CHANGING THE SPEED OF THE CLEANING CYLINDER ON THE BATT-LESS LINT CLEANER

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Abstract

An experiment was run to determine the optimum speed of the cleaning cylinder on the Batt-Less Lint Cleaner. This experimental machine combines the roller ginning and lint cleaning functions into one unit. The roller ginning section is a standard 40-inch wide Hardwicke-Etter stand. The cleaning section is 46.5 inches wide, and consists of a 16-inch diameter, spiral-wrapped, saw-type cylinder. The experiment consisted of seven treatments times three replications for a total of 21 lots. Treatment one bypassed the lint cleaning section of the Batt-Less Lint Cleaner and instead cleaned the fiber with mill-type/air-jet lint cleaners. Treatments two through seven consisted of varying the cleaning cylinder speed at the following speeds: 300, 450, 600, 750, 900, and 1050 rpm, respectively. The criterion used for determining the optimum cylinder speed included condition of the fiber and yarn, lint turnout, lint loss, and lint cleaner efficiency. With the exception of color grade, there were no significant differences due to treatment on data from the USDA-AMS Classing Office. Overall, staple and micronaire averaged 45.0 32nd inch and 3.52, respectively. The lowest color grade occurred on the 350- and 450-rpm treatments, both of these treatments averaging 3.2. The control , 750- and 1050-rpm treatments all had the highest color grade of 2.0. There were no significant differences due to treatment on the Stelometer and Fibrograph data. Overall, fiber strength and elongation averaged 26.6 g/tex and 7.83%, respectively, and fiber length and uniformity averaged 1.33 inches and 47.6%, respectively. Also, fiber neps and short fiber content were not significantly different due to treatment, averaging 17.4 per 100 square inches and 4.45%, respectively. Lint trash content, by the Shirley Analyzer, was significantly different due to treatment. Lint from the 300-rpm treatment contained the most trash at 2.7%. Trash content then decreased as cylinder speed increased with the 1050-rpm treatment containing 1.5% trash content. The yarn data included both 36's and 50's carded yarn. On the 36's yarn, the only measurements that were significantly different due to treatment were opening and cleaning waste, and strength. The opening and cleaning waste followed the same pattern as the lint trash content with the 300-rpm treatment having the highest waste (3.24%) and the 1050-rpm treatment having the lowest waste (1.70%). Yarn strength ranged from 22.4 (the control treatment) to 23.1 (the 600-rpm treatment) g/tex. The overall means of other 36's yarn measurements that were not significantly different due to treatment are as follows: adjusted brake factor (Skein) of 3669; elongation (Statimat) of 7.05%; and neps, thick places, and low places of 88, 204, and 4 per 1000 yards, respectively. None of the 50's yarn data was significantly different due to treatment, and some of their overall means are as follows: adjusted brake factor of 3369; strength and elongation of 22.2 g/tex and 6.68%, respectively; and neps, thick places, and low places of 224, 329, and 44 per 1000 yards, respectively. Lint turnout was not significantly different due to treatment and averaged 35.2% overall. Lint loss was significantly different due to treatment and ranged increasingly from 0.12 to 1.11% on treatments 1 through 7, respectively. Further analysis of the data is needed to determine the optimum speed of the cleaning cylinder.

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