# SLOVENSKI STANDARD

**SIST EN 14035-38:2006**

**01-maj-2006**

---

**Ognjemet - 38. del: Tulci, enostrelni - Specifikacija in preskusne metode**

Fireworks - Part 38: Shot tubes - Specification and test methods

Feuerwerkskörper - Teil 38: Feuerwerksrohre - Anforderungen und Prüfverfahren

Artifices de divertissement - Partie 38: Chandelles monocoup - Spécifications et méthodes d'essai



**Ta slovenski standard je istoveten z:** **EN 14035-38:2006**



---

**ICS:**

71.100.30

**SIST EN 14035-38:2006** **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 14035-38

February 2006

ICS 71.100.30

English Version

# Fireworks - Part 38: Shot tubes - Specification and test methods

Artifices de divertissement - Partie 38: Chandelles monocoup - Spécifications et méthodes d'essai

Feuerwerkskörper - Teil 38: Feuerwerksrohre - Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 30 December 2005.

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.

CEN members are the national standards bodies of Austria, Belgium, 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 United Kingdom.



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

**Management Centre: rue de Stassart, 36 B-1050 Brussels**



Ref. No. EN 14035-38:2006: E

# Contents

Page

## Foreword

This European Standard (EN 14035-38:2006) 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 August 2006, and conflicting national standards shall be withdrawn at the latest by August 2006.

This 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*

EN 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*

EN 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*

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

EN 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*

EN 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*

EN 14035-31, *Fireworks - Part 31: Shell–in-mortars - Specification and test methods*

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

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

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

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

EN 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

## 1 Scope

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

It is not applicable to shot tubes 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 as mass fraction of sulfuric acid, greater than 0,002 %;

— zirconium with a particle size of less than 40 μm.

NOTE In EN 14035-2, shot tubes are classified as follows:

— brief description: tube containing propellant charge and a pyrotechnic unit, with or without a transmitting fuse;

— principal effects: ejection of the pyrotechnic unit, producing a visual and/or aural effect in the air.

Schemes for type testing of shot tubes and batch testing of shot tubes are specified in Annex A and Annex B respectively.

## 2 Normative references

The following referenced documents are indispensable for the application of this European Standard. 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*

ISO 3599, *Vernier callipers reading to 0,1 and 0,05 mm*

## 3 Terms and definitions

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

## 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 shot tube 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 shot tube shall be contained in a primary pack or selection pack conforming to Clause 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 8.6, the protruding fuse shall not ignite.

## 4.4 Materials

### 4.4.1 Firework case

The tube shall be made of paper, cardboard or plastics. If the end closures are separate components, they shall be made of clay or similar material, paper,cardboard or cellular 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.

### 4.4.2 Pyrotechnic unit

The case of the pyrotechnic unit, if any, shall be made of paper, cardboard or plastics. If the end closure(s), if any, is a (are) separate component(s), it (they) shall be made of clay or similar material, or of paper, cardboard or cellular plastics.

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(s). If the end closure(s) is a (are) separate component(s), it (they) shall be securely in place. If the base and/or means of fixing is a separate component, it shall be securely in place.

Conformity to these requirements shall be verified by visual examination.



## 4.6 Net explosive content

When determined in accordance with 8.5, a category 2 shot tube shall have a net explosive content of not more than 20,0 g.



When determined in accordance with 8.5, a category 3 shot tube shall have a net explosive content of not more than 50,0 g.

## 4.7 Mass of report and/or bursting charge (if any)

When determined in accordance with 8.5, the mass of the report and/or bursting charge in the pyrotechnic unit of a category 2 shot tube shall be not more than 5,0 g of black powder or 4,0 g of nitrate/metal-based report composition or 2,0 g of perchlorate/metal-based report composition.

When determined in accordance with 8.5, the mass of the report and/or bursting charge in the pyrotechnic unit of a category 3 shot tube shall be not 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 Internal diameter

When measured in accordance with 8.4, the inside diameter of a category 2 shot tube shall not exceed 20 mm.

When measured in accordance with 8.4, the inside diameter of a category 3 shot tube shall not exceed 32 mm.

## 4.9 Vertical stability

For shot tubes designed to be placed on the ground, the shot tube 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 shot tube shall ignite within 10 s and the ignition shall be visible.

For category 2 shot tubes, 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 shot tubes, 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 Principal effects

When tested in accordance with 8.3, the principal effects of the shot tube, as given in EN 14035-2, shall be the ejection of the pyrotechnic unit producing a visual and/or aural effect in the air.

## 5.3 Functioning

When tested in accordance with 8.3, the pyrotechnic unit of the shot tube shall be ejected and shall produce a visual and/or aural effect in the air.

## 5.4 Sound pressure level



When tested in accordance with 8.3, a category 2 shot tube shall produce a maximum A-weighted impulse sound pressure level ($L_{AImax}$) of not higher than 120 dB(AI) 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 shot tube shall produce a maximum A-weighted impulse sound pressure level ($L_{AImax}$) of not higher than 120 dB(AI) at a horizontal distance of 15,0 m from the testing point and at a height of 1,0 m above the ground.

## 5.5 Height of explosion and bursting (if applicable)

When tested in accordance with 8.3, the pyrotechnic unit of a category 2 shot tube shall not explode or burst below a height of 8 m.

When tested in accordance with 8.3, the pyrotechnic unit of a category 3 shot tube shall not explode or burst below a height of 20 m.

## 5.6 Burning matter

When tested in accordance with 8.3, no burning or incandescent matter from a category 2 shot tube 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 shot tube 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 shot tube shall be extinguished within 60,0 s of the shot tube ceasing to function.

## 5.7 Stability

When tested in accordance with 8.3, the shot tube shall remain upright whilst functioning.

### 5.8 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 shot tube(s) (see 4.3.3), the pack shall completely enclose the shot tube(s) and there shall be no holes or splits in the pack, except those which are intended to enable the packaging to be opened and those which are otherwise technically necessary.

Conformity to these requirements shall be verified by visual examination.

## 7 Minimum labelling requirements

### 7.1 General

Shot tubes 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 shot tubes 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 shot tubes in this European Standard, are given in EN 14035-4.

### 7.2 Type name and category

The type name shall be marked, in upper case, as 'SHOT TUBE'. If a trade name is used in addition to the type name, it shall not conflict with the effect of a shot tube 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 shot tubes

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 shot tubes, inserted as appropriate (see 7.3.4);

— 'Remove orange fuse cover'[1)];

— 'Standing sideways, light fuse at its outermost end and retire immediately at least 8 m';

### 7.3.3 Category 3 shot tubes

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 shot tubes, inserted as appropriate (see 7.3.4);

— 'Remove orange fuse cover'[1)];

— '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'.

### 7.3.4 Placing instructions

For shot tubes to be placed on flat ground:



— 'Place shot tube upright on flat ground'.

For shot tubes to be buried into soft ground:



— 'Bury two-thirds of shot tube upright in ground'.

For shot tubes to be inserted in soft ground:

— 'Insert shot tube upright in soft ground or other non-flammable material, e.g. sand';

— 'Ensure shot tube will not fall over'.

For shot tubes to be fixed to a post:

— 'Fix shot tube firmly and upright to a solid post';

— 'Ensure top of shot tube clears post'.

For shot tubes supplied with a special holding device, or for which particular instructions are necessary, the manufacturer, distributor or importer shall provide appropriate instructions.

---

[1)] If applicable.

### 7.4 Name, address and telephone number of manufacturer or distributor or importer

Labelling shall include:

— name or trade mark, the address and the telephone number of the manufacturer; or

— an abbreviation or a code allowing the identification of the manufacturer, and the name or trade mark, the address and the telephone number:

  — of his authorized distributor; or

  — if the manufacturer is not established in a CEN member country, of the importer in a CEN member country.

The address shall comprise at least the town and the country. On the shot tube at least the abbreviations allowing the identification of

— the manufacturer; or

— the distributor or importer. An additional code or abbreviation for the manufacturer shall be marked.

### 7.5 Reference to this European Standard



A shot tube shall be marked with 'EN 14035-38'. A primary pack shall be marked with the words 'Contents conform to EN 14035-38'.



### 7.6 Printing



#### 7.6.1 Labelling

Labelling shall be clearly visible, easily legible, indelible and on a single-colour background.

NOTE Printing errors which are not misleading should not be classified as faults.

#### 7.6.2 Type size

When measured in accordance with 8.7, the type sizes shall be such that the height of the capital letter “X” (in upper case) is at least 2,8 mm for the information specified in 7.2, 7.3 and 7.8 and at least 2,1 mm for the other information.

### 7.7 Marking of very small shot tubes

#### 7.7.1 Reduced size

If the shot tube does not provide enough space for the specified information using the types sizes specified in 7.6.2, for the information specified in 7.2 and 7.3 the type size shall be reduced to 2,1 mm.

#### 7.7.2 Reduced information

If the shot tube does not provide enough space to carry all the specified information even in reduced type size, at least the information specified in 7.4 shall be given on the shot tube, if at all possible.