

English Version

Pyrotechnic articles - Fireworks, Categories F1, F2 and F3 - Part 5: Requirements for construction and performance

Articles pyrotechniques - Artifices de divertissement,
Catégories F1, F2 et F3 - Partie 5 : Exigences de
construction et de performances

Pyrotechnische Gegenstände - Feuerwerkskörper,
Kategorien F1, F2 und F3 - Teil 5: Anforderungen an
Konstruktion und Funktion

This European Standard was approved by CEN on 8 August 2022.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents	Page
European foreword	4
1 Scope.....	6
2 Normative references.....	7
3 Terms and definitions	7
4 Construction	7
4.1 Construction materials (type test and batch test)	7
4.1.1 General requirements	7
4.1.2 Specific requirements	7
4.2 Length of handle and pull string (type test and batch test).....	8
4.3 Permitted elements in battery, battery requiring external support, combination and combination requiring external support (type test and batch test)	9
4.4 Dimensions for mini rocket (type test and batch test)	9
4.5 Specific requirements for compound firework (type test and batch test)	10
4.6 Specific requirements for fireworks which eject pyrotechnic units with end closures (type test)	10
5 Pyrotechnic composition (type test)	10
6 Means of initiation.....	14
6.1 Permitted means of initiation (type test and batch test)	14
6.2 Protection of means of initiation (type test and batch test).....	16
6.3 Attachment of means of initiation and resistance to ignition by an abrasive surface (type test and batch test).....	16
6.4 Requirements for means of initiation (type test and batch test)	16
6.4.1 General requirements	16
6.4.2 Specific requirements	17
7 Performance	17
7.1 Properties to be checked before functioning tests	17
7.1.1 Loose pyrotechnic composition after mechanical conditioning (type test)	17
7.1.2 Integrity (type test and batch test).....	17
7.1.3 Stabilization of flight (type test and batch test).....	18
7.1.4 Other requirements (type test)	18
7.2 Properties to be checked during functioning tests (type test and batch test).....	18
7.2.1 Principal effects.....	18
7.2.2 Functioning	18
7.2.3 Angle of ascent or flight	18
7.2.4 Motion	19
7.2.5 Stability during functioning	19
7.2.6 Height of explosion.....	20
7.2.7 Sound pressure level	20
7.2.8 Explosions and other failures.....	20
7.2.9 Burning or incandescent matter	21
7.2.10 Extinguishing of flames.....	21
7.2.11 Debris and projected debris	23
7.2.12 Burning rate of composition	23
7.2.13 Pull-string or strip	24

7.3	Properties to be checked after functioning tests (type test and batch test)	24
7.3.1	Droop	24
7.3.2	Plastics body	24
7.3.3	Tube containing the propellant charge for rocket and report rocket	24
8	Primary pack or selection pack (type test and batch test)	24
9	Type testing	24
9.1	General	24
9.2	Specific requirements for primary packs to be examined	26
10	Batch testing	26
10.1	General	26
10.2	Sampling plans	26
10.3	Unit of product	26
10.4	Nonconformities	27
10.5	Acceptance or rejection of a batch	29
10.5.1	Nonconforming units	29
10.5.2	Critical nonconforming units	29
10.5.3	Major nonconforming units	29
10.5.4	Minor nonconforming units	29
10.5.5	Fireworks supplied in primary packs or selection packs	29
Annex ZA	(informative) Relationship between this European Standard and the essential safety requirements of Directive 2013/29/EU aimed to be covered	30

European foreword

This document (EN 15947-5:2022) has been prepared by Technical Committee CEN/TC 212 “Pyrotechnic articles”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2023, and conflicting national standards shall be withdrawn at the latest by April 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 15947-5:2015.

In comparison with the previous edition EN 15947-5:2015, the following essential technical modifications have been made:

- new fireworks types “report rocket” in F3 and “senko-hanabi” in F1 added with corresponding requirements;
- requirements for hand-held Bengal flame and Banger with preliminary effect have been added;
- procedure to check the labelling during type testing has been revised;
- measuring of sound pressure level during batch testing is not required, if the measured values during type testing were less than 90 dB (AI) at the respective safety distance;
- for fireworks with whistle elements no plastic tubes shall be ejected from the article during functioning;
- deletion of the requirements regarding “Integrity after function” (earlier 7.3.4);
- type testing was revised;
- requirements on elements in battery, battery requiring external support, combination and combination requiring external support has been revised;
- requirement for end closures breakability has been added;
- the requirement to use a non-metallic base plate to fix the individual fireworks for a compound firework has been removed;
- requirement removed for mounted wheels in category F3 (ex 6.4.2).

This document has been prepared under a Standardization Request (M/583) concerning pyrotechnic articles given to CEN by the European Commission and the European Free Trade Association, and supports Essential Safety requirements of Directive 2013/29/EU.

For relationship with Directive 2013/29/EU, see informative Annex ZA, which is an integral part of this document.

This document is one of the series of standards as listed below:

- EN 15947-1, *Pyrotechnic articles — Fireworks, Categories F1, F2 and F3 — Part 1: Terminology*
- EN 15947-2, *Pyrotechnic articles — Fireworks, Categories F1, F2 and F3 — Part 2: Categories and types of firework*

- EN 15947-3, *Pyrotechnic articles — Fireworks, Categories F1, F2 and F3 — Part 3: Minimum labelling requirements*
- EN 15947-4, *Pyrotechnic articles — Fireworks, Categories F1, F2 and F3 — Part 4: Test methods*
- EN 15947-5, *Pyrotechnic articles — Fireworks, Categories F1, F2 and F3 — Part 5: Requirements for construction and performance*

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

1 Scope

This document specifies requirements for construction and performance of firework and primary packs and selection packs. It is applicable to firework of the categories F1, F2 and F3 as defined by Article 6 Paragraph (1) clause (a) subclause (i) to (iii) of Directive 2013/29/EU.

This document is not applicable for fireworks containing detonative explosives other than black powder or flash composition or pyrotechnic composition that includes any of the following substances:

- arsenic or arsenic compounds;
- hexachlorobenzene;
- lead or lead compounds;
- mixtures containing a mass fraction of chlorates greater than 80 %;
- mixtures of chlorates with metals;
- mixtures of chlorates with red phosphorus (except when used in Christmas crackers, party poppers or snaps);
- mixtures of chlorates with potassium hexacyanoferrate (II);
- mixtures of chlorates with sulphur (these mixtures are allowed for friction heads only);
- mixtures of chlorates with sulphides;
- mercury compounds;
- nitrocellulose with a mass fraction of nitrogen of more than 12,6 %;
- picrates or picric acid;
- potassium chlorate with a mass fraction of bromates greater than 0,15 %;
- sulphur with an acidity, expressed in mass fraction of sulphuric acid, greater than 0,002 %;
- white phosphorus;
- zirconium with a particle size of less than 40 µm.

This document does not apply to fireworks intended to be kept or used at temperatures below –20 °C or above 50 °C.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

EN 15947-1:2022, *Pyrotechnic articles — Fireworks, Categories F1, F2 and F3 — Part 1: Terminology*

EN 15947-2:2022, *Pyrotechnic articles — Fireworks, Categories F1, F2 and F3 — Part 2: Categories and types of firework*

EN 15947-3:2022, *Pyrotechnic articles — Fireworks, Categories F1, F2 and F3 — Part 3: Minimum labelling requirements*

EN 15947-4:2022, *Pyrotechnic articles — Fireworks, Categories F1, F2 and F3 — Part 4: Test methods*

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

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15947-1:2022 apply.

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

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp/ui>

4 Construction

4.1 Construction materials (type test and batch test)

4.1.1 General requirements

Conformity to the following requirements shall be verified by visual examination according with EN 15947-4:2022, 6.13, except the last sentence of the second hyphen.

- The body of the firework case, except rocket motors containing only propellant charge, shall be made of paper, cardboard or plastic. The base (end closures) shall be made of non-metallic material. For fixing purposes, wood, staples, nails, aluminium coated foil or binding wires may be used.
- For articles fitted with a friction head: the primary pack shall be fitted with a striking surface. The striking surface on the primary pack shall be covered or the primary pack shall be sealed. The striking surface shall be resistant enough to allow ignition of all the fireworks included within the primary pack when tested in accordance with EN 15947-4:2022, 6.16.
- Any part of a firework that acts as handle shall not contain any pyrotechnic composition.

4.1.2 Specific requirements

Conformity to the following requirements shall be verified by visual examination according with EN 15947-4:2022, 6.13.

¹ As impacted by ISO 2859-1:1999/Cor.1:2001 and ISO 2859-1:1999/Amd.1:2011.

- For banger and flash banger: additionally to 4.1.1 cardboard wrapped in string is permitted as construction material.
- For Bengal match and Bengal stick: the stick shall be made of wood.
- For Christmas cracker and snap: the overlapping strips shall be made of cardboard, paper or string.
- For hand-held sparkler and non-hand-held sparkler: a metal stick is permitted as construction material.
- For jumping cracker: the firework case shall be made of paper only.
- For mini rocket: the tube containing the propellant charge and the effect charge shall be made of cardboard or, when no report charge is present, plastic.
- For novelty match: the stick shall be made of cardboard or wood.
- For party popper: the shape shall not resemble a gun.
- For rocket and report rocket: the tube containing the propellant charge shall be made of cardboard, plastic or sheathed aluminium.
- For Roman candle and shot tube: the case, if any, of the pyrotechnic unit, shall be made of paper, cardboard or plastics.
- For senko-hanabi: natural straw is permitted as construction material.
- For spinner: the aerofoils, if any, shall be made of cardboard or plastics.
- For throwdown: the body shall be made of tissue paper or foil.

Conformity to the following requirement shall be verified by determination of diameter according to EN 15947-4:2022, 6.1.5:

- For Roman candle: the inside diameter of the tube shall not exceed 30 mm.
- For shot tube: the inside diameter of the tube shall not exceed 30 mm (category F2) or 50 mm (category F3).

Conformity to the following requirement shall be verified by determination of tube angle according to EN 15947-4:2022, 6.18:

- For battery, battery requiring external support, combination and combination requiring external support: the angle of tubes of mines, Roman candles or shot tubes shall not exceed 30° to the vertical.

Conformity to the following requirement shall be verified by conformity to drawings and part lists according to EN 15947-4:2022, 6.2.2 and visual examination according to EN 15947-4:2022, 6.13:

- For battery, battery requiring external support, combination and combination requiring external support: Any technical appliances as an integral part of the firework allowing ignition transmission to other fireworks are not allowed. Reserve fuse is not considered a technical appliance.

4.2 Length of handle and pull string (type test and batch test)

Conformity to the following requirements shall be verified by the test method described in EN 15947-4:2022, 6.1.1.

- For Bengal match: the uncoated end of a Bengal match which acts as the handle shall have a length of at least 40 % of the total length of the Bengal match with a minimum of 20 mm.
- For Bengal stick: the uncoated end of a Bengal stick which acts as the handle shall have a minimum length of 75 mm.
- For hand-held fountain and hand-held Bengal flame: the end of the firework case which acts as a handle, or if it is a separate component, shall have a minimum length of 40 mm. If the handle is an integral part of the body, the handle section shall be marked in a contrasting colour.
- For hand-held sparkler: a category F1 hand-held sparkler shall have a minimum handle length of 75 mm; a category F2 hand-held sparkler shall have a minimum handle length of 75 mm when the total length does not exceed 450 mm and 150 mm when the total length is more than 450 mm.
- For novelty match: the uncoated end of a novelty match which acts as the handle shall have a minimum length of 20 mm.
- For senko-hanabi: the handle shall have a minimum length of 80 mm.

Conformity to the following requirements shall be verified by the method described in EN 15947-4:2022, 6.1.4.

- For Christmas cracker and snap: the total length of the pull-strip or -string shall be at least 50 mm.
- For party popper: the length of the pull-string shall be at least 75 mm.

4.3 Permitted elements in battery, battery requiring external support, combination and combination requiring external support (type test and batch test)

Conformity to the following requirements shall be verified by the individual applicable test method described in EN 15947-4:2022, Clause 6.

Elements in a category F2 battery, battery requiring external support, combination and combination requiring external support shall be of category F1 or F2. Elements in a category F3 battery, battery requiring external support, combination and combination requiring external support shall be of category F1, F2 or F3.

Elements in a battery, battery requiring external support, combination and combination requiring external support shall comply with the requirements of 4.1, 4.2, 4.4, 4.6 and Clause 5 applicable to the type and the category of the elements.

4.4 Dimensions for mini rocket (type test and batch test)

When tested in accordance with EN 15947-4:2022, 6.1.5 and 6.1.3, mini rockets shall have the following dimensions:

- outer diameter of tube: maximum 10 mm;
- length of tube: maximum 60 mm;
- total length: minimum 250 mm, maximum 350 mm.

4.5 Specific requirements for compound firework (type test and batch test)

Compound firework may only consist of the following pyrotechnic articles:

- fireworks of categories F1, F2 and F3 for which an EU-type examination certificate (Module B) has been issued and
- pyrotechnic cords and fuses of category P1 only, which were CE marked.

NOTE 1 Usually pyrotechnic cords and fuses cannot be labelled on account of the nature and size of the pyrotechnic article.

Elements which are designed to ensure the stability of the firework during its functioning as single articles may be omitted, when the firework is fixed on a base plate.

NOTE 2 Such elements can include for example loose attachment bases, metal fixings (loops)/spikes to be inserted in the ground, foldable bases and packaging with fixing functions.

The category of a compound firework shall be determined by the highest category amongst the individual fireworks in the compound firework or the category according to the net explosive content (NEC) limits for compound firework given in Table 1, whichever is the highest.

A base plate is required for compound fireworks. When tested in accordance with EN 15947-4:2022, 6.13 all fireworks which are required to remain upright during functioning according to 7.2.5 shall remain fixed to the base plate during functioning of the compound firework.

When tested in accordance with EN 15947-4:2022, 6.13, every single article in a compound firework shall be oriented as individually type tested.

When tested in accordance with EN 15947-4:2022, 6.13, compound fireworks shall be supplied in a primary pack.

When tested in accordance with EN 15947-4:2022, 6.13, the locations where the initial fuses and/or pyrotechnic cords and fuses are connected with each other within compound fireworks shall be securely covered and not be exposed or directly accessible.

4.6 Specific requirements for fireworks which eject pyrotechnic units with end closures (type test)

End closures of pyrotechnic units having a diameter larger than 20 mm and weighing more than 8,0 g, which are designed to be ejected from a tube or a launcher and to burst in the air, shall be breakable and no fragments shall weigh more than 8,0 g when tested in accordance with EN 15947-4:2022, 6.1.8.

5 Pyrotechnic composition (type test)

When tested in accordance with EN 15947-4:2022, 6.2.2 and 6.2.3, the NECs shall comply with Table 1. For report and/or bursting charges with a composition other than black powder, nitrate/metal-based compositions or perchlorate/metal-based compositions the same upper limits as for perchlorate/metal-based compositions apply.

Table 1 — Pyrotechnic composition

Firework type	Category	NEC
aerial wheel	F3	Not more than 160 g, shall not contain more than eight pyrotechnic units. A pyrotechnic unit shall have a NEC of not more than 20 g. Each report charge, if any, shall have a NEC of not more than 10 g of black powder or 4,0 g of nitrate/metal-based report charge or 2,0 g of perchlorate/metal-based report charge.
banger	F2	In case of no preliminary effect, not more than 6,0 g black powder. In case of preliminary effect not more than 3,0 g black powder and 4,5 g other effects (in case of whistle unit, not more than 1,0 g and only one unit).
	F3	In case of no preliminary effect, not more than 10 g black powder. In case of preliminary effect not more than 5,0 g black powder and 7,5 g other effects (in case of whistle unit, not more than 2,0 g and only one unit).
battery, battery requiring external support, combination and combination requiring external support	F2	Each element shall have a NEC of not more than the limit for F2 firework of the same type. A battery or battery requiring external support of fountains shall have a NEC of not more than 600 g. A combination or combination requiring external support containing fountains, shall have NEC of not more than 600 g of which not more than 500 g shall be contained in elements other than fountains. Any other battery or battery requiring external support shall have a NEC of not more than 500 g. Any other combination or combination requiring external support shall have a NEC of not more than 500 g. Bangers used in batteries, batteries requiring external support, combinations or combinations requiring external support shall have a total NEC of not more than 100 g. Flash bangers used in batteries, batteries requiring external support, combinations or combinations requiring external support shall have a total NEC of not more than 25 g.
	F3	Each element shall have a NEC of not more than the limit for F3 firework of the same type. A battery or battery requiring external support of fountains shall have a NEC of not more than 3 000 g. A combination or combination requiring external support containing fountains, shall have a NEC of not more than 3 000 g of which not more than 1 000 g shall be contained in elements other than fountains. Any other battery or battery requiring external support shall have a NEC of not more than 1 000 g. Any other combination or combination requiring external support shall have a NEC of not more than 1 000 g. Bangers used in batteries, batteries requiring external support, combinations or combinations requiring external support shall have a total NEC of not more than 1 000 g. Flash bangers used in batteries, batteries requiring external support, combinations or combinations requiring external support shall have a total NEC of not more than 250 g.

Firework type	Category	NEC
Bengal flame	F1	Not more than 20 g.
	F2	Not more than 250 g.
	F3	Not more than 1 000 g.
Bengal match	F1	Not more than 3,0 g.
Bengal stick	F1	Not more than 7,5 g.
	F2	Not more than 50 g.
Christmas cracker	F1	Not more than 16 mg report charge based on potassium chlorate and red phosphorous, or not more than 1,6 mg silver fulminate as report charge.
combination		See batteries, batteries requiring external support, combinations and combinations requiring external support.
compound firework	F2	Not more than 2 000 g; the respective NEC limits of the included fireworks types apply independently.
	F3	Not more than 4 000 g; the respective NEC limits of the included fireworks types apply independently.
crackling granule	F1	Not more than 3,0 g.
	F2	Not more than 15 g.
double banger	F2	Not more than 10 g black powder.
flash banger	F2	In case of no preliminary effect, not more than 1,0 g for nitrate/metal-based report charge or not more than 0,5 g for perchlorate/metal-based report charge. In case of preliminary effect not more than 0,6 g nitrate/metal-based report charge or not more than 0,3 g perchlorate/metal-based report charge and 4,5 g other effects (in case of whistle unit, not more than 2,0 g and only one unit).
	F3	In case of no preliminary effect, not more than 10 g for nitrate/metal-based report composition charge or not more than 5,0 g for perchlorate/metal-based report composition charge. In case of preliminary effect not more than 5,0 g nitrate/metal-based report charge or not more than 2,5 g perchlorate/metal-based report charge and 7,5 g other effects (in case of whistle unit, not more than 2,0 g and only one unit).
flash pellet	F1	Not more than 2,0 g.
	F2	Not more than 30 g.
fountain	F1	Not more than 7,5 g, no whistle unit (for indoor use: pyrotechnic composition that is based on nitrocellulose, with no additional oxidizing substances).
	F2	Not more than 250 g, each whistle unit, if any, not more than 5,0 g.
	F3	Not more than 1 000 g, each whistle unit, if any, not more than 20 g.
ground mover	F2	Not more than 25 g, each pyrotechnic unit not more than 3,0 g, no report charge.
ground spinner	F1	Not more than, 5,0 g.
	F2	Not more than 25 g and each pyrotechnic unit not more than 8,0 g.
hand-held sparkler	F1	Not more than 7,5 g.
	F2	Not more than 50 g.
jumping cracker	F2	Not more than 10 g black powder.

Firework type	Category	NEC
jumping ground spinner	F2	Not more than 25 g, each pyrotechnic unit not more than 5,0 g.
mine	F2	Not more than 50 g; shall not contain more than five pyrotechnic units containing report charge and each of these pyrotechnic units shall not contain more than 5,0 g of black powder or 2,0 g of nitrate/metal-based composition or 1,0 g of perchlorate/metal-based composition. Not more than 8,0 g nitrocellulose only for mines with non-pyrotechnic objects.
	F3	Not more than 200 g; shall not contain more than 25 pyrotechnic units containing report charge and each of these pyrotechnic units shall not contain more than 5,0 g of black powder or 2,0 g of nitrate/metal-based composition or 1,0 g of perchlorate/metal-based composition. Not more than 32 g nitrocellulose only for mines with non-pyrotechnic objects.
mini rocket	F2	Not more than 1,5 g, not more than 0,13 g report charge.
non-hand-held sparkler	F1	Not more than 7,5 g.
	F2	Not more than 50 g.
novelty match	F1	Not more than 50 mg; shall only contain one report charge, if any; the report charge shall have a NEC of not more than 2,5 mg silver fulminate.
party popper	F1	Not more than 16 mg of pyrotechnic composition that is based on potassium chlorate and red phosphorous.
report rocket	F3	In case of report rockets with a single report: Not more than 200 g; report charge shall be not more than 100 g of black powder or 40 g of nitrate/metal-based composition or 20 g of perchlorate/metal-based composition. In case of report rockets with multiple reports: Not more than 125 g; report charge not more than 50 g; each pyrotechnic unit shall not contain more than 4,5 g of report charge. Bursting charge shall be not more than 35 g of black powder.
rocket	F2	Not more than 75 g; report and bursting charge, if any, shall be not more than 10 g of black powder or 4,0 g of nitrate/metal-based composition or 2,0 g of perchlorate/metal-based composition.
	F3	Not more than 200 g; report and bursting charge, if any, shall be not more than 50 g of black powder or 20 g of nitrate/metal-based composition or 10 g of perchlorate/metal-based composition.
Roman candle	F2	Not more than 50 g; each pyrotechnic unit not more than 10 g; shall not contain more than five pyrotechnic units containing report charge and each of these pyrotechnic units not more than 10 g of black powder or 4,0 g nitrate/metal-based composition or 2,0 g perchlorate/metal-based composition.
	F3	Not more than 250 g; each pyrotechnic unit not more than 50 g; shall not contain more than 10 pyrotechnic units containing report charge and each of these pyrotechnic units not more than 20 g of black powder or 8,0 g of nitrate/metal-based composition or 4,0 g of perchlorate/metal-based composition.
senko-hanabi	F1	Not more than 0,5 g.
serpent	F1	Not more than 3,0 g.

Firework type	Category	NEC
shot tube	F2	Not more than 25 g; mass of the report and bursting charge in the pyrotechnic unit: not more than 10 g of black powder or 4,0 g of nitrate/metal-based composition or 2,0 g of perchlorate/metal-based composition.
	F3	Not more than 40 g; mass of the report and bursting charge in the pyrotechnic unit: not more than 20 g of black powder or 8,0 g of nitrate/metal-based composition or 4,0 g of perchlorate/metal-based composition.
snap	F1	Not more than 16 mg report composition based on potassium chlorate and red phosphorous, or not more than 1,6 mg silver fulminate as report charge.
spinner	F2	Not more than 30 g.
table bomb	F1	Not more than 2,0 g nitrocellulose.
throwdown	F1	Not more than 2,5 mg silver fulminate.
wheel	F2	Not more than 100 g; each whistle unit, if any, not more than 5,0 g.
	F3	Not more than 900 g; each single unit not more than 150 g; each whistle unit, if any, not more than 20 g.

6 Means of initiation

6.1 Permitted means of initiation (type test and batch test)

When tested in accordance with EN 15947-4:2022, 6.13, conformity to the following requirements in Table 2 shall be verified.

Table 2 — Permitted means of initiation (type test and batch test)

Firework type	Protruding fuse	Ignition head	Sealing paper	Friction head	No means of initiation
aerial wheel	+	–	–	–	–
banger	+	+	–	+	–
battery	+	–	–	–	–
battery requiring external support	+	–	–	–	–
Bengal flame	+	+	+	–	–
Bengal match	–	–	–	+	–
Bengal stick	–	–	–	–	+
Christmas cracker	–	–	–	–	+
combination	+	–	–	–	–
combination requiring external support	+	–	–	–	–
compound firework	+	–	–	–	–
crackling granule	+	–	–	–	–
double banger	+	–	–	–	–

Firework type	Protruding fuse	Ignition head	Sealing paper	Friction head	No means of initiation
flash banger	+	–	–	–	–
flash pellet	+	+	–	–	+
fountain (indoor use)	+	+	+	–	+
fountain (outdoor use)	+	+	+	+	–
ground mover	+	+	–	–	–
ground spinner	+	–	–	–	–
hand-held sparkler	–	+	–	–	+
jumping cracker	+	+	–	+	–
jumping ground spinner	+	–	–	–	–
mine	+	+	–	–	–
mini rocket	+	–	–	–	–
non-hand-held sparkler	–	+	–	–	+
novelty match	–	–	–	+	–
party popper	–	–	–	–	+
report rocket	+	–	–	–	–
rocket	+	–	–	–	–
Roman candle	+	–	–	–	–
senko-hanabi	–	–	+	–	+
serpent	+	+	–	–	+
shot tube	+	–	–	–	–
snap	–	–	–	–	+
spinner	+	–	–	–	–
table bomb	+	–	–	–	–
throwdown	–	–	–	–	+
wheel	+	–	–	–	–
NOTE For types given in the column "No means of initiation" refer to EN 15947-3:2022, Table A.1 for initiation of functioning.					
+: permitted. –: not permitted.					

Batteries, batteries requiring external support, combinations and combinations requiring external support shall be fitted with one initial fuse and may be fitted with one reserve fuse, both meeting the requirements given in 6.4.1.

Compound fireworks shall be fitted with one initial fuse and may be fitted with a maximum of three reserve fuses, all meeting the requirements given in 6.4.1.

6.2 Protection of means of initiation (type test and batch test)

Conformity to the following requirements shall be verified by visual examination according with EN 15947-4:2022, 6.13:

- the initial fuse and the reserve fuse, if any, shall be protected by a fuse cover, a primary pack or a selection pack;
- the use of a primary pack is mandatory for Bengal match, friction ignited banger, friction ignited outdoor fountain, hand-held sparkler, non-hand-held sparkler, novelty match, senko-hanabi and throwdown;
- the use of a primary or selection pack is mandatory for Bengal stick, Christmas cracker, flash pellet, jumping cracker, mini rocket, party popper, serpent, snap and spinner;
- throwdowns shall be embedded in sawdust;
- there shall be no exposed instantaneous fuse in any firework, verified by conformity to drawings and part lists according with EN 15947-4:2022, 6.2.2, except in the following types provided any pyrotechnic composition is covered (using tape or similar):
 - batteries and batteries requiring external support containing elements of type fountain or Bengal flame or flash banger or banger;
 - combinations and combinations requiring external support containing elements of type fountain or Bengal flame or flash banger or banger;
 - wheel.

6.3 Attachment of means of initiation and resistance to ignition by an abrasive surface (type test and batch test)

The initial and reserve fuse(s) of the firework shall not be detached within 10 s when tested in accordance with EN 15947-4:2022, 6.1.6. The friction head shall not ignite when tested in accordance with EN 15947-4:2022, 6.1.7.

6.4 Requirements for means of initiation (type test and batch test)

6.4.1 General requirements

Conformity to the following requirements shall be verified unless other specific requirements according with 6.4.2 apply.

When tested in accordance with EN 15947-4:2022, 6.13, means of initiation shall be visible or shall be indicated by labelling or instructions. When tested in accordance with EN 15947-4:2022, 6.6.2.1, the initial fuse and reserve fuse shall ignite within 10 s and the ignition shall be visible, or the friction head shall ignite and the ignition shall be visible.

When tested in accordance with EN 15947-4:2022, 6.6.2.2, for category F1 and F2 fireworks, the duration of the initial fuse and reserve fuse burning shall be 3,0 s to 8,0 s and for category F3 fireworks 5,0 s to 13,0 s.

For fireworks fitted with a friction head: when tested in accordance with EN 15947-4:2022, 6.1.7, the friction head shall not ignite.

6.4.2 Specific requirements

For indoor fountain of category F1: when tested in accordance with EN 15947-4:2022, 6.6.2.1, the fountain shall ignite within 5,0 s.

For Roman candle, banger and flash banger: when tested in accordance with EN 15947-4:2022, 6.6.2.3, the period of invisible burning occurring after the preliminary effect, if any, shall not exceed 5,0 s (category F2) or 10,0 s (category F3).

For spinner and jumping ground spinner: the point of ignition shall be visible from the top of the article, when tested in accordance with EN 15947-4:2022, 6.13.

Hand-held sparkler and non-hand-held sparkler shall ignite within 15 s when tested in accordance with EN 15947-4:2022, 6.6.2.1.

For compound firework: the delay time between the functioning of subsequent fireworks included in the compound firework shall not exceed 15 s when measured in accordance with EN 15947-4:2022, 6.6.2.4.

7 Performance

7.1 Properties to be checked before functioning tests

7.1.1 Loose pyrotechnic composition after mechanical conditioning (type test)

When tested in accordance with EN 15947-4:2022, 6.14, the mass of loose pyrotechnic composition shall not exceed 100 mg for each item tested except for Christmas crackers and snaps it shall not exceed 1,0 mg.

7.1.2 Integrity (type test and batch test)

7.1.2.1 General requirements

Conformity to the following requirement shall be verified by visual examination in accordance with EN 15947-4:2022, 6.13 and by conformity to drawings and part lists in accordance with EN 15947-4:2022, 6.2.2.

- There shall be no holes, splits, dents or bulges in the body of the firework case, except those technically necessary for the correct functioning of the firework. There shall be no holes or splits in the end closures. If the end closures are separate components, they shall be fixed in place.
- For fireworks with a separate base or handle, these shall not be detached within 10 s. Conformity to this requirement shall be examined in accordance with EN 15947-4:2022, 6.1.2. If the handle is an integral part of the body, it shall be marked.

7.1.2.2 Specific requirements

Conformity to the following requirements shall be verified by visual examination in accordance with EN 15947-4:2022, 6.13.

- For battery, battery requiring external support, combination and combination requiring external support: each individual element shall be attached, other than by the transmitting fuse(s) alone, to the other elements or to other internal means of stabilization. For a battery of rockets or a battery requiring external support of rockets this requirement shall apply to the rocket launchers, not to the rockets, report rockets or mini rockets.
- The fireworks articles in the compound fireworks shall be fixed to the base.

- For elements in banger batteries or banger batteries requiring external support and flash banger batteries or flash banger batteries requiring external support: Elements shall be joined entirely by the transmitting fuse or other means.
- For Bengal flame: holes and splits in the end closures intended for fixing the Bengal flame are allowed.
- For Bengal match, Bengal stick and novelty match: the wooden sticks shall have no splits.
- For Christmas cracker and snap: the pyrotechnic composition shall not be visible. The strip cover shall not be loose but allow sufficient movement for functioning.
- For party popper and table bomb: there shall be no holes or splits in the closure of the opening through which the content is ejected and the closure shall be in place so that it retains the contents.

7.1.3 Stabilization of flight (type test and batch test)

Conformity to the following requirements shall be verified by visual examination in accordance with EN 15947-4:2022, 6.13.

- For mini rocket and report rocket: the article shall be fitted with a stick or sticks as a means of stabilization.
- For rocket: the article shall either be fitted with a stick or sticks or be fitted with other means for stabilization of flight (for example fins, basket or ring).

The means for stabilization of flight shall be made of non-metallic materials.

7.1.4 Other requirements (type test)

For throwdown: when tested in accordance with EN 15947-4:2022, 6.14, the throwdown shall not explode during mechanical conditioning, and when tested subsequently in accordance with EN 15947-4:2022, 6.17 it shall produce a single report.

7.2 Properties to be checked during functioning tests (type test and batch test)

7.2.1 Principal effects

When tested in accordance with EN 15947-4:2022, 6.17, the principal effects of each firework shall conform to the effects described in EN 15947-2:2022, Table 2.

7.2.2 Functioning

When tested in accordance with EN 15947-4:2022, 6.17, the firework shall function completely, by using only one fuse.

For compound fireworks: When tested in accordance with EN 15947-4:2022, 6.17, the functioning of the individual fireworks within the compound firework shall not initiate unintendedly any other pyrotechnic article included in the compound firework.

For Senko-hanabi: When tested in accordance with EN 15947-4:2022, 6.17, the handle shall not burn.

7.2.3 Angle of ascent or flight

When tested in accordance with EN 15947-4:2022, 6.17, conformity to the following requirements shall be verified by the method described in EN 15947-4:2022, 6.4:

- For aerial wheel: the angle of ascent of the aerial wheel shall not exceed 15° to the vertical up to a height of 20 m above ground.

- For double banger: the angle of flight of a double banger shall not exceed 8° to the vertical up to a height of 3 m above ground.
- For mini rocket: the angle of flight of the rockets shall not exceed 30° to the vertical up to a height of 20 m above ground.
- For rocket and report rocket: the angle of flight of the fireworks shall not exceed 15° to the vertical up to a height of 20 m above ground.
- For spinner: the angle of flight of the spinner shall not exceed 30° to the vertical up to a height of 3 m above ground.

7.2.4 Motion

When tested in accordance with EN 15947-4:2022, 6.17, conformity to the following requirements shall be verified by visual examination in accordance with EN 15947-4:2022, 6.13 of the test site and the relevant method described in EN 15947-4:2022, 6.4.3.

- For banger and flash banger with preliminary effect(s): the firework shall not move more than 1 m during functioning until the main effect.
- For ground mover: while functioning, the ground mover shall not move more than 8,0 m away from the testing point.
- For ground spinner: while functioning, the article shall not move more than 1,0 m (category F1) or 8,0 m (category F2) away from the testing point; in case of ascent or jump the height shall not be greater than 0,5 m.
- For jumping ground spinner: while functioning, the article shall not move more than 8,0 m away from the testing point; the height of ascent shall be not greater than 3 m.

7.2.5 Stability during functioning

When tested in accordance with EN 15947-4:2022, 6.17, verified by visual examination in accordance with EN 15947-4:2022, 6.13, the following fireworks shall remain upright while functioning:

- Bengal flame (designed to be placed upright on the ground);
- compound firework, except the banger and flash banger elements;
- fountain (designed to be placed upright on the ground);
- mine;
- Roman candle;
- shot tube;
- table bomb.

The same applies to batteries, batteries requiring external support, combinations and combinations requiring external support containing any of the elements listed above.

7.2.6 Height of explosion

When tested in accordance with EN 15947-4:2022, 6.17, conformity to the following requirements shall be verified by the relevant method described in EN 15947-4:2022, 6.4.3.

- For aerial wheel: no explosion shall occur below a height of 20 m.
- For mini rocket: no explosion shall occur below a height of 8 m.
- For rocket: no explosion shall occur and the article shall not burst, below a height of 20 m.
- For report rocket: no explosion and no report shall occur below a height of 20 m (category F2) or below a height of 30 m (category F3).
- For Roman candle: the pyrotechnic units shall not explode or burst below a height of 8 m.
- For shot tube: the pyrotechnic unit shall not explode or burst below a height of 8 m (when the inner diameter of the tube is 30 mm or less) or below a height of 30 m.
- For mine: the pyrotechnic unit(s), if any, shall not explode or burst below a height of 8 m.
- For compound firework: As per individual fireworks being part of the compound firework.
- For battery, battery requiring external support, combination and combination requiring external support: shall comply with requirements applicable to the contained elements.

Conformity to the following requirements shall be verified by the relevant method described in EN 15947-4:2022, 6.4.2.

- For double banger: the second report of a double banger shall be at least 3 m above the ground.

7.2.7 Sound pressure level

When tested in accordance with EN 15947-4:2022, 6.17, verified by measurement of sound pressure level in accordance with EN 15947-4:2022, 6.5, no firework shall produce a maximum A-weighted impulse sound pressure level (L_{AImax}) exceeding 120 dB (AI).

The measuring of sound pressure level during batch testing is not required, if the measured values during type testing were less than 90 dB (AI) at the respective safety distance.

7.2.8 Explosions and other failures

Conformity to the following requirements shall be tested in accordance with EN 15947-4:2022, 6.17 verified by visual examination in accordance with EN 15947-4:2022, 6.13.

The following firework types shall not explode during functioning:

- Bengal flame;
- flash pellet;
- fountain;
- ground spinner;
- hand-held sparkler;
- jumping ground spinner;

- non-hand-held sparkler;
- senko-hanabi;
- spinner;
- wheel.

For fountain: the casing shall not rupture during functioning.

For battery, battery requiring external support, combination, combination requiring external support and compound firework: the fireworks article shall not produce an explosion damaging the integrity of the firework. This requirement is not applicable to banger batteries, banger batteries requiring external support, flash banger batteries, flash banger batteries requiring external support. For combinations, combinations requiring external support and compound fireworks containing elements of bangers or flash bangers: the elements of bangers or flash bangers shall not produce an explosion damaging the integrity of the other elements in the fireworks.

7.2.9 Burning or incandescent matter

Following requirements shall be verified when tested in accordance with EN 15947-4:2022, 6.17 in combination with the specific test method given.

No burning or incandescent matter shall fall to the ground more than 1 m (category F1), 8 m (category F2) or 15 m (category F3) from the testing point when tested in accordance with EN 15947-4:2022, 6.12.

For fountain, hand-held sparkler and non-hand-held sparkler, Bengal match, flash pellet, novelty match, serpent and table bomb which are intended for indoor use: functioning shall not cause any holes to be burnt in the test paper when tested in accordance with EN 15947-4:2022, 6.3.1.

For aerial wheel, rocket, report rocket and shot tube: any burning effect produced by the fireworks, other than effects associated with ascent, shall be extinguished at least 3 m above the ground when tested in accordance with EN 15947-4:2022, 6.4.3.

For Christmas cracker, party popper and table bomb: the functioning of the fireworks shall not cause the ejected material to catch fire, verified by visual examination in accordance with EN 15947-4:2022, 6.13.

7.2.10 Extinguishing of flames

Following requirements shall be verified when tested in accordance with EN 15947-4:2022, 6.17 in combination with the specific test method given.

When tested in accordance with EN 15947-4:2022, 6.8 any flames caused by the functioning of the firework shall be extinguished within 5,0 s after the firework ceased to function. This requirement applies to the following firework types:

- banger;
- Bengal match;
- Bengal stick;
- crackling granule;
- double banger;
- flash banger;
- flash pellet (without base);

- fountain (for indoor use);
- jumping cracker;
- serpent.

When tested in accordance with EN 15947-4:2022, 6.8 any flames caused by the functioning of the firework shall be extinguished within 10 s after the firework ceased to function. This requirement applies to the following firework types:

- hand-held fountain (for outdoor use);
- hand-held Bengal flame;
- Senko-hanabi.

When tested in accordance with EN 15947-4:2022, 6.8 any flames caused by the functioning of the firework shall be extinguished within 120 s after the firework ceased to function. This requirement applies to the following firework types:

- aerial wheel,
- battery;
- battery requiring external support;
- Bengal flame;
- combination;
- combination requiring external support;
- compound firework;
- flash pellet (with base);
- fountain (for outdoor use);
- ground mover;
- ground spinner;
- jumping ground spinner;
- mine;
- Roman candle;
- shot tube;
- wheel.

7.2.11 Debris and projected debris

7.2.11.1 Debris

Following requirements shall be verified when tested in accordance with EN 15947-4:2022, 6.17 in combination with the specific test method given.

For aerial wheel: the means for stabilization of flight shall not become detached before the principal effects, other than ascent, occur (verified by visual examination) and any particle of debris shall not exceed a mass of 150 g, when tested in accordance with EN 15947-4:2022, 6.11.

For party popper and table bomb: when tested in accordance with EN 15947-4:2022, 6.3.2 and 6.3.3 respectively, the projected material shall not penetrate the test paper.

For rocket, report rocket, mini rocket and spinner: the means for stabilization of flight shall not become detached during the ascent respectively until the firework has burst (verified by visual examination according to EN 15947-4:2022, 6.13) and any particle of debris shall not exceed a mass of 100 g (category F2) or 150 g (category F3), when tested in accordance with EN 15947-4:2022, 6.11.

For table bomb: the ejected objects shall not be made of glass or sharp metal, when tested in accordance with EN 15947-4:2022, 6.13.

For fireworks with whistle elements no plastic tubes shall be ejected from the article during functioning when tested in accordance with EN 15947-4:2022, 6.13 and EN 15947-4:2022, 6.2.2.

For compound firework, the requirement applies as per individual fireworks being part of the compound firework.

7.2.11.2 Projected debris

Following requirements shall be verified when tested in accordance with EN 15947-4:2022, 6.17 in combination with the specific test method given.

There shall be no projected debris of metal, verified by visual examination in accordance with EN 15947-4:2022, 6.13.

There shall be no projected debris more than 1 m (category F1), 8 m (category F2) or 15 m (category F3) from the testing point when tested in accordance with EN 15947-4:2022, 6.11.

This requirement is not applicable to the following types:

- party popper;
- table bomb;
- throwdown.

For compound firework, the requirement applies as for the fireworks articles included within the compound firework.

7.2.12 Burning rate of composition

For Bengal flame: when tested in accordance with EN 15947-4:2022, 6.9, the pyrotechnic composition shall have a burning rate of less than 1,7 g/s.

For Bengal match and stick: when tested in accordance with EN 15947-4:2022, 6.9, the pyrotechnic composition shall have a burning rate of less than 0,17 g/s.

7.2.13 Pull-string or strip

For fireworks equipped with a pull-string or –strip, when used in accordance with the instructions the pull-string or -strip shall not break, verified in accordance with EN 15947-4:2022, 6.5.2 respectively 6.5.3.

7.3 Properties to be checked after functioning tests (type test and batch test)

7.3.1 Droop

For hand-held sparkler: when tested in accordance with EN 15947-4:2022, 6.10, the droop of the wire shall be less than 45° from the horizontal.

7.3.2 Plastics body

For banger, crackling granule and flash banger with a plastic body: when tested in accordance with EN 15947-4:2022, 6.17 and verified according to EN 15947-4:2022, 6.13, the body shall not produce any sharp debris.

7.3.3 Tube containing the propellant charge for rocket and report rocket

For rocket and report rocket where the propellant charge is contained in a sheathed aluminium tube: When tested in accordance with EN 15947-4:2022, 6.17 and verified accordance with EN 15947-4:2022, 6.13, the aluminium tube shall not rupture.

8 Primary pack or selection pack (type test and batch test)

Conformity to the following requirements shall be verified by visual examination in accordance with EN 15947-4:2022, 6.13.

If a primary pack or selection pack is used to protect the means of initiation the pack shall completely enclose the firework(s). There shall be no holes or splits in the pack, except those which are necessary for the design (e.g. to enable the packaging to be opened) and do not affect the protection the means of initiation.

9 Type testing

9.1 General

NOTE Type test is normally performed within Module B: EU type examination described in Annex 2 of the Directive 2013/29/EU. Other Modules can apply according to the Directive as well, such as Module G.

Each firework to be type tested shall meet the following requirements.

- Clause 4, Construction;
- Clause 5, Pyrotechnical composition;
- Clause 6, Means of initiation;
- Clause 7, Performance;
- Clause 8, Primary or selection pack;
- EN 15947-3:2022, 4.5.

Articles except compound fireworks shall be tested in accordance with Table 3. Compound fireworks shall be tested in accordance with Table 4.

Table 3 gives the number of items to be tested, the conditions after which they have to be tested, the tests to be carried out and includes the requirements to be fulfilled.

For thermal conditioning in accordance with EN 15947-4:2022, 6.15, the test is failed if any article presents signs of ignition or chemical reaction and no re-test in accordance with EN 15947-4:2022, 6.15, is possible.

Table 3 — Number of items to be tested

Number of fireworks to be tested	Condition	Requirements
10	as received	Clause 4 Clause 6 Clause 7 Clause 8 (at least one primary pack shall be tested) EN 15947-3:2022, 4.5
10	after thermal conditioning (see EN 15947-4:2022, 6.15)	Clause 6 Clause 7 Clause 8 (at least two primary packs shall be tested)
10	after mechanical conditioning (see EN 15947-4:2022, 6.14)	Clause 6 Clause 7 Clause 8 (at least three primary packs shall be tested)
3	determination of NEC and verify the construction to the technical documents of the manufacturer (see EN 15947-4:2022, 6.2)	Clause 5
For fireworks fitted with a friction head: 10 extra items for the determination of resistance to ignition by an abrasive surface in accordance with EN 15947-4:2022, 6.1.7.		
For ground spinners, ground movers and jumping crackers: 10 extra items for sound pressure level measurement while the item is in a fixed position, in accordance with EN 15947-4:2022, 6.5.1.		

Table 4 — Number of items of compound fireworks to be tested

Number of fireworks to be tested	Condition	Requirements
10	as received (dismantling, thermal and mechanical conditioning is not required for compound fireworks)	4.5 Clause 6 Clause 7 Clause 8 EN 15947-3:2022, 4.5

For type testing no nonconformities are permitted.

9.2 Specific requirements for primary packs to be examined

Except for compound fireworks, fireworks which are supplied in primary packs in order to protect the means of initiation shall be tested for thermal and mechanical conditioning within the primary pack according to EN 15947-4:2022, 6.14 respectively 6.15.

10 Batch testing

10.1 General

NOTE Batch testing is normally performed within Module E: Conformity to type based on product quality assurance as described in Annex 2 of the Directive 2013/29/EU. Other Modules can apply according to the Directive as well, such as Module C2.

For the purposes of batch testing, acceptance sampling in accordance with 10.2 to 10.4 shall be applied.

10.2 Sampling plans

Sampling shall be in accordance with ISO 2859-1:1999¹ using double sampling plans and applying the switching procedures for normal, tightened and reduced inspection. Inspection level S-4 shall apply.

NOTE For the purpose of this standard, the term batch has the same meaning as lot according to ISO 2859-1:1999¹.

In case of batches smaller than 35 001 articles, the following single sampling plan given in Table 5 may be applied:

Table 5 — Batch test sampling plan for batch sizes smaller than 35 001 articles and allowed number of nonconformities

Batch size	sample size	allowed number of minor nonconformities	allowed number of major nonconformities	allowed number of critical nonconformities
2 to 15	1	0	0	0
16 to 25	2	0	0	0
26 to 90	3	0	0	0
91 to 150	5	1	0	0
151 to 500	8	2	0	0
501 to 1 200	13	3	0	0
1 201 to 10 000	32	7	2	0
10 001 to 35 000	80	14	5	1

10.3 Unit of product

For fireworks which are not supplied in primary packs, the unit of product on which the sample size is based shall be the individual firework.

For fireworks supplied in primary packs, the unit of product shall be an individual firework and the sample shall comprise the contents of the appropriate number of primary packs.

For testing the requirements for primary packs, the appropriate number of primary packs shall be sampled and examined for faults.

10.4 Nonconformities

Nonconformities shall be classified in accordance with Table 6.

Table 6 — Nonconformities

Requirement	Remark	Type of nonconformity
Construction material (4.1)		Critical
Length of handle (4.2)		Minor
Elements in battery, battery requiring external support, combination and combination requiring external support (4.3)		Major
Dimensions for mini rocket (4.4)		Minor
Requirements for compound fireworks (4.5)		Critical
Permitted means of initiation (6.1)		Major
Protection of means of initiation (6.2)		Major
Attachment of means of initiation (6.3)		Major
Ignition of initial fuse and reserve fuse (if applicable) (6.4.1)	For articles only with one means of initiation	Major
	For articles with two or more fuses and failure of the first tested fuse, but functioning of the second tested fuse	Minor
	For articles with two or more fuses and failure of two or more fuses	Major
Duration of initial fuse and reserve fuse (if applicable) (6.4.1)	for category F1 and F2 items:	< 2,0 s or > 10,0 s: Critical ≥ 2,0 s and < 3,0 s: Major > 8,0 s and ≤ 10,0 s: Major
	for category F3 items:	< 3,0 s or > 15,0 s: Critical ≥ 3,0 s and < 5,0 s: Major > 13,0 s and ≤ 15,0 s: Major
Resistance to ignition of friction head by an abrasive surface (6.4.1)		Major
Delay time between subsequent fireworks in compound fireworks (6.4.2)		Major
Ignition time of indoor fountains, category F1 (6.4.2)		Minor
Period of invisible burning of Roman candles, bangers and flash bangers (6.4.2)		Major
Visibility of point of ignition from top of spinners and jumping ground spinners (6.4.2)		Minor

Requirement	Remark	Type of nonconformity
Ignition time of hand-held sparklers and non-hand-held sparklers (6.4.2)		Minor
Integrity (7.1.2)		Major
Stabilization of flight (7.1.3)		Critical
Principal effects (7.2.1)		Minor
Functioning (7.2.2)	For articles with only one means of initiation	Major
	Failure of the functioning of the firework when using the first tested fuse, but complete functioning of the firework when using the second tested fuse	Minor
	No complete functioning after using two or more fuses	Major
Angle of ascent or flight (7.2.3)	for aerial wheels, rockets and report rockets	> 15° and ≤ 30°: Minor
		> 30°: Major
	for double bangers	> 8° and ≤ 16°: Minor
		> 16°: Major
	for mini rockets and spinners	> 30°: Major
Motion (7.2.4)	ejection of burning or incandescent matter outside the safety distance	Major
Stability during functioning (7.2.5)		Critical
Height of explosion (7.2.6)		Major
Sound pressure level (7.2.7)		Major
Explosion and other failures (7.2.8)		Critical
Burning or incandescent matter (7.2.9)		Major
Extinguishing of flames (7.2.10)		Minor
Projected debris (7.2.11)		Major
Burning rate of pyrotechnic composition (7.2.12)		Major
Pull-string or -strip (7.2.13)		Major
Droop (7.3.1)		Major
Plastic body (7.3.2)	Any sharp debris inside the safety distance	Major
	Sharp debris outside the safety distance	Critical
Tube containing the propellant charge for rockets and report rockets (7.3.3)		Major
Primary pack or selection pack (8)		Major
		Minor ^a

Requirement	Remark	Type of nonconformity
Verification of labelling and instructions for use accordance with EN 15947-3:2022, Clause 4	when the information on the label or in the instructions for use changes the meaning of the text making it misleading or incomplete	Major ^b
		Critical ^c
^a Individual labelling errors that apply to the complete batch leading to consequences as defined for minor nonconformities shall be counted as one minor nonconformity for each serial error, including but not limited to year of production, incomplete contact information.		
^b Labelling errors leading to consequences as defined for major nonconformities shall be classified as major nonconformity, including but not limited to size of typing is too small but still readable.		
^c Labelling errors leading to consequences as defined for critical nonconformities shall be classified as critical nonconformity, including but not limited to safety distance, age limits, category, type, missing placing instructions.		

10.5 Acceptance or rejection of a batch

10.5.1 Nonconforming units

Acceptance or rejection of the batch shall be determined by the number of nonconforming units of each type, in accordance with 10.5.2 to 10.5.4.

NOTE Acceptance or rejection of the batch is determined by the number of nonconforming units of each type and not necessarily by the number of nonconformities found.

10.5.2 Critical nonconforming units

For critical nonconforming units an Acceptance Quality Limit (AQL) of 0,65 % shall apply. If the batch fails to meet this criterion, it shall be rejected. Any critical nonconforming unit shall not be counted as major nonconforming unit either minor nonconforming unit.

10.5.3 Major nonconforming units

For major nonconforming units an AQL of 2,5 % shall apply. If the batch fails to meet this criterion, it shall be rejected. Any major nonconforming unit shall not be counted as minor nonconforming unit.

10.5.4 Minor nonconforming units

For minor nonconforming units an AQL of 10 % shall apply. If the batch fails to meet this criterion, it shall be rejected.

10.5.5 Fireworks supplied in primary packs or selection packs

For fireworks which are supplied in primary packs or selection packs, if the selection pack is required to protect the initial fuse, the acceptance criteria in 10.5.2 to 10.5.4 shall be applied separately to the fireworks and to the primary packs or selection packs (see 10.3).

Annex ZA (informative)

Relationship between this European Standard and the essential safety requirements of Directive 2013/29/EU aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/583 "Standardization mandate assigned to CEN concerning pyrotechnic articles" to provide one voluntary means of conforming to essential safety requirements of Directive 2013/29/EU of the European Parliament and of the Council of 12 June 2013 on the harmonization of the laws of the Member States relating to the making available on the market of pyrotechnic articles (recast).

Once this standard is cited in the Official Journal of the European Union under that Directive 2013/29/EU, compliance with the normative clauses of this standard confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding essential safety requirements of that Directive 2013/29/EU, and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 2013/29/EU

Essential safety Requirements (ESRs) of Directive 2013/29/EU	Clause(s)/subclause(s) of this EN	Remarks/Notes
1.	Clause 7	
2.	4.1.1 1 st hyphen, 4.1.2 (except hyphens 2, 3, 10, 13, 15 and 18)	
3. 1 st sentence	Clause 7	
3. 2 nd and 3 rd sentence	7.2.2	See also EN 15947-4:2022, 6.17
3.a	Clause 4, 5 and 6	
3.b	7.1.2, 9.1, 9.1 Table 3, 9.2	
3.c	7.1, Clause 8, 9.1 Table 3	
3.d	9.1 Table 3	
3.e		Not applicable.
3.f	Clause 1 last paragraph, Clause 7 except 7.1.1, 9.1 Table 3	Normal, foreseeable conditions (between -20 °C and +50 °C) covered
3.g	4.1.1. 3 rd paragraph, 4.5 last paragraph, 6.2, 6.4.1 last paragraph, 7.1.4 and Clause 8.	
3. h		See EN 15947-3:2022, 4.1, 4.5, 4.6, 4.8 and Table A.1
3.i	9.1 Table 3	
3. j		See EN 15947-3:2022, Table A.1 placing instructions

Essential safety Requirements (ESRs) of Directive 2013/29/EU	Clause(s)/subclause(s) of this EN	Remarks/Notes
3. last sentence	7.1.1, 7.1.2 and 9.1 Table 3	
4. 1 st sentence	Clause 5 Table 1	Fireworks of the categories F1, F2 and F3 shall not contain detonative explosives other than black powder and flash composition
4. remaining ESRs beside 1 st sentence		Not applicable.
5.A.1 1 st sentence	Clause 5 Table 1, 7.2.4, 7.2.6, 7.2.7, 7.2.9, 7.2.11	See also EN 15947-2:2022, Clause 4
5.A.1 2 nd sentence		See EN 15947-3:2022, 4.2 3 rd paragraph
5.A.1.a-i	7.2.4, 7.2.9, 7.2.11	
5.A.1.a-ii	7.2.7	
5.A.1.a-iii		See EN 15947-2:2022, 5.1 and 5.2
5.A.1.a-iv	Clause 5 (Table 1 throwdown)	
5.A.1.b-i	7.2.4, 7.2.9, 7.2.11	
5.A.1.b-ii	7.2.7	
5.A.1.c-i	7.2.4, 7.2.9, 7.2.11	
5.A.1.c-ii	7.2.7	
5.A.2	4.1.1 1 st hyphen, 4.1.2 (except hyphens 2, 3, 10, 13, 15 and 18), 4.6, 7.2.11	
5.A.3	6.4.1	
5.A.4	7.1.3, 7.2.3, 7.2.4, 7.2.5	
5.A.5 1 st sentence	4.1.1 2 nd hyphen 2 nd sentence, 4.5 last two paragraphs, 6.2, Clause 8	
5.A.5 2 nd sentence		Not applicable.

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the product(s) falling within the scope of this standard.