#### BALE PACKAGING MATERIALS AND STANDARDS Shay L. Simpson National Cotton Council Memphis, TN

#### <u>Abstract</u>

The Joint Cotton Industry Bale Packaging Committee (JCIBPC) exists to protect U.S. cotton bales from contamination. After years of testing, they approved three new materials for industry-wide use in 1998. The JCIBPC also approved five materials for experimental test programs in 1998. The performances of these materials are reported.

The publication, "A Guide for Cotton Bale Standards," was developed and distributed by the JCIBPC in 1998. The fundamental characteristics of a Grade A, a Grade B and an Other bale are described.

#### **Introduction**

Bale packaging takes on an important role in protecting the growers' product and the textile manufacturers' investment from contamination and degradation. If packaging materials are not strong enough to withstand the handling practices that gins, warehouses and textile manufacturers subject bales to, then the cotton industry suffers. Programs have been enacted by the cotton industry to ensure that only those adequate packaging materials are allowed to restrain and cover bales. This program began in 1968 and was called the Joint Cotton Industry Bale Packaging Committee (JCIBPC).

#### Joint Cotton Industry Bale Packaging Committee

The JCIBPC is a joint committee between the raw cotton industry and the cotton textile industry. The composition has changed over the years and now consists of sixteen producer/ginners, five warehousers, three merchants, three cooperatives and twenty-three textile manufacturers. Approval, rejection, modification or testing of materials used for cotton bale packaging requires a majority vote from each of these five segments.

# Approved Materials For 1998 Crop Year

The decisions the JCIBPC makes for full approval of materials are based on a minimum of two years of laboratory and widespread field-testing. Products generally are required to be tested in the four regions of the Cotton Belt and in severe handling and storage practices. This is to ensure that different environments are evaluated in the performance of test bagging and ties. Once the JCIBPC approves a material for full use, recommendations are sent to the USDA/FSA for inclusion in the Specifications for Cotton Bale Packaging Materials. These then become requirements for packaging cotton under Commodity Credit Corporation loans.

Three new materials were added to the 1998 Specifications. An eight-gauge wire in a six-tie configuration was approved after three years of testing. The wire joint strength is 2600 pounds, the wire length must be no longer than 88 inches and the spacing between the wires must be no less than 9 inches. Before this approval, bales tied with wire were required to have eight ties. Fewer ties per bale will allow the industry a lower cost and less material to handle and dispose.

An alternate, woven polypropylene bag construction with a modified strip coating was approved after three years of testing. The bag must have no less than 9.5 warp yarns and 6.5 weft yarns per inch. The coated strips must be no greater than 0.75 inches wide followed by a non-coated strip no greater than 1.0 inch wide. The surface of the bag must be at least 40% coated. Before this approval, woven polypropylene bagging was required to have either 3 inch or 13⁄4 inch coating strips. The narrower strip coating will further reduce the potential for tears and cuts in the bag to produce loose tapes that could find their way into the cotton.

An alternate UV-light stabilizer for woven polypropylene materials was approved after four years of testing. A hindered amine light stabilizer (HALS) must be present in the warp and weft yarns at a concentration of not less than 0.3 percent weight of active inhibitor. The HALS package is a clear product and results in a white bag. The conventional organo-nickel complex type inhibitor used woven polypropylene turns the bagging yellow. HALS packages render the bagging more recyclable than the nickel packages, thus allowing the industry an easier reuse market.

#### **Experimental Test Products Used In 1998 Crop Year**

The JCIBPC continuously seeks improvements to bale packaging materials. One way to develop improvements and allow innovative packaging companies a venue to explore new products is through an experimental test program. Five such materials were allowed programs during the 1998 crop year.

Fabrene Corporation was approved a fifth year test of up to 500,000 patterns of spiral-sewn bags made from a woven polyethylene with a random or lace coating. All bags contained a non-nickel UV-light inhibitor and a trace element for identification. Reports from users indicate that the test bag outperforms film bags and closely rivals the performance of woven polypropylene bags. One disadvantage to this bag is related to adhesive labels. Some adhesives are not sticking aggressively enough to the surface of the bag. Fabrene states that there are adhesives available to the industry that are more aggressive than others.

Reprinted from the *Proceedings of the Beltwide Cotton Conference* Volume 1:416-418 (1999) National Cotton Council, Memphis TN

Shields Bag and Printing was approved a second year test of 200,000 patterns of a polyethylene film bag with improved performance characteristics. The impact resistance and tensile strength of the test bag are improved from the specification film bag. Reports from handlers indicate less bag damage from punctures.

Intertape Polymer Group was approved a first year test of 100,000 patterns of fully coated woven polypropylene bags. The committee also allowed 10,000 patterns to be constructed from woven polyethylene. The bags contained a non-nickel UV-inhibitor exceeding the specification and a trace element for identification. The bag was gussetted instead of spiral-sewn to prevent "ears" from sticking into isles. This test bag was reported to outperform the woven polypropylene bag in some ways.

Samuel Strapping was approved a third year test of up to 300,000 patterns of <sup>3</sup>/<sub>4</sub>" X 0.06 inch polyester strap with a six strap configuration. The joint was made by a hot knife method and had a 2200 pound average joint strength. All but one gin report good performance after the start up phase is complete. Reports for the 1998-99 year indicate that breakage in warehouses so far is similar to that of wire and steel strapping. Bale size measurements of the test bales are the same as 8-wire bale measurements.

Langston Companies, Inc. was approved a second year test of 500,000 patterns of a 9 gauge round wire and 100,000 patterns of a 9 gauge waisted wire in six-wire configurations. These 9 gauge wire ties have higher tensiles than the specification 9 gauge wire ties. The minimum joint strength for the round and waisted wire was 2400 pounds. Both wire lengths were 88" for gin universal density bales. Bale size measurements were about one inch thicker than 8wire bale measurements, however, stack size and truck loading were not affected. Wire breakage has not been reported to date for the 1998-99 year. There have been reports of considerable missing ties or missed knots at some warehouse locations.

Overall performance of these test products will be reported at the 1999 meeting of the Joint Cotton Industry Bale Packaging Committee at the Sheraton Airport Plaza Hotel in Charlotte, North Carolina, February 22-23. At that time performance from the gin to the warehouse to the textile mill will be reported.

### "A Guide For Cotton Bale Standards"

The JCIBPC updated the publication, "A Guide for Cotton Bale Standards," in 1998. The first publication in 1982 was developed due to the lack of clear definitions for those bale conditions expected by U.S. textile mills. The 1982 Guide successfully communicated those definitions among ginners, warehousemen, shippers and receivers. Since 1982, bale conditions have changed significantly. Flat and compress bales were the norm while Gin Universal Density and Gin Standard Density bales were few in number. Now the reverse holds true, with less than one percent of the U.S. crop packaged as flat and compress bales. Sampling processes have become less destructive to the bale package. Instead of cutting through the bag to collect samples, most samples are cut and pulled at the press before the bale is covered. These fundamental changes in practices have improved the initial package conditions that raise the standard.

Advances in baseline standards justified updating the communication tool upon which industry segments rely. The JCIBPC has provided "A Guide for Cotton Bale Standards" for use into the 21<sup>st</sup> century. With continued improvements to packaging materials and further automation of bale handling and processing, the Guide helps the cotton industry remain informed.

The standards are a visual grading system for evaluating cotton bale conditions and are applicable for all types of bales whether flat, compress, standard, or universal density. Bales are to be placed into one of three categories - Grade A, Grade B and Other - by comparison with the text and photographic examples given in the Guide.

## **Grade A Conditions**

Grade A bales are characterized by the following:

- Completely covered
- Covered with JCIBPC approved packaging and recommended patching material
- JCIBPC specified number of ties
- Wire knots on ball of bale
- All ties recessed into flat side of bale
- Square (level) heads
- Permanent Bale Identification (PBI) tag on bale

Grade A bales are generally considered acceptable. The recipients of cotton bales expect Grade A conditions and many times specifically require Grade A conditions in contracts.

Repaired bales must be restored to initial configuration of bales prior to occurrence of broken ties or torn bagging.

Grade A conditions are sought after for each and every bale ginned in the U.S., by all people involved in delivering and receiving cotton. Complete coverage is the goal of bale packaging and is desirable for optimum prevention of cotton contamination from dirt, grime, oil and grease.

The last three items in the list characterizing a Grade A bale were added since the 1982 publication.

*Recessed Ties*. The recessed tie characteristic will be enforced beginning with crop year 2000 bales. The

following definition was developed for the industry's use: Bale tie recesses describe grooves, indentions or notches created in the flat or 'hard' sides of the cotton bale, located such that when bale tie materials are applied, ties (wires or bands) lie within the depth of the recess; recesses are sufficiently deep so that ties are protected from normal handling impacts with floors, lift truck handling devices and other bales; in addition to minimizing handling stresses on bale ties, recesses are intended to reduce tearing and cutting of bagging normally associated with shearing action of ties on bagging; exact width and depth dimensions are not specified, except that grooves should be sufficiently wide to accommodate the width of band or wire tie and sufficiently deep so that the tie does not extend beyond the outside plane of the bale surface.

The JCIBPC recommends that each ginner contact their press equipment manufacturer for specific material lists and installment procedures.

Recessed ties are not a requirement for USDA CCC loans. In fact the only two characteristics of a Grade A bale that are required for USDA CCC loans are the use of JCIBPC recommended packaging materials and the rotation of wire knots to the balls of bales. However, textile manufacturers may require Grade A bales in their contracts, in which case, recessed ties would be included.

Unexpressed concerns may exist in the country about recessed ties. The JCIBPC will be receiving results of a survey that was distributed to ginners, warehousers and textile manufacturers. The survey was sent out to ask the participants about related experience with the use of recessed ties.

Results of the surveys, copies of "A Guide for Cotton Bale Standards," and more information may be obtained by reaching Shay L. Simpson at 1918 North Parkway, Memphis, TN, 38112, or by calling 901-274-9030.

*Square (Level) Heads.* Square or level heads are another requirement for Grade A bales. The purpose for the JCIBPC adding this characteristic was twofold. Maintaining stack stability is important in warehousing for the safety of workers. Non-level heads cause leaning stacks and in some reported cases have caused injuries and death. Also, non-level heads many times can physically not be stacked two or three high. In this case warehousing space is not utilized efficiently.

**Permanent Bale Identification (PBI) Tag.** All Grade A bales must have a permanent bale identification (PBI) tag located on the bale. With the full implementation of the PBI tag format in crop year 1998, this requirement was natural. It was estimated that near 100% of bales ginned in the U.S. in 1998 had a PBI tag on the bale. Textile manufacturers are reporting that 99+% of bales received have the PBI tag on the bale.

## Grade B Conditions

Grade B bales are characterized by the following:

- Completely covered heads
- Sample holes covered with JCIBPC recommended patching material
- Some exposed lint, if free of contaminants
- Covered with JCIBPC approved packaging
- JCIBPC specified number of ties
- Wire knots on ball of bale
- Identification on bale

EXCEPTIONS: Bales with broken tie(s) in which the basic configuration is unchanged are allowed a variance from this standard.

Grade B bales fundamentally differ from Grade A bales by the lack of complete coverage. Since Grade B bales allow for exposed cotton, there is the chance of lint contamination from dirt, grime, oil and grease. Grade B bales are generally considered acceptable <u>provided</u> exposed lint is clean and heads and sample holes are completely covered.

Notice that the requirements for recessed ties, square (level) heads and PBI tag are absent for Grade B bales. Simply stated, warehouses and textile manufacturers will accept bales with an occasional missing PBI tag, bales without recesses and bales with non-level heads. However, a Grade A bale is the overall packaging standard to strive to meet.

### **Other Conditions**

All other bale conditions are inadequate for protecting cotton bales from contamination and in some cases hinder processing or consumption. Any bales with unacceptable conditions should be repaired or repackaged with JCIBPC approved materials so as to improve conditions to Grade B or better.

If improvements are not made, bales will be subject to rejection. If bales must be rejected it is recommended that action be taken immediately upon arrival at the receiving facility. The Guide may be utilized not only at U.S. textile mills but also at warehouse facilities. In addition, if unacceptable bale conditions are created solely by failure of an experimental material approved for tests and identified with the JCIBPC, a waiver of these standards is recommended. In those cases, failure should be reported to the JCIBPC for its consideration in future decisions involving those materials.

### **Conclusion**

The JCIBPC exists for the sole purpose of protecting U.S. cotton bales from contamination and degradation. Decisions on materials for approval into USDA/FSA requirements for CCC loan eligibility, on materials for experimental testing programs and on packaging standard development are made by the cotton industry through

### **References**

producers/ginners, warehousers, merchants, cooperatives and textile manufacturers. Members of the JCIBPC are the voice of the cotton industry; they want input related to packaging materials from colleagues in the industry. Take an active roll in helping the cotton industry protect its cotton – talk with your representative on the JCIBPC.

National Cotton Council. 1998. A Guide for Cotton Bale Standards. Order No. TS609.