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**Pirotehnični izdelki - Ognjemetni izdelki, kategorije 1, 2 in 3 - 5. del: Zahteve za izdelavo in delovanje**

Pyrotechnic articles - Fireworks, Categories 1, 2, and 3 - Part 5: Requirements for construction and performance

**iTeh STANDARD PREVIEW**

Pyrotechnische Gegenstände - Feuerwerkskörper, Kategorien 1, 2 und 3 - Teil 5: Anforderungen an Bauart und Funktion

[SIST EN 15947-5:2010](https://standards.itih.si/catalog/standards/sist/73a67de1-d92e-4bd3-b0f8-f414e1dd470/sist-en-15947-5-2010)

Articles pyrotechniques - Artifices de divertissement, Catégories 1, 2, et 3 - Partie 5: Exigences de construction et de performances

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English Version

## Pyrotechnic articles - Fireworks, Categories 1, 2, and 3 - Part 5: Requirements for construction and performance

**STANDARD PREVIEW**

Articles pyrotechniques - Artifices de divertissement  
Catégories 1, 2, et 3 - Partie 5: Exigences de construction  
et de performances

Pyrotechnische Gegenstände - Feuerwerkskörper,  
Kategorien 1, 2 und 3 - Teil 5: Anforderungen an  
Konstruktion und Funktion

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**EN 15947-5:2010 (E)****Foreword**

This document (EN 15947-5:2010) 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of an identical text or by endorsement, at the latest by March 2011, and conflicting national standards shall be withdrawn at the latest by March 2011.

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

This document supersedes EN 14035-7:2004, EN 14035-31:2005, EN 14035-35:2004, EN 14035-28:2004, EN 14035-36:2004, EN 14035-6:2004, EN 14035-24:2004, EN 14035-9:2004, EN 14035-23:2003, EN 14035-15:2003, EN 14035-12:2003, EN 14035-34:2003, EN 14035-29:2004, EN 14035-27:2003, EN 14035-38:2006, EN 14035-33:2005, EN 14035-20:2005, EN 14035-8:2004, EN 14035-10:2004, EN 14035-3:2004, EN 14035-22:2004, EN 14035-18:2004, EN 14035-13:2004, EN 14035-5:2006, EN 14035-4:2003, EN 14035-25:2005, EN 14035-17:2004, EN 14035-19:2003, EN 14035-21:2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

This European Standard is one of the series of standards as listed below:

- EN 15947-1, *Pyrotechnic articles — Fireworks, Categories 1, 2 and 3 — Part 1: Terminology*
- EN 15947-2, *Pyrotechnic articles — Fireworks, Categories 1, 2 and 3 — Part 2: Categories and types of firework*
- EN 15947-3, *Pyrotechnic articles — Fireworks, Categories 1, 2 and 3 — Part 3: Minimum labelling requirements*
- EN 15947-4, *Pyrotechnic articles — Fireworks, Categories 1, 2 and 3 — Part 4: Test methods*
- EN 15947-5, *Pyrotechnic articles — Fireworks, Categories 1, 2 and 3 — Part 5: Requirements for construction and performance*

CEN/TC 212 is currently also developing European Standards for:

- Pyrotechnic articles — Fireworks Category 4;
- Pyrotechnic articles — Theatrical pyrotechnic articles;
- Pyrotechnic articles — Pyrotechnic articles for vehicles;
- Pyrotechnic articles — Other pyrotechnic articles.

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

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**EN 15947-5:2010 (E)****1 Scope**

This European Standard specifies requirements for the construction, performance and primary packaging of fireworks of category 1, 2 and 3 of the following types:

- aerial wheels;
- bangers;
- batteries and combinations;
- Bengal flames;
- Bengal matches;
- Bengal sticks;
- Christmas crackers;
- crackling granules;
- double bangers;
- flash bangers;
- flash pellets;
- fountains;
- ground movers;
- ground spinners;
- hand-held sparklers;
- jumping crackers;
- jumping ground spinners;
- mines;
- mini rockets;
- non-hand-held sparklers;
- novelty matches;
- party poppers;
- rockets;
- Roman candles;
- serpents;
- shot tubes;

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- snaps;
- spinners;
- table bombs;
- throwdowns;
- wheels.

This European Standard does not apply for articles containing military explosives or commercial blasting agents except for black powder or flash composition. This European Standard does not apply for articles containing pyrotechnic composition that includes any of the following substances:

- arsenic or arsenic compounds;
- hexachlorobenzene;
- 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 sulfur (these mixtures are allowed for friction heads only);
- mixtures of chlorates with sulfides; [SIST EN 15947-5:2010](https://standards.iteh.ai/catalog/standards/sist/73a57dec-d92e-4bd3-b0f8-f414e1dd470/sist-en-15947-5-2010)
- lead or lead compounds; <https://standards.iteh.ai/catalog/standards/sist/73a57dec-d92e-4bd3-b0f8-f414e1dd470/sist-en-15947-5-2010>
- mercury compounds;
- white phosphorus;
- picrates or picric acid;
- potassium chlorate with a mass fraction of bromates greater than 0,15 %;
- sulfur with an acidity, expressed in mass fraction of sulphuric acid, greater than 0,002 %;
- zirconium with a particle size of less than 40 µm.

## 2 Normative references

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

EN 15947-1:2010, *Pyrotechnic articles — Fireworks, Categories 1, 2 and 3 — Part 1: Terminology*

EN 15947-2, *Pyrotechnic articles — Fireworks, Categories 1, 2 and 3 — Part 2: Categories and types of firework*

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EN 15947-3, *Pyrotechnic articles — Fireworks, Categories 1, 2 and 3 — Part 3: Minimum labelling requirements*

EN 15947-4:2010, *Pyrotechnic articles — Fireworks, Categories 1, 2 and 3 — Part 4: Test Methods*

ISO 2859-1, *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 15947-1:2010 apply.

**4 Construction****4.1 Construction materials (type test and batch test)****4.1.1 General requirements**

- The body of the firework case shall be made of paper, cardboard or plastics. The base (end closures) or means of fixing shall be made of non-metallic material. Where technically necessary, wood, staples, nails, aluminium coated foil or binding wires may be used. Conformity to this requirement shall be verified by visual examination.
- For articles fitted with a friction head: the primary pack shall be fitted with a striking surface for safety matches. Conformity to this requirement shall be verified by visual examination.
- The striking surface shall be resistant enough to allow ignition of all the articles included within the primary pack when tested in accordance with 6.16 of EN 15947-4:2010. The striking surface on the pack shall be covered or the pack shall be sealed, verified by visual examination.

**4.1.2 Specific requirements**

- For bangers and flash bangers: cardboard wrapped in cord is permitted as construction material.
- For batteries of mines, Roman candles or shot tubes: the tubes shall have a maximum angle of 30° to the vertical, when tested in accordance with 6.18 of EN 15947-4:2010. For combinations this requirement applies to the tubes of mines, Roman candles and shot tubes.
- For Bengal matches and Bengal sticks: the stick shall be made of wood.
- For Christmas crackers and snaps: the overlapping strips shall be made of cardboard, paper or string.
- For jumping crackers: the firework case shall be made of paper only.
- For mini rockets: the tube containing the propellant charge shall be made of cardboard or, when no report charge is present, plastics.
- For novelty matches: the stick shall be made of cardboard or wood.
- For party poppers: the shape shall not be confused with a gun.
- For rockets: the tube containing the propellant charge shall be made of cardboard, plastics or sheathed aluminium.

- For Roman candles and shot tubes: the case, if any, of the pyrotechnic unit, shall be made of paper, cardboard or plastics.
- For Roman candles: the inside diameter of the tube shall not exceed 30 mm. Conformity to this requirement shall be verified by the method described in 6.1.5 of EN 15947-4:2010.
- For shot tubes: the inside diameter of the tube shall not exceed 30 mm (category 2) or 50 mm (category 3). Conformity to these requirements shall be verified by the method described in 6.1.5 of EN 15947-4:2010.
- For spinners: the aerofoils, if any, shall be made of cardboard or plastics.
- For throwdowns: the body shall be made of tissue paper or foil.

Conformity to above requirements shall be verified by visual examination, unless stated otherwise.

#### 4.2 Length of handle (type test and batch test)

- For Bengal matches: the uncoated end of a Bengal match (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 sticks: the uncoated end of a Bengal stick (handle) shall have a minimum length of 75 mm.
- For hand-held fountains: the end of the firework case of a hand-held fountain which is not filled with pyrotechnic composition and which acts as a handle, or the handle, if the handle is a separate component, shall have a minimum length of 40 mm.
- For hand-held sparklers: a category 1 hand-held sparkler shall have a minimum handle length of 75 mm; a category 2 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 matches: the uncoated end of a novelty match (handle) shall have a minimum length of 20 mm.

Conformity to above requirements shall be verified by the test method described in 6.1.1.2.1 or 6.1.1.2.2 of EN 15947-4:2010.

- For Christmas crackers and snaps: the total length of the pull-strip or -string shall be at least 50 mm.
- For party poppers: the length of the pull-string shall be at least 75 mm.

Conformity to above requirements shall be verified by the method described in 6.1.4 of EN 15947-4:2010.

#### 4.3 Permitted elements in batteries and combinations (type test and batch test)

The following elements can be used in batteries: bangers and flash bangers, Bengal flames, crackling granules, fountains, ground spinners, mines, rockets (assembled in a launcher), Roman candles, spinners, shot tubes and wheels; the same limits (mass, composition, etc.) as given in Table 1 apply to these elements.

The following elements can be used in combinations: bangers and flash bangers, Bengal flames, fountains, mines, Roman candles, shot tubes, spinners and wheels; the same limits (mass, composition, etc.) as given in Table 1 apply to these elements.

Conformity to above requirements shall be verified by visual examination.

## EN 15947-5:2010 (E)

## 4.4 Dimensions for mini rockets (type test and batch test)

When tested in accordance with 6.1.5 and 6.1.3 of EN 15947-4:2010, 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.

## 5 Pyrotechnic composition (type test)

When tested in accordance with 6.2.2 of EN 15947-4:2010, the net explosive contents 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 types	Cat.	Net explosive content
aerial wheels	3	Not more than 160 g, shall not contain more than eight pyrotechnic units. A pyrotechnic unit shall have a net explosive content of not more than 20 g. A report charge, if any, shall have a net explosive content of not more than 10,0 g of black powder or 4,0 g of nitrate/metal-based report composition or 2,0 g of perchlorate/metal-based report composition.
bangers	2	Not more than 6,0 g black powder.
	3	Not more than 10,0 g black powder.
batteries and combinations	2	A battery or combination, except a combination containing fountains, shall have a net explosive content of not more than 500 g; the net explosive content of a combination containing fountains shall have a net explosive content of not more than 600 g, of which not more than 500 g shall be contained in elements other than fountains; the net explosive content of a battery containing fountains shall have a net explosive content of not more than 600 g.  Bangers used in batteries or combinations shall have a total net explosive content of not more than 100 g.  Flash bangers used in batteries or combinations shall have a total net explosive content of not more than 25 g.
	3	A battery or combination, except a combination containing fountains, shall have a net explosive content of not more than 1 000 g; a combination containing fountains shall have a net explosive content of not more than 3 000 g, of which not more than 1 000 g shall be contained in elements other than fountains; a battery containing fountains shall have a net explosive content of not more than 3 000 g.  Bangers used in batteries or combinations shall have a total net explosive content of not more than 1 000 g.  Flash bangers used in batteries or combinations shall have a total net explosive content of not more than 250 g.
Bengal flames	1	Not more than 20 g.
	2	Not more than 250 g.
	3	Not more than 1 000 g.
Bengal matches	1	Not more than 3,0 g.
Bengal sticks	1	Not more than 7,5 g.
	2	Not more than 50 g.
Christmas crackers	1	Not more than 16,0 mg report composition based on potassium chlorate and red phosphorous, or not more than 1,6 mg silver fulminate as report composition.