SLOVENSKI STANDARD
oSIST prEN 15947-4:2018

01-oktober-2018

Pirotehnični izdelki - Ognjemetni izdelki, kategorije F1, F2 in F3 - 4. del: Preskusne metode

Pyrotechnic articles - Fireworks, Categories F1, F2 and F3 - Part 4: Test methods

Pyrotechnische Gegenstände - Feuerwerkskörper, Kategorien F1, F2 und F3 - Teil 4: Prüfverfahren

Articles pyrotechniques - Artifices de divertissement, Catégories F1, F2 et F3 - Partie 4: Méthodes d'essai

Ta slovenski standard je istoveten z: prEN 15947-4:2018

ICS:

71.100.30	Eksplozivi. Pirotehnika in ognjemeti	Explosives. Pyrotechnics and fireworks

oSIST prEN 15947-4:2018 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

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Will supersede EN 15947-4:2015

English Version

Pyrotechnic articles - Fireworks, Categories F1, F2 and F3 - Part 4: Test methods

Articles pyrotechniques - Artifices de divertissement, Catégories F1, F2 et F3 - Partie 4: Méthodes d'essai

Pyrotechnische Gegenstände - Feuerwerkskörper, Kategorien F1, F2 und F3 - Teil 4: Prüfverfahren

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 212.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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

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European foreword

This document (prEN 15947-4:2018) has been prepared by Technical Committee CEN/TC 212 “Pyrotechnic articles”, the secretariat of which is held by NEN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 15947-4:2015.

In comparison with the previous edition, the following technical modifications have been made:

— a new subclause 6.19 “Test conditions for fireworks equipped with two fuses” was added;

— as a consequence of the inclusion of hand-held bengal flames (category F1) into the standard the title for subclause 6.1.1.2.2 is changed into “Hand-held fountains and hand-held bengal flames without a separate handle”;

— a sentence to cover the testing of fuses fixed with adhesive tape for certain articles is added into subclause 6.1.6.2;

— a mention for the batch test was added in 6.1.7 “Attachment of sealing paper, ignition head or friction head”;

— Table 2 and Table 3 into subclause 6.3.1.2.2 are updated including all possible types;

— Figure 9 into subclause 6.5.2 has been revised, considering a new positioning of the sound meter with regards to the party popper;

— bullet point in subclause 6.14.2 has been removed and changes have been done into the whole subclause proposing an appropriate balance (5.7.3) fitting with the accuracy needed.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential safety 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 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*

1 Scope

This document specifies test methods. It is applicable to fireworks in categories F1, F2 and F3 according to prEN 15947-2:2018.

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.

prEN 15947-1:2018, *Pyrotechnic articles — Fireworks, Categories F1, F2 and F3 — Part 1: Terminology*

prEN 15947-3:2018, *Pyrotechnic articles — Fireworks, Categories F1, F2 and F3 — Part 3: Minimum labelling requirements*

prEN 15947-5:2018 *Pyrotechnic articles — Fireworks, Categories F1, F2 and F3 — Part 5: Requirements for construction and performance*

EN 61672-1:2013, *Electroacoustics - Sound level meters - Part 1: Specifications*

EN ISO 845, *Cellular plastics and rubbers - Determination of apparent density (ISO 845)*

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

EN ISO 2439, *Flexible cellular polymeric materials - Determination of hardness (indentation technique) (ISO 2439)*

ISO 6344-3, *Coated abrasives — Grain size analysis — Part 3: Determination of grain size distribution of microgrits P240 to P2500*

ISO 13385-1, *Geometrical product specifications (GPS) — Dimensional measuring equipment — Part 1: Callipers; Design and metrological characteristics*

ISO 21948, *Coated abrasives — Plain sheets*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 15947-1:2018 apply.

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

4 Test environment

4.1 General

The test area shall be a clean, flat, horizontal, non-flammable and sound reflecting surface (for example concrete). The test sample shall be placed in accordance with the instructions on the label in the centre of the test area.

4.2 Indoor

The test area shall be indoors.

The test area shall be inside a fume cupboard, or similar enclosed space, which is capable of preventing movement of air.

4.3 Outdoor

4.3.1 General

The test area shall be an outdoor site. If applicable, provisions shall be made at the centre of the test area for partially burying into the ground.

If applicable, insert support pole in the centre of the test area.

A means of measuring the wind speed at a height of 1,5 m above the ground shall be provided. No performance testing shall be carried out if the wind speed exceeds 5,0 m/s.

4.3.2 Category F1

A test area meeting the requirements given in 4.1, with a radius of at least 2 m and a circle, radius 1 m, shall be marked around the centre of the test area.

4.3.3 Category F2

A test area meeting the requirements given in 4.1, with a radius of at least 9 m and a circle, radius 8 m, shall be marked around the centre of the test area.

4.3.4 Category F3

A test area meeting the requirements given in 4.1, with a radius of at least 16 m and a circle, radius 15 m, shall be marked around the centre of the test area.

4.4 Monitoring height

Two positions for monitoring the height of ascent and angle of flight shall be provided, at a measured distance of at least 50 m from and at an angle of 90° to each other in relation to the testing point. If the monitoring positions are not in the same horizontal plane, appropriate corrections shall be made in the calculation of heights.

If necessary the measuring distance and the number of positions may be adapted to the firework.

5 Apparatus

NOTE The described apparatuses are only examples, any equivalent apparatus with the same accuracy or better can be used.

5.1 Timing device

5.1.1 Timing device, capable of being read to the nearest 0,1 s.

5.1.2 Timing device, capable of being read to the nearest 1 min.

5.2 Calliper, flat faced vernier calliper reading to 0,1 mm, conforming to ISO 13385-1.

5.3 Ruler, reading to 1 mm.

5.4 Measuring tape, reading to 10 mm.

5.5 Wind speed meter, capable to measure with accuracy of at least 0,5 m/s.

5.6 Masses with clamping device

5.6.1 (50 ± 1,0) g mass total.

5.6.2 (100 ± 1,0) g mass total.

5.6.3 (500 ± 1,0) g mass total.

5.7 Balance

5.7.1 Balance, reading to 100 mg.

5.7.2 Balance, reading to 10 mg.

5.7.3 Balance, reading to 0,1 mg.

5.8 Abrasive sheet, large enough to permit striking of the ignition head, conforming to ISO 21948, grit P240 measured in accordance with ISO 6344-3.

5.9 Temperature chamber

5.9.1 Up to (+ 130 ± 2,5) °C.

5.9.2 Up to (+ 75 ± 2,5) °C.

5.9.3 Up to (+ 50 ± 2,5) °C.

5.10 Test paper, 700 mm × 750 mm, (80 ± 3,0) g/m^2.

5.11 Clamping device

Means of clamping to hold different test sample at different heights and/or angles.

5.12 Plate, non-flammable, with a diameter of (200 ± 5) mm.

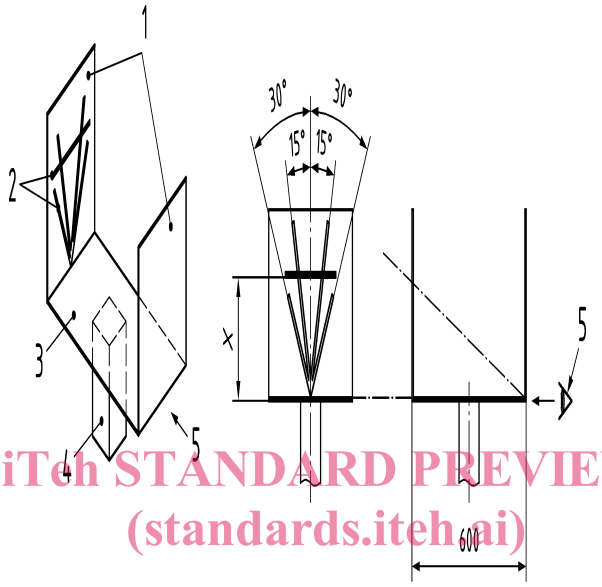
5.13 Paper holder

Means of clamping to fix the test paper in a horizontal or vertical plane in different heights.

5.14 Viewing screen

Suitable viewing screens, as shown in Figure 1, shall be provided for monitoring height and angle of flight criteria.

Dimensions in millimetres



Key

1 acryl glass
2 black tape, 10 mm to 20 mm wide
3 solid base
4 stand
5 position of observer

Figure 1 — Viewing screen

The distance X in Figure 1 is given in metres by the Formula (1):

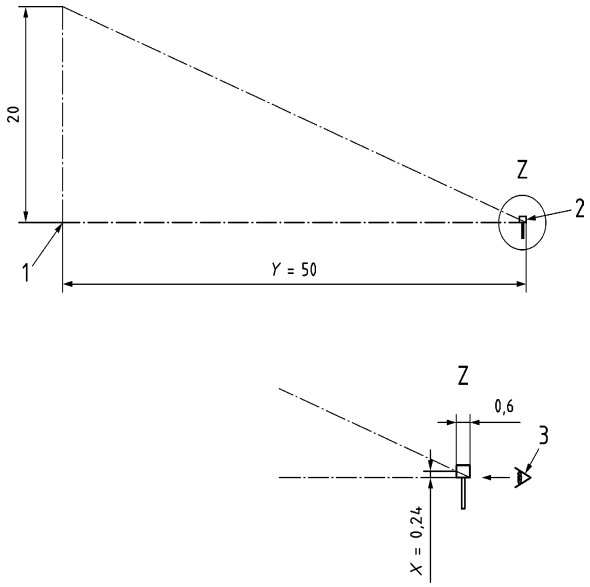
$$\frac{20\,\text{m}}{X} = \frac{Y}{0{,}6\,\text{m}} \tag{1}$$

where

Y is the distance in metres from the viewing point to the testing point.

EXAMPLE Y = 50 m

$$X = \frac{0{,}6\,\text{m} \cdot 20\,\text{m}}{Y} = \frac{0{,}6\,\text{m} \cdot 20\,\text{m}}{50\,\text{m}} = 0{,}24\,\text{m}$$



Key

1 base of firework before firing

2 sighting device

3 position of observer

Figure 2 — Use of a viewing screen to monitor a height of 20 m

5.15 Poles, with 3 m height.

NOTE A vertical height of 3 m can be identified by the poles placed around the perimeter of the test area and the 8 m height can be estimated using the same poles.

5.16 Rack

Horizontal plate with a central hole of 800 mm diameter, mounted in a height of 3,0 m above the ground in a mobile rack.

5.17 Sound level meter to class 1 of EN 61672-1:2013 with free-field microphone.

5.18 Shock apparatus, shall provide a deceleration of 490^{+100}_{-50} m/s2 (when measured at the centre of an unloaded platform) and the mechanical conditioning impulse duration (time elapsed from the starting of the machine's deceleration to the time in which the deceleration reaches its maximum value during each first shock pulse) shall be 2 ms ± 1 ms working at a frequency of 1 Hz ± 0,1 Hz.

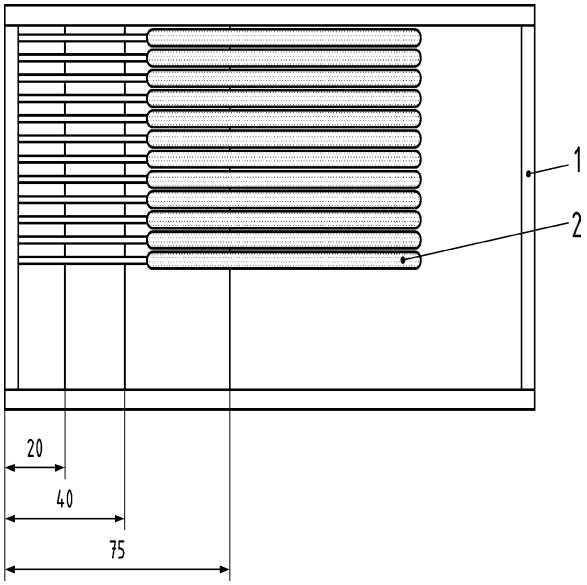
An example of an apparatus is shown in Annex A.

5.19 Goniometer, read to 1°.

5.20 Frame

The frame shall retain the test sample consistently.

To gauge the length of the handles, clearly marked lines shall be marked at distances of 20 mm, 40 mm and 75 mm from the handle end of the frame.



Key

1 frame

2 sparkler

Figure 3 — Example for determining length of handles (Batch test)

5.21 Ignition source, capable of producing a small flame or of smouldering.

5.22 Transparent type size sheet

The printing, as required in prEN 15947-3:2018, 4.8, shall comply with the size shown in the figure below.

1,8 mm: ABC abc XYZ xyz 123

Figure 4 — Type size of print