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Fireworks — Category 4 —

Part 1: Terminology

Artifices de divertissement — Catégorie 4 —

Partie 1: Terminologie

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Foreword

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This document was prepared by Technical Committee ISO/TC 264, *Fireworks*.

A list of all the parts in the ISO 26261 series can be found on the ISO website.

Fireworks — Category 4 —

Part 1: Terminology

1 Scope

This document provides terminology relating to the design, construction, primary packaging and testing of category 4 fireworks.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1 General terms

3.1.1
category 4
fireworks which present a high hazard, whose handling and use require specialist knowledge and whose noise level is not harmful to human health

3.1.2
type
sample representative of the production envisaged used in *type tests* (3.2.47)

3.1.3
generic type
set of articles with a common, very general, design feature and/or with a common characteristic effect

3.1.4
subtype
set of articles within a *generic type* (3.1.3) with specific design features

3.1.5
individual item
article within a *generic type* (3.1.3) and/or a *subtype* (3.1.4), for which every possible feature and characteristic has been fixed

Note 1 to entry: Each feature and characteristic will be specified in the *technical name* (3.1.6) or a technical data sheet, as appropriate.

3.1.6
technical name
general description of an *individual item* (3.1.5)

3.1.7
trade name
description of an *individual item* (3.1.5) from a particular supplier

3.1.8
compound firework
device in which all the individual elements have been type certified and which does not need any new specific type certification

3.2 Technical terms

3.2.1
acceptance quality level
AQL
quality level that is the worst tolerable process average when a continuing series of lots is submitted for acceptance sampling

3.2.2
batch test
test performed on a sample of products taken at random from a production batch to check compliance with a given standard

Note 1 to entry: Batch testing needs all products in the production batch to comply with the characteristics the standard requires to assure homogeneity of the whole batch. It aims at proving that all products which are placed on the market are in conformity with the type which is described in the type-examination certificate and have been successfully submitted to *type tests* (3.2.47) as determined by the standard.

3.2.3
burst height
altitude of the bursting point of the effect or the article

Note 1 to entry: For single break shells, this is the height at which the bursting charge of the shell functions. For complex shells, it is the highest bursting effect.

3.2.4
calibre
external diameter of a firework designed to be fired from a *mortar* (3.2.31) tube (e.g. shell) or the internal diameter of a tube which contains pre-assembled items (e.g. a roman candle)

Note 1 to entry: It is important that the internal diameter of the mortar tube is close to the external diameter of the firework, enabling the existence of a peripheral gap which is a compromise between the necessity of a free motion of the firework in the tube and a lowest escape of lift gases passing by the firework during its motion in the tube.

3.2.5
critical nonconforming unit
nonconforming unit (3.2.33) with one or more *critical nonconformities* (3.2.6), with or without major or minor nonconformities

3.2.6
critical nonconformity
nonconformity (3.2.34) that judgment and experience indicate is likely to result in hazardous or unsafe conditions

Note 1 to entry: This type of nonconformity is referred to as ‘class A nonconformity’ in ISO 2859-1:1999.

3.2.7
debris
any part of the firework which remains after the firework has ceased to function

Note 1 to entry: Chemical products resulting from the combustion of the *pyrotechnic compositions* (3.2.42) are not considered as “debris”.

3.2.8
delay fuse
fuse incorporated into the *initial fuse* (3.2.24) of a firework to introduce a delay between firing and functioning or the internal fuse in a firework to enable sequential firing of elements of the firework (e.g. in a shell)

3.2.9
drift
movement of a firework away from the direction of firing, as a result of the action of the wind or other effects

Note 1 to entry: For instance, an aerial wheel might drift away from the vertical direction in which it was fired. Drift can be quantified in terms of angle or distance.

3.2.10
effect broadness
broadness of effect
horizontal dimension of the firework effect

3.2.11
effect height
maximum height achieved by the firework

Note 1 to entry: For a shell, this would equate to the *burst height* (3.2.3) plus the burst radius of the shell. For waterfalls, this corresponds with the vertical length of the effect.

3.2.12
effect range
horizontal distance between the firing point and the point of *explosion* (3.2.15) (or functioning) on to the water

3.2.13
effect time
total duration of effect from its visible and/or aural emergence until vanishing

3.2.14
end closure
part or crimp which is designed to seal one end of a *firework case* (3.2.16)

3.2.15
explosion
sudden release of energy accompanied by a bang with or without a flash

3.2.16
firework case
container which is designed to retain *pyrotechnic compositions* (3.2.42)

Note 1 to entry: According to its mechanical strength, this container may intentionally (by design) influence the firework's behaviour.

3.2.17
firing angle
angle (measured from the vertical) of an item as prepared for firing

3.2.18
flash composition
uncompacted *pyrotechnic composition* (3.2.42) used to produce an aural effect, with or without emission of an intense and short flash light, or used as a bursting charge

3.2.19
friction head
ignition head (3.2.23) designed to be ignited by friction

3.2.20
fuse
small tube or cord containing a pressed or compacted *pyrotechnic composition* (3.2.42) which burns gradually to ignite a pyrotechnic composition or article

Note 1 to entry: By extension, this term also applies to other types of fire transmission devices like quickmatch or blackmatch or pressed fuse.

Note 2 to entry: See also "*delay fuse* (3.2.8)".

3.2.21
gross mass
total mass of the firework

Note 1 to entry: This does not include any ancillary equipment (e.g. frames).

3.2.22
group
set of *individual items* (3.1.5) which will be considered together for the purposes of testing and certification

Note 1 to entry: Synonymous with "family".

3.2.23
ignition head
initial fuse (3.2.24) consisting of *pyrotechnic composition* (3.2.42) only

3.2.24
initial fuse
component of a firework which is ignited in order to start the firework functioning

3.2.25
initial fuse time
burning time of the *initial fuse* (3.2.24)

3.2.26
lifting charge
non-consolidated *pyrotechnic composition* (3.2.42) used to project the firework as a whole or a subcomponent of the firework into the air (e.g. in mine or shell)

3.2.27
major nonconforming unit
nonconforming unit (3.2.33) with one or more *major nonconformities* (3.2.28), with or without *minor nonconformities* (3.2.30), but with no *critical nonconformities* (3.2.26)

3.2.28
major nonconformity
nonconformity (3.2.34), other than a *critical nonconformity* (3.2.6), which is likely to result in failure, to reduce materially the usability of the firework or to increase the potential hazard

Note 1 to entry: This type of nonconformity is referred to a 'class B nonconformity' in ISO 2859-1:1999.

3.2.29
minor nonconforming unit
nonconforming unit (3.2.33) with one or more *minor nonconformities* (3.2.30), but with no critical or major nonconformities

3.2.30
minor nonconformity
nonconformity (3.2.34) that is not likely to reduce materially the usability of the firework

Note 1 to entry: This type of nonconformity is referred to as 'class C nonconformity' in ISO 2859-1.

3.2.31
mortar
tube which is closed at the lower end and from which a firework is projected

3.2.32
net explosive content
NEC
mass of *pyrotechnic composition* (3.2.42) in the firework, excluding the pyrotechnic composition in the *initial fuse* (3.2.24) or *transmitting fuses* (3.2.46), friction or *ignition heads* (3.2.23)

Note 1 to entry: Net explosive quantity (NEQ), net explosive mass (NEM) or net explosive weight (NEW) are often used to convey the same meaning.

3.2.33
nonconforming unit
firework or assembly of fireworks fused together at the manufacturing level with one or more *nonconformities* (3.2.34)

3.2.34
nonconformity
non-fulfilment of a specified requirement

[SOURCE: ISO 2859-1:1999, 3.1.5]

3.2.35
overall duration
time from the start of the first effect until the end of the last effect and, for an aerial wheel, the flight time from the take off until the landing

3.2.36
packaging
wrapping or encasing in which an item is presented for transport, storage and/or sale

3.2.37
principal effect
main visual and/or aural effect the firework has been designed to display

3.2.38
projected article
article whose movement is produced by a non-consolidated *pyrotechnic composition* (3.2.42) in a single event and a short duration

3.2.39
projected debris
fragments projected laterally from the firework while functioning

3.2.40
propelled article
article moved by an attached or integral motor, producing thrust over an extended period of time

3.2.41
protective pack
package of one or more fireworks which may act as protection of the means of ignition and/or for labelling purposes

3.2.42
pyrotechnic composition
explosive substance or explosive mixture of substances which is designed, on ignition or initiation, to produce heat, light, sound, gas or smoke or a combination of such effects through self-sustained exothermic chemical reactions

3.2.43
pyrotechnic leakage
pyrotechnic composition (3.2.42) released from damaged pyrotechnic articles

3.2.44
pyrotechnic unit
discrete unit that is part of a firework which, upon functioning, will burn or explode to produce a visual and/or aural effect

Note 1 to entry: The effect produced by a pyrotechnic unit is normally part of a combination of effects produced by the firework.

3.2.45
total NEC
mass of *pyrotechnic composition* (3.2.42) in the firework, including the pyrotechnic composition in the *initial fuse* (3.2.24) or *transmitting fuses* (3.2.46), friction or *ignition heads* (3.2.23)

3.2.46
transmitting fuse
component of a firework which is intended to transmit ignition from one part of a firework to another, with or without a delay

3.2.47
type test
test performed on a sample of products, representative of the production envisaged, in order to demonstrate their conformance with the provisions of ISO 26261 series

Note 1 to entry: The successful submission to type tests leads to the attribution of a type-examination certificate.

3.2.48
wind speed
measured speed of the wind at a defined height

4 List of generic types and descriptions

	Generic type	Description	Comments (informative)	Principal effects
4.1	Aerial wheel	Tubes containing propellant charges and sparks-producing, flame-producing and/or noise-producing pyrotechnic composition(s), the tubes being fixed to a supporting structure, designed to rotate and ascend into the air.	Some of the tubes (if not all) are fixed in such a way that the device ascends, in an unsupported manner, into the air.	Rotation and ascent, with emission of sparks and flames, producing a visual and/or aural effect.
4.2	Aquatic firework	A firework designed to be floated on or near the surface of water by means of a buoyancy device or by itself and to function on or below water.		Same as Bengal flames, fountains, mines, shells for example.
4.3	Combination	Assembly including several elements, of one or more types, each corresponding to one of the types of firework listed in this table, with one or more points of ignition. Compound fireworks shall not be considered as combinations.	The elements may be fused together in series or parallel, with or without delay fuses, to give their effects in a sequence or at the same time.	As for the individual elements.

	Generic type	Description	Comments (informative)	Principal effects
4.4	Fountain	Case containing sparks-producing and/or flame-producingand/or aural effect-producing pyrotechnic composition.		Emission of sparks and flames with aural effect other than report or without any aural effect.
4.5	Guided firework	An article containing pyrotechnic composition designed to function along a rope or other guide and to produce a visual and/or aural effect.	For example, line rockets may also be used to transmit ignition to other fireworks, generally fixed on a frame located at a distance from the firing place, e.g. at the top of a steeple or a tower.	Emission of a visual and/or aural effect.
4.6	Mine	Article which may include integral mortar, containing propellant charge and more than one pyrotechnic unit, having as main effect the discharge of all the pyrotechnic units in a single ejection.	Pyrotechnic units may be stars, bangers, butterflies, crackers, hummers, spinners/tourbillions, whistles, for example.	Ejection of all the pyrotechnic units in a single burst producing a widely dispersed visual and/or aural effect in the air.
4.7	Report	Article containing pyrotechnic composition designed to produce a bang.		Bang may also include a coloured (or other effect) delay element.
4.8	Rocket	Article containing pyrotechnic composition and/or pyrotechnic units, equipped with a launching motor and stick(s) or other means for stabilization of flight, and designed to be propelled into the air.		Ascend with visual and/or aural effect.
4.9	Roman candle	Tube containing a single charge or alternating propellant charges and pyrotechnic units, as well as transmitting fuses.	The pyrotechnic units may be bombettes, comets, hummers, maroons, mini mines, stars, whistles, for example.	Ejection of the pyrotechnic units in succession, producing a series of visual and/or aural effects in the air.
4.10	Shell	A device with or without lifting charge, with one or more delays before bursting, containing pyrotechnic unit(s) or loose pyrotechnic composition and usually designed to be projected and burst at a distance from a mortar.	Pyrotechnic units may be stars, butterflies, crackers, hummers, spinners/tourbillions, whistles, etc., as well as report shells or other shells to produce multiple bursts simultaneously or sequentially.	As for the individual pyrotechnic units.
4.11	Smoke/aerosol generator	Article containing smoke-producing pyrotechnic composition or heat/gas-generating composition to evaporate a substance or disperse hygroscopic particles and designed to function on the ground or fixed to a support.	Casing of the article may be made of different materials.	Emission of white or coloured smoke/aerosol without any aural effect.

5 List of subtypes and descriptions

	Subtype	Description	Link to generic type/ comments	Principal effects
5.1	Aquatic shell	A spherical, cylindrical or other shell designed to be floated on water by means of a buoyancy device or by itself and which is fired from a mortar.	See **"Aquatic firework".**	Same effects as shells.
5.2	Bag mine	Container with propellant charge and pyrotechnic units, designed to be placed in a mortar and to function as a mine.	See **"Mine"**. Container is typically a cloth or paper or plastic bag or cloth or paper cylinder.	Same effects as mines.
5.3	Battery	Assembly including several elements, each of the same type or subtype and corresponding to one of the types of firework listed in this document, with one or more points of ignition.	See **"Combination"**. The elements may be fused together in series or parallel, with or without delay fuses, to give their effects in a sequence or at the same time.	As for the individual elements.
5.4	Bengal flame	Tube containing slow-burning pyrotechnic composition.	See **"Fountain"**. The pyrotechnic composition may be pressed or not. The tube has no choke and optionally burns away during functioning.	Emission of white or coloured flame.
5.5	Complex shell	A shell composed of several discrete elements designed to be projected from a mortar with a single lifting charge and to function sequentially or simultaneously. This subtype includes the following articles. — Multibreak Shell A shell with several discrete elements and with or without propellant charge, with delay fuse and bursting charge, pyrotechnic unit(s) or loose pyrotechnic composition and designed to be projected from a mortar and to function sequentially or simultaneously by the lighting of multiple internal delay fuses. — Peanut Shell A shell with two or more spherical shells in a common wrapper propelled by the same propellant charge with independent internal delay fuses.	See **"Shell"**.	As for the individual elements.

	Subtype	Description	Link to generic type/ comments	Principal effects
		— Repeater Shell A shell with several discrete elements and with or without propellant charge, with delay fuse and bursting charge, pyrotechnic unit(s) or loose pyrotechnic composition and designed to be projected from a mortar and to function sequentially by the lighting of the internal delay fuses by the functioning (burst) of the previous device. — Shell of shells (spherical) A shell with or without propellant charge, with delay fuse and bursting charge, containing report or other shells as subcomponents and designed to be projected from a mortar.		
5.6	Daylight shell	A spherical, cylindrical or other shell designed to be fired from a mortar and which contains discrete elements which are visible in the daylight and/or components which produce an aural effect.	See **"Shell"**.	Emission of coloured light and/or smoke, and/or aural effect.
5.7	Flash banger	Non-metallic case containing metal-based pyrotechnic composition.	See **"Report"**. May be used as pyrotechnic units in fireworks (shells, Roman candles, for example).	Report and a flash of light.
5.8	Ground maroon	A maroon without propellant charge and with or without delay fuse, designed to produce its report on the ground.	See **"Report"**.	Production of a loud bang.
5.9	Lance	A small diameter tube containing a compacted pyrotechnic composition, burning in a cigarette way, intended to deliver a thermal output to manually ignite other fireworks or a small white or coloured flame to be used in lanceworks.	See **"Fountain"**. The pyrotechnic composition may be pressed or simply consolidated. The tube has no choke and generally burns away during functioning.	Thermal output and/ or visual effect.
5.10	Maroon	A firework containing pyrotechnic unit(s) or loose pyrotechnic composition and designed to produce a loud bang report as main effect.	See **"Report"**. Not to be confused with bangers, as their design is similar to shells or bombettes, which is not the case of bangers.	Production of a loud bang.
5.11	Maroon shell	A maroon with or without propellant charge and with delay fuse, designed to be projected from a mortar and to produce its report in the air.	See **"Shell"** and **"Report"**. This article is strictly shell-type designed.	Production of a loud bang.

	Subtype	Description	Link to generic type/ comments	Principal effects
5.12	Parachute rocket	Article containing pyrotechnic composition and/or pyrotechnic units, which contains subcomponents some or all of which will descend on parachutes and equipped with a launching motor and stick(s) or other means for stabilization of flight, and designed to be self-propelled into the air.	See **"Rocket"**.	As for the individual subcomponents.
5.13	Parachute shell	A spherical, cylindrical or other shell designed to be fired from a mortar and which contains sub-components some or all of which will descend on parachutes.	See **"Shell"**.	As for the individual pyrotechnic units contained in the shell.
5.14	Preloaded mortar, shell in mortar	Assembly comprising a shell inside a mortar from which the shell is designed to be projected.	See **"Shell"**.	As for the individual shell.
5.15	Saxon	Tube intended to be attached to a support in its middle so that it can rotate and containing pyrotechnic compacted charge(s) which burn opposite and eject their combustion products sideways so that rotation is obtained.	See **"Fountain"**. The two pyrotechnic charges may be merged in a single charge. In that case, this charge burns at its two free ends.	Rotation, with emission of sparks and/ or flames, with or without aural effect.
5.16	Set piece	Assembly including one or multiple elements which is designed not to rotate.	See **"Combination".** Generally, these elements belong to the sub type of lances, fountains and waterfalls, but can also include bangers, ground maroons and/ or whistles.	As for the individual elements.
5.17	Shot tube	Tube containing a single propellant charge and a pyrotechnic unit, with or without a bursting charge, with or without a transmitting fuse.	See **"Roman candle"**. The pyrotechnic unit may be a bombette, a comet, a hummer, a shell (including maroon shells), a whistle, for example.	Single shot effect, as for Roman candles.
5.18	Signal rocket	Tube containing pyrotechnic composition and/or pyrotechnic unit(s), equipped with a stick or other means for stabilization of flight, and designed to be propelled into the air to produce predominantly an aural effect.	See **"Rocket"**.	Constant or variable pitch sound or report.
5.19	Spinner	Tube or tubes containing pyrotechnic composition with aerofoils attached.	See **"Aerial wheel"**.	Rotation and ascent, with emission of sparks and/or flames, with or without aural effect.

	Subtype	Description	Link to generic type/ comments	Principal effects
5.20	Strobe	Tube containing an intermittently-burning pyrotechnic composition to produce long and rapid series of flashes at a constant frequency. The tube has no choke and optionally burns away during functioning.	See **"Fountain"**. The pyrotechnic composition may be pressed or not.	Production of series of flashes.
5.21	Subaquatic fireworks	Firework designed to function under the water near the surface.	See **"Aquatic firework"**. These articles have the capacity to float at a few centimetres under the surface of water.	Essentially similar to Bengal flames: emission of coloured flame.
5.22	Volcano	Conical device containing consolidated or pressed composition in which the effect (height or intensity) increases as the device burns.	See **"Fountain"**.	Production of an increasing visual effect.
5.23	Waterfall	Case containing pressed or consolidated pyrotechnic composition producing sparks and flames and generally to consume the tube whilst burning.	See **"Fountain"**. Combustion products are ejected from the flame zone at low speed, then drop downwards as water in a waterfall.	Production of a bright white or coloured "waterfall" visual effect.
5.24	Wheel	Assembly including a tube or tubes containing pyrotechnic composition and provided with a means of attaching it to a support so that it can rotate.	See **"Fountain"** and **"Combination"**. This article is designed to rotate about a fixed point in either a vertical or horizontal plane.	Rotation around a fixed point or axis and emission of sparks and flames, with or without aural effect(s).

Bibliography

[1] ISO 2859-1:1999, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

[2] ISO 26261-2, *Fireworks —Category 4 — Part 2: Requirements*

[3] ISO 26261-3, *Fireworks —Category 4 — Part 3: Test methods*

[4] ISO 26261-4, *Fireworks —Category 4 — Part 4: Minimum labelling requirements and instructions for use*

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