

CONFIRMATION OF LENGTH EFFECT ON HVI COTTON FIBER STRENGTH MEASUREMENT
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Abstract

Two experiments were performed to investigate the effect of variations in fiber length distribution on strength measured by different instruments. In these experiments, we assumed that cutting the fibers along their length would not have any effect on the strength measurements. This assumption was accepted in view of the results obtained with single-fiber tests using Mantis, even though further tests should be performed.

In the first experiment, fibers from five varieties with a wide range of High Volume Instrument (HVI) strengths were homogenized and transformed into a web where the fibers were maintained parallel by a drafting process. These fibers were then cut to a 0.75 ratio of their Upper Half Mean Length (UHML). In the second experiment, following a similar preparation process as described above, two varieties were cut to 0.50, 0.62, 0.75 and 0.87 ratios of their UHML. This cutting operation modified the fiber length distribution of the samples.

All the samples were characterized using Mantis, Stelometer, HVI and a research method known as the 'Reference Strength Tester' (RST) as used in previous research presented during Cotton Beltwide Conferences in 1998. As described in these previous presentations, Stelometer and RST use a true mass measurement of the broken fiber beard, while HVI estimates the mass of broken beard.

In these conditions, the fiber distribution had a significant effect on Stelometer strength (+ 2 g/tex fibers between cut at '0.5 UHML ratio' and 'uncut reference cotton') and HVI strength (+ 4 to 8 g/tex depending on the cotton between fibers 'cut at 0.5 UHML ratio' and 'uncut reference cotton'). No effect was observed on the RST strength readings over the same UHML range.

The reason for those changes in HVI strength readings were found to be due to a change in the mass of broken fiber, according to the length of tested fibers. We also noticed that the positioning of the breaking jaws to make the break of the fiber beard may also be affected when fiber length becomes too short (< 25 mm).