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Part 3: Requirements for construction and performance

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National foreword

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Foreword

This document (EN 16256-3:2012) 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of an identical text or by endorsement, at the latest by June 2013, and conflicting national standards shall be withdrawn at the latest by June 2013.

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, which is an integral part of this document.

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

— EN 16256-1, *Pyrotechnic articles — Theatrical pyrotechnic articles — Part 1: Terminology*

— EN 16256-2, *Pyrotechnic articles — Theatrical pyrotechnic articles — Part 2: Categories of theatrical pyrotechnic articles*

— EN 16256-3, *Pyrotechnic articles — Theatrical pyrotechnic articles — Part 3: Requirements for construction and performance*

— EN 16256-4, *Pyrotechnic articles — Theatrical pyrotechnic articles — Part 4: Minimum labelling requirements and instructions for use*

— EN 16256-5, *Pyrotechnic articles — Theatrical pyrotechnic articles — Part 5: Test methods*

CEN/TC 212 has also developed European Standards for:

— Pyrotechnic articles —Fireworks Categories 1, 2 and 3

— Pyrotechnic articles — Fireworks, Category 4

— Pyrotechnic articles — Pyrotechnic articles for vehicles

— Pyrotechnic articles — Other pyrotechnic articles

According to the CEN/CENELEC Internal Regulations, the national standards organisations 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 requirements for the construction, performance and primary packaging of theatrical pyrotechnical articles of the generic types defined in EN 16256-1:2012, Clause 3.

NOTE "Theatrical pyrotechnic article(s)" is abbreviated by "article(s)" in this European Standard.

This European Standard does not apply for articles containing military explosives or commercial blasting agents except for black powder or flash composition.

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

— arsenic or arsenic compounds;

— polychlorobenzenes;

— lead or lead compounds;

— mercury compounds;

— white phosphorus;

— picrates or picric acid.

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 16256-1:2012, *Pyrotechnic articles — Theatrical pyrotechnic articles — Part 1: Terminology*

EN 16256-4:2012, *Pyrotechnic articles — Theatrical pyrotechnic articles — Part 4: Minimum labelling requirements and instructions for use*

EN 16256-5:2012, *Pyrotechnic articles — Theatrical pyrotechnic articles — Part 5: Test methods*

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 terms and definitions given in EN 16256-1:2012 apply.

4 Construction

4.1 General requirements (type test and batch test)

When tested in accordance with EN 16256-5:2012, 6.2.2, the article dimensions shall be in accordance with the manufacturers declaration.

If applicable, the tolerances according to Table 1 for dimensions shall only be used in batch tests (not applicable for calibres):

Table 1 — Construction tolerances

Dimensions in mm	Construction tolerances in %
≤ 30	± 15
> 30	± 10

NOTE These tolerances would not be applicable for articles contained in flexible material, such as a plastic bag.

For calibres, tolerances of ± 5 % and for (tube) angles ± 3 ° shall only be used in batch tests in accordance with EN 16256-5:2012, 6.1.4 and 6.16.

4.2 Permitted elements for combinations T1 indoor use (type test)

The following elements may be used in combinations T1 for indoor use:

a) Bengal flares,

b) Fountains,

c) Theatrical flashes,

d) Jets,

e) Dropping effects,

f) Projection devices,

g) Flame projectors,

h) Fireballs,

i) Rotating effects,

j) Desensitised pyrotechnic compositions,

k) Whistles,

l) Split tubes.

Conformity to above requirements shall be verified by visual examination in accordance with EN 16256-5:2012, 6.11 during function tests according to EN 16256-5:2012, 6.15.

4.3 Length of uncoated end of Bengal sticks (type test and batch test)

The uncoated end of Bengal sticks (handle) shall have a minimum length of 75 mm, when tested in accordance with 6.1.1 of EN 16256-5:2012.

4.4 Materials not permitted for T1 Maroons (type test and batch test)

The following casing materials are not permitted for T1 Maroons:

- glass;
- ceramics;
- metal;
- wood;
- reinforced glass fibre;
- any other similar materials producing hard brittle fragments.

This requirement shall be verified by visual inspection according to 6.11 of EN 16256-5:2012 during function tests according to EN 16256-5:2012, 6.15 and 6.9.

5 Pyrotechnic composition (type test)

When tested in accordance with EN 16256-5:2012, 6.2.3, the net explosive contents (NEC) shall comply with Table 2 and the specifications of the manufacturer. Articles of category T1 that exceed the NEC values listed in Table 2 are articles of category T2.

No limits are given for the NEC of category T2 articles in this European Standard.

NOTE The NEC has an influence (directly or indirectly) on the minimum safety distances. For category T2 articles it is agreed that no fixed minimum safety distances are defined. The safe use of T2 articles is one of the major responsibilities of the person with specialist knowledge who should determine the minimum safety distance by using the information given in EN 16256-4:2012, Clause 6.

Table 2 — Maximum NEC limits for theatrical pyrotechnic articles T1 *(1 of 2)*

Generic Types	Maximum NEC for T1 indoor and outdoor use	Maximum NEC for T1 'for outdoor use only'
Airburst	15 g	30 g
Bengal flame	50 g	2500 g
Bengal flare	50 g	2500 g
Bengal stick	7,5 g	50 g
Binary mixture	Not T1.	
Carretilla	Not T1 indoor.	80 g in total. The report unit shall not exceed 10,0 g of black powder or 4,0 g nitrate/metal-based composition or 2,0 g of any other composition that produces a report effect.
Combination	A combination shall have a total net explosive content of not more than 100 g; single elements shall not exceed the respective NEC limits. For combinations containing simultaneous Theatrical flashes: The combined NEC of the Theatrical flashes shall not exceed 15 g.	A combination, except a combination containing fountains, waterfalls, jets or rotating effects, shall have a NEC of not more than 500 g. The NEC of a combination containing fountains, waterfalls, jets or rotating effects shall have a NEC of not more than 600 g, of which not more than 500 g shall be contained in elements other than fountains, waterfalls, jets or rotating effects. Single elements shall not exceed the respective NEC limits of the single elements. Combinations shall have a total NEC of not more than 100 g report composition.
Comet	Not more than 10 g total NEC, shall only contain a pyrotechnic star as effect.	Not more than 25 g total NEC, mass of any report and/or bursting charge in the pyrotechnic unit: not more than 10 g of black powder or 4,0 g of nitrate/metal-based report composition or 2,0 g of any other composition that produces a report and/or bursting effect.
Desensitised pyrotechnic composition	50 g	
Dropping effect	50 g	250 g
Explosion simulator	Not T1 indoor.	50 g
Fireball	50 g of which a maximum of 15 g may be lifting charge	60 g of which a maximum of 20 g may be lifting charge
Flame projector	200 g	300 g
Fountain	100 g	250 g
Jet	15 g	30 g
Line rocket	15 g	30 g
Maroon	5,0 g of black powder or 2,0 g of nitrate/metal-based composition or 1,0 g of any other composition that produces a report effect.	10,0 g of black powder or 4,0 g nitrate/metal-based composition or 2,0 g of any other composition that produces a report effect.
Mine	For mines where the propellant and the stars are physically separated such that they do not mix, not more than 10 g; otherwise 50 g. Mines shall only contain pyrotechnic stars as effect.	Not more than 50 g; shall not contain more than 5 pyrotechnic units containing report composition and none of these pyrotechnic units shall contain more than 5,0 g of black powder or 2,0 g of nitrate/metal-based report composition or 1,0 g of any other composition that produces a report and/or bursting effect.

Table 2 ***(2 of 2)***

Generic Types	Maximum NEC for T1 indoor and outdoor use	Maximum NEC for T1 'for outdoor use only'
Projection device	10 g	
Roman candle	Not T1 indoor.	Not more than 50 g; each pyrotechnic unit not more than 10 g; shall not contain more than 5 pyrotechnic units containing report composition and each of these pyrotechnic units not more than 10 g of black powder or 4,0 g nitrate/metal-based report composition or 2,0 g of any other composition that produces a report effect.
Rotating effect	Not more than 50 g per pyrotechnic unit, max 100 g	50 g max per pyrotechnic unit, max 250 g
Self consuming article	Not T1.	
Smoke device	50 g	1000 g
Split tube	15 g	50 g
Squib	Not T1.	
Theatrical fire	1000 g	
Theatrical flash	15 g	30 g
Theatrical report	5,0 g of black powder or 3,0 g of any other composition that produces a report effect.	20 g of black powder or 10 g of any other composition that produces a report effect.
Whistle	20 g	

For the total NEC (m) of a given article, the tolerances according to Table 3 apply.

Table 3 — Tolerances for the total NEC

Masses (m)	Tolerances
$m \leq 1$ g	± 50 %
1 g < $m \leq 5$ g	± 40 %
5 g < $m \leq 15$ g	± 30 %
m > 15 g	± 20 %.

The NEC limits given in Table 2 for T1 articles shall not be exceeded.

6 Means of ignition (type test and batch test)

6.1 General requirements

Articles (T1 and T2) shall:

— provide means of ignition which are clearly visible or indicated by labelling or instructions for use. Conformity to this requirement shall be verified by visual examination in accordance with EN 16256-5:2012, 6.11;

— be protected against accidental / premature ignition by adequate safety measures; conformity to this requirement shall be verified by visual examination in accordance with EN 16256-5:2012, 6.11;

— have a distinct visual/sound indication that ignition has occurred – this may be the effect itself, smoke, sparks or noise etc.; conformity to this requirement shall be verified by visual or aural examination in accordance with EN 16256-5:2012, 6.11 during function test according to EN 16256-5:2012, 6.15;

— have no delay before the first effect. This requirement is not applicable for those generic types which actually do not have electric ignition, see also Table 4. In case of smoke generators the delay shall not exceed 3 s; conformity to this requirement shall be verified by timing measurement in accordance with EN 16256-5:2012, 6.5.

6.2 Initial fuses and electric igniters

The initial fuse or the electric igniter shall be supplied with the article.

Conformity to this requirement shall be verified by visual examination in accordance with EN 16256-5:2012, 6.11. If provided as an integral part of the article, the attachment of the initial fuse shall be secure when tested in accordance with EN 16256-5:2012, 6.1.5.

Electric igniters shall be securely attached to the article, when tested according to EN 16256-5:2012, 6.11.

6.3 Friction heads

For articles of category T1, when tested in accordance with EN 16256-5:2012, 6.5.2.2, the delay time shall be as specified by the manufacturer with a tolerance of ± 1 s.

When tested in accordance with EN 16256-5:2012, 6.1.6, the friction head shall not ignite.

6.4 Permitted means of ignition for theatrical pyrotechnic articles T1

For T1 articles the means of ignition shall comply with Table 4. For T2 all forms of ignition are permitted.

Conformity to the requirements of Table 4 shall be verified by visual examination in accordance with EN 16256-5:2012, 6.11.

Table 4 — Permitted means of ignition for theatrical pyrotechnic articles T1

Generic Types	Means of electrical ignition including electric igniters	Initial fuses	Friction heads	Others
Airburst	+	—	—	—
Bengal flame	+	+	—	+
Bengal flare	+	+	+	+
Bengal stick	+	+	+	+
Binary mixture	Not T1.			
Carretilla	+	+	—	—
Combination	+	[a]	—	[b]
Comet	+	—	—	—
Desensitised pyrotechnic composition	+	+	+	+
Dropping effect	+	—	—	—
Explosion simulator	+	—	—	—
Fireball	+	—	—	—
Flame projector	+	—	—	—
Fountain	+	—[c]	—[c]	—[c]
Jet	+	—	—	—
Line rocket	+	—	—	—
Maroon	+	—	—	—
Mine	+	—	—	—
Projection device	+	—	—	+
Roman candle	+	—	—	—
Rotating effects	+	—	—	—
Self consuming article	Not T1.			
Smoke device	+	+	+	+
Split tube	+	—	—	—
Squib	Not T1.			
Theatrical fire	+	+	—	+
Theatrical flash	+	—	—	—
Theatrical report	+	—	—	—
Whistle	+	—	—	—

[a] Only permitted if the initial fuse ignition is permitted for the initial generic type

[b] Only permitted if other ignition types are permitted for the initial generic type.

[c] Except fountains containing at least 80 % nitrocellulose material by mass and fountains specifically designed to be held in hand.

+ permitted; — not permitted

7 Performance

7.1 Properties to be checked before functioning tests

7.1.1 Loose pyrotechnic composition after mechanical conditioning (type test)

When tested in accordance with EN 16256-5:2012, 6.12, the mass of loose pyrotechnic composition shall not exceed 100 mg for each tested item.

7.1.2 Integrity (type test and batch test)

7.1.2.1 General requirements

— There shall be no holes, splits, dents or bulges in the body of the article case, except those technically necessary for the correct functioning of the article. There shall be no holes or splits in the end closures unless otherwise specified in the technical documents. If the end closures are separate components, they shall be in place.

Conformity to the above requirements shall be verified by visual examination in accordance with EN 16256-5:2012, 6.11.

— For articles with a separate component (e.g. base or handle): these components shall be securely in place; if the handle is an integral part of the body, it shall be clearly identified.

Conformity to the above requirement shall be verified in accordance with EN 16256-5:2012, 6.1.2.

7.1.2.2 Specific requirements

— For combinations: each individual element shall be fixed in place, other than by the transmitting fuse(s) alone.

Conformity to the above requirement shall be verified by visual examination in accordance with EN 16256-5:2012, 6.11.

7.2 Properties to be checked during functioning tests (type test and batch test)

7.2.1 Principal effects

When tested in accordance with EN 16256-5:2012, 6.15, the principal effects of each article shall conform to the effects described in EN 16256-1 and in the manufacturer’s declaration. This is to be tested according to EN 16256-5:2012, 6.11.

7.2.2 Functioning

When tested in accordance with EN 16256-5:2012, 6.15, all pyrotechnic articles shall function completely according to the manufacturers declaration and shall be in accordance with the instruction for use.

For combinations T1 indoor use: When tested in accordance with EN 16256-5:2012, 6.5, there shall be no visual or aural delay of such a duration that it can be confused with the end of functioning of the combination.

7.2.3 Stability during functioning

When tested in accordance with EN 16256-5:2012, 6.15, all free standing articles shall remain upright or in the intended position whilst functioning. For articles where the manufacturer has supplied or prescribed ancillary equipment which is intended for use to aid stability during functioning, this shall be used during testing.

7.2.4 Effect dimensions

When tested in accordance with EN 16256-5:2012, 6.3, the effect dimensions shall comply with Table 5. Articles with effect dimensions exceeding the limits for category T1 (see Table 5) default to category T2.

During type tests, all test results shall be within a tolerance of ± 20 % of the measured average. The measured average value shall be given in the instructions for use or on the label. This value may be rounded.

During batch tests, all test results shall be within a tolerance of ± 20 % from the value which is displayed in the instructions for use or on the label.

The maximum effect dimensions given in Table 5 for T1 articles shall not be exceeded.

Table 5 — Maximum effect dimensions for theatrical pyrotechnic articles T1 ***(1 of 2)***

Generic Types	**T1 indoor and outdoor use**		**T1 'for outdoor use only'**
	radial effect distance	**effect distance**	**radial effect distance**
Airburst	2 m	8 m downwards.	4 m
Bengal flame	0,25 m	0,5 m	0,5 m
Bengal flare	0,25 m	0,5 m	0,5 m
Bengal stick	0,25 m	0,25 m	0,5 m
Binary mixture	Not T1.		
Carretilla	Not T1 indoor.		2 m
Combination	As per individual element.	As per individual element.	As per individual element.
Comet	2 m	8 m	Not restricted.
Desensitised pyrotechnic composition	Not restricted.		
Dropping effect	3 m	8 m	3 m
Explosion simulator	Not T1 indoor.		Not restricted.
Fireball	2 m	5 m	3 m
Flame projector	1 m	5 m	3 m
Fountain	3 m	8 m	3 m
Jet	3 m	8 m	3 m
Line rocket	1 m	functioning length ≤ 30 m	3 m
Maroon	See 7.2.5.		
Mine	3 m	8 m	Not restricted.
Projection device	Not restricted.		
Roman candle	Not T1 indoor.		Not restricted.
Rotating effect	2 m	Not applicable.	3 m
Self consuming article	Not T1.		

Table 5 *(2 of 2)*

Generic Types	T1 indoor and outdoor use		T1 'for outdoor use only'
	radial effect distance	effect distance	radial effect distance
Smoke device	Not restricted.		
Split tube	3 m	8 m	4 m
Squib	Not T1.		
Theatrical fire	0,25 m	0,5 m	0,5 m
Theatrical Flash	2 m	5 m flashes, 8 m sparks.	3 m
Theatrical report	See 7.2.5.		
Whistle	3 m	8 m	3 m

7.2.5 Sound pressure level

When tested in accordance with EN 16256-5:2012, 6.4, no article shall produce a maximum A-weighted impulse sound pressure level (L_{AImax}) exceeding 120 dB (AI) at the minimum safety distance.

7.2.6 Explosions and other failures

When tested in accordance with EN 16256-5:2012, 6.15, the article shall not produce an explosion damaging the integrity of the article unless specifically designed to do so.

For combinations: the article shall not produce an explosion damaging the integrity of the article. Conformity to this requirement shall be verified by visual examination in accordance with EN 16256-5:2012, 6.11.

7.2.7 Burning or incandescent matter

No burning or incandescent matter shall fall to the ground outside the minimum safety distance when tested in accordance with EN 16256-5:2012, 6.10.

Materials included in projection devices shall not:

— burn if directly exposed to a flame or spark or other potential source of fire,

— be readily flammable (the flame goes out as soon as the fire cause disappears),

— project any hazardous debris.

When tested in accordance with EN 16256-5:2012, 6.15, conformity to this requirement shall be tested by visual examination according to EN 16256-5:2012, 6.11.

7.2.8 Extinguishing of flames

Any flames caused by the functioning of the article shall be extinguished within 30 s of the article ceasing to function when tested in accordance with EN 16256-5:2012, 6.7.

7.2.9 Projected debris

No hazardous debris from the article shall be projected outside the minimum safety distance when tested in accordance with EN 16256-5:2012, 6.9.

7.2.10 Burning rate of pyrotechnic composition

When tested in accordance with EN 16256-5:2012, 6.8, the burning rates of pyrotechnic compositions (T1 and T2) shall comply with the manufacturers declaration. Articles (indoor and outdoor use) with burning rates that exceed the limits as listed below shall be categorised in category T2 only.

Maximum burning rates for the following category T1 articles apply:

- Bengal flames: ≤ 10 g/s;
- Bengal flares: ≤ 10 g/s;
- Bengal sticks: ≤ 1 cm/s;
- Smoke devices: ≤ 0,6 g/s (indoor and outdoor use) and ≤ 2 g/s ('for outdoor use only');
- Theatrical fire: ≤ 10 g/s.

For loose compositions, the maximum burning rates for category T1 articles shall not exceed 2 cm/s.

7.3 Integrity to be checked after functioning tests (type test and batch test)

Unless otherwise designed, all articles shall remain intact after functioning.

For line rockets, the article shall not destroy the wire or the holder. Tests shall be carried out in accordance with the manufacturers recommended test equipment (e.g. with regards to the type of wire), if at all stated.

When tested in accordance with EN 16256-5:2012, 6.15, conformity to this requirement shall be tested by visual examination according to EN 16256-5:2012, 6.11.

7.4 Minimum safety distances for theatrical pyrotechnic articles T1 (type test)

The minimum safety distance for articles of category T1 shall be calculated in effect and radial effect directions based on the following formula:

$$D_{\mathrm{MSD}} = 1{,}3 \cdot L \qquad (1)$$

Where

D_{MSD} is the minimum safety distance

L is the maximum length measured during testing or declared by the manufacturer/importer whichever is the greater; based on effect dimensions, debris, burning or incandescent matter, and sound pressure level (see EN 16256-5:2012, Annex C).

For Bengal flares, Bengal flames and Bengal sticks, smoke devices, fountains containing at least 80 % nitrocellulose material by mass, projection devices, and Theatrical fires, the calculated value shall be rounded

up to the next half metre. For all other generic types the calculated value shall be rounded up to the next metre.

The minimum safety distance shall be at least 0,5 m, unless the article is specifically designed to be held in hand.

The minimum radial safety distance for T1 line rockets and T1 airbursts shall be calculated by the following formula:

$$D_{\mathrm{MSD}} = 1{,}3 \cdot L + 1m \tag{2}$$

where

D_{MSD} is the minimum safety distance

L is the maximum length measured during testing or declared length by the manufacturer/importer whichever is the greater; based on effect dimensions, debris, burning or incandescent matter, and sound pressure level (see EN 16256-5:2012, Annex C).

Conformity to this requirement shall be verified by checking the label in comparison with measured performance data.

8 Primary pack or selection pack (type test and batch test)

Where a primary pack or selection pack is used, it shall be of a size to enable labelling and include the instructions for use.

Conformity to these requirements shall be verified by checking the label and instructions for use according to EN 16256-5:2012, 6.11.

9 Type testing

9.1 General

Each article to be type tested, except those required for the determination of net explosive content, shall meet the following requirements.

— Clause 4, Construction;

— Clause 5, NEC;

— Clause 6, Means of ignition;

— Clause 7, Performance;

— Clause 8, Primary or selection pack;

— EN 16256-4, Labelling.

9.2 Number of items to be tested

When tested in accordance with 9.1, the following number of articles shall be tested according to Table 6.

Table 6 — Number of items to be tested

Number of theatrical pyrotechnic articles to be tested	Condition	Tests
10	As received	– Visual – Clause 4 – Clause 6 – Clause 7 – Clause 8 – Labelling (EN 16256-4)
10	After thermal conditioning EN 16256-5:2012, 6.13	– Visual – Clause 6 – Clause 7
10	After mechanical conditioning EN 16256-5:2012, 6.12	– Visual – Clause 6 – Clause 7
3	Determination of net explosive content and verify the construction to the technical documents of the manufacturer EN 16256-5:2012, 6.2	

For articles fitted with a friction head: 10 extra items for the determination of resistance to ignition by an abrasive surface according to EN 16256-5:2012, 6.1.6.

9.3 Additional requirements for primary packs

9.3.1 Thermal and mechanical conditioning

Articles which are supplied in primary packs shall be tested for thermal and mechanical conditioning within the primary pack.

9.3.2 Labelling

For articles which are supplied in primary packs examine at least five packs for labelling to assess conformity to Clause 8 of this European Standard and to EN 16256-4. The packs to be examined shall include all those whose contents are used for the tests described in EN 16256-5.

9.4 Test report

The test report shall include at least:

a) a reference to this European Standard (i.e. EN 16256-3);

b) the complete identification of the sample under test;

c) the date of completion of testing;

d) the relevant observations concerning the applicable type test requirements for the articles under tests given in Table 6;

e) information about the chosen protection of the initial fuse;

f) information whether the primary pack or selection pack is used for labelling;

g) for combinations a list of the elements.

10 Batch testing

10.1 General

For the purposes of batch testing, acceptance sampling in accordance with 10.2 to 10.4 shall be applied.

10.2 Sampling plans

Sampling shall be in accordance with ISO 2859-1 using double sampling plans and applying the switching procedures for normal, tightened and reduced inspection. Inspection level S-4 shall apply.

In case of lots smaller than 35001 articles, the following single sampling plan given in Table 7 may be applied:

Table 7 —Batch test sampling plan for lot sizes smaller than 35001 articles and allowed number of nonconformities

Lot size	sample size	allowed number of minor nonconformities	allowed number of major nonconformities	allowed number of critical nonconformities
2 to 15	1	0	0	0
16 to 25	2	0	0	0
26 to 90	3	0	0	0
91 to 150	5	1	0	0
151 to 500	8	2	0	0
501 to 1200	13	3	0	0
1201 to 10000	32	7	2	0
10001 to 35000	80	14	5	1

NOTE This sampling plan applies to destructive and non-destructive batch tests. In case of lots smaller than 1201 articles the sample size given in this table deviates from the requirements of ISO 2859-1.

An equivalent standard (e.g.: ISO 2859-3 or ISO 2859-5) may be used in case of application of module "D" according to Annex II of the Directive 2007/23/EC.

10.3 Unit of product

For articles which are not supplied in primary packs, the unit of product on which the sample size is based shall be the individual article.

For articles supplied in primary packs, the unit of product shall be an individual article and the sample shall comprise the contents of the appropriate number of primary packs.

In addition to the above, an appropriate number of primary packs shall be sampled and examined for faults.

10.4 Nonconformities

Nonconformities shall be classified in accordance with Table 8.

Table 8 — Nonconformities

Requirement	Reference to clauses of this standard	Type of nonconformity
Construction tolerances	4.1	Minor
Length of uncoated end (50 mm to 75 mm)	4.3	Minor
Length of uncoated end (less than 50 mm)	4.3	Major
Permitted materials for T1 maroons	4.4	Critical
Means of ignition clearly visible for T1	6.1	Major
Means of ignition clearly visible for T2	6.1	Minor
Protected against accidental ignition	6.1	Major
Distinct visual/sound indication of ignition	6.1	Minor
Audible or visual delay	6.1	Major
Safety fuses supplied with the article and securely attached for T1, if applicable	6.2	Critical
Safety fuses supplied with the article and securely attached for T2, if applicable	6.2	Minor
Fitting of means of electrical ignition including electric igniters for T1, if applicable	6.2	Major
Fitting of means of electrical ignition including electric igniters for T2, if applicable	6.2	Minor
Friction heads secure, delay time as specified for T1, ignition of friction head on abrasive surface, if applicable	6.3	Major
Permitted means of ignition for T1 articles	6.4	Minor
Integrity	7.1.2	Major
Principal effects[a]	7.2.1	Major
Functioning for T1	7.2.2	Major
Functioning for T2	7.2.2	Minor
Stability during functioning, if applicable	7.2.3	Critical
Effect dimensions > ± 20 % of manufacturer's declaration[b]	7.2.4	Critical

Table 8 *(continued)*

Requirement	Reference to clauses of this standard	Type of nonconformity
Sound pressure level exceeding type test results	7.2.5	Major
Explosion and other failures	7.2.6	Critical
Burning or incandescent matter for T1	7.2.7	Critical
Burning or incandescent matter for T2	7.2.7	Major
Extinguishing of flames for T1	7.2.8	Critical
Extinguishing of flames for T1 'for outdoor use only' and T2	7.2.8	Minor
Projected debris	7.2.9	Major
Burning rate of pyrotechnic composition for T1	7.2.10	Major
Burning rate of pyrotechnic composition for T2	7.2.10	Minor
Integrity after functioning	7.3	Minor
Primary pack or selection pack	8	Major
Labelling	EN 16256-4	Minor[c]
		Major[d]
		Critical[e]

[a] A change of colour or visual effect is not considered as a change of the principal effect

[b] Type of non conformity has to be seen as critical since article is not corresponding to type.

[c] Labelling errors leading to minor consequences shall be classified as minor non-conformities.

[d] Labelling errors leading to major consequences shall be classified as major non-conformities.

[e] Labelling errors leading to critical consequences shall be classified as critical non-conformities.

For labelling requirements refer to EN 16256-4. In the case where a unique label is used throughout a batch, the text on a single label should be examined.

10.5 Test report

The test report shall include at least:

a) a reference to this European Standard (i.e EN 16256-3);

b) the complete identification of the sample under test;

c) the date of completion of testing;

d) the relevant observations concerning the applicable batch test requirements for the article type under test given in Table 8;

e) information about the chosen protection of the initial fuse;

f) information whether the primary pack or selection pack is used for labelling;

g) for combinations a list of the elements.

10.6 Acceptance or rejection of a batch

10.6.1 Nonconforming units

Acceptance or rejection of the batch shall be determined by the number of nonconforming units of each type, in accordance with 10.6.2 to 10.6.4

NOTE Acceptance or rejection of the batch is determined by the number of nonconforming units of each type and not necessarily by the number of nonconformities found.

10.6.2 Critical nonconforming units

For critical nonconforming units an Acceptance Quality Limit (AQL) of 0,65 % shall apply. If the batch fails to meet this criterion, it shall be rejected. Any critical nonconforming units shall not also be counted as major nonconforming units or minor nonconforming units.

10.6.3 Major nonconforming units

For major nonconforming units an AQL of 2,5 % shall apply. If the batch fails to meet this criterion, it shall be rejected. Any major nonconforming units shall not also be counted as minor nonconforming units.

10.6.4 Minor nonconforming units

For minor nonconforming units an AQL of 10 % shall apply. If the batch fails to meet this criterion, it shall be rejected.

10.6.5 Theatrical pyrotechnic articles supplied in primary packs or selection packs[1)]

For articles which are supplied in primary packs or selection packs, the acceptance criteria in 10.6.2 to 10.6.4 shall be applied separately to the articles and to the primary packs or selection packs (see 10.3).

1) If a selection pack is required to protect the initial fuse.

Annex A
(informative)

Overview of essential safety requirements and corresponding clauses of all parts of this European Standard

The correspondence between the parts of this European Standard and Directive 2007/23/EC on the placing on the market of pyrotechnic articles can be found in Annex ZA of each part of the standard.

Table A.1 gives an overview about all essential safety requirements and the corresponding clauses and subclauses of all parts of the European Standard.

Table A.1 — Overview of essential safety requirements and corresponding clauses of all parts this European Standard

Essential Requirements (ESR) of Directive 2007/23/EC	Clause(s)/sub-clause(s) of			Qualifying remarks/Notes
	EN 16256-3:2012	EN 16256-4:2012	EN 16256-5:2012	
1	7			
2	1, 4	4.10	6.9	
3; 1st sentence	7, 9, 10	6.15	6.15	
3; 2nd and 3rd sentence	9, 10		4	
3 (a)	4, 5, 9.1, 10		6.1, 6.2	
3 (b)	7, 9, 10		6.12, 6.13	
3 (c)	7.1, 9.2, 10		6.12, 6.13	
3 (d)	7, 9.2, 10		6.13, 6.15	
3 (e)				Not applicable.
3 (f)	9.2, 10		6.13	
3 (g)	6, 9.2, 10	4.10	6.14	
3 (h)	8, 9.2, 10.4	4, 5, 6		
3 (i)	7.1, 9.2, 9.3, 10		6.12, 6.13	
3 (j)		4, 5, 6		
3; last sentence	7.1, 9.2, 10		6.12	
4 (a)	1			
4 (b)	1			

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

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 2007/23/EC on the placing on the market of pyrotechnic articles. The Parts 1, 2, 3 and 4 of the standard will support Part 5 to fulfil the Essential Requirements of the Directive 2007/23/EC Annex 1.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implements as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 2007/23/EC on the placing on the market of pyrotechnic articles

Clause(s)/sub-clause(s) of this EN	Essential Safety Requirements (ESR) of Directive 2007/23/EC	Qualifying remarks/Notes
7	1	
1, 4	2	See also EN 16256-4:2012, 4.10 and EN 16256-5:2012, 6.9
7, 9, 10	3 1st sentence	See also EN 16256-5:2012, 6.15
9, 10	3 2nd and 3rd sentence	See also EN 16256-5:2012, Clause 4
4, 5, 9.1, 10	3 (a)	See also EN 16256-5:2012, 6.1, 6.2
7, 9, 10	3 (b)	See also EN 16256-5:2012, 6.12, 6.13
7.1, 9.2, 10	3 (c)	See also EN 16256-5:2012, 6.12, 6.13
7, 9.2, 10	3 (d)	See also EN 16256-5:2012, 6.13, 6.15
-	3 (e)	Not applicable
9.2, 10	3 (f)	See also EN 16256-5:2012, 6.13
6, 9.2, 10	3 (g)	See also EN 16256-4:2012, 4.10 and EN 16256-5:2012, 6.14
8, 9.2, 10.4	3 (h)	See also EN 16256-4:2012, Clauses 4, 5, 6
7.1, 9.2, 9.3, 10	3 (i)	See also EN 16256-5:2012, 6.12, 6.13

Clause(s)/sub-clause(s) of this EN	Essential Safety Requirements (ESR) of Directive 2007/23/EC	Qualifying remarks/Notes
	3 (j)	See also EN 16256-4:2012, 4, 5, 6
7.1, 9.2, 10	3 last sentence	See also EN 16256-5:2012, 6.12
1	4 (a)	
1	4 (b)	

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Bibliography

EN 16256-2, *Pyrotechnic articles — Theatrical pyrotechnic articles — Part 2: Categories of theatrical pyrotechnic articles*

ISO 2859-3*, Sampling procedures for inspection by attributes — Part 3: Skip-lot sampling procedures*

ISO 2859-5, *Sampling procedures for inspection by attributes — Part 5: System of sequential sampling plans indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

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