

# FZ

Textile Industry Standard of the People's Republic of China

FZ/T 93098—2017

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## Blowroom and card combination line 清梳联合机

*(English Translation)*

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工业和信息化部标准报批公示

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## Foreword

This standard is drafted in accordance with to the rules given in GB/T 1.1-2009 *Directives for standardization-Part 1: Structure and drafting of standards*. SAC/TC215 is in charge of this English translation. In case of any doubt about the contents of English translation, the Chinese original shall be considered authoritative.

This standard was proposed by China National Textile and Apparel Council.

This standard was prepared by Subcommittee 1 on Spinning, Dyeing and Finishing Machinery of Committee 215 on Textile Machinery and Accessories of Standardization of Administration of China (SAC/TC215/SC1).

## Blowroom and card combination line

### 1 Scope

This standard specifies the classification, definition, parameters, requirements, test methods, inspection rules, marking, packaging, transportation and storage of blowroom and card combination line (abbreviated as “B & C line”).

This standard is applicable to blowroom and card combination line for carding cotton fiber, cotton chemical fiber and also for other types of fiber in reference.

### 2 Normative references

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

GB/T 191, *Packaging – Pictorial marking for handling of goods*

GB 2894, *Safety signs and guideline for the use*

GB 5226.1-2008, *Electrical safety of machinery – Electrical equipment of machines – Part 1: General requirements*

GB/T 7111.1, *Textile Machinery-Noise test code-Part 1: Common requirements*

GB/T 7111.2, *Textile Machinery-Noise test code-Part 2: Spinning preparatory and spinning machinery*

GB/T 17626.2-2006, *Electromagnetic Compatibility-Testing and measurement techniques – Electrostatic discharge immunity test*

GB/T 17626.4-2008, *Electromagnetic Compatibility-Testing and measurement techniques - Electrical fast transient/burst immunity test*

GB/T 17780.2, *Textile machinery - Safety requirements - Part 2: Spinning preparatory and spinning machines*

GBZ/T 192.1-2007, *Determination of dust in the air of workplace-Part 1: Total dust concentration*

FZ/T 90001, *Product package of textile machinery*

FZ/T 90074, *Painting for the products of textile machinery*

FZ/T 90089.1, *Textile machinery nameplate-Part 1: Types, dimensions and specifications*

FZ/T 90089.2, *Textile machinery nameplate-Part 2: Information*

FZ/T 93033, *Flat carding machines*

FZ/T 93058, *Autolevelling system for spinning preparatory and spinning machines*

FZ/T 93089, *Feeding hopper*

FZ/T 93094, *Bale plucker*

FZ/T 93095, *Openers*

### 3 Classification and definitions

#### 3.1 Classification

Classification according to technological process:

-Flow of B & C line applicable for processing cotton fiber:

After plucking, pre-cleaning, mixing, fine cleaning and de-dusting in blow room, cotton fiber is fed by feeding hopper to card for carding, further de-dusting and even mixing, finally forming even sliver in single fiber state.

Cotton plucking→pre-cleaning→mixing→ fine cleaning→carding→sliver forming.

-Flow of B & C line applicable for processing cotton type chemical fiber:

After plucking, mixing, fine cleaning and de-dusting in blow room, cotton type chemical fiber is fed by feeding hopper to card for carding, further de-dusting and even mixing, finally forming even sliver in single fiber state.

Cotton plucking→mixing→fine cleaning→carding→sliver forming

#### 3.2 Definition

3.2.1 The individual machines in B & C line applicable for processing cotton fiber includes:

Bale plucker → axial flow roller pre-cleaner → multi bin cotton mixer → fine cleaner → feeding hopper → flat carding machines

3.2.2 The individual machines in B & C line applicable for processing cotton type chemical fiber includes:

Bale plucker → multi bin cotton mixer → fine cleaner → feeding hopper → flat carding machines

Note: The basic process may include condenser, transporting fan etc., meanwhile auxiliary device such as dust remover, foreign fiber sorter, fire detector, weight separator, and metal detector can be added according to the actual production requirements by user.

### 3.3 Parameters

#### 3.3.1 Bale plucker

Parameters of bale plucker see table 1.

Table 1

Item	Parameters
Working width /mm	1 600, 1 700, 2 300
Working speed of take-off roller / (r/min)	≤ 1 400

#### 3.3.2 Axial flow roller pre-cleaner

Parameters of axial flow roller pre-cleaner see table 2.

Table 2

Item		Parameters
Working width /mm	Single-roller pre-cleaner	1 600
	Double-roller pre-cleaner	1 300
Rotation speed of opening roller/ (r/min)	Single-roller pre-cleaner	380 ~ 960
	Double-roller pre-cleaner	650

#### 3.3.3 Multi bin cotton mixer

Parameters of Multi bin cotton mixer see table 3.

Table 3

Item	Parameters
Working width/ mm	1 200, 1 600, 1 800
Working speed of opening roller/ (r/min)	time-sharing feed and simultaneous output 360 ~ 760

	Simultaneous feed and time-sharing output	520 ~ 890
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### 3.3.4 Fine cleaner

Parameters of fine cleaner see table 4.

Table 4

Item		Parameters
Working width/ mm		1 000, 1 200, 1 600, 1 800
Working speed of opening roller/ (r/min)	Single roller	$\leq 1\ 300$
	Three rollers	$\leq 3\ 400$

### 3.3.5 Feeding hopper

Parameters of feeding hopper see table 5.

Table 5

Item		Parameters
Working width/ mm		920 ~ 1 500
Working speed of opening roller/ (r/min)		$\leq 1\ 200$

### 3.3.6 Flat carding machines

Parameters of flat carding machines see table 6.

Table 6

Item		Parameters
Working width /mm		1 000 ~ 1 500
The maximum output speed/(m/min)		$\geq 140$
Sliver count/(g/m)		3 ~ 12
Applicable fiber length/mm		22 ~ 65

## 4 Requirement

### 4.1 Card sliver quality

Card sliver quality see table 7.

Table 7

Item		Parameters
Weight unevenness of sliver CV/%		Cotton fiber $\leq 2.0$ cotton type chemical fiber $\leq 2.5$
Qualification rate/% of card sliver weight deviation $\pm 2.5\%$		$\geq 95$

## 4.2 Requirements to each individual machine

### 4.2.1 Bale plucker

Bale plucker is in accordance with the requirements given by FZ/T 93094

### 4.2.2 Axial flow roller pre-cleaner

Axial flow roller pre-cleaner is in accordance with the requirements given by FZ/T 93095.

### 4.2.3 Multi bin cotton mixer

4.2.3.1 The compartment switching valve shall be opened and closed flexibly without block.

4.2.3.2 The material convey belt shall be turned flexibly without block, slip and deviation.

4.2.3.3 The inner surface of the cotton distribution channel shall be smooth, fiber-adhesion free, without burrs.

### 4.2.4 Fine cleaner

4.2.4.1 The spiked roller or pinned roller shall be fiber-adhesion free, no spiker or pin is broken or bended.

4.2.4.2 Saw tooth roller or roller clothing shall not have tooth collapse or defect. Clothing joints should be firmly welded, and should be fiber-adhesion free.

### 4.2.5 Feeding hopper

Feeding hopper is in accordance with the requirements given by FZ/T 93089.

### 4.2.6 Flat carding machines

Flat carding machines is in accordance with the requirements given by FZ/T 93033.

## 4.3 Requirements to B & C line

4.3.1 Each individual machine is configured reasonably, connected correctly, run stably, without abnormal vibration and noise.

4.3.2 Material is able to be continuously and stably transported between each individual machine without choke and interruption.

4.3.3 The end-breaking rate of card  $\leq 0.5$ / (set\*shift)

### 4.3.4 Control system

4.3.4.1 The central control system shall be able to ensure the continuous operation of B & C line, correct action of each individual machine in concert and harmony

4.3.4.2 The central control system shall be able to realize the independent controlling and debugging to each individual machine.

4.3.4.3 The central control system shall be able to realize the functions of setting and modifying the technological parameters, displaying working conditions and warning etc.

4.3.4.4 Function of speed selection, start, stop, emergency stop on the controlling system of each individual machine shall be accurate and infallible.

4.3.4.5 In case of machinery fault, the system shall be able to make emergency braking.

4.3.4.6 The blowroom and card combination machine should be configured with the continuous feeding system for uninterrupted cotton supply.

4.3.4.7 Cards should be configured with the autolevelling system which should comply with the provisions of FZ/T 93058

#### **4.3.5 Pneumatic system**

4.3.5.1 Each pneumatic circuit is unobstructed without air leakage.

4.3.5.2 Action of each pneumatic element should be flexible, reliable and correct, and the cylinders should not have creeping or impact phenomenon.

#### **4.4 Electrical equipment and safety performance.**

4.4.1 Electrical fast transient/burst immunity of the electrical equipment shall comply with the provisions of level 3 in GB/T 17626.4-2008.

4.4.2 Electrostatic discharge immunity of the electrical equipment shall comply with the provisions of level 4 in GB/T 17626.2-2006, and the equipment shall not have abnormal action during the test.

4.4.3 Connection and cabling of the electrical equipment shall comply with the provisions of 13.1 in GB 5226.1-2008.

4.4.4 Wire identification of the electrical equipment shall comply with the provisions of 13.2 in GB 5226.1-2008.

4.4.5 Continuity of the protecting connection circuit of the electrical equipment shall comply with the provisions of 18.2.3 in GB 5226.1-2008.

4.4.6 Insulation performance of the electrical equipment shall comply with the provisions of 12.3 in GB 5226.1-2008.

4.4.7 Withstand voltage test of the electrical equipment shall comply with the provisions of 18.4 in GB 5226.1-2008.

#### **4.5 Safety and environment protection**

4.5.1 Whole machine shall take safety protection measures and put-up warning marks according to GB/T 17780.2.

4.5.2 The noise of each individual machine (emission sound pressure level) during operation without load should be less than 85dB(A); in addition, the noise including fan



(emission sound pressure level) should be less than 90dB(A)

4.5.3. The dust content in working area should be less than 1.5 mg/m<sup>3</sup>

**4.6 Appearance and surface quality**

4.6.1 Shape of the safety hood, door and operating panel of each individual machine should be unified and the style of appearance should be coherent.

4.6.2 Product painting shall comply with FZ/T 90074.

**5 Test method**

**5.1 Inspection method**

5.1.1 Card sliver mass (4.1)

a) Weight unevenness of card sliver is measured with sampling and weighing method and sampling method is following:

Minimum 5 samples (5 m segment) for each machine by intermittent sampling; Sampling for every card in operation, minimum 30 samples in total.

Samples are weighed with a balance. Weight unevenness CV is calculated according to formula (1):

$$CV = \frac{1}{\bar{m}} \sqrt{\frac{\sum_{i=1}^n (m_i - \bar{m})^2}{n-1}} \times 100\% \quad \dots\dots\dots (1)$$

In the formula:

*m<sub>i</sub>*— mass of each sample in grams (g);

*m̄*— arithmetic mean value of each sample mass in gram (g);

*n*— total number of samples.

b) Qualification rate of card sliver weight deviation

Rate between qualified segments and total tested segments. Each segment is 5 m long and continuously takes no less than 30 segments for calculation according to the formula (2)

$$\text{Qualification rate} = \text{qualified segments} / \text{total test segments} \times 100\% \quad \dots\dots\dots (2)$$

In the formula:

Number of qualified segments----the number of test data conforming to the standard.

5.1.2 Bale plucker (4.2.1) should be inspected according to FZ/T 93094.

- 5.1.3 Axial flow roller pre-cleaner (4.2.2) should be inspected according to FZ/T 93095.
- 5.1.4 Feeding hopper (4.2.5) should be inspected according to FZ/T 93089.
- 5.1.5 Carding machines (4.2.6) should be inspected according to FZ/T 93033.
- 5.1.6 End breakage rate of card is calculated (4.3.3) according to formula (3) after all cards in one B & G line running 72 hours.

$$\text{End breakage rate} = \text{total breakage number} / 9 \times \text{card number} \quad \dots\dots\dots (3)$$

In formula:

9—3 shifts for one day and totally 9 shifts for 72 hours

- 5.1.7 The autolevelling system (4.3.4.7) is inspected according to FZ/T 93058.
- 5.1.8 Electrical fast transient pulse immunity of the electrical equipment (4.4.1) is inspected by electrical fast transient pulse generator, and the functional actions of the inspected equipment should comply with the specified requirements.

Note: test conditions are as follows: the peak value of interference test voltage output in power source terminal and PE terminal is 2 kV and the repetition frequency is 5 kHz or 100 kHz; the peak value of test voltage in terminals of input signal, output signal, data and control are 1 kV and the repetition frequency is 5 kHz or 100 kHz.

- 5.1.9 Electrostatic discharge immunity of the electrical equipment (4.4.2) is tested with electrostatic discharge generator.

Note: 8 kV contact discharge and 15 kV air discharge shall be used for test.

- 5.1.10 For connection and wiring of the electrical equipment (4.4.3), inspect if wiring is firm; wiring and cables between two terminals should not have any joints and/or splicing points; the additional length of cables and cable bundles should meet the needs of assembly and disassembly.

- 5.1.11 For wire identification of the electrical equipment (4.4.4), inspect if each end of the wire is marked; the wire marked with color shall comply with the provisions of GB 5226.1-2008.

- 5.1.12 Continuity of the protecting connection circuit of the electrical equipment (4.4.5) shall be tested according to the provisions of 18.2.2 in GB 5226.1-2008, and the test data shall be determined according to the provisions of annex G in GB 5226.1-2008

- 5.1.13 Insulation performance of the electrical equipment (4.4.6) shall be tested with megohmmeter.

- 5.1.14 Withstand voltage of the electrical equipment (4.4.7) shall be tested with withstand voltage tester.

- 5.1.15 Noise of each individual machine and fan during test without load (sound emission

pressure level) (4.5.2) is tested by sound meters according to the provisions of GB/T 7111.1 and GB/T 7111.2.

5.1.16 Dust contents of work area (4.5.3) in normal suction system and reasonable air conditioning is checked according to the provisions of GBZ/T 192.1-2007.

5.1.17 The other items are inspected through sensory organ.

## 5.2 Unloaded test

5.2.1 Test conditions:

- a) Each individual machine should run according to designed speed.
- b) Test duration: 2h.

5.2.2 Check items: 4.2, 4.3.1, 4.3.4.1 ~ 4.3.4.4, 4.3.5, 4.4, 4.5.1, 4.5.2, 4.6.

## 5.3 Workload test

5.3.1 Test conditions:

- a) The workload test can be carried out only after the unloaded test meets the requirements.
- b) Reasonably selects and adjusts process parameters such as technological speed, gauge, draft multiple etc., according to the material and variety processed.
- c) Environment temperature: 18 °C-32°C.
- d) Relative humidity: 55%-65%
- e) Test duration: continuous production operation for 72 hours.

5.3.2 Check items: 4.1, 4.3.2, 4.3.3, 4.3.4.5, 4.3, 4.6, 4.5.3.

## 6 Inspection rules

### 6.1 Type inspection

6.1.1 Type inspection for product shall be conducted under one of the following conditions:

- a) New product appraisal;
- b) Big changes in structure, material and process during production, may affect the product performance;
- c) Big difference between the ex-factory inspection result and the last type inspection occurs;
- d) When the production is resumed after shutdown more than two years;

e) Quality inspection by the third party.

6.1.2 Inspection items: all items in chapter 4.

## 6.2 Ex-factory inspection

6.2.1 Each individual machine shall not leave the factory until it is inspected by the quality inspection department of the enterprise and attached with the qualified certificate.

6.2.2 The individual machine with driving system should make test without load.

6.2.3 Inspection items: 4.2, 4.4, 4.5.1, 4.6.

## 6.3 Judgement rules

This product shall be judged to comply with the requirements of the standard after all item inspections are qualified.

## 6.4 Others

IF any item not conforming to this standard is found during installation and debugging, manufacturer shall handle it together with customer.

## 7 Marking

7.1 The storage and transportation pictorial marks on packing box shall be in accordance with the provisions of GB/T 191.

7.2 Product nameplate shall be in accordance with the provisions of FZ/T 90089.1 and FZ/T 90089.2.

7.3 Product safety signs shall be in accordance with the provisions of GB 2894.

## 8 Packaging, transportation and storage

8.1 Packaging of the products shall comply with the requirement in FZ/T 90001.

8.2 Packing box shall be placed in the specified direction, and shall not be tilted or changed in direction during transportation of the product.

8.3 Moisture-proof and rust proof period of the product in the packing box after leaves the factory is one year under the good rainproof and ventilated storage conditions.