

BS EN ISO 14451-2:2013



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# Pyrotechnic articles — Pyrotechnic articles for vehicles

Part 2: Test methods

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**National foreword**

This British Standard is the UK implementation of EN ISO 14451-2:2013.

The UK participation in its preparation was entrusted to Technical Committee CII/47, Pyrotechnic articles.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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English Version

Pyrotechnic articles - Pyrotechnic articles for vehicles - Part 2:  
Test methods (ISO 14451-2:2013)

Articles pyrotechniques - Articles pyrotechniques pour  
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Pyrotechnische Gegenstände - Pyrotechnische  
Gegenstände für Fahrzeuge - Teil 2: Prüfverfahren (ISO  
14451-2:2013)

This European Standard was approved by CEN on 9 February 2013.

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.

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EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

## Foreword

This document (EN ISO 14451-2:2013) has been prepared by Technical Committee CEN/TC 212 "Pyrotechnic articles" the secretariat of which is held by NEN, in collaboration with Technical Committee ISO/TC 22 "Road vehicles".

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of an identical text or by endorsement, at the latest by September 2013, and conflicting national standards shall be withdrawn at the latest by September 2013.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.

For relationship with EU Directive, see informative Annex ZA, which is 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.

### Endorsement notice

The text of ISO 14451-2:2013 has been approved by CEN as EN ISO 14451-2:2013 without any modification.

## Annex ZA (informative)

### Relationship between this European Standard and the Essential Requirements of EC 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 one means of conforming to Essential Requirements of the New Approach Directive 2007/23/EC on the placing on the market of pyrotechnic articles.

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the normative 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 corresponding Essential 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 (1 of 2)**

| Clause(s)/sub-clause(s) of this document | Essential Safety Requirements (ESRs) of Directive 2007/23/EC | Qualifying remarks/Notes                                                                                                             |
|------------------------------------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 4.7, 4.8, 4.9                            | (1)                                                          | Note: It is taken into account that the intended purpose of the pyrotechnic article is to function in a vehicle in case of accidents |
| 4.1                                      | (2)                                                          | Reference: Directive 2000/53/EC                                                                                                      |
| 4.9                                      | (3) 1st sentence                                             |                                                                                                                                      |
| 4.9                                      | (3) 2nd and 3rd sentences                                    | Note: It is taken into account that the intended purpose of the pyrotechnic article is to function in a vehicle in case of accidents |
| 4.1                                      | (3a)                                                         |                                                                                                                                      |
| 4.3, 4.4                                 | (3b)                                                         |                                                                                                                                      |
| 4.2, 4.3, 4.5                            | (3c)                                                         |                                                                                                                                      |
| 4.4                                      | (3d)                                                         |                                                                                                                                      |
| 4.4                                      | (3e)                                                         |                                                                                                                                      |
| 4.3, 4.4                                 | (3f)                                                         |                                                                                                                                      |
| 4.5                                      | (3g)                                                         |                                                                                                                                      |
| 4.1                                      | (3h)                                                         | See also ISO 14451-3                                                                                                                 |
| 4.2                                      | (3i)                                                         |                                                                                                                                      |

**Table ZA.1 — (2 of 2)**

| Clause(s)/sub-clause(s) of this document | Essential Safety Requirements (ESRs) of Directive 2007/23/EC | Qualifying remarks/Notes |
|------------------------------------------|--------------------------------------------------------------|--------------------------|
| 4.1                                      | (3j)                                                         |                          |
| 4.2, 4.3, 4.5                            | (3) Last sentence                                            |                          |
| 4.1                                      | (4a)                                                         |                          |
| 4.1                                      | (4b)                                                         |                          |
| 4.1, 4.9                                 | (5 B.1)                                                      |                          |
| 4.1                                      | (5 B.2)                                                      |                          |
| 4.5, 4.6                                 | (5 B.3)                                                      |                          |
|                                          | (5 B.4)                                                      | Not applicable           |
| 4.7                                      | (5 C.1)                                                      |                          |
| 4.5                                      | (5 C.2)                                                      |                          |
| 4.5                                      | (5 C.3)                                                      |                          |
|                                          | (5 C.4)                                                      | Not applicable           |
|                                          | (5 C.5)                                                      | Not applicable           |
| 4.1                                      | (5 C.6)                                                      |                          |
| 4.5                                      | (5 C.7)                                                      |                          |

**WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this part of EN ISO 14451.**

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 14451-2 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 212, *Pyrotechnic articles*, in collaboration with Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 12, *Passive safety crash protection systems*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

ISO 14451 consists of the following parts, under the general title *Pyrotechnic articles — Pyrotechnic articles for vehicles*:

- *Part 1: Terminology*
- *Part 2: Test methods*
- *Part 3: Labelling*
- *Part 4: Requirements and categorization for micro gas generators*
- *Part 5: Requirements and categorization for airbag gas generators*
- *Part 6: Requirements and categorization for airbag modules*
- *Part 7: Requirements and categorization for seatbelt pretensioners*
- *Part 8: Requirements and categorization for igniters*
- *Part 9: Requirements and categorization for actuators*
- *Part 10: Requirements and categorization for semi-finished products*

# Pyrotechnic articles — Pyrotechnic articles for vehicles —

## Part 2: Test methods

### 1 Scope

This part of ISO 14451 establishes uniform test methods for pyrotechnic articles for vehicles.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 14451-1, *Pyrotechnic articles — Pyrotechnic articles for vehicles — Part 1: Terminology*

ISO 14451-3, *Pyrotechnic articles — Pyrotechnic articles for vehicles — Part 3: Labelling*

ISO 14451-5, *Pyrotechnic articles — Pyrotechnic articles for vehicles — Part 5: Requirements and categorization for airbag gas generators*

ISO 14451-6, *Pyrotechnic articles — Pyrotechnic articles for vehicles — Part 6: Requirements and categorization for airbag modules*

ISO 14451-7, *Pyrotechnic articles — Pyrotechnic articles for vehicles — Part 7: Requirements and categorization for seatbelt pretensioners*

ISO 14451-9, *Pyrotechnic articles — Pyrotechnic articles for vehicles — Part 9: Requirements and categorization for actuators*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14451-1 apply.

NOTE Wherever reference is made to *pyrotechnic article(s)* only *pyrotechnic articles for vehicles* are meant.

### 4 Test methods

#### 4.1 Verification of design and documentation

The manufacturer shall supply a document which describes the pyrotechnic article. The typical content of the document shall include the following information:

- description of the purpose of the pyrotechnic article;
- sketch with external dimensions;
- total mass of the pyrotechnic article;
- cross section and part list;
- mass and pyrotechnic composition(s) contained in the article;

- description of intended behaviour;
- description of foreseeable behaviour during fire test if applicable;
- proposed labelling in accordance with ISO 14451-3;
- safety data sheet/handling instructions, including electrical characteristics (e.g. all-fire current, no-fire current, resistance, etc.) which shall be provided with the pyrotechnic article.

This shall be verified by visual inspection by the naked eye.

## 4.2 Drop test

### 4.2.1 Purpose

The purpose of this test is to determine whether the pyrotechnic article experiences any detrimental effect when dropped from a specified height and at specified orientations.

### 4.2.2 Equipment

A steel impact plate of a minimum of 1 m x 1 m with at least 10 mm thickness, resting on a solid floor, with a fixture that supports the pyrotechnic article at the specified height, shall be used.

### 4.2.3 Test conditions

The drop height shall be  $1^{+0,2}_0$  m.

The test shall be done with the pyrotechnic article at ambient temperature.

### 4.2.4 Test procedure

Mount one pyrotechnic article into the support fixture at the specified height above the impact plate and oriented such that it will fall in one of the six directions indicated in [Figure 1](#). Disarm the trigger device, if included in the pyrotechnic article.

Release the pyrotechnic article, allowing it to free fall onto the impact plate. Repeat the test using the same pyrotechnic article oriented to fall in the opposite direction.

Repeat the test twice more, once using a second pyrotechnic article and once using a third pyrotechnic article, each time along one of the remaining directions indicated in [Figure 1](#).

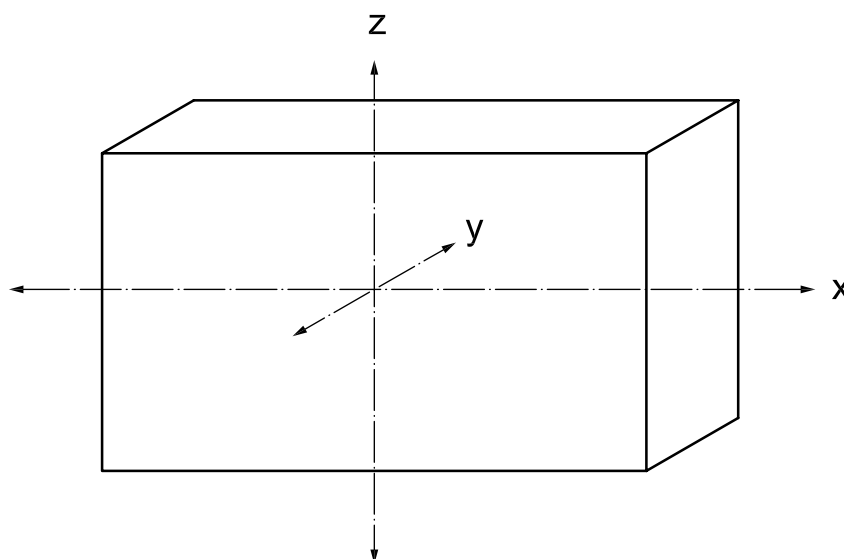


**Figure 1 — Definition of main axes**

## **4.3 Vibration and temperature test**

### **4.3.1 Purpose**

The purpose of this test is to determine the ability of the pyrotechnic article to withstand vibration and temperature conditions. The test may be performed simultaneously or sequentially.

### **4.3.2 Equipment**

The equipment shall consist of a vibration table capable of producing the vibration loads as characterized in [Figure 2](#) and a climatic chamber capable of controlling the temperature during the test in accordance with [Figure 3](#). In case the test is being performed simultaneously the vibration table shall be mounted within the climatic chamber.

### **4.3.3 Test conditions**

The temperature tolerance shall be  $\pm 2,5$  °C.

### **4.3.4 Test procedure**

Fix the pyrotechnic article to the vibration table by an appropriate method insuring correct transmission of the vibration load. Apply random vibration in accordance with [Table 1](#) and [Figure 2](#) along each of the three main axes (see [Figure 1](#)) of each pyrotechnic article for 24 h.

Place the pyrotechnic article in the climatic chamber. The temperature shall be changed in accordance with [Figure 3](#). It may be changed simultaneously with application of the vibration load.