

# Fireworks —

## Part 1: Classification of fireworks

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The following organizations were represented on the Technical Committee:

Ministry of Roads-Materials dept

Kenya Police

Tononoka Fireworks LTD.

Hindu Council of Kenya.

Ministry of Environment and Mineral –Mines Dept

UON- Geology Dept

Consumer Information Network

Government Chemist Dept

UON-Chemistry Dept

Kirdi

Kenya National Cleaner Production Centre

NEMA

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## Foreword

This standard has been prepared by the Technical Committee on commercial explosives, Fireworks, Pyrotechnics and other Blasting materials under the guidance of the Standards Projects Committee, and it is in accordance with the procedures of the Kenya Bureau of Standards.

KS 2443-1 has been prepared in order to specify certain basic requirements for the construction and performance of fireworks (as well as describing an associated classification system and methods of test) which will help to ensure that the risks of injury to users, onlookers and the public in general and of damage to property are minimized. It also includes requirements for labelling in order to encourage the proper use of fireworks. Prior to the publication of KS 2443-1 there had been no comprehensive document published in Kenya concerned with the quality of fireworks, although fireworks are subject to certain legislation, notably the Explosives Act Chapter 115 and the Firearms Act Chapter 114.

The main purpose of this Part of CD/CHEM/2010 is to provide the classification of fireworks. During the preparation of this standard, reference was made to the following document:

### **BS 7114-1:1988 Fireworks —Part 1: Classification of fireworks**

The Explosives Act Chapter 115.

Acknowledgement is hereby made for the assistance received from this source.



## **1 Scope**

This Kenya Standard establishes a system for the classification of fireworks. It is applicable to fireworks for consumer use or public display, both indoors and outdoors.

## **2 Definitions**

For the purposes of CD/CHEM/2010 the following definitions and those found in KS 2364:2012 shall apply.

Note 2: An alphabetical index to these terms is given in Appendix A.

### **2.1**

#### **firework**

a device containing explosive composition which, upon functioning, will burn and/or explode to produce a visual or aural effect, or a combination of such effects, intended as a form of entertainment

Note 1: Specialized technical devices such as signal flares, military devices and many theatrical devices are excluded by this definition.

### **2.2**

#### **explosive composition**

a substance or mixture of substances which is designed, on ignition or initiation, to produce an aural and/or visual effect and/or to evolve gas

### **2.3**

#### **fuse**

a component of a firework which is intended to transmit ignition from one part of a firework to another, with or without a delay

### **2.4**

#### **initial fuse**

a fuse which is ignited in order to start the firework

### **2.5**

#### **firework case**

a container which is designed to retain all the explosive composition of a firework excluding the initial fuse

### **2.6**

#### **end closure**

a disc, plate, plug or crimp which is designed to seal one end of a firework case

### **2.7**

#### **pyrotechnic unit**

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a discrete unit which is assembled into a firework case and which, upon functioning, will burn or explode to produce a visual and/or aural effect as part of a combination of effects produced by the firework

### **2.8**

#### **propellant charge**

explosive composition which will burn to evolve gas which, in turn, is intended to propel the firework as a whole or to expel one or more pyrotechnic units without bursting the firework case

### **2.9**

#### **burster**

explosive composition which will burn to evolve gas which in turn is intended to burst open the firework case, in order to expel one or more pyrotechnic units

### **2.10**

#### **gunpowder**

explosive composition which is an intimate mixture of carbon and either potassium nitrate or sodium nitrate, or a similar mixture also containing sulphur

### **2.11**

#### **net explosive content**

the mass of explosive composition in the firework

### **2.12**

#### **functioning point**

the position in the test area where the firework is placed at the beginning of a performance test

### **2.13**

#### **principal effect**

any of the effects listed in this CD/CHEM/2010 for the particular type of firework

### **2.14**

#### **first principal effect**

the principal effect of a firework which is the first actually to occur during the functioning of the firework

### **2.15**

#### **initial fuse burning**

burning which immediately follows ignition and precedes any other effect

### **2.16**

#### **invisible burning**

burning occurring within the firework which is not visible to the person who ignited the firework

### **2.17**

**explosion**

a sudden release of energy accompanied by a flash and/or a report

**2.18****debris**

any part of the firework which remains after the firework has finished functioning

**2.19****communication**

the inadvertent ignition or initiation of one or more fireworks by another firework in the same package or strip

**2.20****amorce**

a cap which comprises a paper envelope containing explosive composition and forms part of a roll

**2.21****leading tape**

the section of a roll of amorces, at its outermost end, which does not contain any dots of explosive composition

**2.22****plastics encapsulated cap**

a cap in which the explosive composition is completely enclosed in a plastics material

**2.23****plastics cup type cap**

a cap which comprises a plastics cup containing explosive composition with a sealing disc

**2.24****composition length**

the length of the section of a sparkler wire which is coated with explosive composition

**2.25****vertical droop**

the ratio of the distance by which the tip of a sparkler has been deflected from the horizontal, after the sparkler ceases to burn, to the composition length, expressed as a percentage

**2.26****defect**

a fault or malfunction of a firework

**2.27****critical defect**

a defect that judgement and experience indicate is likely to result in hazardous or unsafe conditions

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## 2.28

### **major defect**

a defect, other than a critical defect, which is likely to result in failure, to reduce materially the usability of the firework, or to increase the potential hazard

## 2.29

### **minor defect**

a defect that is not likely to reduce materially the usability of the firework

## 2.30

### **defective**

a firework or a primary pack with one or more defects

## 2.31

### **critical defective**

a defective with one or more critical defects, with or without major or minor defects

## 2.32

### **major defective**

a defective with one or more major defects, with or without minor defects, but with no critical defects

## 2.33

### **minor defective**

a defective with one or more minor defects, but with no critical defects or major defects

## 2.34

### **acceptable quality level (AQL)**

the maximum percentage defective that, for purposes of sampling inspection, can be considered satisfactory as a process average

## 2.35

### **primary pack**

a package of fireworks of the same category and type, offered for retail sale as a single unit

## 2.36

### **selection pack**

a package of fireworks of more than one type, in one or more categories, offered for retail sale as a single unit

Note 4: A selection pack may contain primary packs as well as individual fireworks.



**2.37****ancillary equipment**

any device which does not form part of a firework but which is supplied with the firework and is required in order that the firework may function correctly when used in accordance with the manufacturers Instruction.

**2.38****rocket launcher**

a tube, frame or base from which a rocket may be launched

**2.39****port fire**

a hand-held device containing slow-burning explosive composition which will emit a small flame

**3 Classification**

Fireworks for sale to the general public are classified into the following three categories based on their intended use: Further explanation of categories 1, 2 and 3 is given in Annex A. Each of categories 1, 2 and 3 is divided into several different types each of which produces a principal effect or combination of such effects, as described in Table 1 to Table 3.

Fireworks which are incomplete and/or which are not intended for sale to the general public are classified as category 4.

Note 2: Category 4 fireworks are not covered in this Kenya Standard. However, some information and guidance on the further classification of category 4 fireworks and on the marking of such fireworks are given in Annex B.

Note 3: Category 4 fireworks may be subject to particular legal requirements regarding acquisition, storage and use which are different from, or additional to, those which apply to categories 1, 2 and 3.

**3.1** Category 1: Fireworks suitable for use inside domestic buildings;

**3.2** Category 2: Fireworks suitable for outdoor use in relatively confined areas;

**3.3** Category 3 : Fireworks suitable for outdoor use in large open spaces.

Further explanation of categories 1, 2 and 3 is given in Appendix B.

Each of categories 1, 2 and 3 is divided into several different types each of which produces a principal effect or combination of such effects, as described in Table 1 to Table 3. Fireworks which are incomplete and/or which are not intended for sale to the general public are classified as category 4.

## KS 2443-1:2012

**Table 1 — Category 1 fireworks**

Type	Type name	Description	Principle effect
I A	Cap	Dot of impact-sensitive explosive composition contained in a nonmetallic envelope	Report
I B	Smoke device	Preformed shape of explosive composition or an integral container of explosive composition	Emission of smoke
I C	Party popper	Hand-held device operated by a pull-string pull-string	Ejection of streamers or confetti
I D	Table bomb	Device operated by igniting a fuse	Ejection of streamers and/or novelties with a report Impact
I E	Throwdown	A device containing an impact-sensitive explosive composition	Report, when thrown
I F	Novelty match	Hand-held device ignited by friction	Report and/or visual effect
I G	Non-hand-held sparkler	Wire partially coated with explosive composition and designed to be free-standing or to be fixed to a base	Wire partially coated with explosive
I H	Hand-held sparkler	Wire coated along one end with explosive composition and designed to be held in the hand	Emission of sparks
I J	Cracker snap	Two overlapping strips of card or paper with a friction-sensitive explosive composition in sliding contact with an abrasive surface	Report, when device is pulled apart
I K	Serpent	Preformed shape of explosive composition or an integral container of explosive composition	Emission of expanded residue

**Table 2 — Category 2 fireworks**

Type	Type name	Description	Principle effect
2 A	Banger Single tube	Banger Single tube containing gunpowder Report	Report
2 B	Fountain	Single tube containing explosive composition	Emission of sparks and flames, with aural effect or without any aural effect
2 C	Roman Candle	Single tube containing alternate pyrotechnic unit(s) and propellant charge(s)	Ejection of a pyrotechnic unit, or several units in succession, producing a visual and/or aural effect, or a series of such effects, remote from the firework case
2 D	Mine	Device fired on the ground, containing a single propellant charge and pyrotechnic units	Ejection of all the pyrotechnic units in a single burst producing a widely dispersed visual and/or aural effect
2 E	Wheel	Device which is designed to rotate about a fixed point	Rotation, emission of sparks and flames, with or without aural effect
2 F	Rocket	Self-propelled device, with stick(s) for stabilization of flight	Ascent, which can be followed by report and/or ejection of pyrotechnic units producing a visual and/or aural effect
2 G	Non-hand-held sparkler	Wire partially coated with explosive composition and designed to be free-standing, or to be fixed to a support, or to be fixed in the ground	Emission of sparks
2H	Hand-held sparkler	Wire coated along one end with explosive composition and designed to be held in the hand	Emission of sparks
2X	Combination	Assembly including several elements each corresponding to one of the devices listed under 2A to 2G, in any combination, with a single point of ignition	As for the individual elements

Table 3 — Category 3 fireworks

Type	Type name	Description	Principle effect
3 A	Banger Single tube	Contain explosives	Report
3 B	Fountain Single tube containing explosive	composition	Emission of sparks and flames, with report
3 C	Roman Candle	Single tube containing alternate pyrotechnic unit(s) and propellant charge(s)	Ejection of a pyrotechnic unit, or several units in succession, producing a visual and/or aural effect, or a series of such effects, remote from the firework case
3D	Mine	Device fired on the ground, containing a single propellant charge and pyrotechnic units	Ejection of all the pyrotechnic units in a single burst producing a widely dispersed visual and/or aural effect
3 E	Wheel	Device which is designed to rotate about a fixed point	Rotation, emission of sparks and flames, with or without aural effect
3 F	Rocket	Self-propelled device, with stick(s) and/or fin(s) for stabilization of flight	Ascent, which can be followed by report and/or ejection of pyrotechnic units producing a visual and/or aural effect
3 G	Non-hand-held sparkler	Wire partially coated with explosive composition and designed to be free-standing, or to be fixed to a support, or to be fixed in the ground	Emission of sparks
3 H	Shell	Device designed to be projected from a mortar tube and containing propellant charge, delay fuse, burster and pyrotechnic unit(s)	Projection, bursting of the firework case and ejection of the pyrotechnic unit(s) producing a visual and/or aural effect
3 J	Shell-in-mortar	Assembly comprising a shell inside a tube, from which the shell is designed to be projected, with the initial fuse fixed so that it connects with the outside of the tube	Projection of the shell, bursting of its case and ejection of the pyrotechnic unit(s) producing a visual and/or aural effect
3 X	Combination	Assembly including several elements each corresponding to one of the devices listed under 3A to 3J, in any combination, with a single point of ignition	As for the individual elements

**Annex A**  
(normative)

**Explanatory notes on categories 1, 2 and 3**

**A.1 Category 1**

When used according to the instructions, these fireworks should not cause injury to people standing 1 m or more away and should not cause damage to property. In the case of hand-held fireworks, the person holding them should not be injured.

**A.2 Category 2**

When used according to the instructions, these fireworks should not cause injury to people standing 5 m or more away. In the case of hand-held sparklers, the person holding them should not be injured by the dropping of hot slag or the ejection of sparks. The fuse fitted to the fireworks should enable the person lighting the firework to retire safely to a distance of at least 5 m.

**A.3 Category 3**

When used according to the instructions, these fireworks should not cause injury to people standing 25 m or more away. People firing these fireworks would be expected to wear suitable personal protection.

**Annex B**  
(normative)

**Information and guidance on the classification and marking of category 4 fireworks**

**B.1 Classification**

The fireworks are divided into types as described in Table 4.

**B.2 Marking**

It is recommended that the fireworks are marked with the warning

**“THIS DEVICE MUST NOT BE SOLD TO, OR USED BY, A MEMBER OF THE GENERAL PUBLIC.”**

**Table 4 — Category 4 fireworks**

Type	Type name	Description	Principle effect
4 A	Banger	Single tube containing explosive composition	Report
4 B	Fountain	Single tube containing explosive composition	Emission of sparks and flames, with aural effect other than report or without any aural effect
4 C	Roman Candle	Single tube containing alternate pyrotechnic unit(s) and propellant charge(s)	Ejection of a pyrotechnic unit, or several units in succession, producing a visual and/or aural effect, or a series of such effects, remote from the firework case
4 D	Mine	Device fired on the ground, containing a single propellant charge and pyrotechnic units	Ejection of all the pyrotechnic units in a single burst producing a widely dispersed visual and/or aural effect
4 E	Wheel	Device which is designed to rotate about a fixed point	Rotation, emission of sparks and flames, with or without aural effect
4 F	Rocket	Self-propelled device, with stick(s) and/or fin(s) for stabilization of flight	Ascent, which can be followed by report and/or ejection of pyrotechnic units producing a visual and/or aural effect

4 G	Spinner	Self-propelled device, designed to spin in flight	Rotation, ascent, emission of sparks and flames, with or without aural effect
4 H	Shell	Device designed to be projected from a mortar tube and containing propellant charge, delay fuse, burster and pyrotechnic unit(s)	Projection, bursting of the firework case and ejection of the pyrotechnic unit(s) producing a visual and/or aural effect
4 X	Combination	Assembly including several elements each corresponding to one of the devices listed under 4A to 4H, in any combination, with a single point of ignition	As for the individual elements

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