

ICS 55.020

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National Standard of the People's Republic of China

GB 6975-2013

Replacing GB 6975-2007

Cotton bale packaging

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(Draft standard for comment)

Issue date: December 31, 2013

Implementation date: April 1, 2014

Issued by

General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China
and Standardization Administration of the People's Republic of China

Foreword

All technical contents of this standard are mandatory.

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces GB 6975-2007 *Cotton bale packaging*.

Main technical differences between this standard and GB 6975-2007 are listed below:

- 200 kg type II bale in GB 6975-2007 is deleted, and type III bale in GB 6975-2007 is changed to type II bale;
- Basic manufacturing requirements for plastic packaging bags of cotton bales are added, and specifications of elongation at break strength and anti-aging are also added;
- Galvanized steel wires of $\varnothing 2.5$ mm, $\varnothing 3.2$ mm, $\varnothing 3.75$ mm and $\varnothing 4.0$ mm, carbon steel straps and high strength steel straps are deleted from the strapping materials;
- "Plastic strapping" is changed to "Polyester strapping for cotton bale packaging", and performance specifications of joint breaking strength and stripping forces are added;
- Joint overlapping length and contents product information on the surface of polyester strapping for cotton bale packaging are added.

This standard was proposed by All China Federation of Supply and Marketing Cooperatives.

This standard is under the jurisdiction of National Technical Committee on Cotton Processing of Standardization Administration of China (SAC/TC 407).

This standard was drafted by China Cotton Industries Co., Ltd., Cotton Processing Industry Branch of China Cotton Association, Zhengzhou Cotton & Jute Engineering Technology and Design Research Institute of All China Federation of Supply and Marketing Cooperatives, China Fibre Inspection Bureau, China National Cotton Reserves Corporation, China Academy of Railway Sciences, Zhengzhou Commodity Exchange, China Cotton Machinery and Equipment Co., Ltd., Beijing, Beijing Engineering Technology Co., Ltd. of China Cotton Industries Co., Ltd., Nantong Cotton Machinery Co., Ltd., Shandong Swan Cotton Industrial Machinery Stock Co., Ltd., Nantong Yufeng Plastic Packing Co., Ltd., Changzhou Yuandong Plastic Machinery Co., Ltd., Xinjiang Yili Yixin Cotton Co., Ltd., Shanghai Independence Plastic Products Co., Ltd. and Xinjiang Shihezi Tianyin Logistics Co., Ltd.

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Previous editions replaced by this standard are GB 6975-1986, GB/T 6975-2001, GB 6975-2007.

Cotton bale packaging

1 Scope

This standard specifies the technical requirements, packaging methods, bale marks and test methods of cotton bales.

This standard is applicable to the packages of lint bales and linter bales.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 228.1 *Metallic materials-Tensile testing-Part 1: Method of test at room temperature*

GB/T 1040.3-2006 *Plastics-Determination of tensile properties-Part 3: Test conditions for films and sheets*

GB 1103.1 *Cotton-Part 1: Saw ginned upland cotton*

GB 1103.2 *Cotton-Part 2: Roller ginned upland cotton*

GB/T 3923.1 *Textiles - Tensile properties of fabrics - Part 1: Determination of maximum force and elongation at maximum force using the strip method*

GB/T 4668 *Textiles - Woven fabrics - Determination of number of threads per unit length*

GB/T 6672 *Plastics film and sheeting - Determination of thickness by mechanical scanning*

GB/T 16422.2 *Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc sources*

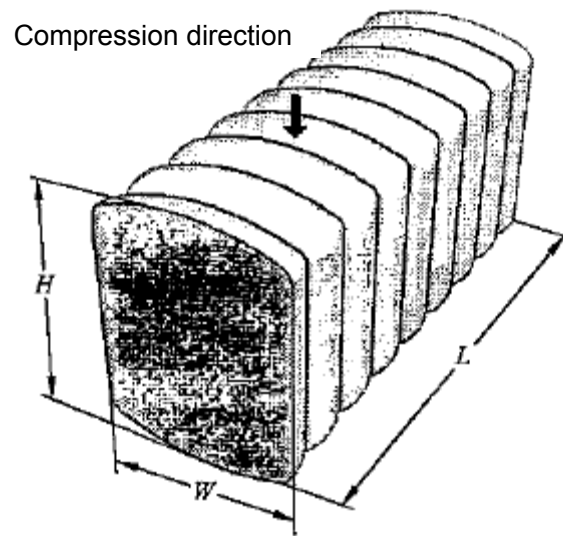
GB/T 16422.3 *Plastics - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps*

GH/T 1068 *Polyester strapping for cotton baling*

3 Technical requirements

3.1 Outline and dimensions of cotton bale

3.1.1 See Figure 1 for outline and dimension codes of cotton bale.



Notes:

L- Length of cotton bale;

W- Width of cotton bale;

H- Height of cotton bale.

Figure 1 Schematic outline diagram and dimension codes of cotton bale

3.1.2 The dimensions, weights and tolerances of cotton bale shall meet the requirements in Table 1.

Table 1 Dimensions, weights and tolerances of cotton bale

Cotton bale type	Length(L) mm		Width(W) mm		Height(H) mm		Weight kg	
	Basic dimension	Tolerance	Basic dimension	Tolerance	Basic dimension	Tolerance	Weight	Tolerance
I	1,400	- 30	530	- 10	700	+ 150	227	± 10
II	800	- 15	400	- 10	600	+ 50	85	± 5

3.1.3 Height differences between both ends of type I cotton bale shall not be more than 50 mm, and height differences between both ends of type II cotton bale shall not be more than 20 mm.

3.2 Packaging materials and tying/strapping materials

3.2.1 Packaging materials

3.2.1.1 Raw white pure cotton cloths and plastics that do not contaminate the cotton or produce foreign fibers shall be used as packaging materials.

3.2.1.2 The plastic packaging bag of cotton bale shall have air holes to ensure good air permeability, and it shall prevent impurities and dusts from entering the cotton bale to contaminate the cotton. The air holes shall be made in such a way that no plastic film scraps are left inside or on the surface of the bag.

3.2.1.3 Technical requirements for raw white pure cotton cloth for cotton bale packaging are listed in Table 2.

Table 2 Technical requirements for raw white pure cotton cloth for cotton bale packaging

Item	Density of cotton cloth thread/10 cm	Breaking strength of cotton cloth N
Warp	≥118	≥180
Weft	≥118	≥220

3.2.1.4 Technical requirements for plastic packaging bag film of cotton bale are listed in Table 3.

Table 3 Technical requirements for plastic packaging bag film for cotton bale packaging

Thickness mm	Tensile strength MPa		Elongation at break strength %	Anti-aging performance(using xenon lamp light source for 800 hours)	
	Machine direction	Traverse direction		Retention rate of tensile strength %	Retention rate of elongation at break strength %
0.145 ± 0.015	≥24	≥23	≥700	≥87	≥87

3.2.2 Tying/Strapping materials

3.2.2.1 Specification, tie quantity and mechanical performance of galvanized steel wire shall meet the requirements in Table 4.

Table 4 Specification, tie quantity and mechanical performance of galvanized steel wire

Tying material	Specification mm	Tie quantity	Mechanical performance			
			Tensile strength MPa		Elongation at break strength %	
			High carbon	Low carbon ^b	High carbon	Low carbon ^b
Galvanized steel wire	ø2.8 ^a	8~10	1,400~1,650	400~510	≥4	≥15
	ø3.4					

^a Galvanized steel wire of ø2.8 mm is only applicable to type II bale.

^b Low carbon galvanized steel wire is only applicable to cotton linter packaging of type II bale.

3.2.2.2 Specification, strap quantity and mechanical performance of polyester strapping for cotton bale packaging shall meet the requirements in Table 5.

Table 5 Specification, strap quantity and mechanical performance of polyester strapping for cotton bale packaging

Strapping material	Specification ^a /m m	Strap quantity	Mechanical performance				
			Breaking strength N	Elongation at break strength %	Anti-aging performance (retention rate of tensile breaking strength when being aged at UV light for 120 hours)	Joint breaking strength N	Joint stripping strength N
Polyester strapping for cotton bale packaging	(19.0~20.0) × (1.20~1.50)	8	≥10,500	12~18	>96	≥9,270	>200

^a The specification is obtained by multiplying section width by section thickness.

4 Packaging methods

4.1 Tying/strapping method: the method by which lint is compressed and wrapped with cotton cloth bags, and then tied/strapped.

4.2 Bagging method: the method by which lint is compressed, tied/strapped, and then bagged.

4.3 The cotton cloth package is applicable to both the strapping method and the bagging method, while the plastic packaging bag is only applicable to the bagging method.

4.4 After strapping the cotton bale packaged by cotton cloth, sew the seam of cotton bale head with cotton cord tightly.

4.5 If cutting is conducted during the baling for sampling, sew the cut with same cotton cloth tightly, and it is permitted to cover the cut by other materials that do not pollute the cotton and produce foreign fiber.

4.6 The cotton bale shall be free from cotton exposure (excluding air hole of plastic packaging bag), damaged package and pollution when leaving the factory.

4.7 The cotton bale slings shall be arranged evenly and shall be parallel to each other. The sling joint shall be solid and reliable. The joint part shall be smooth and shall not scratch and touch other materials with which it contacts.

4.8 The joint overlapping length of polyester strapping of cotton bale shall be 60 mm~80 mm.

5 Identification Markings

5.1 Identification markings of cotton bales applied to lot inspection

5.1.1 For the cotton bale packaged by cotton cloth, markings shall be made at both ends of the bale in visible black color, and the marking contents shall include: place of origin of cotton (county, municipality, province / autonomous region), gin name, cotton quality mark, lot number, bale number, gross weight, code of foreign fiber content and production date.

5.1.2 For the cotton bale packaged by plastics, bale tags shall be fixed at both sides of the bale in a self-adhesive or other way, and the tag contents are the same as those specified in 5.1.1.

5.1.3 The cotton quality marking shall meet the requirements of GB1103.1 and GB 1103.2.

5.1.4 It is allowable to mark information such as the placement direction, the trademark on the surface of plastic packaging bags that does not affect the cotton bale markings.

5.2 Identification markings of cotton bales applied to bale-by-bale inspection

5.2.1 For the cotton bale using bar codes as markings, bar code tags shall be fixed at both ends of the cotton or plastic bag.

5.2.2 For the cotton bale packaged by cotton cloth, markings shall be made at both ends of the bale in visible black color, and the marking contents shall include: place of origin of cotton (county, municipality, province / autonomous region), gin name, cotton quality mark, lot number, bale number, gross weight, code of foreign fiber content and production date.

5.3 For polyester straps used for cotton bale strapping, information such as company trademark, company name and production date shall be marked on the surfaces of straps.

6 Test method

6.1 Outlines and dimensions of cotton bales

6.1.1 After lint bales are stored for 24 hours, take 1 bale out of 20 (if quantity of bales is less than 20, take it as 20) to measure the dimensions of the bale.

6.1.2 Place the cotton bale on a flat surface, and place 2 squares of 1mm accuracy separately against the 2 symmetrical sides of the bale to measure relevant dimensions.

6.1.3 The measurement points of cotton bale length, width and height are respectively positioned at 2 ends of relevant symmetrical sides and the central points of them. Maximum values in millimeters will be taken.

6.1.4 Measurement results will be rounded up to single figures.

6.2 Cotton cloth density

Cotton cloth density shall be tested in accordance with methods specified in GB/T4668.

6.3 Breaking force of cotton cloth

The breaking force of cotton cloth shall be tested in accordance with methods specified in GB/T 3923.1.

6.4 Thickness of plastic packaging bag film

Thickness of plastic packaging bag film shall be tested in accordance with methods specified in GB/T 6672.

6.5 Tensile strength and elongation at break strength of plastic packaging bag film

6.5.1 Carry out the test according to the method specified in GB/T 1040.3—2006.

6.5.2 In the test, the tensile speed is (500 ± 50) mm/min.

6.5.3 The shape and dimension of specimen shall meet the requirements for 2-type specimen specified in GB/T 1040.3—2006, and the specimen width shall be 10 mm.

6.5.4 The testing result of tensile strength shall be rounded to single digit, and the testing result of elongation at break shall be rounded to 1%.

6.6 Anti-aging test of plastic packaging bag film

6.6.1 Carry out the anti-aging test according to the method specified in GB/T 16422.2.

6.6.2 Measure the tensile strength and elongation at break of plastic packaging bag film before and after the anti-aging test respectively according to the method given in 6.5.

6.6.3 Calculate the retention rate of tensile strength by formula (1):

$$\Delta\sigma_M = \frac{\sigma'_M}{\sigma_M} \times 100\% \quad \dots\dots\dots (1)$$

Where,

$\Delta\sigma_M$ - Retention rate of tensile strength, %;

σ'_M - Tensile strength after anti-aging test, in megapascal (MPa);

σ_M - Tensile strength before anti-aging test, in megapascal (MPa).

6.6.4 Calculate the retention rate of elongation at break by formula (2):

$$\Delta\varepsilon_{tB} = \frac{\varepsilon'_{tB}}{\varepsilon_{tB}} \times 100\% \quad \dots\dots\dots (2)$$

Where,

$\Delta\varepsilon_{tB}$ - Retention rate of elongation at break, %;

ε'_{tB} - Elongation at break after anti-aging test, %;

ε_{tB} - Elongation at break before anti-aging test.

6.6.5 Testing results of retention rates of tensile strength and elongation at break shall be rounded to

1%.

6.7 Tensile strength and elongation at break strength of galvanized steel wire

Tensile strength and elongation at break strength of galvanized steel wire shall be tested in accordance with the method specified in GB/T 228.1.

6.8 Specification of polyester plastic strapping for cotton baling

6.8.1 Cut out 5 specimens with length of 1,000 mm from each sample tape.

6.8.2 Measure the width and thickness of two groups at two trisected tap-off positions of each specimen by the micrometer with precision of 0.01 mm, and obtain 10 groups of data respectively (dimension that is measured when the specimen does not change obviously due to pressure).

6.8.3 Calculate average width and thickness by the arithmetic method, and express them in millimeters (mm).

6.8.4 Both the width and thickness results shall be rounded to two decimal places.

6.9 Breaking strength and elongation at break strength of polyester strapping for cotton baling

6.9.1 Determine the specimen length according to the gauge length and dimension of special clamp, cut out the strapping of required length from the specimen tape as the specimen, and the number of valid specimens is 5.

6.9.2 Carry out the test according to the method specified in GB/T 1040.3-2006.

6.9.3 For the specimen, the gauge length shall be 100 mm, and the tensile speed shall be (100 ± 10) mm/min.

6.9.4 Read the breaking strength from the load indicator directly.

6.9.5 Measure the elongation of specimen gauge length by the extensometer or recorder or similar device, and calculate the elongation at break strength expressed in percentage.

6.9.6 When the specimen slips in the clamp or breaks in the range of 10 mm from any clamp, or is destroyed too early due to obvious defects, this specimen is invalid, and it is required to take new specimens for retest.

6.9.7 The specimen that breaks within the gauge length and does not have test defects described in 6.9.6 is valid.

6.9.8 Take arithmetic mean value of measurement results of 5 valid specimens as the testing results of breaking strength and elongation at break strength.

6.9.9 Testing results of breaking strength and elongation at break strength shall be rounded to single digit and 1% respectively.

6.10 Anti-aging test of polyester plastic strapping for cotton baling

6.10.1 The anti-aging test shall be tested in accordance with the method specified in GB/T 16422.3.

6.10.2 Measure tensile strengths of polyester strapping before and after the anti-aging test respectively by the method given in 6.9.

6.10.3 The calculation method of retention rate of tensile breaking strength is the same as that in formula (1).

6.10.4 The testing result of retention rate of tensile breaking strength shall be rounded to 1%.

6.11 Joint breaking strength of polyester strapping for cotton baling

6.11.1 Joint breaking strength of polyester strapping for cotton baling shall be tested in accordance with the method specified in 6.9.1, 6.9.2 and 6.9.3.

6.11.2 In the test, keep the joint in the middle of specimen, read the joint breaking strength when the

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joint is pulled off from the load indicator, and express it in Newton (N).

6.11.3 The number of valid specimens is 5, and the specimen that breaks within the gauge length and does not have test defects described in 6.9.6 is valid.

6.11.4 Take arithmetic mean value of measurement results of 5 valid specimens as the testing result.

6.11.5 The testing result of joint breaking strength shall be rounded to single digit.

6.12 Joint stripping strength of polyester strapping for cotton baling

Joint stripping strength of polyester strapping for cotton baling shall be tested in accordance with the method specified in GH/T 1068.
