



SLOVENSKI STANDARD
SIST EN 16263-4:2015

01-oktober-2015

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

(standards.iteh.ai)

Ta slovenski standard je istoveten z: EN 16263-4:2015

SIST EN 16263-4:2015
<https://standards.iteh.ai/catalog/standards/sist/6f0fa65b-53cc-4c26-9277-4b92562f18f1/sist-en-16263-4-2015>

ICS:

71.100.30 Eksplozivi. Pirotehnika Explosives. Pyrotechnics

SIST EN 16263-4:2015

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 16263-4:2015

<https://standards.iteh.ai/catalog/standards/sist/6f0fa65b-53cc-4c26-9277-4b92562f18f1/sist-en-16263-4-2015>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 16263-4

August 2015

ICS 71.100.30

English Version

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

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

Pyrotechnische Gegenstände - Sonstige pyrotechnische
Gegenstände - Teil 4: Prüfverfahren

This European Standard was approved by CEN on 12 May 2015.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

[SIST EN 16263-4:2015](https://standards.iteh.ai/catalog/standards/sist/6f0fa65b-53cc-4c26-9277-4b92562f18f1/sist-en-16263-4-2015)

<https://standards.iteh.ai/catalog/standards/sist/6f0fa65b-53cc-4c26-9277-4b92562f18f1/sist-en-16263-4-2015>



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

| | Page |
|--|-----------|
| European foreword | 4 |
| 1 Scope | 5 |
| 2 Normative references | 5 |
| 3 Terms and definitions | 5 |
| 4 Apparatus | 5 |
| 4.1 General..... | 5 |
| 4.2 Test area | 5 |
| 4.2.1 General..... | 5 |
| 4.2.2 Indoor..... | 6 |
| 4.2.3 Outdoor..... | 6 |
| 4.3 Timing device..... | 6 |
| 4.4 Calliper..... | 6 |
| 4.5 Ruler..... | 6 |
| 4.6 Measuring tape..... | 6 |
| 4.7 Wind speed meter..... | 6 |
| 4.8 Balance | 6 |
| 4.9 Temperature chamber..... | 6 |
| 4.10 Sound level meter..... | 7 |
| 4.11 Shock apparatus..... | 7 |
| 4.12 Drop-test apparatus..... | 7 |
| 4.13 Goniometer..... | 7 |
| 4.14 Devices for measuring of effect height..... | 7 |
| 4.15 Devices for measuring thrust..... | 7 |
| 4.16 Abrasive sheet..... | 8 |
| 4.17 Witness screen..... | 8 |
| 4.18 Transparent type size sheet | 9 |
| 4.19 High speed video equipment..... | 9 |
| 4.20 Further test apparatus..... | 9 |
| 5 Test methods..... | 10 |
| 5.1 General..... | 10 |
| 5.2 Construction..... | 10 |
| 5.2.1 Outer dimension of item | 10 |
| 5.2.2 Determination of calibre..... | 10 |
| 5.2.3 Determination of gross mass | 10 |
| 5.3 Design verification..... | 10 |
| 5.3.1 General..... | 10 |
| 5.3.2 Conformity to drawings and part lists..... | 10 |
| 5.3.3 Pyrotechnic composition — Determination of net explosive content | 10 |
| 5.4 Angle of ascent and height of effects..... | 11 |
| 5.4.1 General..... | 11 |
| 5.4.2 Apparatus | 11 |
| 5.4.3 Procedure | 11 |
| 5.5 Measurement of sound pressure level | 12 |
| 5.5.1 Apparatus | 12 |
| 5.5.2 Procedure | 12 |
| 5.6 Timing measurement..... | 12 |
| 5.6.1 Apparatus | 12 |
| 5.6.2 Procedure | 12 |
| 5.7 Mechanical conditioning..... | 12 |

| | | |
|------------------------|---|-----------|
| 5.7.1 | Apparatus | 12 |
| 5.7.2 | Procedure | 12 |
| 5.8 | Mechanical impact test (Drop test) | 13 |
| 5.8.1 | Apparatus | 13 |
| 5.8.2 | General | 13 |
| 5.8.3 | Procedure | 13 |
| 5.9 | Thermal conditioning | 13 |
| 5.9.1 | Apparatus | 13 |
| 5.9.2 | Procedure | 13 |
| 5.10 | Function test | 14 |
| 5.10.1 | General | 14 |
| 5.10.2 | Apparatus | 14 |
| 5.10.3 | Procedure | 15 |
| 5.11 | Measurement of thrust | 16 |
| 5.11.1 | Apparatus | 16 |
| 5.11.2 | Procedure | 16 |
| 5.12 | Resistance to ignition by an abrasive surface | 16 |
| 5.12.1 | Apparatus | 16 |
| 5.12.2 | Procedure | 16 |
| 5.13 | Further tests | 16 |
| 5.13.1 | Sensitiveness of pyrotechnic composition | 16 |
| 5.13.2 | External temperature of hand-held pyrotechnic articles | 19 |
| 5.14 | Measuring of labelling | 19 |
| 5.14.1 | Apparatus | 19 |
| 5.14.2 | Procedure | 19 |
| 5.15 | Measuring of the energy of fragments | 20 |
| 5.15.1 | Apparatus | 20 |
| 5.15.2 | Procedure | 20 |
| 5.16 | Water immersion test | 21 |
| 5.16.1 | Apparatus | 21 |
| 5.16.2 | Procedure | 21 |
| Annex A (informative) | Mechanical conditioning (Shock apparatus) | 22 |
| Annex B (informative) | Drop test (Mechanical impact test) | 25 |
| Annex C (informative) | Procedures for calculation of heights | 26 |
| Annex D (informative) | Determination of the duration of accelerated ageing test to demonstrate the correct functioning at the 'use by' date | 30 |
| Annex E (informative) | Overview of essential safety requirements and corresponding clauses of all parts of EN 16263 | 33 |
| Annex ZA (informative) | Relationship between this European Standard and the Essential Requirements of EU Directive 2007/23/EC on the placing on the market of pyrotechnic articles | 34 |
| Annex ZB (informative) | Relationship between this European Standard and the Essential Requirements of EU Directive 2013/29/EU on the placing on the market of pyrotechnic articles | 35 |
| Bibliography | | 36 |

EN 16263-4:2015 (E)**European foreword**

This document (EN 16263-4:2015) has been prepared by Technical Committee CEN/TC 212 "Pyrotechnic articles", 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 2016, and conflicting national standards shall be withdrawn at the latest by February 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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 or Annex ZB, which are an integral part of this document.

This European standard is one of the series of standards as listed below:

- EN 16263-1, *Pyrotechnic articles — Other pyrotechnic articles — Part 1: Terminology*;
- EN 16263-2, *Pyrotechnic articles — Other pyrotechnic articles — Part 2: Requirements*;
- EN 16263-3, *Pyrotechnic articles — Other pyrotechnic articles — Part 3: Categories and types*;
- EN 16263-4, *Pyrotechnic articles — Other pyrotechnic articles — Part 4: Test methods*;
- EN 16263-5, *Pyrotechnic articles — Other pyrotechnic articles — Part 5: Minimum labelling requirements and instructions for use*.

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

1 Scope

This European Standard 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, in whole or in part, are referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 16263-1:2015, *Pyrotechnic articles — Other pyrotechnic articles — Part 1: Terminology*

EN 16263-2:2015, *Pyrotechnic articles — Other pyrotechnic articles — Part 2: Requirements*

EN 16263-3:2015, *Pyrotechnic articles — Other pyrotechnic articles — Part 3: Categories and types*

EN 16263-5:2015, *Pyrotechnic articles — Other pyrotechnic articles — Part 5: Minimum labelling requirements and instructions for use*

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

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

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

ISO 6344-3, *Coated abrasives — Grain size analysis — Part 3: Determination of grain size distribution of microgrits P240 to P2500*
<https://standards.iteh.ai/catalog/standards/sist/6f0fa65b-53cc-4c26-9277-4b92562f18f1/sist-en-16263-4-2015>

ISO 21948, *Coated abrasives — Plain sheets*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16263-1:2015 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 standard.

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.

EN 16263-4:2015 (E)**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 and EN ISO 13385-2).

4.5 Ruler

Ruler, reading to 1,0 mm.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/6f0fa65b-53cc-4c26-9277-4b92562f18f1/sist-en-16263-4-2015>

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 with free-field microphone.

4.11 Shock apparatus

The apparatus shall provide a deceleration of 490 m/s^2 ($-50/+100$) m/s^2 (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 $2 \text{ ms} \pm 1 \text{ ms}$ working at a frequency of $1 \text{ Hz} \pm 0,1 \text{ Hz}$.

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° .

<https://standards.iteh.ai/catalog/standards/sist/6f0fa65b-53cc-4c26-9277-4b92562f18f1/sist-en-16263-4-2015>

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.

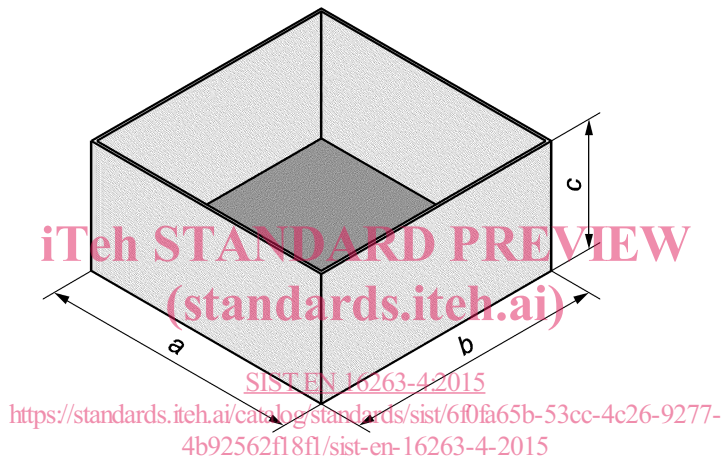
EN 16263-4:2015 (E)**4.16 Abrasive sheet**

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

4.17 Witness screen

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

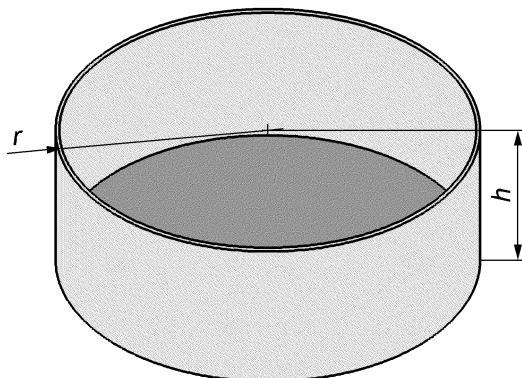
- sturdy square based frame: length: 1 m; width: 1 m; height: 0,5 m, or alternatively a sturdy cylindrical frame: radius 0,5 m, height 0,5 m;
- witness screen material: threshold energy of penetration 5 J (e.g. foils of polycarbonate with a thickness of 0,5 mm). The lateral surfaces of the sturdy base 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


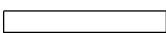
Figure 2 — Alternative test set-up: cylindrical frame covered with witness screen material

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

- witness screen material: threshold energy of penetration 5 J (e.g. 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 2,8 mm and 2,1 mm text. Height of text determined by height of capital X in each case.

2,8 mm :  ABC abc XYZ xyz 123 



2,1 mm :  ABC abc XYZ xyz 123 

Figure 3 — Type sizes 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);

EN 16263-4:2015 (E)

- 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.

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.