Understanding Standardization Cottons

Fiber testing instruments are used extensively in the selection of cotton for standards. This method ensures uniformity and accuracy in duplicating the standards in each set from year to year as long as the standard remains in effect.

The Cotton Program conducts crop surveys and other special studies to determine if any changes are needed in grade or other standards to accurately describe the cotton currently being produced or marketed. When a revision or change in standards becomes necessary, the Program notifies the overseas Signatory Associations and all major U.S. cotton industry groups of the proposed changes. After giving final consideration to the proposed standards at the next Universal Cotton Standards Conference, the Advisory Committee on Cotton Standards recommends action on the proposals to the Secretary. If the Secretary adopts the proposed standards, they become effective in one year as required by the U.S. Cotton Standards Act.

The USDA's official color and leaf grade standards for American Upland cotton have also been the Universal Cotton Standards since 1924. USDA is signatory to the Universal Cotton Standards Agreement with 24 cotton merchant and spinners associations in 21 countries in Europe, South America, and Asia. The agreement provides for (1) the adoption, use, and observance of the Universal Standards in the classification of U.S. Upland cotton, and (2) the preparation, distribution, and protection of copies of the Universal Standards. Conferences are held every three years in the United States to ensure accurate reproduction of the standards and to consider any revisions needed in the standards. In addition to representatives from the overseas signatory associations, representatives of producers, ginners, shippers, exchanges, and other segments of the cotton industry in the United States attend and participate in the work of these conferences and the Advisory Committee on Cotton Standards.

In response to a USDA proposal considered at the triennial conference in 1995, USDA's calibration standards for HVI measurements were incorporated into the Universal Standards Agreement. The proposal had broad support from the U.S. cotton industry because all U.S. cotton is classed by USDA's High Volume Instruments (HVI), and most sales by growers are based on this HVI classification data. The overseas signatory associations overwhelmingly supported the proposal also. While the pace of movement of the cotton industry in changing official cotton standards is conservative, the commitment to adopt to more efficient technology appears to be strong in the U.S. and abroad.

Official measurements for Fiber Length, Length Uniformity Index, Fiber Strength, Micronaire, Color, and Trash are performed by High Volume Instruments. Official classer determinations are made for leaf grade, and extraneous matter.

The cotton standards and other materials used for classing cotton, are listed below:

(1) **Color Grade of American Upland Cotton -** Color Grade describes the color of cotton lint. There are standards for 25 color grades of upland cotton and five categories of "below grade" color. Fifteen of these grades are represented in physical form by boxes of cotton representing the full range of each standard, while the remaining 10 grades and five below grade categories are descriptions based on the physical color grade standards.

(2) **Leaf Grade of American Upland Cotton** - Leaf grade describes the leaf or trash content in the cotton. There are seven leaf grades designated as leaf grade A1" through A7" , and all are represented by physical standards. In addition, there is a descriptive Abelow grade@ (leaf grade 8) designation.

The current reserve set of the Universal Standards for Color and Leaf Grades of American Upland Cotton is sealed and deposited in a vault in Memphis, TN. Copies of these standards, containing six samples or biscuits, known as practical forms, are prepared and sold for $125 f.o.b. Memphis, or $130 domestic delivery. The utmost care is taken to keep the range of color and leaf in all copies of each grade standard as nearly the same as possible. The standards for the seven White color grades contain the leaf content of the respective leaf grades. For example, the standard for Good Middling White (11) color contains the standard leaf content for Leaf Grade "l" and the standard for Low Middling White contains the standard leaf content of Leaf Grade "5".

The color of cotton deepens with age more in the high grades than in the low grades. The color of the cotton in the standards may differ considerably as time goes by, especially when the standards are stored under extreme conditions of temperature and/or relative humidity. Because of this natural propensity for change, copies of the grade standards must be freshly prepared annually and are effective for one year beginning each July 1.

(3) **Grades of American Pima Cotton** - There are six official grades (Grades A1" through A6") for American Pima cotton, all represented by physical standards. In addition, there is a descriptive "below grade" designation. Copies of the American Pima Grade Standards are sold for $160 f.o.b. Memphis, or $165, surface delivery.

(4) **Fiber Length**, **Length Uniformity Index, and Fiber Strength** - The Cotton Program uses High Volume Instruments for the classification of all Upland and American Pima cotton. There are Universal HVI Calibration Standards for American Upland cotton for calibrating length, length uniformity index, and strength. The present official standards for fiber or staple length provide for various lengths in terms of inches and fractions of an inch ranging from 13/16 inches upward, generally in graduations of one thirty-seconds of an inch. The upper half mean length of fiber is measured by the HVI system in hundredths of an inch and length is converted to thirty-seconds of an inch. Length uniformity index is the ratio between the mean length and the upper half mean length expressed as a percentage. Fiber strength is measured in grams per tex and represents the force in grams to break a bundle of fibers one tex unit in size. Both the Universal HVI Calibration Standards for Upland cotton and the USDA HVI Calibration Cottons for American Pima cotton are available, in 5-pound boxes, for $95 f.o.b. Memphis, TN or $100 domestic delivery. Two such cottons, which span a range in length and strength, are required for instrument calibration.

(5) **Micronaire** - Official cotton standards for micronaire or fiber fineness and maturity are described as the measure of such qualities provided by air flow instrument tests in terms of micronaire readings in accordance with established procedures. These procedures include descriptions of approved weighing and testing equipment and standard operating instructions for the equipment. Mike readings are expressed in units to the nearest one tenth, (e.g. 3.1, 3.2, 3.3, 3.4); however, common practice within the industry is to drop the decimal point when reporting "mike" readings (e.g. 31, 32, 33, 34). Mike readings of American Upland cotton range from 2.4 to 6.0. About 75 percent of the cotton crop falls in the 3.5 to 4.9 range.

The Cotton Program participates and manages the International Calibration Cotton Standards (ICCS) Program which, under the guidance of the ICCS Committee, establishes standard values

for International Calibration Cottons. Currently, there are six International Calibration Cotton Standards for Micronaire Only that span the range of micronaire scale from 2.6 to 5.5. The price for a 1-pound roll of the micronaire-only calibration cotton standards is $28 f.o.b. Memphis, or $31 domestic delivery. This price also includes the cost of a semiannual check test program which aids in achieving a common test level on a global basis. Each laboratory that purchases calibration cottons receives two samples for check tests each six-month period, and upon return of data, receives a report on its results compared to other participants. These standards have been purchased by more than 500 laboratories worldwide, and about 250 of the laboratories participated in the most recent semiannual check test. In addition to the semiannual check test, a quarterly check test for micronaire equipment is available to overseas arbitration laboratories. This program, which ensures a common level of test results, is available for a fee of $21 per quarter per laboratory.

(6) **Trash** - The trash measurement is made by the HVI video trashmeter which measures the percentage area and particle count of trash on the sample's surface. A trashmeter calibration tile and cotton trash level samples, mounted under glass, are available for calibration and verification of the trash measurements. The cost of the trash tile is $30 f.o.b. Memphis, TN or $33 domestic delivery. The cost of the trash level samples is $40 f.o.b. Memphis, TN ($240 for full set of six) or $44 domestic delivery ($264 for full set of six). The range of trash levels usually encountered is included in a set of six samples.

(7) **Color** - The HVI colormeter measures reflectance (Rd) and yellowness (+b). The Rd indicates the sample's degree of grayness and +b indicates how much yellow color is in the sample. Ceramic color calibration tiles for the HVI colormeter are distributed by the Cotton Program. The cost for a five tile set is $125 f.o.b. Memphis, TN or $130 domestic delivery.

(8) **Other Standards** - There are also Universal Standards for descriptions of laboratory atmospheric conditions and conditioning practices and procedures. In addition, a brochure entitled "Guidelines for HVI Testing" has been prepared that contains standardized procedures for HVI testing which will enable users of HVI systems to achieve a common test results level for each measured property.

Programs for Checking HVI Measurements - An HVI Check Test Program is conducted to ensure a standard level of testing. Two samples are sent to participants each month for testing. The returned data are summarized and each participant receives a report comparing their results to established values for the samples. The annual cost of the HVI check test program is $168 domestic and $324 overseas. An HVI Level Assessment Program was initiated in 1993 in response to the worldwide proliferation in the use of HVI measurements in trading Upland cotton in the world markets. Participants submit check samples that have been tested by HVI for retesting by the Quality Assurance Unit in much the same manner as the Cotton Programs internal supervisory procedures. The participant receives a report showing how well the results of the two tests compare. This program has been beneficial in achieving a common test level worldwide. Cost for this program is $4 per sample in lots of 10 samples.

Summary - USDA's cotton standards are used almost exclusively within the U.S. and are broadly accepted in the foreign marketing of Upland-type cotton, especially that grown in the United States. The standards provide a sound base for establishing market values that gain more acceptance with each year's crop. International trading disputes are settled by utilizing U.S. standards. The check test programs contribute to the growing confidence in USDA's cotton standards and also ensure a common level of test results for all users.