

**PRELIMINARY COMPARISON OF CLEANING
EFFICIENCIES OF 24-D AND 16-D LINT
CLEANERS**

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Abstract

A saw-type lint cleaner equipped with a 16-inch diameter cleaning saw cylinder was compared to one with a 24-inch diameter saw cylinder individually and in combination. Based on Shirley Analyzer lint foreign matter content, the 24-D lint cleaner removed more foreign matter than did the 16-D lint cleaner when either used alone or in combination with another 16-D lint cleaner. The amount of material removed per bale by the 24-D lint cleaner was about one pound more than that removed by the 16-D lint cleaner. The 24-D lint cleaner had a higher cleaning efficiency than did the 16-D lint cleaner either when used alone or in combination with a 16-D lint cleaner. From a classer's leaf grade standpoint, the 24-D was about $\frac{12}{10}$ leaf grade better than the 16-D. In terms of improvement in the color of the cotton, there was essentially no difference between the 24-D and the 16-D. The 24-D produced bales with a higher monetary value than the 16-D. The 24-D lint cleaner is superior to the 16-D lint cleaner in terms of cleaning efficiency and bale value. This study represents the response of two cottons grown near Stoneville, MS, and other cottons may respond differently.

Introduction

Lint cleaners are designed to remove small leaf particles, motes, grass and bark that remain in the lint after seed-cotton cleaning and lint seed separation. Lint cleaners were developed and improved in conjunction with the transition from manual to mechanized harvesting of cotton. Although flow-through air-type lint cleaners are used in gins, the control batt, saw-type lint cleaner is the most common in the ginning industry today. The cleaning action of the control batt saw-type lint cleaner starts with lint from the gin stand or another lint cleaner formed into a batt on the condenser screen drum (Baker, 1978). The batt is then fed through one or more sets of compression rollers, passed between a very closely fitted feed roller and feed plate or bar, and then fed into the saw cylinder. The feed roller and feed plate grip the batt so that a combing action takes place as the saw teeth seize the fibers. Effective operation of the lint cleaner depends upon the condition of the batt, its' uniformity and

thickness, and the manner in which it is delivered to the saw (Mangialardi, 1993). It also depends upon the speed of the saw, the settings between the saw cylinder and the grid bar, as well as the condition of the saws and the grid bar, and the spacing between the grid bars. Saw-type lint cleaners generally utilize five to eight grid bars with one or more 12 to 24-inch diameter saws (Anthony, 1990). Continental Eagle introduced a 24-inch diameter saw several years ago and only limited information is available on the effect of the 24-D lint cleaner on cleaning cotton. The purpose of this study was to establish the relative cleaning efficiencies of a 24-inch diameter saw cylinder as compared to a 16-inch saw cylinder.

Discussion

The laboratory's commercial-size ginning plant was used in this study. The seed-cotton drying and cleaning sequence consisted of 24-shelf tower drier, 6-cylinder cleaner, stick machine, 24-shelf tower drier, 6-cylinder cleaner, and extractor-feeder, which is the conventional seed-cotton cleaning sequence recommended by the USDA Cotton Ginning Laboratories for ginning Midsouth spindle-picked cotton.

Two gin stands were used in the ginning system to obtain a range of lint cleaner feed rates varying from 5 to 12 bales per hour. In most cases, cotton ginned on a Continental Eagle Corp. 93-saw Double Eagle gin stand was cleaned with one or two stages of Continental 16-D (66-inch) lint cleaners. A Consolidated Cotton Gin Co. 112-saw gin stand was added in parallel with the Double Eagle gin stand to the system to get higher feed rates when cleaning with a Continental 24-D Golden Eagle (66-inch) lint cleaner. Except for the lint cleaner feed rates, the gin stands and lint cleaners were set to operate according to the manufacturer's recommendations.

The 16-inch diameter saw cylinder (16-D lint cleaners) rotated at 1,245 r/min producing a saw tip speed of 5,215 feet-per-minute. Combing ratios were 29.5:1 and 28.3:1, respectively, for the first and second stages of lint cleaning. In the experiments, the 24-inch diameter saw cylinder (24-D lint cleaner) operated at 902 r/min which gave a 5,667 feet-per-minute saw tip speed. Its combing ratio was 25.8:1. The 16-D cleaners used in the study had five grid bars and the 24-D cleaner had eight grid bars. Note that different year models of lint cleaners may have different numbers of grid bars.

Seed-cotton used in the experiments was grown and spindle-harvested by the Delta Research and Extension Center, Mississippi Agriculture & Forestry Experiment Station (MAFES), and the Agricultural Research Service, USDA, Stoneville, MS. Harvesting was done during the week of September 20-26, 1995 and ginning was performed as Experiments 95-143 and 95-144 during the last two weeks of November 13-29, 1995.

Fifty bale-size test lots were processed that involved a combination of two cotton harvestings, three lint cleaner feed rates, five lint cleaner treatments, and three replications per test combination. The zero lint cleaning treatment was not repeated for all feed rates. Each of the two cotton harvestings were Delta Experiment Station (DES) 119 (a hairy-leaf variety), but each cotton was grown in a different field under a different time frame. About 1,440 pounds of seed cotton was used in each test lot.

The five lint cleaner treatments consisted of (1) no lint cleaning, (2) one 16-inch diameter (16-D) saw-cylinder lint cleaner, (3) one 24-inch diameter (24-D) saw-cylinder lint cleaner, (4) two 16-D lint cleaners in series, and (5) one 16-D and 24-D lint cleaner in series. It was planned that feed rates to the lint cleaners be set at 100%, 150%, and 200% of rated capacity. Because of limitations in the machinery, the higher feed rates (above 11 bale/h) could not be obtained. Thus, during the experiments, the treatments were changed to those described in Table 1 and ranged from 4.8 to 10.7 bale/hr.

Test lots were assigned to lint-cleaning treatments in a randomized arrangement to neutralize the effects of processing order. The experiment was conducted and analyzed as a completely random design. The Statistical Analysis System (SAS) was used to investigate the results. An electronic moisture meter aided in adjusting driers to control the fiber-moisture content at fiber-seed separation. A temperature of about 180 °F was maintained at the top of the first tower drier on some replications, while no heat was used in the first drier on other replications. No heat was used in the second tower drier system on any of the test lots. Waste material extracted by the lint-cleaner treatments was collected at a condenser covered with a wire-mesh (100 x 100) screen.

Samples were obtained for seed-cotton moisture and foreign matter contents before and after seed-cotton cleaning and for lint moisture content at ginning. Ginned lint was sampled before and after the lint cleaning treatments for evaluation. The evaluation consisted of classer's color and leaf grades, lint foreign-matter content, and fiber test.

Fiber tests include High Volume Instrument (HVI) measurements, AFIS nep counts, Peyer length measurements, and seed-coat fragment levels. HVI measurements were made by AMS, Dumas, AR. Nep counts, Peyer length, and seed-coat fragment counts were made at the USCGL, Stoneville, MS and are not reported herein but will be reported later. Lint-cleaners' cleaning efficiency was calculated from lint foreign-matter determinations (Mangialardi, 1986). Cleaning efficiency is defined as the ratio of foreign matter removed from cotton to the foreign-matter content of the cotton as it entered the cleaners, expressed as a percentage. Bale values for the experiments were determined from the cotton's grade and staple length, net weight, and price per pound. Bale weights

were normalized to a weight of 480 pounds of lint packaged after one stage of standard saw-cylinder (16-D) lint cleaning. The price per pound was based on average spot-cotton prices during August-December 1995 in seven areas designated as spot markets, and on the 1995 loan prices.

Results

Ginning rates for the study actually ranged from 4.4 to 11.7 bale/h among the 50 individual test lots (Table 1). These ginning rates correspond to lint cleaner loading rates of 0.87 to 2.16 bale per hour per foot of lint cleaner saw-cylinder length. Moisture contents averaged 9.7, 8.4, and 5.0%, respectively, at the wagon, feeder, and lint slide. Seed-cotton foreign matter contents are also shown at Table 1.

Ginning rate, bale weight, lint foreign matter, lint cleaner efficiency, and lint cleaner waste for the study are shown in Table 2. The bale weight values are all adjusted to a standard of 480 pounds of lint after cleaning with one 16-D lint cleaner. After cleaning, the lint foreign matter content averaged 3.8% and ranged from a high of 6.2% with no lint cleaning to a low of 2.9% with a combination of the 16-D and 24-D lint cleaners. Lint cleaner waste for one 16-D lint cleaner operated at 4.7 and 7.2 bales per hour was 12.5 pounds and 12.8 pounds, respectively (Table 3). For two 16-D lint cleaners operated in series at feedrates of 4.8 and 7.3 bales per hour, lint cleaner waste values were 18.2 and 18.6 pounds, respectively. One 24-D lint cleaner following the Continental 93 Saw Double Eagle Gin Stand at 7.4 bales per hour produced 12.9 pounds of waste per bale which is about the same as one 16-D. A 16-D in combination with a 24-D removed 19.7 pounds of material per bale as compared to 18.6 pounds for two 16-D lint cleaners. For the higher process rate for the 24-D, a Consolidated 112 gin stand and a Continental 93 Gin Stand were used in parallel to produce ginning rates of 7.4, 9.6, and 10.7 bales per hour. At these ginning rates, the 24-D lint cleaner removed 13.2, 13.6, and 12.4 pounds of materials, respectively. Thus, one 24-D removes slightly more material than one 16-D (Table 3). Across all feedrates, cleaning efficiencies were 28.2%, 47.6%, 52.3%, and 41.1%, respectively for one 16-D, two 16-D's, one 16-D plus one 24-D, and one 24-D (Table 2). There was no statistical difference in cleaning between the series lint cleaner treatments. A 24-D at 41.4% cleaning efficiency was significantly better (48.6%) than the 16-D at 28.2% efficiency. The averaged cleaning efficiency across all treatments was 40.7%.

Classer's grade for color and leaf as well as staple length are presented in Table 4. With no lint cleaning the color grade designations were mixtures of 42's and 41's. With one 16-D or with one 24-D the color grades were 41's and 31's. For two lint cleaners in series, the color grades were 31. In order to differentiate better between these grades, they were converted to a statistical index. With this method, zero lint cleaning treatment averaged 92.6 and was significantly different from the other lint cleaner treatments.

There was no difference between the color after the 16-D and the 24-D lint cleaners nor between the two series lint cleaners. Leaf grade without lint cleaning averaged 5.3 as compared to 4.1, 3.6, 3.3, and 3.0, respectively, for one 16-D, one 24-D, two 16-D's, or one 16-D plus one 24-D. The overall leaf grade average was 3.8. For staple lengths, all of the lint cleaning treatments significantly reduced staple length from the zero lint cleaning treatment but were not significantly different from each other.

For the HVI color designation, the 16-D was color 31 as compared to color 41 for the 24-D (Table 5). When these HVI color's were converted to statistical indexes, there was no difference between them. For trash measured as percent area by the HVI system, there was no difference between the 16-D and the 24-D but the combination 16-D and 24-D was significantly better than the two 16-D's in series. Statistically, the HVI length did not vary across lint cleaner treatments. Uniformity averaged 83.3 and ranged from 82.9 for the 16-D and 24-D series lint cleaners to 83.4 for the one 16-D lint cleaner (Table 6). Without lint cleaning, uniformity was 83.9. Bale values (based on the average spot market prices during August-December 1995, wherein the price for color 31 leaf 4 was 85.4 cents a pound) for the treatments without lint cleaning averaged \$393 per bale (Table 7). The highest bale value occurred with one 24-D processing cotton at a feedrate of 7.9 bales per hour and was \$421. The lowest value (\$401 per bale) was from one 16-D at 7.3 bales per hour. Apparently, the 66-inch wide 16-D lint cleaner was overloaded at 7.3 bales per hour, whereas the 66-inch wide 24-D was properly loaded at 7.9 bales per hour.

Producer-oriented results of the study are summarized in Table 8. The monetary results should not be used as guidelines in specifying cleaning machines because different results will be obtained when using any particular set of data and pricing scenarios. The most important finding is the cleaning efficiencies of the lint cleaner treatments.

Summary

Based on Shirley Analyzer lint foreign matter content, the 24-D lint cleaner removed more foreign matter than did the 16-D lint cleaner when either used alone or in combination with another 16-D lint cleaner. The amount of material removed per bale by the 24-D lint cleaner was about one pound more than that removed by the 16-D lint cleaner. The 24-D lint cleaner had a higher cleaning efficiency than did the 16-D lint cleaner either when used alone or in combination with a 16-D lint cleaner. From a classer's leaf grade standpoint, the 24-D was about ½ leaf grade better than the 16-D. In terms of improvement in the color of the cotton, there was essentially no difference between the 24-D and the 16-D.

Disclaimer

Mention of a trade name, propriety product or specific equipment does not constitute a guarantee or warranty by the U.S. Department of Agriculture and does not imply approval of a product to the exclusion of others that may be suitable.

References

- Anthony, W. S. 1990. Performance characteristics of cotton ginning machinery. Transactions of the ASAE. 33(4):1089-1098.
- Baker, Roy V. 1978. Performance characteristics of saw-type lint cleaners. Transactions of the ASAE. 21(6):1081-1087,1091.
- Mangialardi, Jr., Gino J. 1986. An alternative method for determining lint cleaner efficiency. Transactions of the ASAE. 29(1):288-293.
- Mangialardi, Jr., Gino J. 1993. Effect of lint cleaning at gins on market value and quality. Applied Engineering in Agriculture. 9(4):365-371.

Table 1. Seed-cotton moisture and foreign-matter data, and lint moisture contents for lint cleaner grid bar parameters study, crop of 1995.¹

| Item | Feed rate | | Lint cleaner treatment ² | | | | | |
|-----------------------------|-----------|--------|-------------------------------------|---------|----------|---------|---------|------|
| | No. | Bale/h | 0 | 16D | 2-16D | 16+24D | 24D | Avg. |
| Wagon moisture content (%) | 1 | 4.8 | 10.0 (6) | 9.6 (6) | 9.4 (6) | - | - | 9.7 |
| | 2 | 7.3 | - | 9.8 (6) | 10.0 (6) | 9.9 (6) | 9.1 (7) | 9.7 |
| | 3 | 10.1 | - | - | - | - | 9.7 (7) | 9.7 |
| | Avg. | - | 10.0 | 9.7 | 9.7 | 9.9 | 9.4 | 9.7 |
| Wagon foreign matter (%) | 1 | 4.8 | 4.9 (6) | 5.1 (6) | 4.8 (6) | - | - | 5.0 |
| | 2 | 7.3 | - | 4.6 (6) | 5.2 (6) | 5.0 (6) | 5.3 (7) | 5.0 |
| | 3 | 10.1 | - | - | - | - | 5.1 (7) | 5.1 |
| | Avg. | - | 4.9 | 4.9 | 5.0 | 5.0 | 5.2 | 5.0 |
| Feeder moisture content (%) | 1 | 4.8 | 8.6 (6) | 8.4 (6) | 8.8 (6) | - | - | 8.6 |
| | 2 | 7.3 | - | 8.4 (6) | 8.6 (6) | 8.5 (6) | 8.3 (7) | 8.4 |
| | 3 | 10.1 | - | - | - | - | 8.0 (7) | 8.0 |
| | Avg. | - | 8.6 | 8.4 | 8.7 | 8.5 | 8.1 | 8.4 |
| Feeder foreign matter (%) | 1 | 4.8 | 2.2 (6) | 2.2 (6) | 2.3 (6) | - | - | 2.2 |
| | 2 | 7.3 | - | 4.8 (6) | 5.0 (6) | 2.4 (6) | 2.2 (7) | 2.3 |
| | 3 | 10.1 | - | - | - | - | 2.4 (7) | 2.4 |
| | Avg. | - | 2.2b | 2.2b | 2.3ab | 2.4a | 2.3b | 2.3 |
| Lint moisture content (%) | 1 | 4.8 | 5.2 (6) | 5.1 (6) | 5.2 (6) | - | - | 5.2 |
| | 2 | 7.3 | - | 4.8 (6) | 5.0 (6) | 5.2 (6) | 5.1 (7) | 5.1 |
| | 3 | 10.1 | - | - | - | - | 4.6 (7) | 4.6 |
| | Avg. | - | 5.2 | 5.0 | 5.1 | 5.2 | 4.9 | 5.0 |

¹Means for the feed rate and lint cleaner treatment averages followed by different letters are significantly different at the 0.05 level of probability according to the Waller-Duncan procedure.

² Number of bales tested are in parenthesis.

Table 2. Ginning rates, cleaning efficiencies, foreign matter, and bale weights for lint cleaner grid bar parameters study, crop of 1995.

| Item | Feed rate | | Lint cleaner treatment ¹ | | | | | |
|----------------------------------|-----------|--------|-------------------------------------|-----------|-----------|-----------|-------------|-------|
| | No. | Bale/h | 0 | 16D | 2-16D | 16+24D | 24D | Avg. |
| Gin rate (%) ² | 1 | 4.8 | 94(6) | 94 (6) | 94 (6) | - | - | - |
| | 2 | 7.3 | - | 144 (6) | 144 (6) | 144 (6) | 94 (7) | - |
| | 3 | 10.1 | - | - | - | - | 120/134 (7) | - |
| | Avg. | - | - | - | - | - | - | - |
| Bale net weight (lb) | 1 | 4.8 | 490.8 (6) | 480.2 (6) | 474.3 (6) | - | - | 481.8 |
| | 2 | 7.3 | - | 481.5 (6) | 471.2 (6) | 471.8 (6) | 479.1 (7) | 476.0 |
| | 3 | 10.1 | - | - | - | - | 461.9 (7) | 461.9 |
| | Avg. | - | 490.8 | 480.8 | 472.8 | 471.8 | 470.5 (7) | 476.1 |
| Lint cleaner waste wt. (lb/bale) | 1 | 4.8 | - | 12.5 (6) | 18.2 (6) | - | - | 15.3 |
| | 2 | 7.3 | - | 12.9 (6) | 18.5 (6) | 19.7 (6) | 15.1 (7) | 16.5 |
| | 3 | 10.1 | - | - | - | - | 12.5 (7) | 12.5 |
| | Avg. | - | - | 12.7b | 18.3a | 19.7a | 13.8b | 15.5 |
| Shirley analyser waste (%) | 1 | 4.8 | 6.23 (6) | 4.00 (6) | 3.00 (6) | - | - | 4.41 |
| | 2 | 7.3 | - | 4.12 (6) | 3.27 (6) | 2.88 (6) | 3.69 (7) | 3.50 |
| | 3 | 10.1 | - | - | - | - | 3.54 (7) | 3.54 |
| | Avg. | - | 6.23a | 4.06b | 3.13d | 2.88d | 3.61c | 3.83 |
| Lint cleaner efficiency (%) | 1 | 4.8 | - | 26.4 (6) | 49.2 (6) | - | - | 37.8 |
| | 2 | 7.3 | - | 30.0 (6) | 45.9 (6) | 52.3 (6) | 37.2 (7) | 41.2 |
| | 3 | 10.1 | - | - | - | - | 45.1 (7) | 45.1 |
| | Avg. | - | - | 28.2c | 47.6a | 52.3a | 41.1b | 40.7 |

¹ Number of bales tested are in parenthesis.

² Figures are percent of rated lint cleaner capacity.

Table 3. Summary of treatments, lint cleaner feed rates, and bale and lint cleaner waste weights, experiments 94-143 and 94-144.

| Gin stand used ¹ | Lint cleaners used ² | Number bales in average | Lint cleaner feed rates (bale/h) | Lint cleaner loading (bale/h/ft of saw) | Adjusted ³ | |
|-----------------------------|---------------------------------|-------------------------|----------------------------------|---|-----------------------|------------------------------|
| | | | | | Bale net wt. (lb) | Lint cleaner waste (lb/bale) |
| C93 | 0 | 6 | 4.8 | 0.94 | 493 | - |
| C93 | 16D | 6 | 4.7 | 0.92 | 480 | 12.5 |
| C93 | 16D | 6 | 7.2 | 1.42 | 480 | 12.8 |
| C93 | 2-16D | 6 | 4.8 | 0.94 | 472 | 18.2 |
| C93 | 2-16D | 6 | 7.3 | 1.44 | 474 | 18.6 |
| C93 | 24D | 2 | 7.4 | 1.46 | 480 | 12.9 |
| C93 | 16D+24D | 6 | 7.2 | 1.42 | 473 | 19.7 |
| CS+CN | 24D | 4 | 7.4 | 1.46 | 480 | 13.2 |
| CS+CN | 24D | 4 | 9.6 | 1.89 | 479 | 13.6 |
| CS+CN | 24D | 3 | 10.7 | 2.10 | 481 | 12.4 |

¹C93 or CN = Continental Eagle 93-saw gin stand, CS = Consolidated Cotton Gin 112-saw gin stand.

²Treatments: 1 = no lint cleaning, 2 and 3 = one 16-D lint cleaner, 5 and 6 = two 16-D lint cleaners in series, 8 = one 16-D and one 24-D lint cleaner in series, 9, 10, 11, and 12 = one 24-D lint cleaner.

³All bales were adjusted to 480 lb lint after lint cleaning with one stage of 16-D saw-cylinder lint cleaner.

Table 4. Classer's grade and staple length data for lint cleaner grid bar parameters study, crop of 1995.

| Item | Feed rate | | Lint cleaner treatment ¹ | | | | | |
|-------------------------|-----------|--------|-------------------------------------|-----------|-----------|----------|-----------|-------|
| | No. | Bale/h | 0 | 16D | 2-16D | 16+24D | 24D | Avg. |
| Classer's color index | 1 | 4.8 | 92.6 (6) | 97.5 (6) | 98.3 (6) | - | - | 96.1a |
| | 2 | 7.3 | - | 95.3 (6) | 97.5 (6) | 98.7 (6) | 98.0 (7) | 97.4a |
| | 3 | 10.1 | - | - | - | - | 95.3 (7) | 95.3b |
| | Avg. | - | 92.6d | 96.4c | 97.9ab | 98.7a | 96.6bc | 96.6 |
| Color grade designation | 1 | 4.8 | 42/41 (6) | 41/31 (6) | 31 (6) | - | - | 41/31 |
| | 2 | 7.3 | - | 41/31 (6) | 41/31 (6) | 31 (6) | 41/31 (7) | 41/31 |
| | 3 | 10.1 | - | - | - | - | 41 | 41 |
| | Avg. | - | 42/41 | 41/31 | 31 | 31 | 41/31 | 41/31 |
| Leaf grade | 1 | 4.8 | 5.3 (6) | 3.9 (6) | 3.4 (6) | - | - | 4.2 |
| | 2 | 7.3 | - | 4.3 (6) | 3.3 (6) | 3.0 (6) | 3.4 (7) | 3.5 |
| | 3 | 10.1 | - | - | - | - | 3.9 (7) | 3.9 |
| | Avg. | - | 5.3a | 4.1b | 3.3c | 3.0d | 3.6c | 3.8 |
| Staple length (1/32-in) | 1 | 4.8 | 36.6 (6) | 35.9 (6) | 36.0 (6) | - | - | 36.2a |
| | 2 | 7.3 | - | 35.8 (6) | 35.6 (6) | 35.8 (6) | 36.0 (7) | 35.8b |
| | 3 | 10.1 | - | - | - | - | 35.5 (7) | 35.5c |
| | Avg. | - | 36.6a | 35.9b | 35.8b | 35.8b | 35.7b | 35.9 |

¹ Number of bales tested are in parenthesis.

Table 5. High Volume Instrument (HVI) color and trash data for lint cleaner grid bar parameters study, crop of 1995.

| Item | Feed rate | | Lint cleaner treatment ¹ | | | | | |
|------------------------|-----------|--------|-------------------------------------|----------|----------|----------|----------|-------|
| | No. | Bale/h | 0 | 16D | 2-16D | 16+24D | 24D | Avg. |
| HVI color index | 1 | 4.8 | 94.6 (6) | 97.0 (6) | 98.8 (6) | - | - | 96.8 |
| | 2 | 7.3 | - | 95.6 (6) | 97.7 (6) | 99.7 (6) | 97.1 (7) | 97.5 |
| | 3 | 10.1 | - | - | - | - | 94.9 (7) | 94.9 |
| | Avg. | - | 94.6b | 96.3b | 98.3a | 99.7a | 96.0b | 96.9 |
| HVI color designation | 1 | 4.8 | 41-3 (6) | 31-4 (6) | 31-3 (6) | - | - | 31-4 |
| | 2 | 7.3 | - | 31-4 (6) | 31-3 (6) | 31-4 (6) | 31-4 (7) | 31-4 |
| | 3 | 10.1 | - | - | - | - | 41-3 (7) | 41-3 |
| | Avg. | - | 41-3 | 31-4 | 31-3 | 31-4 | 41-3 (7) | 31-4 |
| Reflectance (Rd) (no.) | 1 | 4.8 | 71.2 (6) | 73.2 (6) | 73.9 (6) | - | - | 72.8b |
| | 2 | 7.3 | - | 72.4 (6) | 73.8 (6) | 74.1 (6) | 73.7 (7) | 73.5a |
| | 3 | 10.1 | - | - | - | - | 72.4 (7) | 72.4b |
| | Avg. | - | 71.2c | 72.8b | 73.9a | 74.1a | 73.0b | 73.1 |
| +b reading (no.) | 1 | 4.8 | 8.92 (6) | 9.32 (6) | 9.49 (6) | - | - | 9.24 |
| | 2 | 7.3 | - | 9.36 (6) | 9.47 (6) | 9.46 (6) | 9.49 (7) | 9.44 |
| | 3 | 10.1 | - | - | - | - | 9.19 (7) | 9.19 |
| | Avg. | - | 8.92c | 9.34b | 9.48a | 9.46ab | 9.34b | 9.34 |
| Pct area | 1 | 4.8 | 1.18 (6) | 0.51 (6) | 0.40 (6) | - | - | 0.69 |
| | 2 | 7.3 | - | 0.51 (6) | 0.42 (6) | 0.27 (6) | 0.41 (7) | 0.40 |
| | 3 | 10.1 | - | - | - | - | 0.56 (7) | 0.56 |
| | Avg. | - | 1.18a | 0.51b | 0.41c | 0.27d | 0.48bc | 0.53 |

¹ Number of bales tested are in parenthesis.

Table 6. High Volume Instrument micronaire, length, and strength data for lint cleaner grid bar parameters study, crop of 1995.

| Item | Feed rate | | Lint cleaner treatment ¹ | | | | | |
|------------------|-----------|--------|-------------------------------------|-----------|-----------|-----------|-----------|---------|
| | No. | Bale/h | 0 | 16D | 2-16D | 16+24D | 24D | Avg. |
| Micronaire | 1 | 4.8 | 4.72 (6) | 4.77 (6) | 4.74 (6) | - | - | 4.74c |
| | 2 | 7.3 | - | 4.71 (6) | 4.77 (6) | 4.76 (6) | 4.73 (7) | 4.74a |
| | 3 | 10.1 | - | - | - | - | 4.61 (7) | 4.61b |
| | Avg. | - | 4.72 | 4.74 | 4.76 | 4.76 | 4.67 | 4.72 |
| HVI length (in.) | 1 | 4.8 | 1.135 (6) | 1.119 (6) | 1.121 (6) | - | - | 1.125a |
| | 2 | 7.3 | - | 1.114 (6) | 1.109 (6) | 1.110 (6) | 1.116 (7) | 1.113bb |
| | 3 | 10.1 | - | - | - | - | 1.104 (7) | 1.104c |
| | Avg. | - | 1.135a | 1.116 | 1.115b | 1.110b | 1.110b | 1.116 |
| Uniformity (%) | 1 | 4.8 | 83.9 (6) | 83.4 (6) | 83.3 (6) | - | - | 83.6 |
| | 2 | 7.3 | - | 83.3 (6) | 83.2 (6) | 82.9 (6) | 83.3 (7) | 83.2 |
| | 3 | 10.1 | - | - | - | - | 83.0 (7) | 83.6 |
| | Avg. | - | 83.9a | 83.4b | 83.3b | 82.9c | 83.1bc | 83.3 |
| Strength (g/tex) | 1 | 4.8 | 31.35 (6) | 30.70 (6) | 30.91 (6) | - | - | 30.97 |
| | 2 | 7.3 | - | 30.85 (6) | 31.02 (6) | 30.97 (6) | 30.86 (7) | 30.92 |
| | 3 | 10.1 | - | - | - | - | 31.05 (7) | 31.05 |
| | Avg. | - | 31.35a | 30.78b | 30.96b | 30.97ab | 30.96b | 30.96 |

¹ Number of bales tested are in parenthesis.

Table 7. Bale values for individual test lots in lint cleaner grid bar parameters study, crop of 1995¹.

| Lint cleaner treatment | Feed rate | Bale value (dol) for two cottons and three replications shown | | | | | | | | |
|------------------------|-----------|---|-----|-----|------|--------|-----|-----|------|------------|
| | | 95-143 | | | | 95-144 | | | | Grand avg. |
| | | 1 | 2 | 3 | Avg. | 1 | 2 | 3 | Avg. | |
| 0 | 1 | 359 | 371 | 406 | 379 | 408 | 406 | 406 | 407 | 393 |
| 16D | 1 | 402 | 413 | 419 | 411 | 397 | 418 | 414 | 410 | 410 |
| 16D | 2 | 361 | 396 | 413 | 390 | 396 | 419 | 420 | 412 | 401 |
| 24D (C93) | 2 | - | - | - | - | - | 420 | 422 | 421 | 421 |
| 24D | 2 | 412 | 412 | 413 | 412 | 421 | - | - | 421 | 416 |
| 24D | 3 | 412 | 412 | 412 | 412 | 419 | - | - | 419 | 416 |
| 24D | 3 | 413 | 413 | 412 | 413 | - | - | - | - | 413 |
| 2-16D | 1 | 408 | 409 | 408 | 408 | 403 | 416 | 419 | 413 | 410 |
| 2-16D | 2 | 406 | 416 | 409 | 410 | 403 | 413 | 418 | 411 | 410 |
| 16+24D | 2 | 415 | 416 | 407 | 413 | 414 | 415 | 417 | 415 | 414 |

¹ Bale values are based on average spot market prices at designated markets during August-December 1995; price for 41 color grade, 4 leaf grade, and 34/32 in. staple length averaged 85.38 cents per pound.

Table 8. Summary table of important factors.

| Lint cleaners | Bale weight ¹ (pounds) | Lint cleaner waste (lb/bale) | Cleaning efficiency (percent) | Leaf grade | Color | | Bale value (dollars) |
|---------------|-----------------------------------|------------------------------|-------------------------------|------------|-------|---------|----------------------|
| | | | | | HVI | Classer | |
| 0 | 492.7 | 0 | 0 | 5.3 | 41 | 42/41 | 392.67 |
| 16D | 480.0 | 12.7 | 28.2 | 4.1 | 31 | 41/31 | 405.67 |
| 24D | 478.9 | 13.8 | 41.1 | 3.6 | 41 | 41/31 | 414.85 |
| 2-16D | 474.4 | 18.3 | 47.6 | 3.3 | 31 | 31 | 410.67 |
| 16D+24D | 473.0 | 19.7 | 52.3 | 3.0 | 31 | 31 | 414.00 |

¹ Normalized with one 16D lint cleaner at 480 pounds