SLOVENSKI STANDARD
SIST EN 16261-3:2013

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Pirotehnični izdelki - Ognjemet, kategorija 4 - 3. del: Preskusne metode

Pyrotechnic articles - Fireworks, Category 4 - Part 3: Test methods

Pyrotechnische Gegenstände - Feuerwerkskörper, Kategorie 4 - Teil 3: Prüfverfahren

Articles pyrotechniques - Artifices de divertissement, Catégorie 4 - Partie 3: Méthodes d'essai

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Pyrotechnic articles - Fireworks, Category 4 - Part 3: Test methods

Articles pyrotechniques - Artifices de divertissement, Catégorie 4 - Partie 3: Méthodes d'essai

Pyrotechnische Gegenstände - Feuerwerkskörper, Kategorie 4 - Teil 3: Prüfverfahren

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 16261-3:2012) 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of an identical text or by endorsement, at the latest by June 2013, and conflicting national standards shall be withdrawn at the latest by June 2013.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 Directive 2007/23/EC on the placing on the market of pyrotechnic articles.

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

EN 16261 is divided into the following parts:

— EN 16261-1, *Pyrotechnic articles — Fireworks, category 4 — Part 1: Terminology;*

— EN 16261-2, *Pyrotechnic articles — Fireworks, category 4 — Part 2: Requirements;*

— EN 16261-3, *Pyrotechnic articles — Fireworks, category 4 — Part 3: Test methods;*

— EN 16261-4, *Pyrotechnic articles — Fireworks, category 4 — Part 4: 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 fireworks of category 4.

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 16261-1:2012, *Pyrotechnic articles — Fireworks, Category 4 — Part 1: Terminology*

EN 16261-2:2013, *Pyrotechnic articles — Fireworks, Category 4 — Part 2: Requirements*

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

ISO 3599, *Vernier callipers reading to 0,1 and 0,05 mm*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16261-1:2012 apply.

4 Test environment for functioning test

4.1 General

A large unobstructed area, which shall be wide open. The measuring points shall be positioned appropriately for the type of measurement being carried out.

For aquatic fireworks, a water test area shall be available for testing the resistance to moisture and functioning in the expected manner.

4.2 Wind measurement

The wind speed at a height of 1,50 m above the ground shall be measured and recorded using a wind speed meter (see 5.5). No performance testing shall be carried out if the wind speed exceeds 5,0 m/s.

5 Apparatus

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

5.1 Timing device.

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

5.2 Calliper.

Calliper, flat faced vernier calliper reading to 0,1 mm, conforming to ISO 3599.

5.3 Ruler.

Ruler, with a scale resolution of 1,0 mm or better.

5.4 Measuring tape.

Measuring tape, with a scale resolution of 10 mm or better.

5.5 Wind speed meter.

The wind speed meter should accurate to at least 0,5 m/s.

5.6 Balance.

Balance, with an accuracy of ± 0,01 g or better.

5.7 Temperature chamber.

5.7.1 Up to (50 ± 2,5) °C.

5.7.2 Up to (75 ± 2,5) °C.

5.8 Sound level meter.

Sound level meter of class 1 conform to EN 61672-1 with a free-field microphone.

5.9 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 shock impulse duration (time elapsed from the starting of the machine's deceleration to the time in which the deceleration reaches its maximum value during each first shock pulse) shall be 2 ms ± 1 ms working at a frequency of 1 Hz ± 0,1 Hz.

An example of an apparatus is shown in Annex A.

5.10 Devices for measuring heights.

Heights shall be measured using universal surveying instruments (USI) such as theodolites, electronic spirit levels or video (visible and/or infrared) systems.

Examples of measuring methods and the calculation of the height are given in Annex B.

5.11 Goniometer.

Goniometer reading to 1° or better.

5.12 Mortar.

The rising height of shells depends particularly on the clearance of the shell in the mortar (ratio of the maximum cross section area of the shell (A_{Shell}) to the inner cross section area of the mortar (A_{mortar})), also designated as "Q". Q is the ratio of the outer diameter of the shell ($d_{o,shell}$, including the fuse to the lifting charge) squared over the inner diameter of the mortar ($d_{i,mortar}$) squared. The outer diameter of the shell shall be measured horizontally at the place of largest diameter including the fuse to the lifting charge. The following conditions shall be achieved:

$$0{,}9 \le Q = \frac{A_{shell}}{A_{mortar}} = \frac{d^2{}_{o,shell}}{d^2{}_{i,mortar}} \le 0{,}98$$

$$\sqrt{1{,}02 \cdot d^{2}_{\text{o,shell}}} \leq d_{\text{i,mortar}} \leq \sqrt{1{,}1 \cdot d^{2}_{\text{o,shell}}}$$

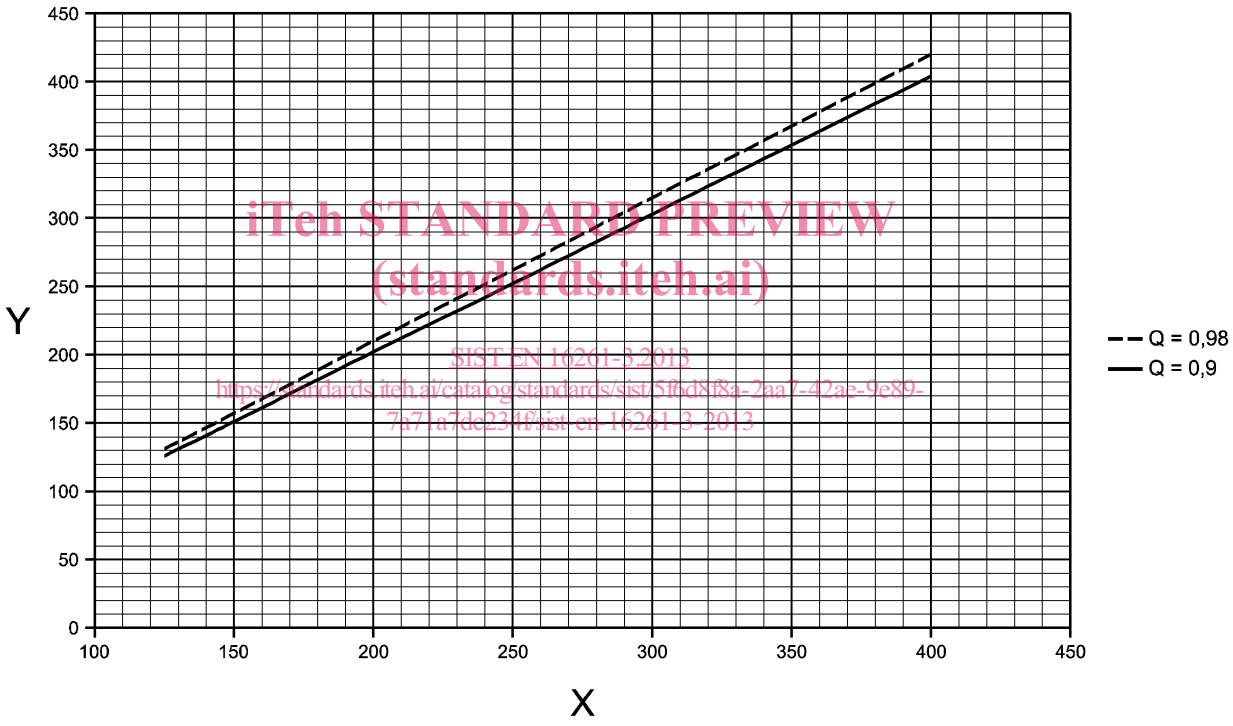
For calibre ≤ 100 mm, a wider tolerance can be accepted. The following conditions shall be achieved:

$$0{,}83 \leq Q^{*}_{\leq 100} \leq 0{,}98$$

$$\sqrt{1{,}02 \cdot d^{2}_{\text{o,shell}}} \leq d^{*}_{\text{i,mortar}} \leq \sqrt{(1{,}2 \cdot d^{2}_{\text{o,shell}}}$$

Another determining factor influencing the rising height is the length of the mortar (l_{mortar}) – length from the mortar muzzle to the mortar ground.

The dimensions of the mortar may also be determined from Figures 1, 2 and 3.

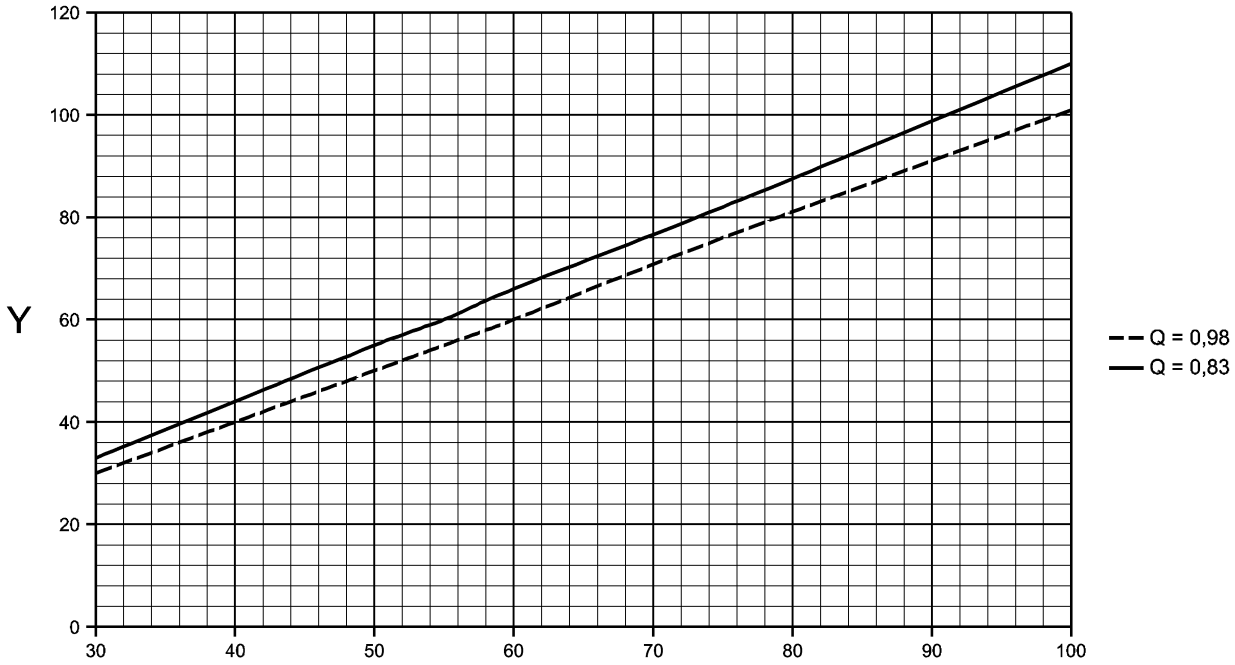


Key

X calibre of the shell (mm)

Y internal diameter of the mortar (mm)

Figure 1 — Dimensions of the mortars for spherical shells – Calibre above 100 mm

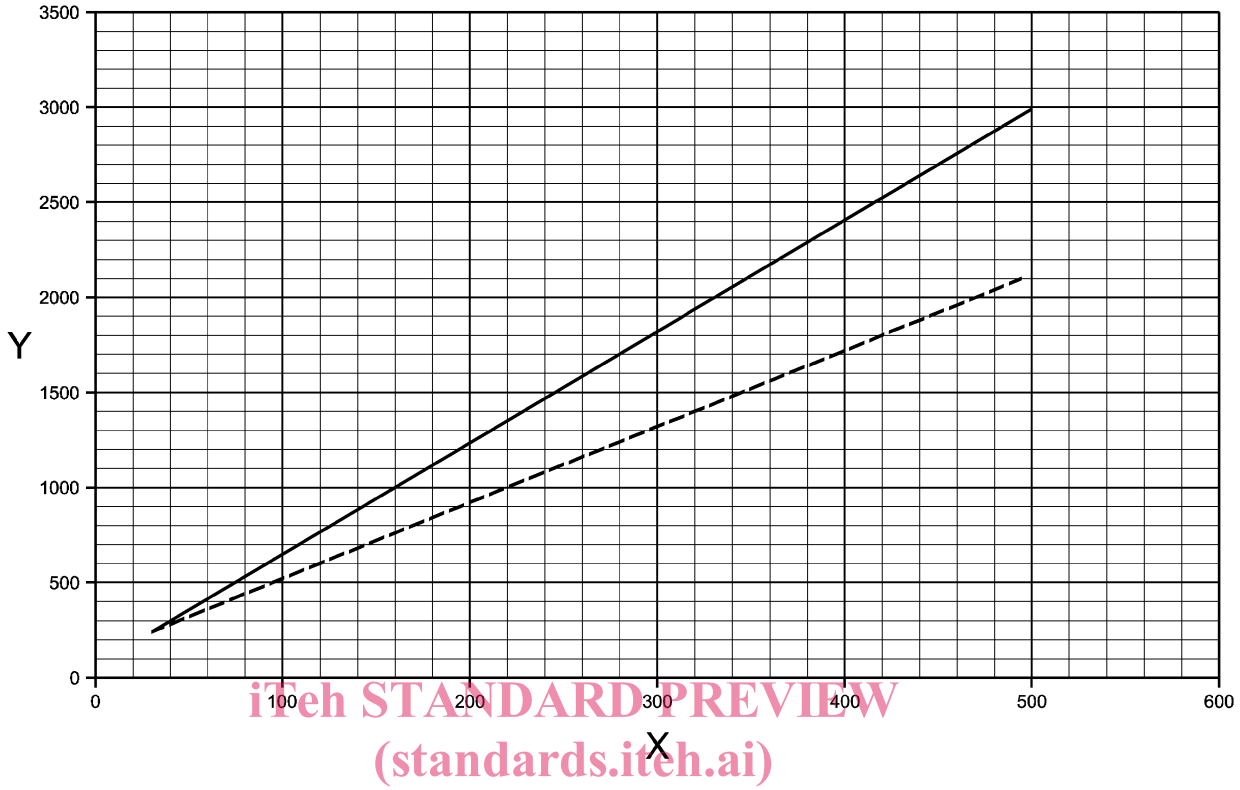


Key

X calibre of the shell (mm)

Y internal diameter of the mortar (mm)

Figure 2 — Dimensions of the mortars for spherical shells – Calibre up to 100 mm



Key

X calibre of the shell (mm)

Y inside length of the mortar (mm)

—— l_{mortar} = 6 X d_n + 70

– – l_{mortar} = 4 X d_n + 120

4 X d_n + 120 ≤ l_{mortar} (mm) ≤ 6 X d_n + 70

d_n nominal calibre

Figure 3 — Range of the mortar length for spherical shells

6 Test methods

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

6.1 Construction and stability

6.1.1 Outer dimension of item

6.1.1.1 Apparatus

— Ruler (see 5.3).

6.1.1.2 Procedure

Use the ruler to measure the outer dimensions of the tested article to the nearest of 1,0 mm and record the results.