



# SLOVENSKI STANDARD

## SIST EN 16265:2016

01-marec-2016

---

### Pirotehnični izdelki - Drugi pirotehnični izdelki - Vžigalne naprave

Pyrotechnic articles - Other pyrotechnic articles - Ignition devices

Pyrotechnische Gegenstände - Sonstige pyrotechnische Gegenstände - Anzündmittel

Articles pyrotechniques - Autres articles pyrotechniques - Dispositifs de mise à feu

Ta slovenski standard je istoveten z: **EN 16265:2015**

[SIST EN 16265:2016](https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016)

<https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016>

#### **ICS:**

71.100.30      Eksplozivi. Pirotehnika      Explosives. Pyrotechnics

**SIST EN 16265:2016**

**en,fr,de**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 16265:2016

<https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016>

EUROPEAN STANDARD

EN 16265

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2015

ICS 71.100.30

English Version

## Pyrotechnic articles - Other pyrotechnic articles - Ignition devices

Articles pyrotechniques - Autres articles  
pyrotechniques - Dispositifs de mise à feu

Pyrotechnische Gegenstände - Sonstige pyrotechnische  
Gegenstände - Anzündmittel

This European Standard was approved by CEN on 10 October 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.

<https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016>



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

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

<b>Contents</b>	<b>Page</b>
European foreword.....	6
<b>1 Scope</b> .....	<b>7</b>
<b>2 Normative references</b> .....	<b>7</b>
<b>3 Terms and definitions</b> .....	<b>8</b>
3.1 General terms.....	8
3.2 Technical terms.....	8
<b>4 Categories and types of ignition devices</b> .....	<b>14</b>
4.1 Generic types.....	14
4.2 Subtypes.....	14
4.3 Conditions determining whether an article is P1 or P2.....	16
4.3.1 Igniters.....	16
4.3.2 Components for pyrotechnic trains.....	16
4.3.3 Pyrotechnic cords and fuses.....	16
4.3.4 Delay fuses.....	16
4.3.5 Fuzes.....	17
<b>5 Requirements</b> .....	<b>17</b>
5.1 Verification of construction and design.....	17
5.1.1 General.....	17
5.1.2 Incompatible substances.....	17
5.1.3 Igniters.....	17
5.1.4 Delay fuses.....	18
5.1.5 Fuzes and components for pyrotechnic trains.....	18
5.2 Verification of labelling and instructions for use.....	18
5.3 Verification of specified functioning characteristics.....	18
5.3.1 General.....	18
5.3.2 Igniters.....	18
5.3.3 Components of pyrotechnic trains.....	19
5.3.4 Delay fuses, pyrotechnic cords and fuses.....	19
5.3.5 Fuzes.....	20
5.4 Thermal stability.....	20
5.5 Safety features.....	20
5.6 Sensitivity to normal, foreseeable handling and transportation.....	20
5.7 Resistance to moisture.....	21
5.8 Resistance to mechanical damage.....	21
5.8.1 Leading wires of electric igniters and electrically triggered fuzes.....	21
5.8.2 Leading optical fibre of optical igniters and optically triggered fuzes.....	21
5.8.3 Crush test.....	22
5.8.4 Pyrotechnic cords and fuses.....	22
5.9 All-Fire / No-Fire levels of igniters.....	22
5.10 Series firings of electric igniters.....	23
5.11 Electrical characteristics.....	23
5.12 Electrostatic discharge.....	23
5.13 Sensitivity of pyrotechnic composition.....	23
5.14 Type testing.....	23
5.14.1 General.....	23

5.14.2	Number of items to be tested .....	23
5.14.3	Test report .....	25
5.15	Batch testing.....	25
5.15.1	General .....	25
5.15.2	Sampling plans.....	25
5.15.3	Sample size for small batches (destructive tests).....	26
5.15.4	Nonconformities .....	27
5.15.5	Labelling and instructions for use.....	28
5.15.6	Test report .....	28
5.15.7	Acceptance or rejection of a batch .....	28
6	Test methods.....	29
6.1	General .....	29
6.2	Apparatus .....	29
6.2.1	Calliper .....	29
6.2.2	Ruler .....	29
6.2.3	Balance .....	29
6.2.4	Climatic chamber.....	29
6.2.5	Sound level meter .....	29
6.2.6	Electric firing sources .....	29
6.2.7	Time-measuring equipment.....	30
6.2.8	Optical sensors .....	30
6.2.9	Pressure sensors.....	30
6.2.10	Video camera.....	30
6.2.11	Stills photographic camera .....	30
6.2.12	Microphone.....	30
6.2.13	Shock apparatus.....	30
6.2.14	Drop-test apparatus.....	30
6.2.15	Ohmmeters.....	30
6.2.16	ESD generator .....	31
6.2.17	Magnifying equipment.....	31
6.2.18	Transparent type size sheet .....	31
6.3	Test methods.....	31
6.3.1	Construction .....	31
6.3.2	Verification of design .....	31
6.3.3	Verification of labelling and instructions for use .....	32
6.3.4	Initiation (or reaction) time .....	32
6.3.5	Closed vessel test.....	33
6.3.6	Aspect of flame or flow of reacting species .....	35
6.3.7	Fire transmission.....	37
6.3.8	Linear burning rate or delay time .....	38
6.3.9	Thermal conditioning .....	41
6.3.10	Mechanical conditioning.....	41
6.3.11	Mechanical impact (drop test).....	42
6.3.12	Resistance of leading wires to abrasion .....	43
6.3.13	Resistance of leading wires or fibres to traction .....	50
6.3.14	Crush test.....	52
6.3.15	Resistance of cords and fuses to tension.....	54
6.3.16	Series firing of electric igniters .....	55
6.3.17	Electrical resistance of electric igniters .....	56
6.3.18	Insulation resistance of electric igniters.....	56
6.3.19	Electrostatic discharge .....	57
6.3.20	Sensitivity testing .....	59

6.3.21	Water immersion test.....	63
6.3.22	Determination of the detonative / non- detonative characteristics.....	63
6.3.23	Visual examination.....	64
7	Minimum labelling requirements and instructions for use .....	64
7.1	General.....	64
7.2	Labelling requirements .....	64
7.2.1	Name and type.....	64
7.2.2	CE marking and identification number.....	64
7.2.3	Category and registration number .....	64
7.2.4	Age limit and specialist knowledge labelling.....	65
7.2.5	Net Explosive Content.....	65
7.2.6	Details on manufacturer or importer .....	65
7.2.7	“Use by” date .....	65
7.2.8	Printing.....	65
7.2.9	Marking of very small items.....	66
7.2.10	Ignition input.....	66
7.3	Instructions for use .....	66
Annex A	(informative) Bruceton method .....	68
A.1	General.....	68
A.2	Procedure.....	68
A.3	Calculation of results.....	68
A.4	Values at 95 % confidence level.....	69
A.5	Example .....	70
A.6	Curves of <i>G</i> and <i>H</i> functions.....	72
A.7	Table of Student-t distribution.....	72
Annex B	(informative) Dichotomic (or Langlie) method .....	74
B.1	General.....	74
B.2	Procedure.....	74
B.3	Calculation of results .....	75
B.4	Values at 95 % confidence level.....	78
B.5	Example .....	79
Annex C	(informative) Mechanical Conditioning (Shock Apparatus) .....	83
Annex D	(informative) Mechanical Impact Test (Drop Test) .....	86
Annex E	(informative) Adjustment of the ESD generator.....	87
E.1	Apparatus.....	87
E.2	Procedure.....	88
Annex F	(informative) Specification of grinding steel for wire abrasion test.....	89
F.1	Type.....	89
F.2	Material.....	89
F.3	Dimensions.....	89
F.4	Availability of abrasive strips (informative).....	91

<b>Annex G (normative) Determination of the duration of accelerated ageing test to demonstrate the correct functioning at the “use by” date .....</b>	<b>92</b>
<b>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 .....</b>	<b>95</b>
<b>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 .....</b>	<b>97</b>
<b>Bibliography .....</b>	<b>98</b>

## **iTeh STANDARD PREVIEW** **(standards.iteh.ai)**

[SIST EN 16265:2016](#)

<https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016>

EN 16265:2015 (E)

## European foreword

This document (EN 16265:2015) 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 June 2016, and conflicting national standards shall be withdrawn at the latest by June 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 European standard 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 2007/23/EC and 2013/29/EU on the placing on the market of pyrotechnic articles.

For relationship with EU Directives 2007/23/EC and 2013/29/EU on the placing on the market of pyrotechnic articles, see informative Annexes ZA and ZB, which are an integral part of this document.

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.

[SIST EN 16265:2016](https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016)

<https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016>



## 1 Scope

This European Standard defines the terms and specifies the requirements, means of categorization, test methods, minimum labelling requirements and instructions for use, for ignition devices (except ignition devices for pyrotechnic articles for vehicles) of the following generic types:

- igniters;
- components for pyrotechnic trains;
- pyrotechnic cords and fuses;
- delay fuses;
- fuzes.

NOTE Safety fuses are subject to Directive 93/15/EEC and therefore not considered in this European Standard.

This European Standard does not apply for articles containing pyrotechnic compositions that include any of the following substances:

- arsenic or arsenic compounds;
- polychlorobenzenes;
- mercury compounds;
- white phosphorus;
- picrates or picric acid.

**ITeH STANDARD PREVIEW**  
(standards.iteh.ai)

[SIST EN 16265:2016](https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016)

<https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016>

This European Standard does not apply to pyrotechnic articles that contain detonative explosives other than black powder and/or flash composition, except igniters if these detonative explosives:

- can be easily extracted from the pyrotechnic article, or
- can initiate secondary explosives, or
- can function in a detonative manner, although the article is not designed to detonate and the article belongs to the category P2.

## 2 Normative references

The following documents, in whole or in part, are normatively 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 ISO 13385-1, *Geometrical product specifications (GPS) — Dimensional measuring equipment — Part 1: Callipers; Design and metrological characteristics (ISO 13385-1)*

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

ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

#### 3.1 General terms

##### 3.1.1

##### **type**

sample representative of the production envisaged

##### 3.1.2

##### **generic type**

set of articles with common, very general, design features and/or with common characteristic effects

##### 3.1.3

##### **subtype**

set of articles within a generic type with specific design features

##### 3.1.4

##### **individual item**

article within a generic type and/or subtype for which every possible feature and characteristic has been fixed

Note 1 to entry: Each feature and characteristic will be specified in the technical name or a technical data sheet, as appropriate.

##### 3.1.5

##### **technical name**

general description of an individual item

[SIST EN 16265:2016](https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016)

<https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016>

#### 3.2 Technical terms

##### 3.2.1

##### **Acceptance Quality Limit**

##### **AQL**

quality level that is the worst tolerable process average when a continuing series of lots is submitted for acceptance sampling

##### 3.2.2

##### **acceptor charge**

##### **acceptor component**

charge of pyrotechnic composition or component receiving a stimulus from another charge (See “donor charge”)

Note 1 to entry: The term acceptor charge is also known as acceptor component.

##### 3.2.3

##### **all-fire current**

minimum current (generally expressed in Amperes DC) needed to ensure that an electric igniter is fired within a given time frame (See “All-fire level”)

**3.2.4****all-fire level**

minimum level of the initiation input (e.g. electric current in Amperes, mechanical force in Newtons, optical power in Watts, etc.) needed to ensure that an igniter or an ignition device is fired within a given time frame

Note 1 to entry: All-fire level is a characteristic given in the instructions for use of every igniter. It is generally associated with a probability level (e.g. 99,9 % at 95 % confidence level) within a specified time frame (e.g. 50 ms).

**3.2.5****ancillary equipment**

any device which does not form part of a pyrotechnic article, but which is supplied with it and is required in order that the article functions safely and correctly when used in accordance with the instructions for use

**3.2.6****batch test**

test performed on one or more sample(s) of products taken at random from a production batch to check compliance with a given specification

Note 1 to entry: Batch testing needs all products in the production batch to comply with the characteristics the standard requires to ensure homogeneity of the whole batch. It aims at proving all products which are placed on the market are in conformity with the type which is described in the EC type-examination certificate and have been successfully submitted to type tests determined by the standard.

**3.2.7****black powder**

intimate mixture of charcoal and sodium nitrate or potassium nitrate with or without sulfur

**3.2.8****booster**

pyrotechnic device used as a donor charge to amplify the energy supplied to the acceptor charge

**3.2.9****bridgewire**

resistive element connecting the leading wires inside an electric igniter or primer

**3.2.10****burning time**

time in seconds for a defined mass or length of pyrotechnic composition to burn from its ignition to its consumption

**3.2.11****critical nonconformity**

nonconformity that judgement and experience indicate is likely to result in hazardous or unsafe conditions

Note 1 to entry: This type of nonconformity is referred to as a 'class A nonconformity' in ISO 2859-1.

**3.2.12****critical nonconforming unit**

nonconforming unit with one or more critical nonconformities, with or without major or minor nonconformities

ITEH STANDARD PREVIEW  
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016>

## EN 16265:2015 (E)

**3.2.13****deflagration**

reaction of fast combustion through a pyrotechnic composition at subsonic velocity in the reacting explosive

**3.2.14****delay fuse duration**

time delay of a delay fuse

**3.2.15****detonation**

reaction which propagates through an explosive at supersonic velocity in the reacting explosive

**3.2.16****detonative explosive**

substance or mixture of substances which can undergo a fast internal decomposition reaction leading to a detonation in normal use

**3.2.17****donor charge**

charge of pyrotechnic composition supplying a stimulus to another charge (See "acceptor charge")

**3.2.18****electrostatic discharge****ESD**

sudden and momentary electric current that flows between two objects at different electrical potentials

**3.2.19****explosive**

chemical substance or mixture of chemical substances as defined in Article 1 paragraph 2 of Directive 93/15/EEC

**3.2.20****firework**

pyrotechnic article intended for entertainment purposes, as defined by Art. 2 No. 3 of Directive 2007/23/EC

**3.2.21****firing current**

constant electrical direct current required to reliably initiate functioning of an electric igniter or primer

**3.2.22****friction head**

ignition head designed to be ignited by friction

**3.2.23****fusehead**

part of an electric igniter consisting of one or more pairs of metal conductors, bridged by fine resistance wire(s), and coated with a pyrotechnic composition which initiates when the firing current is passed through the bridgewire(s)

**3.2.24****gross mass**

total mass of a pyrotechnic article (not including any ancillary equipment)

**3.2.25****ignition head**

initial fuse consisting of pyrotechnic composition only

**3.2.26****ignition tube**

tube usually containing a thin pyrotechnic charge on the inner wall capable on activation of transmitting a deflagration effect from one end of the tube to the other at a subsonic velocity

**3.2.27****incompatible substances**

substances or materials that react together resulting in unsafe conditions

**3.2.28****linear burning rate**

length of pyrotechnic composition in millimetres or metres divided by the burning time in seconds

**3.2.29****main charge**

pyrotechnic composition which produces the principal effect

**3.2.30****major nonconformity**

nonconformity, other than a critical nonconformity, which is likely to result in failure, to reduce materially the usability of the pyrotechnic article, or to increase the potential hazard

Note 1 to entry: This type of nonconformity is referred to as a "class B nonconformity" in ISO 2859-1.

[SIST EN 16265:2016](https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016)

**3.2.31****major nonconforming unit**

nonconforming unit with one or more major nonconformities, with or without minor nonconformities, but with no critical nonconformities

**3.2.32****minor nonconformity**

nonconformity that is not likely to reduce materially the usability of the pyrotechnic article

Note 1 to entry: This type of nonconformity is referred to as a "class C nonconformity" in ISO 2859-1.

**3.2.33****minor nonconforming unit**

nonconforming unit with one or more minor nonconformities, but with no critical or major nonconformities

**3.2.34****misfire**

incomplete functioning or non-functioning of a pyrotechnic article after application of initiation stimulus

**3.2.35****Net Explosive Content****NEC**

total mass of explosive material in a pyrotechnic article

## EN 16265:2015 (E)

**3.2.36****no-fire current**

maximum current (generally expressed in Amperes DC) that can be applied without causing an electric igniter to function within a specified time period (See “No-fire level”)

**3.2.37****no-fire level**

maximum level of the initiation input (e.g. electric current in Amperes, mechanical force in Newtons, optical power in Watts, etc.) that can be applied without causing an igniter to function within a specified time period

Note 1 to entry: No-fire level is a characteristic given in the instructions for use of every igniter. It is generally associated with a probability level (e.g. 99,9 % at 95 % confidence level) within a specified time frame (e.g. 50 ms).

**3.2.38****nonconforming unit**

pyrotechnic article with one or more nonconformities

**3.2.39****nonconformity**

non-fulfilment of a requirement

**3.2.40****other pyrotechnic article**

pyrotechnic article other than fireworks, theatrical pyrotechnic articles and pyrotechnic articles for vehicles

**iTeh STANDARD PREVIEW**  
(standards.iteh.ai)

**3.2.41****“pin-to-case” configuration**

configuration in which the ESD occurs between the two short-circuited leading wire ends and the igniter casing or between the pins and the casing of the connector of the igniter

SIST EN 16265:2016

<https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-11d111111111/EN-16265-2016>

**3.2.42****“pin-to-pin” configuration**

configuration in which the ESD occurs through the bridgewire of the igniter

**3.2.43****primary pack**

package of one or more pyrotechnic articles, offered for retail sale as a single unit

Note 1 to entry: A primary pack is neither necessarily the smallest piece of packaging nor a full enclosure: for instance, pyrotechnic cords and fuses are often delivered coiled around a reel as the smallest piece of retail sale.

**3.2.44****principal effect**

main effect a pyrotechnic article is designed to produce, as defined by the manufacturer

**3.2.45****pyrotechnic component**

any component of a pyrotechnic article which contains one or more pyrotechnic compositions

**3.2.46****pyrotechnic composition**

explosive substance or mixture of explosive substances which is designed, on ignition or initiation, to produce heat, light, sound, gas or smoke or a combination of such effects through self-sustained exothermic chemical reactions

**3.2.47****pyrotechnic delay**

pyrotechnic device designed in such a manner that it generates a delay in the transmission of ignition in a pyrotechnic train

Note 1 to entry: Delay fuses are specific examples of such pyrotechnic delays (see "Delay fuse").

**3.2.48****pyrotechnic device**

any device containing pyrotechnic composition(s) which determine its principal effect

**3.2.49****pyrotechnic operation**

any operation which leads to the direct application of a mechanical, thermal and/or chemical stress on a pyrotechnic composition without intending to ignite or initiate the article at the time the stress is applied

**3.2.50****pyrotechnic train**

set of pyrotechnic components which are functionally linked and, after an initial input of energy, function in a designed sequence to transmit, enhance and/or distribute ignition to one or more other pyrotechnic components

iTeh STANDARD PREVIEW  
(standards.iteh.ai)

SIST EN 16265:2016

<https://standards.iteh.ai/catalog/standards/sist/36ed3967-d244-4e9e-8362-e3f71a8e7bfc/sist-en-16265-2016>

**3.2.51****relay**

charge of pyrotechnic composition that is used to transmit ignition

**3.2.52****safe test current**

maximum electrical current (generally expressed in Amperes DC) that can be applied without causing an electric igniter to function regardless of the duration

**3.2.53****safety friction tip**

friction head that can only be ignited when rubbed against a striker component containing a chemical substance with which it reacts, such as red phosphorus, or a combination of such a chemical substance and an abrasive surface

**3.2.54****safety fuse**

article consisting of a core of fine-grained black powder surrounded by a flexible woven fabric with one or more protective coverings

Note 1 to entry Other names: safety cord, fuse cord, mine or mining fuse. This article is subject to Directive 93/15/EEC and to the corresponding European Standard EN 13630.