

THE IMPORTANCE OF FIBER PROPERTIES IN EVALUATING WEST TEXAS COTTONS

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Abstract

Faerber and Gannaway have shown that the best spinning West Texas cottons in high speed open-end spinning machines have long length, small linear density, high maturity, and the greatest fiber and yarn strengths. These particular cottons, therefore, are classified as "World Class Cottons" and confirm previous results by Faerber and Duessen for other cottons in high speed open-end spinning machines. De Luca and Thibodeaux have shown that the lower the angular dispersion of the 50% X-ray Intensity 002 diffraction arc of cotton fibers, the greater are single fiber, fiber bundle and yarn strengths for any cottons. By measuring the 50% X-ray angle for the same West Texas cottons and comparing the data with the various fiber properties and fiber, bundle, and yarn strengths the underlying reasons for growing improved varieties of cottons may be determined. These analyses show similar results to earlier work of DeLuca and Thibodeaux for all strength measurements as related to the 50% X-ray angle. The fiber properties, however, exhibit different results. With the exception of fiber maturity (fiber maturity is nearly constant), the 50% X-ray angle is highly correlated with each fiber property. Best results are obtained when fiber, bundle, and yarn tensile moduli are used. When multiple correlations of the several tensile moduli are compared with the 50% X-ray angle and all fiber properties, X-ray angle and all fiber properties except one fiber property is excluded. The reason for this is statistical collinearity among all of the above properties. Thus, "World Class Cottons" have the smallest 50% X-ray angle in addition to: long length, small linear density, high maturity, and the greatest fiber, bundle, and yarn strengths.

References

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