation of Ginning (BMP)

Project Commencement Date: 01/07/2008 **Project Completion Date:** 30/06/2011

CRDC Program: Value Chain

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Part 3 – Final Report Guide

(The points below are to be used as a guideline when completing your final report.)

Background

1. Outline the background to the project.

If Australia is to maintain its reputation as a consistent supplier of high quality cotton it will need to ensure that the entire cotton pipeline from growing to ginning and from warehouse to port conforms to industry Best Management Practices (BMP). The BMP program has been successfully taken up by the growing sector in 1999 and the classing sector in 2004, with the ginning, harvesting and warehousing and despatch still outstanding. In response to this need a draft BMP Handbook for Ginning, was compiled by members of the Australian Cotton Ginners Association (ACGA) in conjunction with Allan Williams and the author of this report in late 2006. Initial audits were conducted during the 2007 ginning season to determine the compliance of the gins to the draft BMP for Ginning (version 3.0 dated February 2007). These audits were also conducted to determine any discrepancies and omissions in the draft BMP for Ginning. Eighty two percent (28 of the 34 operational gins) were audited during the 2007 ginning season. A number of issues were highlighted (as outlined in the audit report forwarded to CRDC and ACGA in August 2007), which the individual gins and the ACGA needed to attend to. As a result of the initial audits the draft BMP was amended and formalised with formal scheduled audits conducted on most operating gins during the 2009, 2010 and 2011 ginning season. No audits were conducted in 2008, as it was a short ginning season; due to the continuing drought conditions and also that no funding was available to conduct the audits. Upon compliance the various gins were certified by Cotton Australia (CA).

Objectives

2. List the project objectives and the extent to which these have been achieved.

The aims of the project are to:

1. Update and finalise a BMP Handbook for Ginning.
2. Audit gins to determine their compliance with the BMP Handbook for Ginning.
3. Ensure that ginning practices across the industry are consistent. This work together with other projects in the ginning sector should ensure that Australia will be able to preserve quality.

Methods

3. Detail the methodology and justify the methodology used. Include any discoveries in methods that may benefit other related research.

See descriptions under ‘*Results*’ for this project.

Results

4. Detail and discuss the results for each objective including the statistical analysis of results.

- 1) Best Management Practice Handbook

The Best Management Practice (BMP) Handbook for Ginning has been extensively updated over the last three years. The current Handbook is version 7.0 dated March 2011. This new version has been considerably expanded from the previous version and now also includes sections on Safety Management and Round Modules. The findings for the 2011 audits will be comprehensively recorded and reported, as opposed to the previous ‘tick and flick’ audit reports. This new version has been aligned to the current BMP Handbook for Classing (version 11.0 dated February 2011). It is however, currently not aligned with the BMP Handbook for Storage and Handling, which is currently in draft form. A copy of the current BMP Handbook for Ginning is attached in Appendix 1.

- 2) Best Management Practice Audits

As mentioned earlier during the last three years a large number of BMP audits were carried out to determine the compliance of the individual operating gins according to the current version of the BMP Handbook for Ginning.

All ginning companies that are members of the ACGA must be audited annually during the ginning season to determine their compliance to the latest version of the BMP Handbook for Ginning. All individual gins of these ginning companies will be audited and the audit must be conducted while the gins are operational. The audit will focus on the entire BMP Handbook, there are no exclusions. These audits are scheduled. A checklist is used by the auditor which will be completed during the audit. Since 2009, a scoring system is used to determine the degree of compliance. In 2009 and 2010; if a gin scores 80%, it was considered to be compliant, a score between 80% and 65% was considered partially compliant and a score below 65% was considered not compliant. For the 2011 audits the ACGA decided to tighten the requirements with the result that if a gin scores 80%, it is considered to be compliant, and a score below 80% is considered not compliant. The audit form is completed in duplicate; one to report back to the individual gin and one to be sent to Cotton Australia with a recommendation to certify/not certify the individual gin. Before the report is formalised, a draft is forwarded to the gin to allow the gin to raise any concerns before the report is finalised and submitted formally to the gin and CA. If the individual gin complies with the BMP handbook for Ginning, CA will forward certification to the individual gin which is valid for one year.

During the 2009 ginning season, 63 percent (20 of the 32 gins that were operational) were audited against BMP for Ginning; version 5.0, dated March 2009. During the 2010 season, 75 percent (24 of the 32 operational gins) were audited against BMP for Ginning; version 6.0, dated March 2010. During the 2011 season, 80 percent (28 of the 35 operational gins) were audited against

BMP for Ginning; version 7.0 dated March 2011. The gins that were audited over the last five years are shown in Table 1.

Table 1 List of gins audited in each of the years

Gin Company	Gin location	2007	2008	2009	2010	2011
Auscott Limited	Narrabri	X	-	X	X	X
	Moree	X	-	X	X	X
	Trangie	X	-	X	X	X
	Warren	X	-	X	X	X
Brighann	Moree	-	-	-	X	X
Carroll Cotton	Carroll	X	-	-	X	X
Carrington Cotton	Goondiwindi	-	-	-	-	-
Dunavant	Dalby	X	-	-	X	X
	Emerald	-	-	-	X	-
	Moree	X	-	-	X	-
Koramba	Boomi	X	-	X	X	X
North West Ginning	Moree	X	-	X	X	X
Namoi Cotton Co-Operative	Ashley	X	-	X	X	X
	Boggabri	X	-	-	X	X
	Hillston	X	-	X	X	X
	Merah North	X	-	X	X	X
	Moomin	-	-	-	X	X
	MacIntyre	X	-	X	X	X
	Mungindi	X	-	X	X	X
	Trangie	X	-	-	X	X
	Wathagar	X	-	X	X	X
	Yarraman	X	-	X	-	-
Queensland Cotton	Beardmore	X	-	X	X	X
	Cecil Plains	X	-	X	-	X
	Collymogle	X	-	-	-	-
	Dalby	X	-	X	-	X
	Dirranbandi	-	-	X	-	X
	Emerald	X	-	X	X	X
	Moura	X	-	X	X	-
Mungindi	-	-	-	-	-	
	St George	-	-	-	-	X

Gin Company	Gin location	2007	2008	2009	2010	2011
	Warren	X	-	-	-	-
	Wee Waa	X		X	X	X
Clyde Agriculture	Bourke	-	-	-	-	X
North Bourke	Bourke	-	-	-	-	X
Tandou Limited	Menindee	-	-	-	-	X

Legend ; X audited and – not audited.

As can be seen in Table 1; during the 2011 audit, four gins were audited for the first time, These gins were the Queensland Cotton in St George and Tandou Limited, which were operational for the first time in a number of years, and the two gins in Bourke; North Bourke and Clyde Agriculture.

One will note that not all the gins installed in Australia were formally audited during the past three ginning seasons. Gins were not audited due to;

1. The gin not being operational during the season.
2. Due to the crop size, some gins were only operational for a short period. This generally resulted in the gin only being operational during the night to save costs as power is cheaper.
3. Major breakdown during audit resulting in audit not being able to be conducted.
4. Decline to be audited.

During the 2011 ginning season, five gins declined to be audited;

- Dunavant Moree and Emerald. No reason provided.
- Queensland Cotton gin in Collymongle, which was operational for the first time since 2007.
- Queensland Cotton gin in Warren. This gin has appointed a new gin manager from the US, at the start of the season, who is not familiar with the BMP.
- Carrington Cotton. No reason provided.

During the 2011 ginning season the Queensland Cotton gin in Moura was not audited. Due to the floods in Queensland, this gin was only operational during the night which made it difficult to audit.

There are only two gins that have never been audited during the last five years;

- The Queensland Cotton gin in Mungindi has not been operational for some time due to the drought conditions experienced in Australia. This gin is currently being refurbished and will be operational in 2012.
- The Carrington gin has declined to be audited.

3) Certification

As mentioned earlier the audits conducted in 2007 were in essence an information gathering exercise to determine whether the procedures/systems that the individual gins had in place complied with the draft BMP. The audits were also conducted to determine if there were any discrepancies or omissions

that needed to be addressed. The 28 gins audited in 2007 were thus not recommended for certification. In 2009, all 20 gins audited were recommended for certification. In 2010, 22 of the gins audited were recommended for certification. In 2011, 27 of the gins audited were recommended for certification.

There are several reasons why such a large proportion of the gins audited complied with the BMP for Ginning;

- The BMP for Ginning is still in its infancy and it not very specific or comprehensive.
- In 2009 and 2010, gins only needed to comply with 65% of the BMP to be partially compliant and still be certified.
- In 2011, gins only needed to comply with 80% of the BMP to be certified.

4) General issues arising from the 2011 audits

- Due to shortage of labour, gin managers are forced to manage shifts, which does not allow for much/any time to manage the site.
- A large number of ginners are either untrained or new to the industry.
- There is no standard method used to visually class cotton (i.e. trash and colour grade). Less than 10% of gins have correct lighting to grade the cotton effectively.
- Fifty percent of the USDA Grade boxes used to grade cotton (mainly trash) were outdated.
- There is a need for the ginners to be trained on leaf grade assessment.
- There is no reference to seed storage/handling in the current BMP.
- References will need to be made to the Storage and Handling BMP, regarding the loading of trucks.
- Record keeping is still a major issue.
- Seventy percent of the gins do not keep bale redress records.
- Forty percent of the moisture measuring instruments (Vomax and hand held meters) were not calibrated.
- Fifty percent of gins have not certified their test weights which are used to verify their bale scales.
- The determination and recording of residual lint needs to be improved.
- Thirty percent of gins could not locate current EPA and Dangerous Goods and Liquids licences.
- Procedures for the management and reporting/ recording of fire bales needs to be further formalised. There have been reports that a number of fire bales were released during the 2011 season which caused fires in containers and in one instance at an international spinning company.
- I was only inducted as a visitor by 20% of the gins and in some instances not provided with PPE. This despite the fact that the Safety Management section stipulates that this needs to be done.
- Tare weights used for bales vary from 0.400 grams to 2.0 kilograms. This is obviously dependant on the type of wrap and ties used. However there are large differences in the weights used and as such will need to be standardised.



- No minimum standard for bale packaging (which includes bale cover and ties).
- Twenty percent of the gins did not provide the correct sample size for classing purposes. As the industry has expressed the desire to move to the objective measurement of colour this will need to be improved.

Outcomes

5. Describe how the project's outputs will contribute to the planned outcomes identified in the project application. Describe the planned outcomes achieved to date.

During the last three years of this project, the BMP Handbook for Ginning has evolved and has become more comprehensive. Over the last three years formal audits have been conducted on a large proportion of the operating gins which has led to further standardisation in ginning practices employed in Australia. However, despite the fact that the BMP Handbook for Ginning is not very comprehensive, there are still a substantial number of issues that will need to be addressed. These issues will be addressed in the follow up project which has been submitted for approval to the CRDC in 2010.

6. Please describe any:-
 - a) technical advances achieved (eg commercially significant developments, patents applied for or granted licenses, etc.);
 - b) other information developed from research (eg discoveries in methodology, equipment design, etc.); and
 - c) required changes to the Intellectual Property register.

N/A

Conclusion

7. Provide an assessment of the likely impact of the results and conclusions of the research project for the cotton industry. What are the take home messages?

Work in this area over the last three years has resulted in the ginning industry in Australia standardising their ginning practices. During these three years the BMP Handbook for Ginning has evolved and become more comprehensive from the draft version in 2007 to the current Handbook (version 7.0, dated March 2011). Formal scheduled audits have been conducted on a large number of the operational gins over the last 3 years, with a large number of gins recommended and certified by Cotton Australia. Whilst these improvements have been impressive it must be borne in mind that the BMP Handbook for Ginning is still in its infancy and will need to be further expanded as it is still not very comprehensive. A worrying point is that despite the fact that the BMP Handbook for Ginning is not very comprehensive a number of gins have struggled to comply with the requirements. A number of issues have been raised which the Australian Ginners Association and the individual gins will need to address in the near future.

Extension Opportunities

8. Detail a plan for the activities or other steps that may be taken:
 - (a) to further develop or to exploit the project technology.
 - (b) for the future presentation and dissemination of the project outcomes.
 - (c) for future research.

Work in this area has been presented to the ACGA and at industry forums.

- 9 A. List the publications arising from the research project and/or a publication plan. (NB: Where possible, please provide a copy of any publication/s)

- B. Have you developed any online resources and what is the website address?

N/A

Part 4 – Final Report Executive Summary

Provide a one page Summary of your research that is not commercial in confidence, and that can be published on the World Wide Web. Explain the main outcomes of the research and provide contact details for more information. It is important that the Executive Summary highlights concisely the key outputs from the project and, when they are adopted, what this will mean to the cotton industry.

If Australia is to maintain its reputation as a consistent supplier of high quality cotton it will need to ensure that the entire cotton pipeline from growing to ginning and from warehouse to port conforms to industry Best Management Practices (BMP). The BMP program has been successfully taken up by the growing sector in 1999 and the classing sector in 2004, with the ginning, harvesting and warehousing and despatch still outstanding. In response to this need a draft BMP Handbook for Ginning, was compiled in late 2006. Initial audits were conducted during the 2007 ginning season to determine the compliance of the gins to the draft BMP for Ginning. These audits were also conducted to determine any discrepancies and omissions in the draft BMP for Ginning. As a result of the initial audits the draft BMP was amended and formalised with formal scheduled audits conducted during the 2009, 2010 and 2011 ginning seasons. During the 2009 ginning season, sixty three percent; during the 2010 season, seventy five percent and during the 2011 season, eighty percent of the operational gins were audited against the current version of the BMP Handbook for Ginning. This Handbook for Ginning has evolved over the three years becoming more comprehensive with each updated version. A large number of the audited gins complied with the current version of the BMP Handbook for Ginning and as a consequence were recommended for certification by Cotton Australia. There are however a large number of issues that were raised during the 2011 audits which will need to be attended to by the Australian Cotton Ginners Association and the individual gins.

APPENDIX 1



Best Management Practice for Ginning
Version 7.0



Cotton Ginning Best Management Practice Handbook

All members of the Australian Cotton Ginners Association must comply with the current version of the Cotton Ginning BMP handbook. Gins that are operational during the ginning season will be audited via a scheduled formal audit. Gins that comply with the minimum requirements as laid down in the BMP will be certified by Cotton Australia.

This Handbook forms part of the Post Harvest sector and should thus be read in conjunction with the BMP handbook for Classing and the BMP Handbook for Storage and Handling.

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1.0 Moisture Management

General Principle

Drying systems can seriously over dry cotton and must be used properly to avoid reducing cotton quality. Drying at low temperatures is much less harmful than drying at high temperatures. Larger volumes of drying air allow drying at lower temperatures. The moisture content of seed cotton is very important in the ginning process. When seed cotton enters the gin plant with high moisture content, it should be exposed to as little machinery as possible (especially extractors) before entering the drying system. Seed cotton having too high a moisture content will not clean or gin properly and will not easily separate into single locks but will form wads that may choke and damage gin machinery or entirely stop the ginning process. Seed cotton with too much moisture will also form tight twists known as “fish hooks” that remain in the ginned lint and degrade appearance.

If seed cotton is placed in air of 50% relative humidity and 21 °C, the fibres will tend to reach a moisture content (wet basis) of approximately 6%; the seed will tend to reach a moisture content of about 9%; and the composite mass will approach a moisture content of 8%. The equilibrium moisture content at a given relative humidity is also a function of the temperature and barometric pressure.

When ambient air is used, the relative humidity must be equal to that necessary to achieve the desired equilibrium moisture content of the cotton fibre.

Drying cotton at high temperatures may damage the cotton fibre. Cotton should be dried at the lowest temperature that will produce satisfactory market grades and allow satisfactory gin operation. Cotton will scorch at 232 °C, ignite at 460 °C and flash at 316 °C. Under no circumstance should the temperature in any portion of the drying system exceed 177 °C, because irreversible damage may occur. Temperatures over 93 °C damage dry fibre and should not be used if at all possible. There is an optimum fibre moisture content for each process in the gin. The effort required to control moisture will pay dividends in gin operating efficiency and market value of the baled cotton.

Dryers should be adjusted to supply the gin stand with lint having a moisture content of 6-7%, to preserve fibre quality. Cotton at this moisture level is more able to withstand the stresses of ginning without breaking. However, cotton at 5% moisture content will result in better cleaning and a smoother appearance, which is erroneously preferred by many classing and marketing systems.

Gin cleaners remove more trash at moisture levels below 6-7% but not without more fiber damage. Fibre moisture higher than 7% preserves fibre length but results in ginning problems and poor cleaning.



Fibre length preservation can best be attained with fiber moisture from 6.5 to 7%; however, both cleaning efficiency and ginning rate are reduced at higher moistures. As a compromise, moisture content of 6 to 7% is feasible. Ginning below 5% moisture can cause serious damage to the fibres, while ginning above 8% may produce rougher lint, decrease gin capacity, and less effective cleaning. For each 1% reduction in fibre moisture content below 5%, the number of short fibre increases by almost 1%. Ginning cotton below 5% moisture can lead to decreased yarn strength and yarn appearance and increased short fibers in the card sliver.

The effect of increased short fibre content resulting from over drying outweighs the benefits of foreign-matter removal from the textile mill perspective but not from a market perspective. Many classing systems offer premiums for low trash and smooth appearance features but these incentives may also encourage over processing at the gin, which produces additional neps and short fibers.¹

Goals

To have sufficient moisture to protect the fibre, extract trash and conserve energy during ginning at the same time avoiding excess and uneven moisture in the bale (generally 6-7.5%).

Best Management Practices for moisture management

- ✓ Gin operator is appropriately trained.²
- ✓ Dryers should be adjusted to supply the gin stand with lint having a moisture content of 6-7%, to preserve fibre quality
- ✓ Bale moisture should not exceed 7.5% at any point in the bale when measured at or near the point of weighing using reasonably available methods of technology
- ✓ Moisture measuring equipment is regularly checked, and is calibrated as per manufacturer's recommendations regarding frequency and methodology. Record of calibration kept.
- ✓ Heating and drying of cotton is recorded, with the following details required for each module ginned:
 - Heaters on/off
 - Level of heat (if any) applied.
- ✓ The moisture level of at least one bale per module is recorded on the shift report, or other relevant document, with moisture levels at both gin stand and the bale checked and recorded as above.
- ✓ Weigh bridges are certified at least annually by the appropriate State

¹ Report of an Expert Panel on Ginning Methods – Impact of Ginning on Fiber Quality: The Best Ginning Practices. International Cotton Advisory Committee, September 2001

² Minimum level of competence required, e.g. TAFE certificate and/or in-house training requirement

Authority or State-approved service provider; evidence of this is retained.

- ✓ Bale scales are calibrated and certified at least annually by a qualified service provider; evidence of this is retained.
- ✓ Bale scales are calibrated at least once per shift with certified check weights. Calibration is recorded (e.g. on shift report).
- ✓ Certified Bale weights require independent verification or certification, at least every two years that they are within tolerances. Evidence of this is retained.

Other Considerations

Growers must inform gins of any potential 'wet' modules³, by ticking box on module ticket.

As part of their BMP Classing facilities should notify the gin of any moisture (or other) issues identified when classing samples sent from the gin. See Appendix 3.

Demonstrating compliance and record keeping

- Records of practices listed above maintained:
 - Gin operator qualification(s) and training
 - Checking of moisture measuring equipment
 - Moisture level of cotton at gin stand and in bales
 - Calibration, certification and taring of bale scales and tare weights
 - Records of heating and drying cotton, keyed to modules and bales, to be kept on the shift report, or other relevant document.
- Records of action taken regarding 'wet modules' are to be recorded on shift reports.
- Records of communications from cotton classers, and merchants, regarding moisture related problems to be kept, along with records of any consequential action.

³ Module is considered wet if moisture content is over 13%.

2.0 Lint Management

General Principle

The cleaning and extracting system serves a dual purpose. First, large trash components such as burs, limbs, and branches, must be extracted from the seed cotton before they are broken up and embedded in the cotton and so that the gin stand will operate at peak efficiency and without excessive downtime. Also, cleaners and extractors help open the seed cotton for more effective drying, which is usually done concurrently with cleaning.

Lint cleaning generally improves the grade classification (colour, leaf and preparation) of the lint. However, the extent of grade improvement decreases with each succeeding cleaning. In addition, lint cleaners blend Light-Spotted cottons so that some of these pass into the White grades. Lint cleaners can also decrease the number of bales that are reduced in grade because of grass and bark content. But they also reduce bale weights and may decrease staple length, thus affecting bale value. In some cases the net effect of multiple stages of lint cleaning is a loss in bale sales value as well as an increase in neps and short fibre content which decreases its spinning value

Whether it is done in a gin or in a textile mill, cleaning generally lowers most of the important fibre quality characteristics other than the colour, foreign matter and appearance, and reduces the amount of usable fibre. Ginners must compromise between trash removal and fibre damage when choosing their cleaning machinery. To deliver the absolute highest quality products for spinning performance, growers and ginners must take care during production, harvesting, ginning, and textile manufacturing to avoid practices that may diminish fibre quality.⁴

Goals

To produce cotton that has the highest possible fibre length, strength and uniformity and the lowest possible level of neps, trash and short fibre content.

Also to minimize the amount of heat used for drying to preserve fibre quality and conserve energy.

Best Management Practices for lint management

- ✓ The ginner is trained in cotton ginning. The ginner has also been given guidance on the classification of leaf grade by a qualified classer⁵.

⁴ Report of an Expert Panel on Ginning Methods – Impact of Ginning on Fiber Quality: The Best Ginning Practices. International Cotton Advisory Committee, September 2001

⁵ Guidance on leaf grade assessment should be conducted biannually.



- ✓ Leaf grade needs to be assessed according to USDA trash standards which are not older than four years from the date of being made.
- ✓ The operational machine speeds and settings used during the gin run are recorded on shift report.
- ✓ The condition of the seed cotton, lint and cottonseed is continuously monitored, and appropriate adjustments made to settings and operations. Trash levels in particular are monitored.
- ✓ The condition of cottonseed, motes and lint is 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.
- ✓ For residual lint, sample jars of cotton seed with residual lint at 8, 10 and 12% are available for comparison and checking.

Demonstrating compliance and 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 for trash level monitoring (ISO trash tester, Uster Intelligin, USDA 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, seed, motes, trash and dust, 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 risks.

Regular monitoring of residual lint should be undertaken⁶.

- Feedback evidence from cotton classers and merchants regarding the presence 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.

⁶ Acceptable minimum frequency to be considered during testing phase (e.g. weekly, monthly, at change of grower/variety/shift)

3.0 Contamination Management

General Principle

All areas of risk for contaminating the lint will be identified and managed.

Goal

To have cotton lint free of contamination.

Best Management Practices for contamination management

- ✓ Growers are formally advised of the role they play in avoiding contamination; pre-season and in-season communication/protocols systems in place for discussing contamination issues with farmers.
- ✓ Staff training and induction includes information on their role in eliminating contamination, with a focus on work procedures to prevent machinery parts, tools, and other contaminants, including hydraulic oil, entering the cotton stream (e.g. at the module yard, feeder bay, gin fall and bale pad). Induction/training form to be signed by employee
- ✓ The protocols developed by Central Queensland Cotton Growers Association for managing sticky cotton shall be observed (detailed in Appendix 1).
- ✓ A clear and uncluttered workplace is maintained in and around the gin to reduce in house contamination risks.
- ✓ An accurate and detailed record (including photos) is kept of any contamination found in the gin, and any resulting downtime (as per CSIRO forms – see Appendix 2, or equivalent in house forms). These records are to be forwarded to CSIRO for attention of René van der Sluijs at the end of the ginning season.

Demonstrating compliance and record keeping

- Records of practices listed above maintained:
 - Grower communication re contamination management and sticky cotton protocols
 - Staff training and induction
 - Contamination recording forms, per Appendix 2

4.0 Bale Management

General Principle

Bale packaging is the final step in processing cotton at the gin. The stress on the ties after the bale is released from the press is a function of the uniformity of the lint distribution, bale weight, bale dimensions, density to which the bale was pressed, moisture content, tie length and other factors. Bale tie strength must be matched carefully to the bale press system to prevent tie breakage and subsequent contamination and handling difficulties.

Bales should be square and fully covered. All bale covering material should be clean, in sound condition and of sufficient strength to adequately protect the cotton. Bales are covered in natural fibres such as cotton (preferably) or hessian. The material must not have salt or other corrosive material added and must not contain sisal or other hard fibre or any other material that will contaminate or adversely affect cotton.⁷

Each bale is to be numerically identifiable by some form of ticket.

Goal

To deliver well-presented, damage-free cotton bales.

Best management Practices for bale management

- ✓ No bale covering material, which in the opinion of the Australian Cotton Ginner's Association is unduly prone to damage or contamination, will be used to wrap bales⁸.
- ✓ Bale dimensions, both top and bottom, should be as follows;
 - High Density (HD) bales should be between 100 and 115 cm (40-42 inches) high
 - Universal Density (UD) bales should be between 130 and 145 cm (53-55 inches) high.
 - Both HD and UD bales should be between 50 and 60 cm (20-24 inches) wide and between 80 and 90 cm (32-36) deep.
 - All bales should be pressed and strapped so that their edges and sides are square.
- ✓ Bale net weights should average 227 kilograms and not be below 150 kilograms or more than 260 kilograms.
- ✓ Tare weights are determined prior to the start of the season.
- ✓ Bales Ties should be as follows; -
 - HD – 5-6 metal wires or 6 plastic straps

⁷ Report of an Expert Panel on Ginning Methods – Impact of Ginning on Fiber Quality: The Best Ginning Practices. International Cotton Advisory Committee, September 2001

⁸ Minimum weight for Hessian is 7.5 ounce and for Cotton still to be decided.

- UD – 8 metal wires or 6 plastic straps.
- ✓ Bales need to be packaged in accordance with the following table;

Grade D Non BMP Compliant	Grade C Minimum BMP Compliant	Grade B Intermediate BMP Compliant	Grade A Aspirational BMP Standard
UD Bale Wire Tie/Metal Strap Jute/hessian Wrap	UD Bale Wire Tie/Metal Strap Cotton Wrap	UD Bale Plastic Strapping Cotton Wrap	HD Bale Plastic Strap Cotton Wrap
	HD Bale Wire Tie/Metal Strap Jute/hessian Wrap	HD Bale Wire Tie/Metal Strap Cotton Wrap	
		HD Bale Plastic Strap Jute/hessian Wrap	

- ✓ The module yard and bale holding area are constructed and managed to minimise the risk of weather and other damage.
- ✓ Bale holding area is concreted, and loading area is well-drained. Evidence of improvement, e.g., roofing, (or of planned improvement), where warranted.
- ✓ Bales with damaged coverings shall be redressed before despatch from the gin. A record of the number of bales redressed will be kept.
- ✓ Contamination claims and country damage⁹ reports are traced back to the source and claims confirm improvement.
- ✓ Non-containerised loads of bales leaving the gin shall be securely tied down and appropriately tarped, taking into account the distance to be travelled, the prevailing weather conditions and any agreed arrangements for bale transport.
- ✓ Receivers of cotton will be notified of any bales that are suspected of or have the potential to be 'fire' bales¹⁰.
- ✓ No smoking whilst loading bales

Other Considerations

Bales will be loaded onto bale trucks, and restrained in accordance with the **Cotton Australia Load Restraining guide**¹¹, the ACGA **Cotton Industry Mass Limit Chart** (Appendix 4) and relevant road transport

⁹ Loss of lint quality due to dust, rain, and packaging damage

¹⁰ Minimum requirement for managing 'fire' bales is removing two bales before and two bales after the affected bale. Bales segregated for a minimum of 7 days before release.

¹¹ http://www.cottonaustralia.com.au/library/publications/Cotton_Restraint_Guide.pdf



legislation such as ***The chain of responsibility legislation*** as well as; in New South Wales, the ***Roads Transport (General) Act 2005*** and ***Road Transport (Mass, Loading and Access) Regulation 2005***, and in Queensland the ***Transport Operations (Road Use Management) Act 1995*** and the ***Transport Operations (Road Use Management—Mass, Dimensions and Loading) Regulation 2005***.

Protocols should be established between the ginner and the receiving merchant for ensuring that clear lines of communication and authority are established regarding the loading, tarping restraint and removal of cotton bales from the gin yard.

Demonstrating compliance and record keeping

- Records of fire bale notifications to merchants
- Training of relevant staff (e.g. bale pad loaders, weighbridge staff) in requirements and responsibilities under the relevant road transport legislation

5.0 Sample Management

General Principle

Classing samples will be taken, packaged and despatched to the relevant classing facility in accordance with the cotton classing BMP requirements.

Goal

To comply with the current version of the BMP Handbook for Classing.

Best Management Practices for bale sampling

Taking Samples

A single sample from each side of the bale is the only sample taken at the gin, unless otherwise authorized by the purchasing merchant.

Sample Roll

Sample Size

Samples shall have the following dimensions:

Face (minimum) 120mm x 220mm

Combined Weight 100 – 170 grams.

Each sample requires an identification tag.

Sample Delivery

Sample rolls shall meet the following requirements:

Length	800 – 900mm
Diameter	400 – 500mm
Weight	5–8kg
Capacity	up to 60 samples

Samples should be well and securely wrapped, and wrapped in numerical order, ensuring that they are wrapped to ensure that the identification tags remain with the sample.

Demonstrating compliance and record keeping

- Confirmation from cotton classers that their classing BMP requirements have been observed.
- Records of notifications or reports (written or verbal) from classing facilities regarding problems with samples, including any actions taken to rectify or address the issue.

6.0 Round Module Management

General Principle

To monitor all round modules for plastic wrap damage which may cause plastic contamination issues or water damage cotton.

Goal

All damaged or contaminated round modules from **farm** are to be recorded on the Round Module Condition Report (Appendix 5).

Damaged round modules must be processed with care, as plastic wrap may be present in the cotton and plastic contamination can wrap in equipment and continue to contaminate bales until the plastic disintegrates.

When round modules are being placed on the module pads, there is to be no person in the area, this is the same safety procedures that already apply for all types of modules. Care must be taken to not let the first round module roll off the module pad when unloading from the Moon buggy when starting a new row.

All damaged or contaminated round modules from **module pad** moving to the feeder bay by a moon buggy are to be monitored and damage recorded on the Round Module Condition Report for Ginning (Appendix 5).

7.0 Safety Management

General Principle

Sound workplace practices and operational arrangements for cotton ginning and occupational health and safety are essential, so that employers and employees at all levels within a site are empowered and encouraged to identify health and safety risks issues and options for dealing with these issues.

Everyone is responsible for achieving high standards of health and safety in the workplace. Commitment needs to be made to ensure the following:

Providing a safe place to work

- ✓ Providing safe work systems
- ✓ Providing safe plant and equipment
- ✓ Establishing objectives and targets that drive continuous improvement
- ✓ People being informed and involved in health and safety in the workplace.

Goal

This goal is to identify the key elements to be undertaken in pursuit of each of the OHS targets and objectives.

The main key elements that need to be present are:

1. An Occupational Health and Safety Management System (OHSMS) - should be in place, which gives a high degree of certainty that work conducted by company towards health and safety, plus provides the facilities operations at maximum efficiency and to the required standards.

It provides guidelines for the training of company personnel in OHS procedures and is used as a tool for continuous improvement.

Risk management is the process of identifying, assessing and controlling risks, with follow up reviews establishing the effectiveness of controls.

2. Machine and Equipment Guarding – All ginning equipment and machinery should be fully guarded, all conveyor, augers, belts, chain drives, etc to be covered or guarded to prevent injury or harm.

3. Fire Safety and Emergency Evacuation – Ensure fire safety controls are in place and emergency evacuation plans are developed and displayed in all areas and all employees have been trained in emergency evacuation procedures. Processes to cover:

- ✓ Emergency planning
- ✓ Emergency procedures

- ✓ Emergency assembly points
- ✓ Roles and responsibility - fire safety wardens are identified in each area and training is provided. Plus all employees must be provided with emergency evacuation training
- ✓ Firefighting equipment – ensure adequate fire extinguishers of the right type (e.g. CO² powder or foam extinguishers for electrical areas) is located in suitable locations and there are suitable working fire hose reels (water) used for general fires (cotton) when required. Ensure that fire extinguishers have been serviced and maintained within the prescribed period.
- ✓ Liaising with external emergency services.
- ✓ The plan must be tested to ensure performance.

4. Personal Protective Equipment (PPE) – It is essential that employees be provided with the right type and quantities of PPE to suit the task required. The company has an obligation to ensure all workers are protected, e.g. dust in general, cotton dust, eyes are protected, hearing is protected, feet and hands, etc.

Clear signage will need to be displayed showing the PPE requirements in each area; this will best be accomplished by using the relevant symbol.

5. Isolation, Lock Out Tag Out (LOTO) Procedures – When equipment and electrical equipment is faulty or out of service, it needs to be identified by using 'Danger' and/ or 'Out of Service' tags and records of isolation must be documented (Isolation Register) and kept including all repairs. Equipment that is isolated must not be used under any circumstances. As part of this process a test and tag program for electrical equipment should be introduced as part of the overall electrical safety.

6. Safe work permits – is to ensure people can safely undertake excavations, work in confined spaces, work at heights and other high risk work where there are no approved means of safe work without causing injury to themselves and others or damage to plant, equipment or product. This is where risk assessments and strict controls are in place to minimise risk.

7. Housekeeping – Operations in the gin and to external areas outside and around the site need to be kept clean at all times. There needs to be a program of regular cleaning occurring at all times to ensure a clean and tidy workplace.

8. Training and Induction – Detailed training and induction must be delivered regarding machine safe guarding, fire safety, PPE, isolation procedures, reporting of incidents and unsafe acts. Visitors are required to sign log book in office, given a short site induction and provided with the necessary PPE.



Not only does the content of training and induction need to be appropriate, but it must meet the needs of the trainees' language, literacy and numeracy skills, level of existing knowledge and level of detail. Records of training must be established.

9. Accident/ Incident Notification – There needs to be a system put into place which records all the incidents that occur, type of incident, the cause and corrective action taken to rectify the incident. Also, did the person need treatment, how was the person treated and follow up action required.

10. Unsafe Acts – Is an intentional or unintentional violation of an established safe work practice, procedure, method or system. All employees need to be made aware of safety procedures, safety protocols and in particular to the above items. Everyone must understand what the difference is between a safe act and an unsafe act in the workplace.

11. Safety Audit – Should be conducted to ensure that all stop buttons, safety devices and load break isolators are working.

8.0 Environmental Management

General Principle

Cotton gins will be operated in a way that minimises their impact on the environment

Goal

Compliance with relevant State and federal laws and regulations

Best Management Practices for environmental management:

- ✓ Trash, dust and noise shall be monitored in accordance with licence requirements, 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 environmental, fire or safety risks.
- ✓ Gins will have a module fire management policy and procedure in place.
- ✓ The requirements of State Authorities regarding safety environmental protection, and insurers regarding fire, shall be fully observed.
- ✓ Gins will comply with the Memorandum of Understanding agreed between the cotton industry and the cattle industry regarding the non-supply of cotton trash for feeding of cattle.
- ✓ Run-off is formally managed.
- ✓ Round module plastic wrap to be recycled.

Demonstrating compliance and record keeping

- Records of compliance with the requirements of Statutory Authorities and insurers, regarding licence conditions, OHS, fire prevention etc. Evidence of appropriate actions beyond these requirements where considered prudent or warranted.
- Evidence of method of disposal of gin trash

Chemical Substances Procedure General Principles

A hazardous substance is defined as any flammable liquid, flammable gas, oxidising substance, toxic gas, oil, grease or other toxic substance or any corrosive substance which either alone or as part of a compound or mixture causes injury or illness to persons if the substance comes into contact with the eyes or skin or it's fumes or vapour are inhaled.

Goal

The goal is to manage hazardous substances in a way that provides a safe workplace, complies with legislation and does not harm the environment.

- ✓ Material Safety Data Sheet (MSDS) from product manufacturers and/ or suppliers for every product on site.
- ✓ Ensure current Register of all hazardous substances used or stored on sites is contained in the MSDS folder and HAZMAT box respectively.
- ✓ Ensure there are identified separate storage areas for all hazardous substances, e.g. correct signage identifying chemicals and storage requirements.
- ✓ Ensure there is separation between non-compatible hazardous substances.
- ✓ Ensure risk assessments using the Risk Assessment for Hazardous Substances are conducted for the use, handling, storage and disposal of hazardous substances.
- ✓ If the use of the hazardous substance causes a significant degree of risk to health, the Risk Assessment for Hazardous Substances, monitoring records and a health surveillance report must be kept for 30 years.
- ✓ If the use of the hazardous substance does not cause a significant degree of risk to health, the Risk Assessment for Hazardous Substances must be kept for 5 years.
- ✓ Ensure all containers are correctly labeled. Label containers when filling a small container from a larger container, e.g. label a spray bottle when filling it with window cleaner.
- ✓ Ensure there is the correct bunding associated with the hazardous storage to ensure all leaking chemicals are contained.
- ✓ Ensure contractors are trained in the safe usage, handling, storage and disposal of any hazardous substances the contractor is using in relation to the work the contractor is performing.
- ✓ Ensure the contractor supplies an MSDS for any substances the contractor brings on site.
- ✓ Ensure hazardous substances are disposed of in accordance with Local Government and Environmental Protections Agency (EPA) requirements.

Best Management Practices for chemical substances;

Ensure that for hazardous substances used on site the following records are kept and are available and readily accessible.

Demonstrating compliance and record keeping:

- Current Hazardous Substances Register.
- MSDS folder containing up to date (within 5 years of publication) MSDS's.
- Identified separate storage area for all hazardous substances, which are clearly signed.
- Separation between hazardous substances.
- Adequate bunding is supplied for containing hazardous substances.

For further reference of hazardous substances for storage and transportation refer to the ***Australian Dangerous Goods Codes (ADG Codes)*** as outlined in the ***The Storage and Use of Chemicals at Rural Workplaces Code of Practice*** and the ***Guide to the Handling and Transport of Dangerous Goods***.

9.0 Auditing Procedures

All ginning companies that are members of the Australian Cotton Ginners Association will be audited annually, during the ginning season, to determine their compliance to the latest version of the Best Management Practice Handbook for Ginning.

All individual operational gins will be audited and must be conducted while the gins are operational focusing on the entire BMP Handbook. These audits will be scheduled.

A checklist is used by the auditor which will be completed during the audit. The audit form will be completed in duplicate; one to report back to the individual gin and one to be sent to Cotton Australia with a recommendation to certify/ not certify the individual gin. If the individual gin complies with the BMP handbook for Ginning, Cotton Australia will forward certification to the individual gin which is valid for one year.

These audits are currently conducted by René van der Sluijs who is a certified Quality, Environmental and OHS systems auditor.

Appendix 1 Sticky Cotton Protocols

These protocols are based on the grower and ginner working together to identify any modules of cotton that may potentially contain sticky cotton.

For potentially sticky cotton:

Growers whose crops have had insects that may lead to sticky cotton will:

- ✓ maintain a close watch on areas where insect control is more difficult (e.g. under power lines, along tree lines and in areas of re growth)
- ✓ maintain a close watch on areas of the top and bottom edges of the field, where whitefly and aphid infestations may be more prevalent
- ✓ identify areas of the crop that may potentially sticky cotton and ensure that it is harvested separately, and as late as possible to allow time for the sugars to break-down
- ✓ place all potentially sticky cotton into separate module(s) that are clearly identified as potentially containing sticky cotton
- ✓ notify the gin

The ginner should then:

- ✓ Ensure that the modules are identified clearly on the gin run sheet
- ✓ Gin these modules separately, and as late as possible to maximise the time for the sugars to break-down
- ✓ Test every bale from these modules for stickiness (or notify the independent classing room of the need to test every bale)

If sticky cotton is found, it is recommended that post-ginning, a meeting be held between the grower, their consultant, the ginner and merchant, to discuss the situation with a view to:

- ✓ Identifying the cause of the stickiness
- ✓ Identifying any improvements in the ways for how the issue was dealt with



Appendix 2 Gin Contamination Recording Forms

Appendix 2C

Gin Site: _____
Month : _____

Grower Valley	# of Modules	Metal	Rocks	Timber	Grease and Oils	Fabric	Module Tarp	Module Rope	Grass	Plastic	Other	Total

Appendix 2 Gin Contamination Recording Forms



Appendix 2C

Gin Site: _____
Month : _____

Grower Valley	# of Modules	Damage to Gin	Time to Repair	Cost of Repairs

AUSTRALIAN COTTON GINNERS ASSOCIATION

Cotton Industry Mass Limits Chart - NSW

General Access:

Vehicles operate within statutory Legal mass limits in accordance with NSW "Road Transport (Mass, Loading and Access) Regulations 2005 - Schedule 1"

Concessional Mass Limits (CML):

CML allows those eligible to operate at increased mass limits compared to statutory limits. Vehicles operating under CML must be NHVAS accredited and carry a copy of the CML notice.

Higher Mass Limits (HML):

HML allows those vehicles that apply and meet the operating conditions to run at increased mass limits compared to statutory mass limits. Vehicles operating under HML must:

- be NHVAS accredited;
- have road friendly suspension fitted to all axles (except the steer axle);
- is monitored through the IAP program when it becomes available.
- operate at HML only on the AUSLINK road network.

Notes:

NHVAS is the National Heavy Vehicle Accreditation Scheme









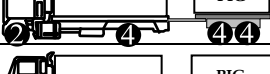

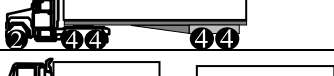

AUSLINK is a network of roads approved by the NSW and Australian Governments for use by HML vehicles.

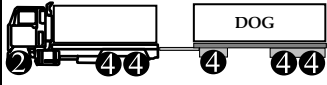
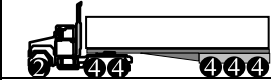
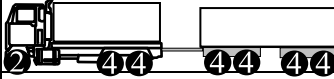
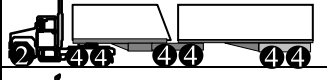
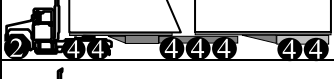
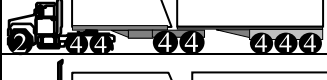
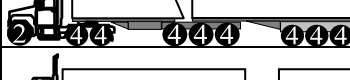
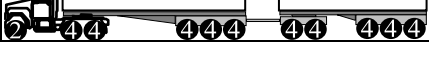
IAP is the Intelligent Access Program, a system of remotely monitoring vehicle movements.

Gross Mass Limit:

The total mass of a vehicle or combination must not exceed the lowest of the following:

The sum of the axle and axle group mass limits, or the Gross Combination Mass (GCM) or Gross Vehicle Mass (GVM) limit specified by the vehicle manufacturer, or the sum of the manufacturer's mass limits for the prime mover (Gross Vehicle Mass (GVM)) and the trailer (Gross Trailer Mass (GTM)) it is towing.

AUSTRALIAN COTTON		General Access	Concessionary Mass Limits (CML)	Higher Mass Limits (HML)
GINNERS ASSOCIATION				
COMMON NAME	TRUCK CONFIGURATION	Tonnes	Tonnes	Tonnes
Single Drive Axle Rigid		15.0		
Twin Steer Single Drive Axle Rigid	 Non Load Sharing F/ Axle 19t	20.0		
Bogey Drive Axle Rigid		22.5	23.0	
Single Drive Axle Rigid / Single Axle Pig		23.5		
Single/Single Artic/Semi		24.0		
Twin Steer /Bogey Drive Axle Rigid	 Non Load Sharing F/ Axle 26.5t	27.5	28.0	
Single Drive Axle Rigid/Single/Single Dog		33.0		
Single Drive Axle Rigid/Bogey Pig		30.0		
Bogey Drive Axle Rigid/Bogey Pig		37.5		
Bogey/Bogey Artic/Semi		39.0	40.0	
Bogey Drive Axle Rigid/Single /Single Dog		40.5	41.0	
Bogey Drive Axle Rigid/Tri Axle Pig		40.5		

AUSTRALIAN COTTON		General Access	Concessionary Mass Limits (CML)	Higher Mass Limits (HML)
GINNERS ASSOCIATION				
COMMON NAME	TRUCK CONFIGURATION	Tonnes	Tonnes	Tonnes
Bogey Drive Axle Rigid/Single/Bogey Dog		48.0		
Bogey/Tri Artic/Semi		42.5	43.5	45.5
Bogey Drive Axle Rigid/Super Dog		50.0		
Bogey/Bogey/ Bogey B Double		55.5	57.0	57.0
Bogey/Tri/Bogey B Double		59.0	61.0	62.5
Bogey/Bogey/Tri B Double		59.0	61.0	62.5
Bogey/Tri/Tri B Double		62.5	64.5	68.0
Road Train		79.0	81.0	85.0

