



**SLOVENSKI STANDARD**  
**SIST EN 14035-28:2004**  
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Fireworks - Part 28: Roman candles - Specification and test methods

Feuerwerkskörper - Römische Lichter - Teil 28: Anforderungen und Prüfverfahren

Artifices de divertissement - Partie 28: Chandelles romaines - Spécifications et méthodes d'essai

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## Fireworks - Part 28: Roman candles - Specification and test methods

Artifices de divertissement - Partie 28: Chandelles  
romaines - Spécifications et méthodes d'essai

Feuerwerkskörper - Römische Lichter - Teil 28:  
Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 14 June 2004.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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## Foreword

This document (EN 14035-28:2004) has been prepared by Technical Committee CEN/TC 212 "Fireworks", 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of an identical text or by endorsement, at the latest by February 2004, and conflicting national standards shall be withdrawn at the latest by February 2004.

This European Standard is one of a series of standards as listed below.

EN 14035-1, *Fireworks - Part 1: Terminology.*

EN 14035-2, *Fireworks - Part 2: Categorisation.*

EN 14035-3, *Fireworks - Part 3: Aerial wheels - Specification and test methods.*

EN 14035-4, *Fireworks - Part 4: Bangers and banger batteries - Specification and test methods.*

prEN 14035-5, *Fireworks - Part 5: Batteries and combinations - Specification and test methods.*

EN 14035-6, *Fireworks - Part 6: Bengal flames - Specification and test methods.*

EN 14035-7, *Fireworks - Part 7: Bengal matches - Specification and test methods.*

EN 14035-8, *Fireworks - Part 8: Bengal sticks - Specification and test methods.*

EN 14035-9, *Fireworks - Part 9: Crackling granules - Specification and test methods.*

EN 14035-10, *Fireworks - Part 10: Double bangers - Specification and test methods.*

EN 14035-12, *Fireworks - Part 12: Flash bangers and flash banger batteries - Specification and test methods.*

EN 14035-13, *Fireworks - Part 13: Flash pellets - Specification and test methods.*

EN 14035-15, *Fireworks - Part 15: Fountains - Specification and test methods.*

EN 14035-17, *Fireworks - Part 17: Ground spinners - Specification and test methods.*

prEN 14035-18, *Fireworks - Part 18: Hand-held fountains - Specification and test methods.*

EN 14035-19, *Fireworks - Part 19: Hand-held sparklers - Specification and test methods.*

prEN 14035-20, *Fireworks - Part 20: Jumping crackers - Specification and test methods.*

prEN 14035-21, *Fireworks - Part 21: Jumping ground spinners - Specification and test methods.*

EN 14035-22, *Fireworks - Part 22: Mines - Specification and test methods.*

EN 14035-23, *Fireworks - Part 23: Non-hand-held sparklers - Specification and test methods.*

EN 14035-24, *Fireworks - Part 24: Novelty matches - Specification and test methods.*

prEN 14035-25, *Fireworks - Part 25: Party poppers - Specification and test methods.*

EN 14035-27, *Fireworks - Part 27: Rockets - Specification and test methods.*

EN 14035-28, *Fireworks - Part 28: Roman candles - Specification and test methods.*

EN 14035-29, *Fireworks - Part 29: Serpents - Specification and test methods.*

prEN 14035-31, *Fireworks - Part 31: Shell-in-mortars - Specification and test methods.*

prEN 14035-32, *Fireworks - Part 32: Snaps - Specification and test methods.*

prEN 14035-33, *Fireworks - Part 33: Spinners - Specification and test methods.*

EN 14035-34, *Fireworks - Part 34: Table bombs - Specification and test methods.*

prEN 14035-35, *Fireworks - Part 35: Throwdowns - Specification and test methods.*

EN 14035-36, *Fireworks - Part 36: Wheels - Specification and test methods.*

prEN 14035-37, *Fireworks - Part 37: Whistlers - Specification and test methods.*

prEN 14035-38, *Fireworks - Part 38: Shot tubes - Specification and test methods.*

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

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## 1 Scope

This document specifies requirements for the construction, performance, primary packaging and labelling of Roman candles and the corresponding test methods. It is applicable to fireworks which are classified as Roman candles in categories 2 and 3 in EN 14035-2.

It is not applicable to Roman candles containing pyrotechnic composition which includes any of the following substances:

- arsenic or arsenic compounds;
- mixtures containing a mass fraction of chlorates greater than 80 %;
- mixtures of chlorates with metals;
- mixtures of chlorates with red phosphorus;
- mixtures of chlorates with potassium hexacyanoferrate(II);
- mixtures of chlorates with sulfur;
- mixtures of chlorates with sulfides;
- lead or lead compounds;
- 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.

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NOTE In EN 14035-2, Roman candles are classified as follows:

- Brief description: tube containing alternate propellant charges, pyrotechnic units and transmitting fuse(s).
- Principal effects: ejection of pyrotechnic units in succession, producing a series of visual and/or aural effects, in the air.

Schemes for type testing of Roman candles and batch testing of Roman candles are specified in annex A and annex B respectively.



## 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 14035-1:2003, *Fireworks — Part 1: Terminology*.

EN 14035-2, *Fireworks — Part 2: Categorisation*.

EN 61672-1, *Electroacoustics - Sound level meters - Part 1: Specifications (IEC 61672-1:2002)*.

EN 61672-2, *Electroacoustics - Sound level meters - Part 2: Pattern evaluation tests (IEC 61672-2:2003)*.

EN ISO 845, *Cellular plastics and rubbers — Determination of apparent (bulk) density (ISO 845:1988)*.

EN ISO 868, *Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868:2003)*.

EN ISO 2439, *Flexible cellular polymeric materials - Determination of hardness (indentation technique) (ISO 2439:1997, including Technical Corrigendum 1:1998)*.

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

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## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14035-1:2003 apply.

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## 4 Construction

### 4.1 Means of ignition

The means of ignition shall be identified by a protruding fuse.

Conformity to this requirement shall be verified by visual examination.

### 4.2 Attachment of initial fuse

The attachment of the protruding fuse to the Roman candle shall be secure when tested in accordance with 8.1.

### 4.3 Protection of initial fuse

#### 4.3.1 General

The initial fuse shall be protected in one of the ways specified in 4.3.2, 4.3.3 or 4.3.4.

#### 4.3.2 Initial fuse protected by fuse cover

An orange fuse cover shall be in place over the initial fuse.

Conformity to this requirement shall be verified by visual examination.

#### **4.3.3 Initial fuse protected by primary pack or selection pack**

The Roman candle shall be contained in a primary pack or selection pack conforming to 6.

Conformity to this requirement shall be verified by visual examination.

#### **4.3.4 Protruding fuse designed to resist side ignition**

When tested in accordance with 8.5, the protruding fuse shall not ignite.

#### **4.4 Materials of firework case**

The tube shall be made of paper, cardboard or plastics. The base and/or means of fixing shall be made of non-metallic material.

Conformity to these requirements shall be verified by visual examination.

#### **4.5 Integrity**

There shall be no holes, splits, dents or bulges in the tube. There shall be no holes or splits in the end closure. If the end closures are separate components, they shall be securely in place. If the base is a separate component, it shall be securely in place.

Conformity to these requirements shall be verified by visual examination.

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#### **4.6 Net explosive content**

When determined in accordance with 8.4, a category 2 Roman candle shall have a net explosive content of not more than 50,0 g. Each pyrotechnic unit shall have a net explosive content of not more than 10,0 g.

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When determined in accordance with 8.4, a category 3 Roman candle shall have a net explosive content of not more than 300,0 g. Each pyrotechnic unit shall have a net explosive content of not more than 50,0 g.

#### **4.7 Mass of report charge**

When determined in accordance with 8.4, a category 2 Roman candle shall not contain more than 5 pyrotechnic units containing report composition and each of these pyrotechnic units shall have a net explosive content of not more than 5,0 g of black powder or 4,0 g nitrate/metal-based report composition or 2,0 g perchlorate/metal-based report composition.

When determined in accordance with 8.4, a category 3 Roman candle shall not contain more than 10 pyrotechnic units containing report composition and each of these pyrotechnic units shall have a net explosive content of more than 10,0 g of black powder or 8,0 g of nitrate/metal-based report composition or 4,0 g of perchlorate/metal-based report composition.

#### **4.8 Vertical stability**

For Roman candles designed to be placed on the ground, the Roman candle shall not fall over when tested in accordance with 8.2.

## 5 Performance

### 5.1 Initial fuse

When tested in accordance with 8.3, the initial fuse of a Roman candle shall ignite within 10 s and the ignition shall be visible.

For category 2 Roman candles, the duration of the initial fuse burning shall be 3,0 s to 8,0 s, when tested in accordance with 8.3.

For category 3 Roman candles, the duration of the initial fuse burning shall be 5,0 s to 13,0 s, when tested in accordance with 8.3.

### 5.2 Invisible burning

When tested in accordance with 8.3, any period of invisible burning occurring after the preliminary effect shall not exceed 5,0 s for a category 2 Roman candle or 10,0 s for a category 3 Roman candle.

### 5.3 Principal effects

When tested in accordance with 8.3, the principal effects of the Roman candle, as given in EN 14035-2, shall be the ejection of pyrotechnic units in succession, producing a series of visual and/or aural effects, in the air.

### 5.4 Functioning

When tested in accordance with 8.3, all the pyrotechnic units of the Roman candle shall be ejected and function.

### 5.5 Sound pressure level

When tested in accordance with 8.3, a category 2 Roman candle shall produce a maximum A-weighted impulse sound pressure level ( $L_{AImax}$ ) of not higher than 120 dB(A) at a horizontal distance of 8,0 m from the testing point and at a height of 1,0 m above the ground.

When tested in accordance with 8.3, a category 3 Roman candle shall produce a maximum A-weighted impulse sound pressure level ( $L_{AImax}$ ) of not higher than 120 dB(A) at a horizontal distance of 15,0 m from the testing point and at a height of 1,0 m above the ground.

### 5.6 Height of explosions and bursting (if applicable)

When tested in accordance with 8.3, the pyrotechnic units of a category 2 Roman candle shall not explode or burst below a height of 8 m.

When tested in accordance with 8.3, the pyrotechnic units of a category 3 Roman candle shall not explode or burst below a height of 20 m.

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## 5.7 Burning matter

When tested in accordance with 8.3, no burning or incandescent matter from a category 2 Roman candle shall fall to the ground more than 6,0 m from the testing point.

When tested in accordance with 8.3, no burning or incandescent matter from a category 3 Roman candle shall fall to the ground more than 15,0 m from the testing point.

When tested in accordance with 8.3, any flames caused by the functioning of the Roman candle shall be extinguished within 60,0 s of the Roman candle ceasing to function.

## 5.8 Stability

When tested in accordance with 8.3, the Roman candle shall remain upright whilst functioning.

## 5.9 Integrity of the firework case after functioning

When tested in accordance with 8.3, there shall be no additional holes or splits in the firework case.

## 6 Primary pack or selection pack

If a primary pack or selection pack is required to protect the initial fuse(s) of the Roman candle(s) (see 4.3.3), the pack shall completely enclose the Roman candle(s) and there shall be no holes or splits in the pack, except those which are intended to enable the packaging to be opened or otherwise technically necessary.

Conformity to these requirements shall be verified by visual examination.

## 7 Minimum labelling requirements

### 7.1 General

Roman candles and their primary packs, if any, shall be marked with the information specified in 7.2 to 7.5 and, if relevant, 7.7 and/or 7.8.

The specified information shall be given in the language(s) of the country in which the Roman candles or primary packs are offered for retail sale. For each language, it shall be presented as a whole and shall not be interrupted by other text. Additional text given in another language shall not conflict with the specified information.

Conformity to the requirements specified in 7.1 to 7.5, 7.6.1, 7.7.2 and 7.8 shall be verified by visual examination.

NOTE Examples of typical labels for bangers, for which many of the marking requirements are similar to those specified for Roman candles in this standard, are given in EN 14035-4.

### 7.2 Type name, category and number of shots

The type name and the number of shots shall be marked, in upper case, e.g. as '8 SHOT ROMAN CANDLE'. If a trade name is used in addition to the type name, it shall not conflict with the effect of a Roman candle or with the name of another type of firework.

The appropriate category shall be marked, in upper case, as 'CATEGORY 2' or 'CAT 2', for example.

## 7.3 Safety information

### 7.3.1 General

Safety information shall be emphasized by use of a heading, or bold type, or similar. If necessary, instructions in addition to those specified in 7.3.2 to 7.3.4 may be given.

### 7.3.2 Category 2 Roman candles

Labelling shall include at least the following safety information in the order as given:

- 'For outdoor use only';
- 'Avoid overhead obstructions';

Specific placing instructions for different types of Roman candles, inserted as appropriate (see 7.3.4);

- 'Remove orange fuse cover'<sup>1)</sup>;
- 'Standing sideways, light fuse at its outermost end and retire immediately at least 8 m'.

### 7.3.3 Category 3 Roman candles

Labelling shall include at least the following safety information in the order as given:

- 'For outdoor use only';
- 'Avoid overhead obstructions';

Specific placing instructions for different types of Roman candles, inserted as appropriate (see 7.3.4);

- 'Remove orange fuse cover'<sup>1)</sup>;
- 'Standing sideways, light fuse at its outermost end and retire immediately';
- 'Spectators must be at least 25 m away';
- 'Operator must retire at least 15 m'.

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<sup>1)</sup> If applicable.