

CONSOLIDATED SUPER 120 LINT CLEANER

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Abstract

A new lint cleaner is available from Consolidated Cotton Gin Co., Inc. The Super 120 is 120" wide and is capable of 20+ bales per hour capacities while maintaining USDA recommended combing ratios and batt densities.

Introduction

This report reviews the new Super 120 Lint Cleaner. This new lint cleaner was developed to clean at the higher capacities currently being reached by Consolidated's 198 Gin Stand of 20+ bales per hour while maintaining USDA recommended combing ratios and batt densities. Previous lint cleaners were unable to operate at this high capacity while maintaining these optimum parameters. The Super 120 is the largest lint cleaner on the market today.

Discussion

Background

The 120 lint cleaner is 120" wide inside the heads. It is capable of 20+ bales per hour while maintaining USDA recommended combing ratios and batt densities. The combing ratio at 22 bales per hour is 15 (USDA recommended ideal). The combing ratio at 16 bales per hour is 21 (USDA recommended maximum). The batt density at these combing ratios is 20.7 grams per square foot (USDA recommended ideal). USDA research has shown these combing ratios and batt densities resulted in optimum cleaning efficiency and had the least adverse affects on fiber quality. The 120 utilizes a PLC control system to operate the dynamic brake and the safety interlocks installed on the unit.

Condenser Unit

The condenser unit for the 120 lint cleaner is an over-shot configuration. The drum is 36" in diameter and is covered with a 12 gauge perforated steel screen for long life. The drum shaft is installed with "ring fitter" hubs to allow for easy shaft and drum removal. The screen is doffed with a 9" diameter aluminum splined roller. A 9" diameter aluminum smooth roller floats next to the screen to allow for varying batt thickness while maintaining an air seal in the doffing chamber. The condenser is driven with a 5 hp variable speed gearmotor.

Saw Unit

The saw unit is constructed of heavy 3/4" heads. The feedworks section utilizes three 4 1/2" diameter aluminum rollers and a steel reinforced, aluminum feed bar. The feed bar is braced on the ends and at the center to maintain precise settings. A 24" diameter saw is made of 1" wall spun cast tubing and 2 11/16" shafts. The saw carries the lint across 9 grid bars in the cleaning section. These grid bars are constructed of 2"x 4" flat steel with 1" thick end heads. The grid bars are adjusted with (4) set screws and (4) 5/8" bolts on each end to maintain proper settings. The end heads of the cleaning section are 1 1/4" thick. The entire grid rack can be removed as a unit to allow for easy saw replacement. The saw is doffed with a 22" diameter brush constructed of 1/2" wall tubing and 2 11/16" shafts. The tubing is drilled and tapped to accept extruded aluminum brush clamps. Both the saw and the brush are installed on the lint cleaner with Dodge heavy duty double roller bearings for long life. The saw unit is driven with a 60 hp motor equipped with a electronic Dynamic Brake. This brake will stop the saw units rotation within a minute of being turned off.

Safety Interlocks

There are numerous safety features on the 120 lint cleaner. There is a proximity switch located near the brush shaft to detect shaft rotation. Air cylinders are used to lock the doors on the lint cleaner saw unit and deny access if the saw and brush are still rotating. There are proximity switches and limit switches on the doors to verify whether they are closed or open. The lint cleaner will not start until all doors are closed and locked with the air cylinders.

Testing & Evaluation

The first 120 lint cleaner was tested at a gin outside of Lubbock, Texas. This testing was done with "stripper" cotton in late April of 1997. Cotton was ginned on (4) Consolidated 112 gin stands were run through a single 120 lint cleaner in the first stage and a Super Twin 86 in the second stage. Capacities of 24-25 bales per hour were observed. After this testing, the feed bar was modified to help control the lint on the saw.

There were (10) Super 120 lint cleaners installed in commercial gins during 1997. (6) were installed in tandem at a (3) 198 plant in Mississippi and (4) in tandem in a (2) 198 plant in North Carolina. The North Carolina location was used as the observation point to determine what other modifications might be required for good operation of the lint cleaners. Modifications to the inlet and drum were made which resulted in a more consistent "batt" and the brush scrolls were modified to help the doffing action of the brush.

Overall, the lint cleaners in North Carolina performed quite well. The test gin was able to increase capacity and single stage lint clean while maintaining similar grades and turn-outs to the previous year. The previous year, capacity was lower and all of the cotton was cleaned with two stages of

lint cleaning. With the new lint cleaners, this facility produced a mote bale every 50+ bales of lint.

Conclusion

The Super 120 Lint Cleaner will play a large role in future

gin improvements. It will allow ginners to operate at higher capacities while maintaining fiber quality and operate their gin at its full potential. Further testing will be performed at the test facility in late January to fine tune the 120 lint cleaner to insure that it is one of the largest, highest capacity, highest quality lint cleaners on the market today.