TRC

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DISCOUNT COTTONS American cottons are lowered in grade at USDA classing offices when bale samples are found to have a low or high micronaire value, and when the samples contain bark (pieces of the exterior surface of the cotton plant). The premium micronaire range is 3.5 through 4.9, and cottons with micronaire values below or above this level are given a reduction in grade and price. It is generally believed that micronaire is an indication of cotton maturity, but research has shown that this is not necessarily true. While a low micronaire reading does indicate immaturity in some cottons, there are other varieties that will mature completely below the 3.5 level. Research on this subject is continuing, and it appears at this time that a measurement of fiber maturity would be of considerably more value than micronaire to farmers and textile manufacturers.

Cotton produced in certain areas of the United States sometimes contains bark and is, therefore, given a lower USDA grade which results in a discounted price. Although experts have given various reasons why the bark content is high in some years and virtually nonexistent in others, it is difficult to predict when a crop will contain a high percentage of bark. An example of this can be found in the cotton harvested in the 25 counties surrounding Lubbock on the Texas High Plains. In 1971, 68% of the crop contained bark and was discounted at least one grade. In 1973 and 1979, only 4% of the cotton in this same area was found to have bark, and in 1977 there was only 1%. The best example of this in recent years occurred in 1981, when the Lubbock area produced 3.5 million bales of cotton. That year, 64% was discounted because of bark. Assuming a rather conservative estimate of $12.00 per bale reduction, this would mean cotton producers suffered a loss of more than $27 million. It is paradoxical that while the barky cotton was reduced in grade and sold at discounted prices, some of it had virtually no bark and processed quite well into quality yarns.

A program currently underway at the Textile Research Center is reevaluating barky cotton. This has already involved 18 bales, and before completion as many as 60 bales may be included. The organization of the project is such that fiber properties are held as constant as possible while comparing bales with and without bark. As in previous studies, we have learned that in some cases, barky cotton spins better and makes higher quality yarn than non-barky cotton with comparable fiber properties.

As indicated, this program is still underway and it will be some time before final results are available. A report will be presented in *Textile Topics* when it is completed.

EFFECTS OF MOISTURE ON COTTON PROPERTIES In the March 1983 issue of *Textile Topics* (Vol. XI, No. 7), we carried an article dealing with the effects of moisture on cotton fiber strength. We have received several comments about that report and have continued our study into this matter. Although we have not found anything new, we have verified some findings that were questioned by those who feel cotton samples should be conditioned for as long as 24 hours prior to testing on high volume instrument systems.

An interesting discussion developed on this subject at the March 1983 meeting of the USDA Committee on High Volume Instrument Standards. While some felt that 4 hours of conditioning would be sufficient, others stated that 8 hours, and preferably 24, would be better and would give more accurate results. The concensus of the discussion was that the longer conditioning period would give samples with a more uniform moisture content, but agreement was not unanimous that all samples should be conditioned for as long as 24 hours. In fact, several studies have shown that cotton arriving at a classing office or testing laboratory in normal condition -- i.e. not having been severely dried nor saturated with water -- should need no more than 4 hours for conditioning to give accurate results.

To satisfy questions we have had about this, it was decided to conduct a test here at the Center to

VISITORS Visitors to the Textile Research Center in July, in addition to those attending the J & J short course, were Eugene E. Alexandroff and Steve Clarke, Gentex Corporation, Carbondale, PA; Carl Anderson, Texas A&M University, College Station, TX; Preston Sasser, Cotton Incorporated, Raleigh, NC; Carl Cox, Natural Fibers & Food Protein Commission of Texas, Dallas, TX; Victor Arnold, University of Texas, Austin, TX; J. M. Judlin, Werner Management Consultants, San Antonio, TX; V. P. Singh and D. K. Sabharival, National Seeds Corporation, Ltd., New Delhi, India; M. R. Baga, Haryana Seeds Development Corporation, Ltd., Chandigarh, India; and Sham S. Dhanju, Punjab State Seeds Corporation, Ltd., Chandigarh, India.

determine what the results would be by conditioning cotton from a "bone dry" state to moisture stabilization in standard laboratory conditions of 70°F and 65% RH. We felt the best procedure would be to use a USDA standard, since fiber properties are listed on the package wrapper. The sample was dried as thoroughly as possible and then tested immediately on our Motion Control HVI 3000 system. Subsequently, it was retested at selected time intervals as indicated in the following table.

EFFECTS OF MOISTURE ON FIBER PROPERTIES
(USDA High Volume Standard No. 25034)

Fiber Property	Conditioning Time							USDA Values
	Dry	¼ hr	1 hr	2 hr	3 hr	4 hr	24 hr	
Micronaire	4.1	4.3	4.5	4.4	4.6	4.6	4.6	4.5
Length (in)	1.08	1.11	1.11	1.12	1.14	1.14	1.14	1.15
Length UR	82.5	82.5	81.8	81.8	83.0	82.2	83.2	82.4
Strength (g/tex)	16.8	19.8	23.0	27.5	26.5	26.2	25.0	30.9
Elongation (%)	4.4	4.2	4.7	4.7	4.5	4.6	5.0	--
Moisture Content (%)	4.00	5.00	5.25	5.50	5.80	6.00	6.25	8.50

It is interesting to note that even when the sample was dried until there was no further weight loss, a moisture meter still measured 4% moisture content. It is true that some moisture would be picked up between the drying oven and the HVI unit, but the testing was done as rapidly as possible and no more than two minutes expired during the process. The increase in moisture as measured by the meter indicates that the regain was about what might be expected. This would give a typical hysteresis curve which shows that a cotton sample will pick up less moisture in a given atmospheric condition when the conditioning is approached from the dry side. It will be noted that in 24 hours the moisture content did not attain the 8.5% listed by the United States Department of Agriculture, and chances are it never would at 65% relative humidity.

In any event, it is interesting to see the changes in fiber properties with the increase in moisture pick-up. As expected, the micronaire value was reduced in the absence of moisture, but this corrected itself by the third hour of conditioning. Fiber length also returned to the USDA specified value after 3 hours.

We indicated in our earlier article that cotton fiber strength increases with moisture content. This is shown in the table. It can be seen that even 24 hours of conditioning did not bring the strength back to the USDA designated value.

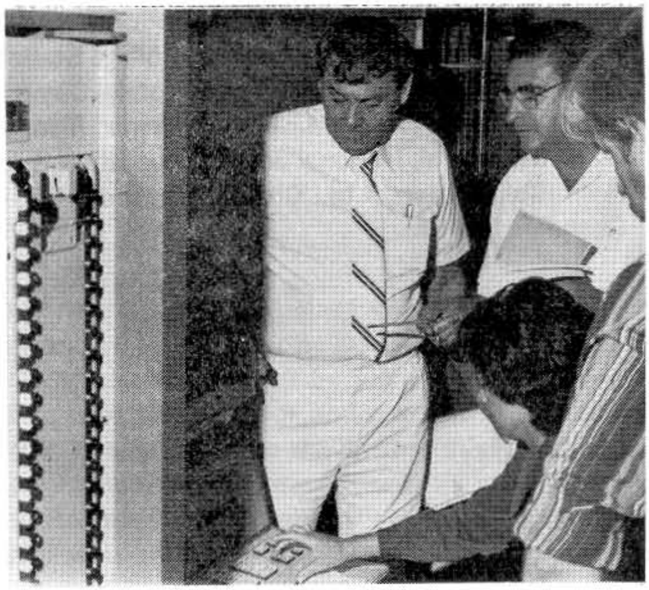
It is obvious that this study of the effects of moisture on cotton has not really produced any new results. We have found it interesting, however, to verify findings that have been accepted by industry for many years. This becomes particularly important as cotton evaluation moves from the subjective manual procedure to high volume instrument systems. This is true because it is expected that a cotton sample classed by one USDA classing office would be given a grade identical to that obtained for the same sample at any other USDA office, when HVI systems are used. However, a deviation in atmospheric conditions could give different grades and, therefore, different monetary values to cottons of the same quality.

As a conclusion to this statement, we would like to reproduce a small portion of the article carried in the March 1983 issue of *Topics*:

> *"While repeated testing has shown the HVI systems are accurate and give reliable results, it is obvious that prevailing atmospheric conditions during testing can influence the values obtained. It is important, therefore, that HVI cotton classing and evaluation in all laboratories be conducted at standard temperature and relative humidity levels."*

ZELLWEGER USTER TENSORAPID TESTER INSTALLED The volume of yarn testing at the Textile Research Center has increased considerably, and the Uster single-end strength tester used in the past has been found insufficient for our current requirements. While the older instrument will continue in use, we have purchased a Zellweger Uster Tensorapid Tester. The instrument consists of three separate components: the Tensorapid Tester itself, the Autocontrol, and the accompanying Printer. The

Tester automatically conducts package changing and the threading-in process from 20 yarn packages. Testing is accomplished by a constant-speed traveling clamp, a measured value transducer for elongation, and electronic and pneumatic control units. Operation of the tester is governed by the Autocontrol, a microprocessing unit which calculates from measured data values designating the quality of each sample. Test results are given in printout form, and graphically if desired.



Tom Leebrick (standing, left) of Zellweger Uster, Inc. gives instructions on the use of the Tensorapid Tester and Autocontrol to TRC staff personnel Gus Abdalah, John Price and Mary Rains.

John Price, Mary Rains and Gus Abdalah check testing results on the Printer as Tom Leebrick (center) explains the operation of the Tensorapid system.

Thomas Leebrick and Les Hoffman of the Zellweger Uster staff in Charlotte, North Carolina came to the Textile Research Center to install the three Tensorapid components. While here they gave a 2-day seminar on the operation and use of the Tester to selected TRC staff members. We were informed by these gentlemen that this installation is only the third in the United States, the first being with a textile company in North Carolina and the second at the Philadelphia College of Textiles and Sciences. We are pleased to have this instrument, for we believe it will be highly useful in the continued expansion of our materials evaluation program.

SPECIAL COURSE OFFERED TO INDUSTRY A special short course in textile technology was conducted at the Textile Research Center July 5 through 8 for Johnson & Johnson, Sherman, Texas. The course included sessions on fiber technology, processing, fabric formation, testing and quality assurance, and wet processing. Classroom instruction was complemented by a field trip to the American Cotton Growers textile division at Littlefield, Texas.

Instructors were Dr. Christopher J. Lupton, Dr. Robert G. Steadman, Edwin Foster and Bobby G. Wyatt, all Department of Textile Engineering faculty. At the conclusion of the course, Jesse Jones, Assistant Dean of Engineering at Texas Tech, presented certificates of satisfactory completion to Toni Intravartolo, Stephen Luk, Artie Massie, Richard Sawicki and Tim Thomas.

While this particular course was conducted and designed especially for Johnson & Johnson, cotton and textile organizations that may be interested in similar courses are encouraged to contact the Chairman of the Department of Textile Engineering at Texas Tech University.