COTTON FIBRE ELONGATION – MEASUREMENT AND ROLE IN SPINNING
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Abstract

A large spinning trial has recently been completed at CSIRO on commercial ring spinning system with ten international cottons, which were carefully selected to cover wide ranges of fibre elongation, tenacity and length. The cotton samples were tested using various techniques including the Favimat single fibre tester, HVI and the CSIRO Tensor bundle tester. The cottons were spun into yarn counts of Ne 50 and Ne 60 and with two twist levels. A close examination on the measurement of cotton fibre elongation show there were reasonably good correlations between Favimat single fibre elongation and Tensor bundle elongation values. Moreover, the correlation between these two testing methods was greatly improved by introducing a new concept of specific elongation, which is defined as the ratio of elongation value to the linear density of the fibre (or bundle) used in the test. By using the specific elongation the square of correlation coefficient between Favimat and Tensor elongation is improved from 0.61 to 0.82 for the ten cottons. However, there was no correlation between Favimat single fibre elongation and HVI bundle elongation. The poor correlation between HVI and Favimat elongation is confirmed in published data reported by other researchers. The spinning results demonstrate that bundle elongation measured by Tensor had higher prediction power than other two testing methods for yarn elongation, yarn work-to-break and spinning ends-down. The spinning results also demonstrate that both bundle elongation and bundle tenacity measured by Tensor played important roles in spinning, and bundle elongation was more critical than bundle tenacity as far as their effect on yarn work-to-break and spinning performance was concerned. It is tentatively concluded that Favimat single fibre and Tensor bundle elongation measurements are adequate for ranking cotton on the basis of elongation and that HVI does not provide adequate measurement.