

DEVELOPMENTS IN COTTON STANDARDS

James L. Knowlton
Standardization & Engineering Branch
USDA, AMS, Cotton Program
Memphis, TN

Abstract

Several important developments are occurring in cotton classification standards. In November 2001, the USDA sent a letter to the member organizations of the Universal Cotton Standards Agreement expressing desire to expand the Universal HVI Calibration Standards to cover the HVI measurements of micronaire, color and trash. Other standardization developments include incentives that have been created to encourage non-participating HVI testing laboratories to consider participation in the USDA HVI Check Test and HVI Level Assessment Programs. In the area of leaf standards, photograph guides and photograph standards for manual leaf grade classification and HVI trash measurements, respectively, were implemented for the 2001 classing season. And finally, in order to accommodate the 2001 Pima classification change requiring separation of color and leaf, the Pima grade standards were changed effective July 1, 2001.

Introduction

The Standardization & Engineering Branch of the USDA, AMS, Cotton Program is responsible for the development, maintenance, production, distribution and promotion of Universal, International and USDA cotton classification standards. Physical standards for cotton classification come in the form of color and leaf grade standards and HVI calibration standards. In 2001, over 4,500 color and leaf grade standard boxes, approximately 40,000 pounds of HVI calibration cottons and over 200 sets of HVI color and trash calibration standards were produced to meet cotton industry needs. In addition to the twelve classing offices, cotton classification standards produced by the Cotton Program are distributed to cotton industry users in the U.S. and in over 50 other countries throughout the world. In order to continue producing cotton standards that meet the demands of the cotton industry, the USDA, AMS, Cotton Program is committed to continual development and improvement efforts in the area of cotton classification standards.

HVI Standardization Efforts through the Universal Cotton Standards Agreement

The Universal Cotton Standards Agreement has played a major role in global standardization of cotton fiber quality since 1923. The success of this agreement is evidenced through the establishment of globally accepted standards by means of a partnership between the USDA and currently twenty-four signatory cotton associations representing twenty-one countries. Under the auspices of the agreement, signatories have agreed to use only Universal Standards to arbitrate U.S. grown American Upland cotton. In addition to use by signatory countries, Universal Standards are routinely used in over twenty-five non-signatory countries as the standard for U.S. and non-U.S. grown cottons.

The first Universal Color and Leaf Grade Standards were established in 1923 and continue to serve today as the official grade standards for American Upland Cotton. As technology has progressed through the years, so too has instrumentation for determining cotton fiber quality. Since 1991, USDA classification has provided cotton fiber quality information on the HVI measured properties of strength, length, uniformity index, micronaire, color and trash. Given the international acceptance of HVI testing, in 1996 the Universal Cotton Standards Agreement was amended to recognize USDA-produced HVI calibration cotton standards for strength, length and uniformity index. The new standards were named Universal HVI Calibration Cotton Standards and continue to serve today as the most recognized standards for HVI calibration.

In continuing this effort toward global HVI standardization, in November 2001 the USDA sent a letter to the foreign signatories and domestic organizations that nominate representatives to the Universal Standards Conference indicating its desire to propose additional Universal measurement standards for acceptance under the Universal Cotton Standards Agreement. These proposals will be considered during the June 12-13, 2002 Universal Cotton Standards Conference to be held in Memphis, Tennessee, USA. If adopted, Universal HVI Standards would be established for micronaire, color and trash. Although calibration standards are currently available from USDA for micronaire, color and trash, their recognition and acceptance would be greatly facilitated and enhanced if adopted as Universal HVI Standards. In conjunction with the proposal for Universal micronaire, color and trash standards, the USDA has also recommended that the USDA publication "Guidelines to HVI Testing" be used as a guide for standardized practices and procedures for HVI testing.

Other HVI Standardization Promotion Efforts

The USDA HVI Check Test Program currently has 53 international participants and 22 U.S. participants. Each month, two samples supplied by the USDA are HVI tested by the participants. The test data are sent to the USDA for analysis and a report is generated and distributed to all participants. The report gives each participant the USDA established values of the cottons as well as the overall participant average for each HVI measurement. The other check test offered by the USDA is the HVI Level Assessment Program which provides HVI users with the opportunity to submit their own check samples to the USDA for retesting. USDA's HVI testing results on the submitted samples are then returned to the participant.

The USDA encourages and promotes utilization of these testing programs. In order to create additional participation incentive, the USDA is now making the USDA HVI Check Test Program available to any new or former participant free of charge for one whole year. The only cost to new participants would be the cost to ship the samples. This offer will hopefully encourage non-participating HVI laboratories to see the value of the HVI Check Test Program in evaluating testing performance. As an incentive to increase participation in the USDA HVI Level Assessment Program, the USDA will now offer this program at no cost. The only cost to participants will be the cost of shipping samples to the USDA's Quality Assurance Branch in Memphis, Tennessee, USA. The only restriction will be to limit the number of submitted samples to ten per month per participant during the months of January through August. During the months of September through December, submitted samples will be limited to two per month.

The ultimate goal of these programs and efforts is to standardize the determination of cotton fiber quality throughout the world. Expanded utilization of these international testing programs by the world's HVI users can only promote global standardization and acceptance of HVI measurements.

HVI Color Grade Leads to Classer Leaf Guide Photographs

Classer's Need for Spotted and Tinged Grade Standards Eliminated

The 2000 USDA cotton classing season was the first to utilize HVI color grade as the official grade for Upland cotton color classification. Since the Upland cotton classer's role has been reduced to classifying leaf and extraneous matter only, the need for the classer to have grade boxes for the "spotted" and "tinged" grades no longer exists. Spotted and tinged grade standards are for color classification only and unlike the "white" standards do not serve as an official leaf grade standard. Therefore, as a result of classers no longer requiring the non-white grade standards, total Upland grade standards production was reduced from last year's production of 5,500 boxes to 4,260 for 2001.

Supplementing the White Grade Standards

The elimination of the classer's color grade provided an opportunity to enhance the leaf grade classification process by focusing on a leaf-only classer guide. Although classers were provided white grade standards for the 2001 classing season, the actual utilization of the boxes was minimal. The reduced usage of the boxes was a result of the implementation of a new concept that provided classers with photographs of the leaf grade standards. In developing this concept, seven photographs, each representing one of the seven leaf grades, were taken from the 1986 original cotton grade standards. The best photograph representations of the actual cotton standards were achieved with the use of high-resolution digital imaging. Once scanned into a computer, leaf grade images were printed using high quality ink jet printing. The resulting photographs are black and white images with clarity as sharp as the actual cotton leaf standards. Several hundred sets of the seven leaf grade images were then mounted into booklet form for actual classer use.

As a pilot study for the 2001 classing season, every USDA classer was given a set of photograph leaf guides. Classers were instructed to utilize the photograph guides as their primary reference. The resulting classer accuracy from the 2001 classing season compared to past seasons shows improvement. Leaf grade reproducibility, between classing office classers and Quality Assurance Branch classers, was 88% for 2001 compared to 86% and 82% for 2000 and 1999, respectively.

As a result of the successful implementation of the leaf guide photographs in 2001, cotton grade standards production will again be reduced for 2002. Upland grade standard's production will be reduced from 4,260 to 3,000 boxes. Each classing office will continue to have one full set of the Upland grade standards to give classers access to the official standard. However, for actual leaf grade classification at the classer's table, the leaf guide photographs will be utilized.

The 1986 Universal Color and Leaf Grade Cotton Standards are, and will probably remain for some time, the official standards for Upland cotton grade classification. However, a set of leaf guide images that accurately represent the 1986 leaf grade standards provide a classer with a reference that is quicker and easier to use than a cotton grade box. Other advantages include lower production costs (compared to cotton standards) and no within-grade variation between same-grade photographs.

Photograph HVI Trash Measurement Standards

HVI trash measurement calibration standards are in the form of a set of six cotton samples with varying degrees of trash content mounted under glass. These standards, referred to as “trash level cottons under glass”, were developed in the early 1990s and continue to serve as the calibration reference for the HVI trash measurement. In an attempt to reduce production costs and to improve consistency from set to set, photographs of the trash level cottons were developed. Sets of developed photographic images were then mounted in HVI trash calibration tile housings. An evaluation demonstrated that the images perform identically to the trash level cottons under glass. Additional advantages are easier handling due to the smaller housing and reduced susceptibility to level changes. The trash particles in the trash level cottons under glass can sometimes shift causing a level change. In classing office applications, plans were implemented in 2001 to phase in the photograph HVI trash standards as older sets of trash level cottons require replacing. The new photograph HVI trash standards are now available to all HVI users.

Color and Leaf Grade Standards for American Pima

The American Pima grade standards were last revised in 1986. On September 15, 1999 the Supima Association of America formally requested that the USDA change the current American Pima grading method to allow for separate classification of color and leaf. In order to accommodate the request, the American Pima grade standards were revised to provide six physical leaf standard graduations. Color grade levels of the six standards remained unchanged. In order to incorporate the leaf grade levels, all bark was removed from grades 4, 5 and 6 and appropriate leaf was added back to attain the proper leaf graduations. The revised standards were displayed at several locations in early 2000 to solicit comments. On April 15, 2000 the proposed rule for comments was published in the Federal Register. On June 20, 2000, a Pima Conference was held in Memphis, Tennessee to provide the cotton industry with the opportunity to make any final changes to the proposed revised standards. All segments of the industry approved the standards and on July 1, 2000 the final rule was published in the Federal Register making the changes final. The new standards became effective on July 1, 2001 and now serve as the new reference for the practical form grade boxes used for Pima classification. Three hundred and fifty practical form grade boxes, based on the Pima grade standards, are prepared annually. On June 19, 2001, the cotton industry approved the first practical forms based on the new Pima standards. The new Pima standards were put to use beginning with the 2001 Pima crop enabling the separate classification of color and leaf.

Conclusion

Cotton standards are the backbone to cotton fiber quality measurements. The primary mission of the USDA, AMS, Cotton Program is to “promote the orderly and efficient marketing of cotton by preparing, distributing, and encouraging the use of universal cotton classification standards”. In order to fulfill this mission, the Cotton Program is committed to meeting U.S. cotton industry needs through continuous development efforts in the area of cotton standards.