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ICS 71.100.30

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GB 19593-2015

Replacing GB 19593-2004

Fireworks - Batteries and combinations

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Issued on: February 4, 2015

Implemented on: April 1, 2016

Issued by: General Administration of Quality Supervision, Inspection and Quarantine;

Standardization Administration Committee.

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Foreword

All technical content of this Standard is mandatory.

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

GB 10631 *Fireworks and firecracker - Safety and quantity*, the general requirements for fireworks products, is applicable to this Standard.

This Standard replaces GB 19593-2004 *Fireworks and firecracker - Combination fireworks*.

This revision is based on GB10631-2013 *Fireworks and firecracker - Safety and quantity*. The main content of this revision are as follows:

- modified and added terms and definitions;
- modified the drug, the dose;
- improved the requirements for the ignition device;
- revised the specifications of the cylinder and added the requirements for materials and processes;
- revised the requirements for the stability of the main body and the inspection rules;
- made a clearer specification for product mark;
- added safety distance during setting off and requirements for firework-setting-off personnel;
- added Annex B, Annex C.

This Standard was proposed by China Light Industry Federation.

This Standard shall be under the jurisdiction of National Technical Committee on Firecrackers of Standardization Administration of China (SAC/TC149).

The main drafting organizations of this Standard: Hunan Fireworks Products Safety And Quality Supervision and Inspection Center, Liuyang Yihe Long Fireworks Group Co., Ltd., Panda Fireworks Group Co., Ltd., Liuyang Dongfang Hong Fireworks Manufacturing Art Discharge Limited, Laiwu Kao Export Fireworks Factory, Jiangxi Li Du Fireworks Group Co., Ltd., Liuyang Eagle Fireworks Co., Ltd., Anhui Xiangying Fireworks Co., Ltd., Liuyang Jinchi Export Fireworks Manufacturing Co., Ltd., Zhejaing Tonglu Fireworks Factory, Liuyang Meidan Yanhua Co., Ltd., Hunan Qingtai Fireworks Manufacturing Co., Ltd., Big Yao Tang Flower Export Fireworks Factory, Sichuan Shifang Qingyou Fireworks

Fireworks - Batteries and combinations

1 Scope

This Standard specifies the terms and definitions, classification, safety and quality requirements, inspection methods, inspection rules, transport and storage of batteries and combinations.

This Standard is applicable to the manufacture and acceptance of batteries and combinations.

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 10631, *Fireworks and firecracker - Safety and quantity*;

GB/T 10632, *Rules of sampling and inspection for fireworks*;

GB/T 15814.1, *Fireworks and firecracker - Qualitative determination of pyrotechnic compositions*;

GB/T 21242, *Methods of qualitative determination of prohibitive and limitative reagent of fireworks and firecrackers*;

GB 24426, *Fireworks and firecracker - Labeling*;

GB 31368, *Packing for fireworks*.

3 Terms and definitions

The terms and definitions specified in GB 10631 apply to this Standard.

3.1 batteries and combinations

a combination of two or more small fireworks, spray fireworks, spit fireworks, or different types of fireworks

3.2 batteries

4.4 The combination of small fireworks is divided into cylinder type, sphere type, grain type, meal powder type and saturn missiles according to rising effect structure, shape and form of emission.

5 Safety and quality requirements

5.1 Marking, packaging

5.1.1 Transport packaging mark

In addition to the implementation according to GB 10631 and GB 24426, it should also mark warning or warning sign as “inversion is not allowed”.

5.1.2 Sales packaging mark

In addition to the implementation according to GB 10631 and GB 24426, it should also mark:

- a) combination type, combined launching number, setting-off effect (text or schematic);
- b) total drug content and single cylinder drug content (single cylinder drug content of different batteries and combinations shall be respectively marked); minimum age required for firework setting off: at least 18 years of age;
- c) for the product with external packaging box for ignition, the top cover can not be opened OR the warning or warning mark as “the product should be removed from the box after setting off” if the rising of effect piece is affected during setting off;
- d) the instructions and warnings on firework setting off should be contained in Annex B;
- e) the diagram shown in Annex C or the diagram equivalent to illustrate the effect should be marked for the purpose of warning and instruction.

5.1.3 Packaging

In accordance with GB 10631 and GB 31368.

5.2 Appearance

In accordance with GB 10631.

5.3 Parts

5.3.1 Base, plug

In accordance with GB 10631.

5.3.2 Ignition device

In addition to GB 10631, it shall also meet the following requirements:

- a) the insulation line surface should be clean, dry, without damage, without leakage medicine, without mildew;
- b) the ignition line should be green safety lead wire; the installation location must be eye-catching or with obvious mark, with care device;
- c) for personal setting-off products, the ignition flame should be installed on the side of the fireworks main body, excluding the products with external packaging box for ignition or the product of which the first launch is spraying, spitting;
- d) the ignition time for personal setting-off products of which the first launch is small firework effect: 5 s ~ 8 s; the ignition time for other types of products shall meet requirements of GB 10631.

5.4 Structure and material

5.4.1 The personal setting-off products should not be linked by more than two pieces (including two).

5.4.2 The cylinder should be made of paper material or other materials that are safe and environmentally friendly.

5.4.3 The rising effect pieces should not use metal shell and metal attachments. Except that the saturn missiles are allowed to use plastic cylinder, the rising effect pieces should be made of paper and adhesive agent, soil which can spread.

5.4.4 The cylinder specifications should meet the following requirements:

5.4.4.1 Small fireworks single cylinder specifications:

Grade A: inner diameter >51 mm, ≤76 mm (cylindrical, grain type) or ≤ 102 mm (sphere type, meal powder type), wall thickness ≥3.0 mm;

Grade B: inner diameter >30 mm, ≤51 mm, wall thickness ≥2.5 mm;

Grade C: inner diameter >20 mm, ≤30 mm, the main height ≤300 mm, wall thickness ≥2.0 mm;

inner diameter ≤20 mm, the main height ≤260 mm, wall thickness ≥1.5 mm.

5.4.4.2 Cylinder specifications of spray fireworks, spit fireworks:

5.5 Main body stability

5.5.1 The product should not be dumped on a slope that is at an angle of 30° to the horizontal.

5.5.2 The ratio of the height of the product cylinder or body to the minimum horizontal dimension or diameter of the bottom surface: grade C, $D \leq 1.5$; grade A, $B \leq 2.0$.

5.6 Drugs, dose and safety performance

5.6.1 The drugs shall be in accordance with GB 10631.

5.6.2 Requirements for the allowable maximum dose of single product, single cylinder dose and open drug dose are shown in Table 1. The error between actual dose and marked dose shall be in accordance with GB 10631.

5.6.3 The safety performance shall be in accordance with GB 10631.

5.7 Setting-off performance

5.7.1 The setting-off effect of the product should meet the design requirements.

5.7.2 The launch off-set angle of small fireworks effects contained in the product (except meal powder type) should be $\leq 22.5^\circ$. The off-set angle of modeling combination fireworks should be $\leq 45^\circ$ (only for professional setting-off fireworks).

5.7.3 Launching height: small fireworks effect (except meal powder type) - $15 \text{ m} \leq \text{grade C} \leq 60 \text{ m}$, grade B $\geq 35 \text{ m}$, grade A $\geq 45 \text{ m}$; saturn missiles type should be $\geq 10 \text{ m}$; other types should be according to corresponding standards.

5.7.4 The interval time should be $\leq 5 \text{ s}$.

5.7.5 There should be no fried cylinder, scattered cylinder, inverted cylinder, washed bottom, off the fire, burning cylinder during the firework setting off. The effect piece of launching should not have a low-fried phenomenon.

5.7.6 There should be no metal projectiles during setting-off. Personal fireworks should not contain conductive floating objects or floating objects with color fires.

5.7.7 Others shall be in accordance with GB 10631.

Place the sample upright on a slope made of hardwood at an angle of 30° to the horizontal plane. The product should not be dumped. Rotate the sample at any angle. The product should not be dumped.

Measure the cylinder or body height of the product directly with the ruler or tape and the minimum horizontal dimension or diameter of the bottom surface (the regular polygon is the inscribed circle). Calculate the ratio.

6.6 Drugs, doses and safety performance

6.6.1 Drugs

In accordance with GB/T 21242 and GB/T 15814.1.

6.6.2 Doses

6.6.2.1 According to the method specified in GB 10631, randomly extract a certain number of single cylinders from products combined of same specification, same effect dose, same type so as to dissect. Remove the ignition wire and debris. Carefully separate open drugs or mine ammunition. Measure with a quarter of the balance. The average value of the measured single cylinder dose multiplied by the number of single cylinder shall be the total product dose. Take the maximum value of the measured single doses as single cylinder dose. If the number of single cylinders is less than the number of samples, it shall dissect all weighing single cylinder dose and total doses.

6.6.2.2 For products combined of different specifications, different effect doses, different types, determine the total dose of same specifications, same effect dose and same type, according to the method of 6.6.2.1. The sum of each type of product of same specification, same effect dose, same type total dose shall be the total dose of the product. Among different type of combinations, respectively take the maximum value of single cylinder dose from each type as the single cylinder dose of this type.

6.6.3 Safety performance inspection

In accordance with GB 10631.

6.7 Setting-off performance

6.7.1 Setting-off effect inspection

The unit sample shall be set off one by one. Confirm the combination type, the number of combinations. After setting off, count the defect category and number of defects one by one.

6.7.2 Launch height, launch off-set angle, sound level inspections

Annex A

(Normative)

Subdivisions of defect categories

The subdivisions of the defect categories are shown in Table A.1.

Table A.1 Subdivisions of defect categories

No.	Item	Technical requirement	Test method	Defect name	Defect category
1	Ignition device	5.3	6.3	Mildew, broken, empty ignition, rhizoma nelumbinis	b ₁
				The installation location does not meet the requirements.	b ₁
2	Structure and materials	5.4	6.4	Combination of more than two personal fireworks (including two)	a ₂
				Rising effect piece material does not meet the requirements.	b ₁
				Cylinder specifications do not meet the requirements (when there is no other defects, the wall thickness shall not be judged).	b ₂
				Cylinder is not vertically installed.	b ₁
				Cylinder bonding is not firm or deformed; under normal conditions, there is crack or scattered cylinder during handling, transport, storage and setting off.	b ₁
				Fireworks which are not allowed to combine are combined.	b ₁
				The actual launch number does not match the number marked.	b ₂
				Plate, partition do not meet the requirements.	b ₂

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