INTERNATIONAL COTTON ADVISORY COMMITTEE

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Report of the 4th Meeting of the Task Force on Commercial Standardization of Instrument Testing of Cotton (CSITC) September 25, 2005, Liverpool, UK

(Final Version, November 16, 2005)

The 4th meeting of the Task Force (previously called an Expert Panel) on Commercial Standardization of Instrument Testing of Cotton (CSITC) was held in Liverpool, UK on September 25, 2005.
Andrew Macdonald, former President of the Liverpool Cotton Association serves as Chair.
Zbigniew Rostwitalski, Vice President and Director of the Gdynia Cotton Association serves as Rapporteur.

Members present:
Ibrahim Malloum, General Manager of Cotontchad and President of the African Cotton Association.
Ralph Schulzé, former executive director of the Australian Cotton Research & Development Corporation.
Joao Luiz Pessa, farm director of Fazenda Nova in Brazil.
John Mitchell, President of the American Cotton Shippers Association (replacing Robert Weil)
Romano Bonadei, Chairman of Filati Filartex in Italy
Thomas Schneider, Vice Chair, ITMF International Committee on Cotton Testing Methods (representing Anton Schenek)
Axel Drieling, Head of Testing Methods Department, Bremen Fibre Institute (representing Axel Herrmann)
Peter Wakefield, Director, Wakefield Inspection Services
Darryl Earnest, Deputy Administrator, Cotton Program, USDA/AMS (replacing Norma McDill)
Jean-Paul Gourlot, CIRAD.

Members Absent:
Lau Cheuk-wai, Quality Control Department of Central Textiles in Hong Kong (replacing Alex Woo)
P.D. Patodia, Vice Chairman & Managing Director of Prime Textiles in India
Graham Fogg, Agricultural Services, SGS North America

Terry Townsend, executive director, and Rafiq Chaudhry, Head Technical Information Services, of ICAC served as Secretariat. James Knowlton, Chief, Standardization and Engineering Branch, USDA/AMS Cotton Program, attended as an official observer.

Observers present: Mohamed Soliman, Ahisha Tembo, Dean Ethridge, Jeanne Reeves, Allen Terhaar, Neal Gillen, Robert Weil II, Bahram Nazari, Stanley Anthony, Greg Parle, Bruce Finney, Bridget Jackson, Hossein Ghorashi, Uzi Mor, Jan Wellmann, Elke Hortmeyer, Detleve Trede, Alan Shirley, Mona Qaud, Roy Cantrell, Nayan Mirani, Dhiren Sheth, and Sieste Van der Werff.

The **Fifth Meeting of the CSITC** is tentatively scheduled for Wednesday, March 22, 2006 in Bremen. Although, it may be necessary to schedule the meeting for Monday, March 20. It is

envisioned that the Fifth Meeting of the CSITC will be conducted as a component of the agenda of the ITMF Committee on Cotton Testing Methods. Details of the agenda and confirmation of the date of the Fifth Meeting will be sent later.

Background: The Expert Panel on CSITC was formed in December 2003 on the instruction of the 62nd ICAC Plenary Meeting in Poland. There is a consensus that instrument testing of cotton is superior to traditional hand classing. Instrument test results provide information to spinners that allow more efficient use of cotton, thereby enhancing demand. Instrument test results provide information to seed breeders, cotton producers and ginners, enabling the production of cotton with characteristics desired by the spinning industry. Instrument testing can also render the trading of cotton more efficient.

The objective of the Task Force is to facilitate widespread use of instrument testing systems at the producer level while upholding the standards and tolerances that maintain the integrity of high-quality testing. The Task Force is trying to facilitate the adoption of instrument testing standards and procedures utilized by the United States Department of Agriculture (USDA) by all testing centers around the world, and to introduce the use of instrument testing language in the trading of cotton so that traditional descriptions of grade or type are replaced with instrument test values.

There are 17 members of the panel representing both exporters and importers and all segments of the world cotton industry.

The CSITC met in Bremen in March 2004, in Mumbai in November 2004 and in Memphis in June 2005; a small-group meeting was held in Bremen in April 2005.

The Expert Panel issued two interim reports in 2004, including a report to the 63rd Plenary Meeting in India in November that identified seven actions to encourage worldwide testing of cotton with standardized instrument testing methods and procedures. The actions include 1) definition of specifications for cotton trading, 2) definition of international test rules, 3) implementation of test rules, 4) certification of testing test centers, 5) definition and provision of calibration standards, 6) specification of commercial control limits for trading and 7) the establishment of arbitration procedures. The report from the Expert Panel included specific actions and identifies responsible parties for the achievement of each recommendation.

During the small-group meeting in Bremen in April 2005 and during the 3rd Meeting in Memphis in June 2005, the seven recommendations and status of implementation were reviewed. During the 3rd Meeting in Memphis, the CSITC determined that the original tasks associated with diagnosis of problems and the development of recommendations had been achieved and that a new phase of work had begun with the implanting of proposals. Therefore, members of the CSITC agreed that the name of the panel should be changed to “Task Force” on CSITC to better describe its new role in facilitating the implementation of proposals.

CSITC Recommendations and Decisions

1. Definition of Specifications for cotton trading

During its 3rd Meeting, the Task Force confirmed that the characteristics recommended for inclusion in an instrument testing system at this time, and their definitions, are:

- Strength (grams/tex)
- Length (Upper Half Mean Length - expressed in inches and decimals, or in mms)
- Length uniformity (Index)
- Micronaire
- Color (Rd and +b)

The CSITC recommended during the 3rd Meeting that the criteria for certification of acceptable testing instruments be compliance with the Universal Calibration Standards (e.g. HVI-CCS and USDA Color Calibration Tiles) and appropriate parameters (e.g. UHML and UI).

There was a consensus to recommend that 100% of bales should be sampled in a standardized testing system, with the understanding that commercial agreements between buyer and seller may stipulate different sampling percentages. It was noted that module averaging and in-line gin sampling techniques are being evaluated. It was also noted that in many countries fewer than 100% of bales are sampled. The Task Force agreed that alternative sampling systems may prove to be effective, but there was agreement that 100% sampling is ideal and should be recommended.

The issue of trash measurement was discussed at the 3rd Meeting. There was a consensus that current technology for measuring trash is not fast enough or repeatable enough to include in an international system at this time. It was recognized that a trash measurement should be added to the international instrument testing system as soon as an acceptable, reliable measurement system can be authenticated. USDA is currently addressing this issue. It was noted that trash measurements are very much a part of commercial operations and it is regrettable that an instrument-derived trash measurement is not available at this time. The Task Force does not wish to imply that trash is not a commercial consideration, only that a practical instrument measurement is not available at this time.

Other specific instrument measurements, including those for neps, short fiber, fineness/maturity, and stickiness, are currently under research development for SITC instrumentation. Members of the CSITC noted during the 4th Meeting the importance of including these measurements in an international instrument testing system. However, it was noted that the technology for testing these parameters is not available at this time. Therefore, the CSITC agreed that the inclusion of these parameters could be considered only after technical developments make high volume testing possible.

There was also concern expressed during the 4th Meeting about the need to recognize differences between handpicked and machine picked cotton. However, there was agreement that the concern of the CSITC was to ensure uniformity between instrument results in different locations, and not to try and differentiate between cottons of different origins. While the importance of harvesting method is recognized in cotton marketing, it was agreed that the harvesting method is not a factor in instrument testing.

The CSITC noted that different methods of drawing samples will result in different instrument test results, and therefore a standard procedure for drawing samples for the standard operation of instrument tests should be agreed. At its 3rd Meeting, the CSITC accepted the guidelines for sampling at origin prepared by Wakefield and SGS. During the 4th Meeting, the CSITC reviewed additional comments from Wakefield and SGS regarding sampling:

> The eventual aim for all pre-shipment and post-landed arbitration sampling is based on 100% sampling, with samples being drawn as follows: Remove 1 or 2 bands/wires from near the center of the bale. After removing the bands/wires, using a knife, cut the covers to expose the surface of the bale. Dig into the layers of cotton with fingers and draw them across the bale in a rolling motion, removing a large flake of approximately 100 grams. This should be repeated on the other side of the bale, giving a total sample weight for each bale of approximately 200 grams. When sampling, ensure that the outer layer of cotton is removed, as this layer may be dirty. A tag or ticket showing the bale number and any other pertinent information should be inserted between the two flakes of cotton, and the samples should be wrapped in heavy paper, marked on the

outside with the Mark/Quantity/Etc. Samples are normally parceled up to 20/25 per paper. Always ensure that sampling procedures and time limits are carried out in strict accordance with the contract and rules governing the sale and/or purchase.

There were concerns about the recommendation to remove bands/wires prior to use, and Wakefield and SGS were asked to review this topic and provide additional guidance at the 5th CSITC meeting.

EICA Views & Suggestions

During the 4th Meeting of the CSITC, a paper was presented by the East India Cotton Association (EICA) giving their Views and Suggestions on the Report of the CSITC. The EICA recommended that USDA standards and procedures should be used as one reference, but that international standards should also use the standards and procedures in vogue in other countries. Among other suggestions, EICA recommended that strength be measured on high volume instruments based on 1/8" gauge, Stelometer. The CSITC noted that the use of 1/8" Stelometer seemed to be outdated. It was noted that USDA has discontinued the production of international calibration cottons based on Stelometer measures and that the world now uses HVI calibration cottons. It was also noted that the U.S., China (Mainland), Brazil and other major trading countries are adopting the Universal Cotton Standards as the basis for instrument testing. The CSITC agreed that the suggestion to use the 1/8" Stelometer measurement for strength could be referred to the ITMF Committee on Cotton Testing Methods. The CSITC also affirmed that all measurements must be based on calibration material in compliance with Universal Calibration Standard material.

The EICA noted that color measurements are affected by the trash content of samples and whether cotton has been roller ginned or saw ginned. Members of the CSITC agreed that the accuracy of Rd and +b values are affected by the reflectance of trash in samples. However, it was noted that the purpose of the CSITC is to standardize test results on machines in different locations and test results would be interpreted by market participants based on variety and origin. Therefore, separate standards for saw ginned and roller-ginned cotton were not needed, and since trash levels are included in the description of cotton, this also could be considered by market participants when values of cotton are negotiated. The CSITC affirmed that at this time color measurements will be based on the given Rd and +b measurements, but the CSITC acknowledges that it would be beneficial to develop tests that can exclude the impacts of trash on reflectance in cotton color measurements.

Regarding Sampling, the EICA reported that practical problems in India will prevent difficulties in implementing a 100% sampling system and that India recommended 4% sampling to begin. The CSITC noted that the recommendation of 100% sampling was based on ideal conditions, and countries would implement the recommendation based on their own situations.

2. Definition of international test rules

It was agreed that the best way to evaluate a test center's overall performance is to provide a complete report showing how the test center performed relative to other test centers on each parameter in the Round Trial. It was agreed that one purpose of a round trial is to give testing centers the information needed to improve performance.

For the certification of the CSITC test centers based on the accuracy and precision of their results the following steps should be followed**:**

(1) Define rules for an adequate CSITC Round Trial system.
(2) Define test center limits of acceptance for the assessment of the CSITC Round Trial individual results.

(3) Define rules and procedures for the certification of the test centers based on the total performance of the test centers during the certification period.

One question is whether samples should be submitted by testing centers with test results, or whether a Round Trial should be conducted using samples of known values and variability provided to each test center. (See – Certification of Test Centers). It was determined that the best initial approach is to conduct a CSITC Round Trial with samples provided to test centers to provide a constant level of testing.

CSITC Round Trial

Therefore USDA and Bremen have developed a procedure for a special International Round Trial, called a CSITC Round Trial. The procedure comprises:

- *Round Trials to be conducted 4 times a year*
- *4 cotton samples per round, including two U.S. upland-type cottons, plus up to one non-U.S. cotton and up to one sample of processed cotton. All samples will come from bales run through the USDA value-setting procedure to ensure uniform samples with established values.*
    - *Day 1: 12 test on all the four cottons (24 combs) for the determination of the level / accuracy*
    - *Days 2 to 5: 6 tests on two cottons (12 combs) for the determination of precision*
    - *Total of 96 tests*
    - *1 test consists of 2 combs for length and strength measurement, 2 for color measurement, and 1 for micronaire*
- *All individual results have to be submitted for evaluation, so that precision can be calculated*
- *Round cotton samples will have restricted variability*
- *Origin of cottons: at least two representative cottons plus other possibilities including processed cotton (blended or carded) and other growths.*
- *Retest possibility*

At its 3rd Meeting, the CSITC discussed the possibility of sending different samples to each testing facility in order to reduce opportunities for collusion among test centers. This proposal will be considered at a future meeting after results have been obtained from enough test centers to provide baseline data.

CSITC Pilot Round Trial

The accuracy of data given by the USDA HVI Checktest or the Bremen Round Trial are not comprehensive enough for fixing the test center limits of acceptance and the rules for the certification of the test centers. In response to this, USDA and Bremen agreed during the 3rd CSITC Meeting to jointly design and conduct a special Pilot Round Test among approximately 30 participating test centers, and from this information to develop recommendations for certification rules and tolerances. The Task Force agreed that test centers that follow standard conditioning and calibrate with Universal Standards should be selected for the Pilot Round Trial, rather than relying on a random selection among all test centers, so that the results will reflect the performance of test centers that follow recommended procedures.

During the 4th Meeting, James Knowlton of USDA, AMS, Cotton Program and Axel Drieling of the Bremen Fiber Institute reviewed the CSITC Pilot Round Trial procedure. They explained that the purpose of a quarterly CSITC Round Trial is to provide a measure of lab testing performance to promote universal standardization in commercial instrument testing. They worked jointly on administration, data collection, analysis and summarization of the Pilot Round Trial. The Pilot Round Trial was completed in early September 2005 by 31 volunteer test

centers from Belgium, France, Germany, Greece, Latvia, Poland, Switzerland, UK, USA, Brazil, India, Australia, and Benin. Appreciation was expressed to these labs for their promptness in performing the tests within a short time frame. Knowlton explained that the Pilot Round Trial served as a “dry run” to refine procedures and to serve as a basis for determining testing tolerances for future Round Trials.

Knowlton further explained that samples for the Pilot Round Trial were drawn from 4 cotton bales previously tested and approved in USDA’s calibration cotton value setting procedure, thereby assuring that the bales have highly uniform measurement properties. Three of the cottons were U.S. saw-ginned upland and one was a carded, roller ginned, American Pima (ELS) cotton. It was mentioned that future round tests would probably not utilize ELS type cottons since CSITC was focused on Upland cotton varieties. Sample sets were distributed to over 30 participants for instrument testing to obtain CSITC measurement results. Testing of samples was performed over a 5-day testing period in order to provide assessment of both accuracy and precision (accuracy being defined as the degree of closeness an instrument is to the average value of all participants and precision being defined in terms of the variability of instrument results on tested cottons).

Axel Drieling presented results of the CSITC Pilot Round Trial. He handed out copies of his analysis that provided means, standard deviations, CV’s, distributions, ratings and rankings. The identity of individual labs was kept confidential in the analyses, but the participants in the CSITC Round Trial will receive individualized copies of their own results relative to the overall results.

Drieling showed a table of possible limits of acceptance for laboratory results. The possible limits were based on Bremen and USDA round tests, USDA’s internal round test and some others. He also showed four possible sets of limits that could be used for the CSITC Round Trials. Drieling then showed examples of graphs of absolute versus relative ratings. He explained that comparisons between parameters were not possible with absolute ratings. However, comparisons between parameters were possible with relative ratings, but limits would have to be fixed. Drieling showed three different methods of determining relative ratings of the test results based on their accuracy: 1) pass/fail evaluation, 2) relative to a limit, and 3) rating only measurements outside the limits. Labs were then rated or ranked based on the three relative rating methods by measurement and overall.

Knowlton described a method of ranking into quartiles based on using both accuracy and precision. Accuracy was defined as the measured value divided by the overall average result, reported as a percentage difference from the mean. Precision was defined as the standard deviation for each measure for each lab, reported as the coefficient of variation (CV) for each measure.

Knowlton’s rankings were not based on limits but only on relative performance between labs. Drieling’s method of ranking was based on accuracy only, but he used limits of acceptance as a basis. Drieling showed a comparison of Knowlton’s rankings compared to Drieling’s. Both methods ranked the poor performing labs similarly but the methods disagreed more on the high performing labs. Drieling suggested that perhaps it wasn’t necessary to rank the high performing labs since they are within limits.

Drieling asked how one would rate a lab when the lab has good overall results but may not have acceptable results on one measurement such as micronaire, for example. It was agreed that analysis would need to be done both on an overall basis and by measurement.

It was asked who was the target audience for the CSITC round trial. Andrew MacDonald answered that it was the commercial industry and that this study would start the process. He further specified that CSITC efforts are focused on the producer side and not the textile mill.

The CSITC offered special thanks and recognition to Axel Drieling and Jimmy Knowlton for their work in conducting the Pilot Round Trial and analyzing the results. The Chair noted that the project required much effort and was a crucial component of the work of the CSITC.

Rating of Test Centers

The CSITC decided that quarterly CSITC Round Trials as described above will be conducted among participating test centers that wish international certification. Based on the experience with the CSITC Pilot Round Trial, minor changes in procedure will be implemented. Bremen and USDA will evaluate Round Trial results. It was agreed that there will not be an international testing center.

There was considerable discussion during the 4th Meeting over whether to 1) rank test centers from best to worst, [perhaps ranking centers within percentage bands similar to the Uster Yarn Standards (ie. Top 5% of participating test centers, top 25%, etc.)], to 2) rate them quantitatively according to their performances 3) to issue pass/fail evaluations of test centers or 4) to issue grades for test centers such as A, B, C and D based on the standard deviations of results from mean values.

There was a consensus that it was premature to adopt a pass/fail system. There was agreement that test centers should be rated according to their performance relative to other participating test centers. It was suggested that ratings should be based on limits that would be based on the results of the Pilot Round Trial, in conjunction with other sources, such as USDA's established tolerance. There was no agreement as to the other criteria to be used in a rating system. Bremen and USDA were asked to provide a specific recommendation as to the criteria to be used in a rating system based on the Pilot Round Trial results. It was further agreed that USDA and Bremen will conduct a Second Pilot Round Trial in April and May 2006 to gather additional information for use in evaluating test center performances.

There was also discussion during the 4th Meeting about whether ratings and results from Round Trials should be published or provided only in confidence to participating testing centers. A majority of participants wanted the test center ratings to be available to the marketplace, but a final consensus was not reached on this point.

There was discussion of the relative weight between accuracy of test results and precision. There was agreement that precision must be a factor in the rating of testing centers, but that accuracy was the primary factor for consideration. The Task Force recognized that some test centers might attempt to bias results through submission of inaccurate test results. It was noted that it would be difficult for test centers to guess the values of known samples sent to them. However, it will be possible for test centers to exaggerate the precision of tests. It was suggested that a future test center certification procedure might include reversing the direction of travel of some samples, with test centers sending samples to USDA and Bremen for comparison.

It was emphasized that a test center rating system would demonstrate the capability of test centers to meet recommended standards, but certification could not guarantee the accuracy of individual tests. The CSITC decided at the 4th Meeting that the cotton industry will not develop a system of auditing or inspecting the performances of individual testing centers for compliance with the procedures required in the Universal Cotton Standards, but that test centers will be rated according to their performance in Round Trials.

3. Implementation of the test rules
It was agreed that the implementation of test rules would be covered under item 4 of the action plan as part of the certification process.

4. Rules for certification of the test centers
It was agreed during the 3rd Meeting of the CSITC that, at least initially, ICAC with its CSITC Task Force would serve an oversight role to establish certification standards and compliance requirements for test centers, and that the functions of coordination among test centers would be delegated to existing institutions.

The structure of similar activities in the international wool industry was discussed during the small-group meeting in Bremen, and it was noted that to adapt this model, would necessitate the creation of new international bodies. However the consensus view was that this was not desirable, and that the international cotton industry should use existing structures to oversee, coordinate and implement internationally standardized instrument testing.

The CSITC is investigating a proposal to establish a committee directly accountable to the ICAC. The oversight committee would consist of several core members representing ITMF, ICA, USDA and the Bremen Fiber Institute, and other members would be chosen by the ICAC to ensure geographic and sectoral representation. USDA and Bremen would work collaboratively to coordinate relevant instrument testing on behalf of the CSITC.

There was a consensus of the CSITC that the Secretariat should work with USDA, Bremen and Ralph Schulzé to continue investigating the establishment of such an oversight committee under the auspices of the ICAC.

The CSITC agreed that test center grades or rankings will not dependent on the instruments being used in testing; rankings will be determined by testing results. Provided that a test center is capable of testing on a correct level, test results will be accepted.

It was agreed that discussion of giving additional support to test centers to enhance the quality of their performances and the practicality of integrating ISO, or ISO-like principles, and the auditing of operational procedures into an overall certification system would be deferred pending the completion of the Pilot Round Trial. The CSITC encourages regional efforts to enhance the quality of test center performances.

5. Development of calibration cottons
The CSITC noted that USDA recently expanded warehouse capacity and has the ability to provide calibration cottons to the world industry for at least the next several years. The CSITC agrees that the Universal HVI Calibration Standards for all six measurement parameters (length, length uniformity, strength, micronaire, Rd, +b) are the official standard of the CSITC.
It was reported that Chinese authorities have indicated that they will eventually develop their own domestic calibration cottons, but they agree in principle to the importance of maintaining a single world reference standard for calibration cottons based on the Universal Standards prepared by USDA. USDA plans to establish a standard for value setting of calibration materials under the American Society for Testing Materials International (ASTM) to cover the procedures used by USDA in creating calibration standards. The CSITC agreed that calibration standards must be referenced to the USDA reference material.

The CSITC agreed that calibration cottons should have an expiration date (e.g. 2 years), and in the longer term should comply with ISO Standard 17025 requirements, (e.g. statement of measurement uncertainty).

During the 4th Meeting, the EICA reported that the Indian research organization, CIRCOT, is a supplier of both HVI and International calibration cottons to users in India, Pakistan, Bangladesh and Nepal, and that CIRCOT intends to supply calibration cottons to test centers around the world in collaboration with other institutions. The EICA felt that the supply of calibration cottons should not be monopolized. Members of the CSITC emphasized the need to ensure that calibration standards are based on USDA reference material to ensure uniformity.

6. Specifying commercial tolerances for trading

The CSITC recognized that commercial tolerances for trading are a different concept to the test center limits of acceptance mentioned in action item 2. In general, commercial tolerances for trading cotton might be broader and less rigorous than the tolerances agreed for certification of test centers. Variations in test results occur because of natural variations within cotton samples as well as variations in test center methods and procedures, and the CSITC recognizes that tolerances in test results exist, even between results provided by well-run test centers. There are three sources of variation in test results to consider:

1) the variation in results when the same sample is tested on the same instrument (repeatability),
2) the variation in results when similar pre-tested samples are tested on different instruments in different locations within the variances of climatic conditions permitted under accepted testing procedures (CSITC Round Trials), and
3) the variation in test results when different samples drawn from the same bale are tested (natural variation of cotton within a given bale).

Note: trading tolerances would include all three potential sources of variation in test results.

CSITC members also recognized that a proliferation of test centers providing results of diminished accuracy could undermine the value of instrument testing.

However, it was also recognized that trading tolerances are highly situational specific depending on end use, type of spinning equipment and the origin of cotton, and no recommendations for trading tolerances could be provided by the CSITC. Trade tolerances are to be negotiated between buyers and sellers on a trade-by-trade basis. Accordingly, in lieu of recommendations, the CSITC asked the Secretariat to work with USDA and Bremen to publicize the results of the Pilot Round Trial so that the variances in tests among well-run test centers can be widely understood within the cotton trade. The knowledge of such variances, combined with information about the variability of test results themselves, could then serve as the basis for negotiation of contracts for trade in cotton.

7. Arbitration procedures

The CSITC received a proposal at its 3rd Meeting on Instrument Testing Arbitration Procedures that had been prepared by the Gdynia Cotton Association and the Bremen Baumwollborse. The CSITC agreed to give tentative approval to the proposal. The proposal, with certain modifications, was circulated by the Secretariat to the CSITC and to the member associations of CICCA for their consideration. However, the CSITC emphasized that the rules for testing need to be introduced into international cotton contracts to allow disputes to be settled even if tolerances have not yet been introduced in such rules. Additional discussion will ensue at a future CSITC meeting.

Attachments:
Sampling Guidelines prepared by Peter Wakefield and Bruno Widmer
Instrument Testing Arbitration Procedures proposed by GCA and BBB
Views & Suggestions of East India Cotton Association