CHANGING THE SPEED OF THE ROTARY KNIFE ON A ROLLER GIN STAND

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Abstract

An experiment was run the determine the optimal frequency of the rotary knife (6 blade) on a roller gin stand. Six treatment levels of rotary knife frequency were chosen: 150, 300, 450, 600, 750, and 900 r/min. (The manufacturer's specification for rotary knife frequency on the gin stand tested is 389 r/min). The criterion used for determining the optimal rate included any damage to the fiber or seed, and differences in ginning rate. There were no significant differences due to treatment with respect to fiber properties. Overall, fiber strength and elongation by the Stelomter averaged 27.8 g/tex and 6.98%, respectively. Fiber span length and uniformity by the Fibrograph averaged 1.38 inches and 47.5, respectively. Fiber grade, staple, and micronaire by the USDA-AMS Classing office averaged 1.67, 46.8 32nd inch, and 38.1, respectively. These fiber properties are on samples taken from the bale and include two Aldrich beater/air jet lint cleaners. With the exception of linters content, there were no significant differences due to treatment on the seed properties. Overall, foreign matter content of the seed averaged 2.16%, and seed grade averaged 114. The 300-r/min rotary knife treatment had the lowest linters content of 1.67%. Linters content on the 150-r/min treatment was 1.73%, and ranged progressively from 1.83 to 2.88% on the remaining treatments. Ginning rate was significantly different due to treatment, with the highest rate occurring on the 300-r/min treatment, this rate being 1.90 bales/hr. The 150-r/min treatment had the lowest ginning rate (1.24 bales/hr). Ginning rate on the 450- through 900- r/min rotary knife treatments ranged decreasingly from 1.83 to 1.31 bales/hr.

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