



Basic textile operations

Level -I

Learning Guide -33

Unit of Competence: Operate Cotton Ginning
Machines and Controlling Bale Press
Operations

Module Title: Operating Cotton Ginning Machines and
Controlling Bale Press Operations

LG Code: IND BTO1 M09 LG-33

TTLM Code: IND BTO1 TTLM, 0919v1

LO 6: Monitor product quality



Instruction Sheet	Learning Guide #33
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This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics –

- Identifying and applying cotton ginning quality requirements
- Monitoring Cotton flow
- checking Cotton quality standard
- Recognizing, isolating and reporting deviations

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, **you will be able to –**

- Identify and apply cotton ginning quality requirements
- Monitor Cotton flow
- check Cotton quality standard
- Recognize, isolate and report deviations

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described in number 3 to 20.
3. Read the information written in the “Information Sheets 1”. Try to understand what are being discussed. Ask you teacher for assistance if you have hard time understanding them.
4. Accomplish the “Self-check 1” **in page -.**
5. Ask from your teacher the key to correction (key answers) or you can request your teacher to correct your work. (You are to get the key answer only after you finished answering the Self-check 1).
6. If you earned a satisfactory evaluation proceed to “Information Sheet 2”. However, if your rating is unsatisfactory, see your teacher for further instructions or go back to Learning Activity #1.
7. Submit your accomplished Self-check. This will form part of your training portfolio.



Information Sheet-1	Identifying and applying cotton ginning quality requirements
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1. Identifying and applying cotton ginning quality requirements

1.1 The Selection Criteria of Seed Cotton:

Quality: is one of the most important aspects of producing a profitable cotton crop. The factors that determine cotton quality are:

Leaf grade: Leaf grade refers to the leaf or trash content in the cotton. Graded on a scale of 1 to 8, leaf grade is determined by human classers who compare a lint sample to Universal standards for the grades. A leaf grade of 8 is referred to as “below grade”, and can result in large price discounts.

Fiber length: Fiber length is primarily determined by cotton variety, but growing conditions and fertility can affect length as well. Night time temperatures of 60-70°F are optimum for fiber length development. Temperatures above or below this range result in shorter fibers. Reduced length can also result from deficit or excess soil moisture levels.

Length uniformity: Length uniformity is the ratio between the mean length of fiber and the upper half mean length expressed as a percentage. Low uniformity values are a function of fibers that are more easily broken. **Strength:** Strength is measured by clamping and breaking the beard of fibers with a 1/8-inch gage spacing between the clamp jaws. The strength reported is the force in grams required to break a bundle of fibers one tex unit in size.

Micronaire: Micronaire (mike) is a measure of the fineness of the cotton fiber. Unlike fiber length, mike is determined more by environmental conditions than variety. Mike is developed after the full fiber length is obtained.

Trash: Trash is a measurement of trash present in the lint. The measurement is made by the HVI video trash meter which measures the percentage area and particle count of trash on



the sample surface. This measurement provides an estimate of the total amount of trash in the bale.

Color: Color is the measure of greyness and yellowness of the lint. Reported as a two-digit code as measured by the HVI, color usually is not affected by variety.

Moisture: The Roller Gins can take up to 10-11% moisture but above that the drying process should be adopted before feeding the seed cotton to the ginning machines and the moisture contents should be brought down to below 10% before ginning.

Self-Check -1	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. What are cotton quality parameters in ginning? (4 pts.)
2. How can quality parameters of cotton tested? (6 pts.)

Note: Satisfactory rating - 3 points

Unsatisfactory - below 3 points

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions



1. _____

_____.

2. _____

_____.



Information Sheet-2	Monitoring Cotton flow
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2 Monitoring Cotton flow

2.1 Material Handling and Equipment:

Seed cotton can be safely stored in modules or trailers if its moisture content is kept at 12 percent less. Wet cotton or cotton containing the green plant material will heat during storage and quickly deteriorate. Cotton damaged in this manner produces low grades and poor quality seed. If the temperature exceeds 110F it should be ginned immediately.

Pre-cleaning: Pre cleaning is done in different ways but in this plant Hot Box is used to clean the seed cotton. It runs with 5 HP motor connected with the belt. The cotton is dried up and Seed cotton cleaners break up large wads and generally get the cotton open and in good conditions cleaning and drying.

$$\text{Ginning Percentage} = \frac{\text{lint weight}}{\text{Weight of ungined}} * 100$$

Conveying systems: After cleaning the seed cotton which is obtained from hot box it is sent to ginning machines by conveying systems. Conveying systems are of two types:

1. Belt conveyor system
2. Screw conveyor system

The main function of belt conveyor is to transport the seed cotton from hot box to cross screw conveyors. The cross screw conveyors have right and left hand screws to carry the seed cotton to the both sides of the gin houses

GINNING: Ginning is the Mechanical process involved in processing cotton. Ginning machines separates cotton fibers from the seed bolls and dust particles. This works on principle operation of gin.

Working of Gins is the In a double roller (DR) gin, two spirally grooved leather rollers, pressed against two stationary knives with the help of adjustable dead loads, are made to rotate in opposite directions at a definite speed

Summery monitoring



➤ **In the monitoring of ginning process:**

- Raw cotton quality must be checked
- Material feeding process is correctly managed
- Machine setting adjusted according to the process
- Quality should be checked during and after production
- Waste is managed appropriately in every stage of process

Self-Check -2	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Which of the following is not considered during monitoring of ginning process (2 pts.)
 - A) Trash of cotton
 - B) Maturity of cotton
 - C) PPC of fabric
 - D) Lint packaging
2. One of the following is ginning process. (2)
 - A) Lint cleaning
 - B) Drying
 - C) Pick inserting
 - D) Drawing-in
 - E) A&B
3. What are core things which are done in ginning monitoring? (4 pts.)

Note: Satisfactory rating – above 5 points points

Unsatisfactory - below 5



Information Sheet-3	checking Cotton quality standard
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3. Checking Cotton quality standard

Evaluation: The technique used to check the quality of fiber is “**HIGH VOLUME INSTRUMENT**”. High volume instrument systems are based on the fiber bundle strength testing. The bundle testing method is automated. The time for testing per sample is 0.3 minutes.

Principles of Fiber Testing Using HVI:

Sample Preparation: The Fibro Gram method is preferred while preparing the sample for fiber length estimation. Bale cotton which is brought from the industry is maintained at room temperature with the help air conditioners for 1-2 hours. This sample is divided into three parts each weighing 10 grams and it is processed for quality evaluation using HVI.

Measurement Of Different Parameters: Length, Strength, Elongation, Micronaire, Color, Trash and moisture. These parameters are discussed in the selection of the seed cotton criteria.



HVI machine

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**Self-Check -3****Written Test**

Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Instrument used to analyze cotton fiber is _____. (2 pts.)
 - A) Bale
 - B) Spinning machine
 - C) Ruler
 - D) High volume instrument
2. HVI can measure all except: (2 pts.)
 - A) Yarn length
 - B) Yarn count
 - C) Color
 - D) Fabric density
3. Why we measure cotton quality parameters? (4 pts.)

Note: Satisfactory rating -above 5 points

Unsatisfactory - below 5 points



Name: _____

Date: _____

Short Answer Questions

1. _____

2. _____

3. _____



6.4 Recognizing, isolating and reporting deviations

We can use HVI tester machine data how to report recognized and isolated quality deviations
As follows:

1, **SCI (spinning consistence index)**:-It determine the spin ability of the fiber.SCI>100is possible to spun our mixed sample SCI value is 118.

2, **Mic (Micronier value)**:- reflect fiber fineness and maturity as we seen our mixed fibers micronier value (4.24) is between the premium range (3.7-4.29) therefore it is fine and matured.

3, **UHML (upper half mean length)** or staple length: - determine the highest fiber length from the tested sample fibers. For cotton fibers staple length between 26mm-28mm is conceder as medium long our result is 28.1mm .other point mentioned related to UHML used to determine a ratio between UHML and ML our mixing result of UI is between intermediate (80 % - 82%) our tested UI is 80.1%.UI below 77% show there might be a high content of short fibers.

4, **Str (strength)**:- it is the force required to break the bread of fibers the breaking strength of cotton fiber is about 3.0 – 4.9 g/denier. Strong fiber can have fiber strength between 29-30.Therefore strength result of our sample (29.5) is strong.

5, **CGrd**:- color grade determine the Rd and yellowness(+b). Rd show the brightness of the sample and (+b) indicate the degree of the cotton color (color pigmentation) the cotton whitens between (31-1 to 31-4) is medium white accordingly our test result is between 31-3.

6, **TrAr(trash area)**:- it measure the amount of non-lint fibers (trash) in the fiber .the value of trash content should be within the range from 0-1.6% due to this our result of TrAr (0.69) has limited amount of trash.

Reporting the result of data



Bale ID	SCI Grade	Mst %	Mic	Mat	UHM L Mm	UI %	Sf [%]	Str [g/tex]	Elg [%]	Rd	+b	cGrd	Trcnt	TrAr[%]
1	120	8.1	4.27	0.86	28.52	80.6	11.4	29.3	6.3	75.1	9.2	31-3	104	0.69
2	131	8.2	4.40	0.86	2802	81.7	9.1	31.7	6.7	76.7	9.3	21-4	88	0.56
3	102	7.9	4.05	0.85	27.94	77.9	15.9	27.3	6.9	75.0	9.2	31-3	96	0.81
Average	118	8.1	4.24	0.86	28.16	80.1	12.1	29.5	6.6	75.6	9.3	31-3	96	0.69

Fig. Test result of HVI machine

Self-Check -4	Written Test
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Directions: Answer all the questions listed below. Use the Answer sheet provided in the next page:

1. Discuss on the result of HVI briefly. (6 pts.)

Answer Sheet

Score = _____
Rating: _____

Name: _____

Date: _____

Short Answer Questions

1. _____

