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(Note) Development of New Reference Standards for Cotton Fiber Maturity

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An accurate measure of the maturity of a sample of cotton is essential for assessing the quality of the fiber. Work has begun to produce large quantities of diverse cottons with well-defined values of fineness and maturity. The reference method for measuring fiber maturity based microscopic image analysis of thin sections of fiber bundles was used to determine the area and perimeters of the individual fiber sections. Fiber samples representing the range of properties of U.S. cottons were obtained from cooperating cotton breeders. Procedures for analysis included preparing a bundle of parallel fibers randomly selected from each fiber type, embedding the bundle in a methacrylate matrix, sectioning the bundle with a microtome, and microscopic image analysis to determine the maturity of each fiber in the thin sections. Findings of the research indicate that: (i) the image analysis reference method gives reliable data with a minimum of problems and is at a point where the technology can be transferred to other laboratories; (ii) producing a range of fiber maturities by selective harvesting from the plant gives reasonable differences in fiber area, perimeter, and micronaire, but only marginal differences in maturity; (iii) a reasonable validation has been established between the present reference method and the 1984 International Textile Manufacturers' Federation (ITMF) Round Test cottons; (iv) image analysis measurements of fiber cross-sectional area and perimeter can be used to predict micronaire; and (v) micronaire measurements alone are not good predictors of fiber maturity.