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Ognjemet – 31. del: Bomba v možnarju – Specifikacija in preskusne metode

Fireworks - Part 31: Shell-in-mortars - Specification and test methods

Feuerwerkskörper - Teil 31: Feuerwerksbomben in Mörsern - Anforderungen und Prüfverfahren

Artifices de divertissement - Partie 31: Bombes logées - Spécifications et méthodes d'essai

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This European Standard was approved by CEN on 12 September 2005.

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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 European Standard (EN 14035-31:2005) 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of an identical text or by endorsement, at the latest by May 2006, and conflicting national standards shall be withdrawn at the latest by May 2006.

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.*

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, *7Fireworks - 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.*

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.

1 Scope

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

It is not applicable to shell-in-mortars containing pyrotechnic composition that 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, shell-in-mortars are classified as follows:

— brief description: assembly comprising a shell inside a mortar, from which the shell is designed to be projected;

— principal effects: projection of the shell and subsequent bursting of the shell case at high altitude, with ejection of any pyrotechnic units producing visual and/or aural effect(s).

Schemes for type testing of shell-in-mortars and batch testing of shell-in-mortars 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 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 shell-in-mortar shall be secure when tested in accordance with 7.4.

4.3 Protection of initial fuse

The initial fuse shall be protected by an orange fuse cover.

Conformity to this requirement shall be verified by visual examination.

4.4 Transmitting fuse

There shall be no holes or splits in the cover of the transmitting fuse, other than pinholes introduced to control the rate of burning. There shall be no exposed instantaneous fuse in the transmitting fuse.

Conformity to these requirements shall be verified by visual examination.

4.5 Materials of mortar and shell case

The mortar shall be made of cardboard.

The bottom end closure of the mortar shall be made of wood, plastics or pressed non-metallic material, e.g. clay, pressed wood pulp.

The shell case in the mortar shall be made of paper, cardboard or plastics.

The top closure of the mortar shall be made of paper, plastics or foil.

Conformity to these requirements shall be verified by visual examination.

4.6 Integrity

There shall be no holes, splits, dents or bulges in the body of the mortar.

There shall be no holes or splits in the end closure of the mortar. If the end closure is a separate component, it shall be securely in place.

There shall be no holes, splits, dents or bulges in the shell case.

The top closure of the mortar shall be in place and retain the contents.

Conformity to these requirements shall be verified by visual examination.

4.7 Propellant charge

When determined in accordance with 7.2, the propellant charge shall be integrated within the shell.

4.8 Location of the shell

When tested in accordance with 7.3, the reading on the balance shall not increase by more than 1 g after shaking the shell-in-mortar.

4.9 Calibre

When measured in accordance with 7.2, the inside diameter of the mortar of a shell-in-mortar shall be at least 32 mm and shall not exceed 65 mm.

4.10 Gross mass

When determined in accordance with 7.1, the shell-in-mortar shall have a gross mass of not more than 500,0 g.

4.11 Net explosive content

When determined in accordance with 7.7, a shell-in-mortar shall have a net explosive content of not more than 300,0 g.

4.12 Mass of report and/or bursting charge

When determined in accordance with 7.7, a shell-in-mortar shall have a report and/or bursting charge, if any, of not more than 50,0 g of black powder (including any supporting medium, e.g. rice or corn husks, willow catkins, cotton seeds) or 30,0 g of nitrate/metal-based composition or 15,0 g of perchlorate/metal-based composition.

4.13 Vertical stability

When tested in accordance with 7.5, the shell-in-mortar designed to be placed on the ground shall not fall over.

5 Performance

5.1 Initial fuse

When tested in accordance with 7.6, the protruding fuse shall ignite within 10 s and the ignition shall be visible.

When tested in accordance with 7.6, the duration of the initial fuse burning shall be 5,0 s to 13,0 s.

5.2 Principal effects

When tested in accordance with 7.6, the principal effects of the shell-in-mortar, as given in EN 14035-2, shall be a projection of the shell and subsequent bursting of the shell case at high altitude, with ejection of any pyrotechnic units producing visual and/or aural effect(s).

5.3 Functioning

When tested in accordance with 7.6, all pyrotechnic units of the shell shall function consistently.

5.4 Sound pressure level

When tested in accordance with 7.6, a shell-in-mortar 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 a height of 1,0 m above the ground.

5.5 Height of explosions

When tested in accordance with 7.6, no explosion shall occur below a height of 30 m.

5.6 Burning matter

When tested in accordance with 7.6, any burning or incandescent matter resulting from any effect produced by the shell, other than effects and concomitant with ascent, shall be extinguished at least 10 m above the ground.

5.7 Stability

When tested in accordance with 7.6, the mortar shall remain upright whilst functioning.

5.8 Integrity of the firework case after functioning

When tested in accordance with 7.6, the mortar shall have no additional holes or splits after the shell-in-mortar has functioned.

6 Minimum labelling requirements

6.1 General

Shell-in-mortars shall be marked with the information specified in 6.2 to 6.5.

The specified information shall be given in the language(s) of the country in which the shell-in-mortars 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 6.1 to 6.5 and 6.6.1 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 shell-in-mortars in this European Standard, are given in EN 14035-4.

6.2 Type name and category

The type name shall be marked, in upper case, as 'SHELL-IN-MORTAR'. If a trade name is used in addition to the type name, it shall not conflict with the principal effects of a shell-in-mortar or with the name of another type of firework.

The category shall be marked, in upper case, as 'CATEGORY 3' or 'CAT 3'.

6.3 Safety information

6.3.1 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 6.3.2 to 6.3.3 may be given.

6.3.2 Shell-in-mortars

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

— 'Remove top closure of the mortar'[1)];

— 'For outdoor use only';

— 'Avoid overhead obstructions';

— 'Never attempt to relight the fuse';

Specific placing instructions for different types of shell-in-mortars, inserted as appropriate (see 6.3.3);

— 'Remove orange fuse cover';

— 'Never position any part of the body over the mortar tube';

— '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'.

6.3.3 Placing instructions

For shell-in-mortars to be placed on flat ground:

— 'Place mortar upright on flat ground'.

For shell-in-mortars to be buried into soft ground:

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1) If applicable.