
Pirotehnični izdelki - Drugi pirotehnični izdelki - 4. del: Preskusne metode

Pyrotechnic articles - Other pyrotechnic articles - Part 4: Test methods

Pyrotechnische Gegenstände - Sonstige pyrotechnische Gegenstände - Teil 4:
Prüfverfahren

Articles pyrotechniques - Autres articles pyrotechniques - Partie 4 : Méthodes d'essai

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pyrotechniques - Partie 4 : Méthodes d'essai

Pyrotechnische Gegenstände - Sonstige pyrotechnische
Gegenstände - 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.

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COMITÉ EUROPÉEN DE NORMALISATION
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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 16263-4:2021) 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 16263-4:2015.

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

- references to 2007/23/EC are replaced by references to 2013/29/EU. Annex ZA has been adjusted accordingly;
- Annex ZB has been deleted. Annex ZA has been adjusted accordingly;
- the description of the witness screen material has been technically changed;
- the description of the transparent type size sheet has been technically changed. Figure 3 has been adjusted accordingly;
- clause 5.3.2 on the conformity to drawings and part lists has been technically changed;
- clause 5.15 on the measuring of the hazard level of fragments has been technically changed;
- a clause on the use of detonative explosives has been added (5.17).

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 document is one of the series of standards as listed below:

- EN 16263-1¹, *Pyrotechnic articles — Other pyrotechnic articles — Part 1: Terminology*;
- EN 16263-2², *Pyrotechnic articles — Other pyrotechnic articles — Part 2: Requirements*;
- EN 16263-3³, *Pyrotechnic articles — Other pyrotechnic articles — Part 3: Categories and types*;
- EN 16263-4⁴, *Pyrotechnic articles — Other pyrotechnic articles — Part 4: Test methods*;

¹ Under preparation. Stage at the time of publication: prEN 16263-1:2021.

² Under preparation. Stage at the time of publication: prEN 16263-2:2021.

³ Under preparation. Stage at the time of publication: prEN 16263-3:2021.

⁴ Under preparation. Stage at the time of publication: prEN 16263-4:2021.

- EN 16263-5⁵, *Pyrotechnic articles — Other pyrotechnic articles — Part 5: Minimum labelling requirements and instructions for use.*

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⁵ Under preparation. Stage at the time of publication: prEN 16263-5:2021.

1 Scope

This document specifies test methods for other pyrotechnic articles (except pyrotechnic articles for vehicles, cartridges for powder actuated tools and ignition devices).

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.

EN 16263-1:—¹, *Pyrotechnic articles - Other pyrotechnic articles - Part 1: Terminology*

EN 16263-2:—², *Pyrotechnic articles - Other pyrotechnic articles - Part 2: Requirements*

EN 16263-3:—³, *Pyrotechnic articles - Other pyrotechnic articles - Part 3: Categories and types*

EN 16263-5:—⁵, *Pyrotechnic articles - Other pyrotechnic articles - Part 5: Minimum labelling requirements and instructions for use*

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

EN ISO 13385-1:2019, *Geometrical product specifications (GPS) - Dimensional measuring equipment - Part 1: Design and metrological characteristics of callipers (ISO 13385-1:2019)*

EN ISO 13385-2:2020, *Geometrical product specifications (GPS) - Dimensional measuring equipment - Part 2: Design and metrological characteristics of calliper depth gauges (ISO 13385-2:2020)*

ISO 6344-3:2013, *Coated abrasives — Grain size analysis — Part 3: Determination of grain size distribution of microgrits P240 to P2500*

ISO 21948:2001, *Coated abrasives — Plain sheets*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16263-1:—¹ apply.

NOTE Wherever reference is made to a pyrotechnic article, only other pyrotechnic articles (not including those for vehicles, cartridges for powder actuated tools and ignition devices) are meant, as it is the scope of this document.

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

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

4 Apparatus

4.1 General

Any equivalent apparatus with the same accuracy or better may be used.

4.2 Test area

4.2.1 General

The test area shall be unobstructed, non-flammable and suitable for the accurate measurement of the required parameters.

The test sample should be placed in the centre of the test area, as shown in the labelled instruction. The manufacturers supplied or recommended equipment shall be used.

4.2.2 Indoor

The test area shall be indoors.

The test area shall be in an enclosed space, which is capable of limiting the movement of air. A means of extracting fumes shall be provided where necessary.

4.2.3 Outdoor

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.

Before starting the function test start the measurement of the wind speed with a wind speed meter (4.7) and continue measuring during the whole function test.

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

4.3 Timing device

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

4.4 Calliper

Calliper, flat faced vernier calliper reading to 0,1 mm conforming to EN ISO 13385-1:2019 and EN ISO 13385-2:2020.

4.5 Ruler

Ruler, reading to 1,0 mm.

4.6 Measuring tape

Measuring tape, reading to 10 mm.

4.7 Wind speed meter

Wind speed meter capable of measuring to an accuracy of at least 0,5 m/s.

4.8 Balance

4.8.1 Balance, read to 0,1 g.

4.8.2 Balance, read to 0,01 g.

4.9 Temperature chamber

The temperature chamber(s) shall comply with the following specifications:

- up to 75 °C or 1,25 times the maximum use temperature of the test samples in degrees Celsius (if higher than 60 °C);
- when required, down to 10 °C lower than the minimum use temperature of the test samples;
- when required, capability of developing the highest level of humidity specified by the manufacturer.

The tolerance on each of the above temperature requirements is $\pm 2,5$ °C. The required test conditions may be delivered by means of a single temperature chamber or by means of two or more chambers, each capable of delivering one or more of the specified sets of conditions.

4.10 Sound level meter

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

4.11 Shock apparatus

The apparatus shall provide a deceleration of 490 m/s² (–50/+100) 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 \pm 1 ms working at a frequency of 1 Hz \pm 0,1 Hz.

An example of an apparatus is shown in Annex A.

4.12 Drop-test apparatus

The drop test apparatus shall comply with the following specifications:

- drop height 1,2 m;
- ground plate with a thickness greater than 10 mm of steel.

An example of an apparatus is shown in Annex B.

4.13 Goniometer

Goniometer, reading to 1°.

4.14 Devices for measuring of effect height

The devices shall be capable of measuring horizontal and/or vertical angles:

- universal surveying instrument (USI);
- theodolite;
- electronic level or clinometers;
- video systems
- measuring grid.

4.15 Devices for measuring thrust

Either of the following apparatus shall be used for the measurement of thrust:

- calibrated strain gauge;
- piezoelectric type load cell.

The accuracy of these gauges shall be determined as a function of levels of thrusts to be measured and the tolerances given by the manufacturer.

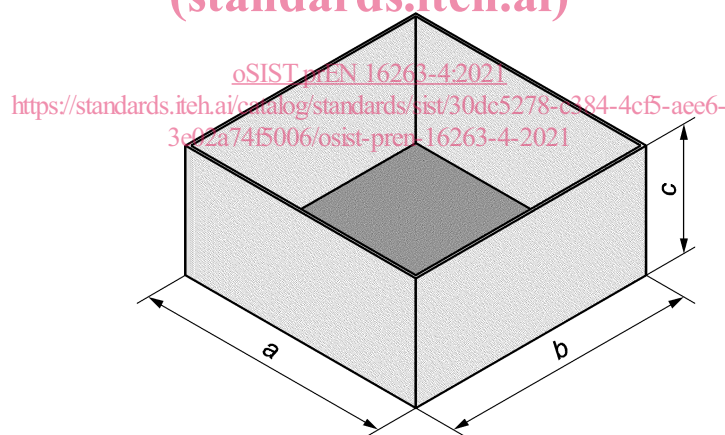
4.16 Abrasive sheet

Abrasive sheet, large enough to permit striking of the ignition head, conforming to ISO 21948:2001, grit P240 conforming to ISO 6344-3:2013.

4.17 Witness screen

For the assessment of fragments according to 5.15.2.2, the following equipment shall be used:

- sturdy square based frame: length: 1 m; width: 1 m; height: 0,5 m, or alternatively a sturdy cylindrical frame: radius 0,5 m, height 0,5 m;
- witness screen material: foils of polycarbonate with a thickness of 0,5 mm. The lateral surfaces of the sturdy base shall be totally covered with the witness screen material. The resulting box shall provide an opening at the bottom side, see Figures 1 and 2.

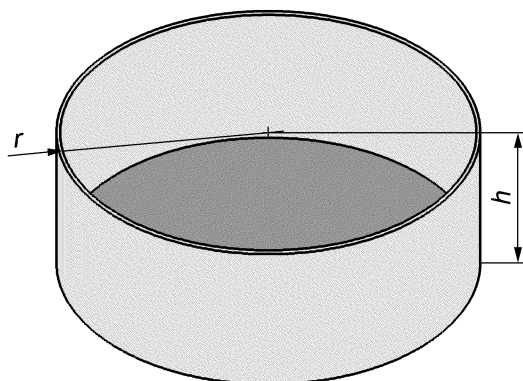


Key

- a* length: 1 m
- b* width: 1 m
- c* height: 0,5 m

Figure 1 — Square based frame covered with witness screen material

An alternative test set-up is given in Figure 2.



Key

- r radius: 0,5 m
 h height: 0,5 m

Figure 2 — Alternative test set-up: cylindrical frame covered with witness screen material

For the assessment of fragments according to 5.15.2.3, the following equipment shall be used:

- witness screen material: specific foils of polycarbonate with a thickness of 0,5 mm;
- four frames: length: 2 m; width: 2 m.

4.18 Transparent type size sheet

Transparent sheet with the characters shown in Figure 3 printed on it in 1,8 mm text. Height of text determined by height of capital X in each case.


1,8 mm :  ABC abc XYZ xyz 123 

Figure 3 — Type size of print

4.19 High speed video equipment

High speed video camera with suitable speed and resolution adapted to the expected size and speed of the foreseen fragments.

4.20 Further test apparatus

Other test apparatus than those listed in 4.1 to 4.19 are:

- thermal flux measuring apparatus;
- pressure gauge;
- strain gauge or piezoelectric type of load cell (see 5.11.1);
- ESD test apparatus (see 5.13.1.2.1);

- drop hammer for impact sensitivity testing (see 5.13.1.3.1);
- friction test apparatus (see 5.13.1.4.1).

5 Test methods

5.1 General

Any equivalent method with the same sensitivity and the same accuracy or better may be used.

5.2 Construction

5.2.1 Outer dimension of item

Using the ruler (see 4.5), measure and record the outer dimensions of the item(s).

5.2.2 Determination of calibre

Using the calliper (see 4.4), measure and record the calibre of the item(s).

5.2.3 Determination of gross mass

Using the balance (4.8.1), measure and record the gross mass of the item(s).

5.3 Design verification

5.3.1 General

This test shall be done for type testing to verify that the tested item is in accordance with the requirements of EN 16263-2 and EN 16263-3.

5.3.2 Conformity to drawings and part lists

The tested item shall be in accordance with the relevant manufacturing drawing. The drawing shall show any relevant component, with its dimensions, the mass and form (e.g. loose powder, granules, pellets, consolidated grains, etc.) of each pyrotechnic composition as well as the proportions of its constituents.

For Pyrotechnic Actuated Dispersers that intentionally by design project or propel solid objects other than soft light-weight materials such as paper, cork, non-rigid foams, the drawing shall indicate the materials the objects are made of as well as the shape of these objects (including the presence of sharp edges, points or any characteristic that may be harmful at low kinetic energies)

Observe and record any non-conformity.

5.3.3 Pyrotechnic composition — Determination of net explosive content

5.3.3.1 Apparatus

- Balance reading 0,01 g (see 4.8.2).
- Balance reading 0,1 g (see 4.8.1).

5.3.3.2 Procedure – dismantling (if necessary)

Separate any pyrotechnic units and count them.