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Pyrotechnic articles - Other pyrotechnic articles - Part 2: Requirements

Pyrotechnische Gegenstände - Sonstige pyrotechnische Gegenstände - Teil 2: Anforderungen

Articles pyrotechniques - Autres articles pyrotechniques - Partie 2: Exigences

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Pyrotechnic articles - Other pyrotechnic articles - Part 2: Requirements

Articles pyrotechniques - Autres articles pyrotechniques - Partie 2 : Exigences

Pyrotechnische Gegenstände - Sonstige pyrotechnische Gegenstände - Teil 2: Anforderungen

This European Standard was approved by CEN on 6 February 2015.

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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 16263-2:2015) 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of an identical text or by endorsement, at the latest by February 2016, and conflicting national standards shall be withdrawn at the latest by February 2016.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 requirements for the construction and performances of other pyrotechnic articles, except pyrotechnic articles for vehicles, ignition devices and cartridges for powder actuated tools (PAT), of the following generic types:

— flares;

— flash devices;

— gas generators;

— heaters;

— other cartridges;

— pyromechanical devices;

— rockets and rocket motors;

— semi-finished pyrotechnic articles;

— smoke / aerosol generators;

— sound emitters;

— pyrotechnic liquid dispersers.

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;

— lead compounds (except for those included in ignition devices);

— white phosphorus;

— picrates or picric acid.

This European Standard does not apply to pyrotechnic articles that contain detonative explosives other than black powder and/or flash composition, 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 16263-1:2015, *Pyrotechnic articles — Other pyrotechnic articles — Part 1: Terminology*

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

EN 16263-4:2015, *Pyrotechnic articles — Other pyrotechnic articles — Part 4: Test methods*

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

prEN 16265:2013, *Pyrotechnic articles — Other pyrotechnic articles — Ignition devices*

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 16263-1:2015 apply.

4 General and safety requirements

4.1 Incompatible substances

Pyrotechnic articles shall not contain incompatible substances as defined in EN 16263-1:2015, 2.2.23 unless effective measures have been taken to permanently segregate incompatible substances one from the other, effective measures have been taken to stabilize mixtures of incompatible substances, or the manufacturer can demonstrate that any mixtures of incompatible substances do not present a risk to safety.

This requirement shall be verified by examination of the design from the manufacturer’s documentation.

4.2 Safe disposal

Each pyrotechnic article shall be designed and manufactured in such a way that it can be disposed of safely by a suitable process with minimum effect on the environment.

This requirement shall be verified by examination of the information about safe disposal in the instructions for use.

4.3 Means of ignition

Any means of ignition shall be protected to avoid accidental initiation of the article. This requirement shall be verified by visual examination.

For pyrotechnic articles equipped with ignition devices which are CE type certified, no further testing of the ignition devices is required.

If the pyrotechnic article is equipped with ignition devices which are not CE type certified, the ignition devices shall comply with the following requirements of prEN 16265:2013:

— safety features (see 4.5 and prEN 16265:2013, 5.5);

— mechanical resistance of leading wires (if any) or leading optical fibre (if any) (see prEN 16265:2013, 5.8.1 and 5.8.2);

— determination of all-fire and no-fire thresholds (see prEN 16265:2013, 5.9);

— electrical characteristics (see prEN 16265:2013, 5.11);

— resistance to ESD (see prEN 16265:2013, 5.12).

These tests may be performed on the articles or on subcomponents of the pyrotechnic articles which include their ignition device provided that their functioning remains representative of the normal behaviour of the ignition device in the article. Manufacturers may provide test reports proving these requirements are fulfilled.

4.4 Safety features

Each pyrotechnic article shall be equipped with safety features which are appropriate to its mode of initiation.

For articles that are sensitive to mechanical shocks, drops or other stimuli with the potential to cause unintended initiation, if the safety feature is not already a part of the included ignition device, the pyrotechnic article shall be equipped:

— with a safe / arm device, a safety pin or any other device intended to stop propagation of ignition along the whole pyrotechnic train; or

— with other means of protection to prevent inadvertent initiation.

The presence of the safety features shall be checked by visual examination and their effectiveness shall be verified in accordance with EN 16263-4:2015, 5.7 (mechanical conditioning), 5.8 (mechanical impact test), and 5.13.1.2 (electrostatic discharge). No initiation shall take place during these tests and the safety features shall remain in their safe position. This last requirement shall be verified by visual examination.

Integral safety features shall be checked by verification of construction and design according to 5.1 and their effectiveness shall be verified in accordance with EN 16263-4:2015, 5.7 (mechanical conditioning), 5.8 (mechanical impact test), and 5.13.1.2 (electrostatic discharge). No initiation shall take place during these tests and the safety features shall remain in their safe position. This last requirement shall be verified by function test in accordance EN 16263-4:2015, 5.10.3.4.

When the user could be exposed to the pyrotechnic effects during the ignition operation, the pyrotechnic article shall be equipped with an appropriate delay to allow the user to retire to the safe firing distance or assume the safe article orientation for hand-held devices as specified in the instructions for use. This requirement shall be verified according to EN 16263-4:2015, 5.10.3.1 and 5.6.

4.5 Toxicity

When the article is designed to generate toxic substances as intended use (e.g. pesticides), the manufacturer or importer shall supply corresponding information on the appropriate means of limiting exposure to these reaction products. This requirement shall be verified by examination of the instructions for use.

5 Performance requirements

5.1 Verification of performance

When tested in accordance with EN 16263-4:2015, 5.10, each pyrotechnic article shall function completely and attain the performance characteristics specified by the manufacturer.

The articles that have been exposed to mechanical conditioning (EN 16263-4:2015, 5.7) and/or mechanical impact test (EN 16263-4:2015, 5.8 – see list in 5.4 of this standard) and to thermal conditioning (EN 16263-4:2015, 5.9.2.1) shall function safely and completely.

When a use by date is specified by the manufacturer and is greater than two years after the manufacturing of the article, its correct functioning at the 'use by' date shall be demonstrated by the manufacturer:

— either by results of firings of articles at the 'use by' date where available;

— or by function test in accordance with EN 16263-4:2015, 5.10, after extension of the thermal conditioning test over a period of time that shall be determined from the 'use by' date according to EN 16263-4:2015, 5.9.2.4.

5.2 Verification of design

When tested in accordance with EN 16263-4:2015, 5.2 and 5.3, the pyrotechnic article shall be in accordance with the manufacturer's documentation regarding construction, dimensions, mass and composition of pyrotechnic substances and mixtures, etc. including tolerances as specified by the manufacturer.

5.3 Verification of labelling and instructions for use

The labelling of the pyrotechnic article and instructions for use (when provided) shall be verified according to the requirements of EN 16263-5:2015, Clause 4.

5.4 Resistance to mechanical impact

Mechanical impact test in accordance with EN 16263-4:2015, 5.8 shall be performed on the following unpacked articles:

— articles (fitted with their safety features) which are designed to function by impact or shock or designed to arm on acceleration;

— articles (fitted with their safety features if any) which exhibit bare pyrotechnic composition;

— articles which exhibit a protection of their pyrotechnic compositions only by varnish or by a deformable or thin casing;

— the following generic types: gas generators (EN 16263-3:2015, 4.3), pyromechanical devices (EN 16263-3:2015, 4.6), rocket motors (EN 16263-3:2015, 4.8) or other cartridges (EN 16263-3:2015, 4.5), the casing of which is designed to withstand an internal pressure developed by the normal functioning of the article.

Articles shall not ignite as a result of mechanical impact test nor release pyrotechnic composition from the article nor exhibit visible damages such as deformations (except those which do not alter the shape of the article or expose the inside of the article), ruptures or cracks. See also 4.4 and Clause 6. These occurrences shall be recorded as positive results.

5.5 Loose pyrotechnic composition after mechanical conditioning and mechanical impact test

When tested in accordance with EN 16263-4:2015, 5.7 and 5.8:

— P1 articles shall not exhibit any loss of pyrotechnic composition from the article. It shall be checked by visual examination;

— For P2 articles, the loose pyrotechnic composition found outside the article after mechanical conditioning shall be weighed.The total mass of loose pyrotechnic composition shall not exceed 2 % of the NEC or

0,5 g, whichever is the smaller. If the pyrotechnic composition cannot be separated from the loose material, the same limits shall apply to the whole loose material.

5.6 Resistance to moisture

If the article is intended to be used in humid or wet conditions, thermal conditioning according to EN 16263-4:2015, 5.9.2.1 or 5.9.2.2 shall be performed in the presence of the highest level of humidity specified by the manufacturer and the article shall function correctly and completely according to EN 16263-4:2015, 5.10.

If the article is intended to be used in or under water, the water immersion test shall be performed according to EN 16263-4:2015, 5.16. The article shall function correctly and completely according to EN 16263-4:2015, 5.10.

5.7 Resistance to high and low temperatures

If the article is intended to be kept or used at high (60 °C or more) and/or low (below 0 °C) temperatures, performance tests in accordance with EN 16263-4:2015, 5.10 shall be carried out after conditioning in accordance with EN 16263-4:2015, 5.9.2.2 and/or 5.9.2.3 at the highest and/or lowest temperatures specified by the manufacturer instead of EN 16263-4:2015, 5.9.2.1. The article shall function correctly and completely and attain the performance characteristics specified by the manufacturer.

5.8 Integrity

When tested in accordance with EN 16263-4:2015, 5.10, only intended fragmentation or intended opening of the article as specified by the manufacturer shall take place.

6 Requirements for semi-finished pyrotechnic articles and rocket motors

6.1 Semi-finished pyrotechnic articles

For semi-finished pyrotechnic articles, only verification of design (see 5.2) shall apply.

6.2 Rocket motors

For rocket motors (except for those to be used in fireworks and theatrical pyrotechnic articles, see EN 16263-3:2015, 4.8), thrust measurement shall be made according to EN 16263-4:2015, 5.11. The measured thrust and tolerances shall comply with the manufacturer's specification.

7 Primary pack

Where a primary pack is used, it shall be of a size to enable labelling. Conformity to this requirement shall be verified by checking the label according to EN 16263-5:2015, Clause 4.

If it is used to protect the contained article(s) (e.g. as a safety feature or protection of the means of ignition):

— in type testing, the pyrotechnic articles shall be tested for thermal and mechanical conditioning (see 8.2.1, Table 1) and, where required in 5.4, for mechanical impact within the primary pack. Then, its integrity shall be verified by visual examination;

— in batch testing, the integrity of the primary pack shall be verified by visual examination.