INTERNATIONAL STANDARD

ISO 14451-6

First edition
2013-03-15

Pyrotechnic articles — Pyrotechnic articles for vehicles —

Part 6: Requirements and categorization for airbag modules

Articles pyrotechniques — Articles pyrotechniques pour véhicules —

Partie 6: Exigences relatives aux modules de sac gonflable et leur classement en catégories

Reference number
ISO 14451-6:2013(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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 14451-6 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 6:
Requirements and categorization for airbag modules

1 Scope

This part of ISO 14451 specifies the types and order of tests for application to the airbag modules and sets out the acceptance criteria and means of categorization.

This part of ISO 14451 applies to type tests.

This part of ISO 14451 is not applicable to articles containing military explosives or commerical blasting agents except for black powder or flash composition.

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 14451-2:2013, *Pyrotechnic articles — Pyrotechnic articles for vehicles —Part 2: Test methods*

ISO 14451-4, *Pyrotechnic articles — Pyrotechnic articles for vehicles — Part 4: Requirements and categorization for micro gas generators*

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

ISO 14451-8, *Pyrotechnic articles — Pyrotechnic articles for vehicles — Part 8: Requirements and categorization for igniters*

3 Terms and definitions

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

4 Requirements and acceptance criteria

4.1 General

Airbag modules shall meet the requirements specified in 4.2 to 4.8 taking into account the test matrix of Clause 5.

4.2 Verification of design and documentation

Documentation shall be complete as specified in ISO 14451-2:2013, 4.1.

4.3 Drop test

4.3.1 Requirements

Airbag modules shall be tested as specified in ISO 14451-2:2013, 4.2.

Alternatively if all (micro) gas generator(s)/igniter(s) are already successfully tested according to ISO 14451-4, ISO 14451-5 and ISO 14451-8, these tests should be considered passed for the airbag module as well.

4.3.2 Acceptance criteria

No ignition of the airbag module shall occur.

No spill out of the pyrotechnic composition from the airbag module shall occur.

4.4 Vibration and temperature test

4.4.1 Requirements

Airbag modules shall be tested as specified in ISO 14451-2:2013, 4.3.

Alternatively if all (micro) gas generator(s)/ignite(s) are already successfully tested according to ISO 14451-4, ISO 14451-5 and ISO 14451-8, these tests should be considered passed for the airbag module as well.

4.4.2 Acceptance criteria

No ignition of the airbag module shall occur.

No spill out of the pyrotechnic composition from the airbag module shall occur.

4.5 Thermal humidity cycling test and functioning test

4.5.1 Requirements

Airbag modules shall be tested as specified in ISO 14451-2:2013.

Alternatively if all (micro) gas generator(s)/ignite(s) are already successfully tested according to ISO 14451-4, ISO 14451-5 and ISO 14451-8, these tests should be considered passed for the airbag module as well.

4.5.2 Acceptance criteria

No ignition of the airbag module shall occur.

4.6 Electro static discharge (ESD) test

4.6.1 Requirements

Airbag modules shall be tested as specified in ISO 14451-2:2013, 4.5.

Alternatively if all (micro) gas generator(s)/ignite(s) are already successfully tested according to ISO 14451-4, ISO 14451-5 and ISO 14451-8, these tests should be considered passed for the airbag module as well.

4.6.2 Acceptance criteria

No ignition of the airbag module shall occur.

4.7 Fire test

4.7.1 Requirements

Airbag modules shall be tested as specified in ISO 14451-2:2013, 4.6 with the following heating rate and positions:

— Heating rate: 80K/min.

The number and orientation of the burners shall be chosen such that the whole cross-section (projection to the gird) of the airbag module or at least to the area of the airbag module where the (micro) gas generator(s) / igniter(s) / actuator(s) are situated shall be completely engulfed by the flames.

Position for curtain modules; see Figure 1:

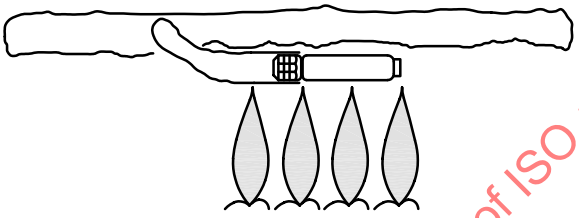

Figure 1 — Bag unfolded

Position for modules except curtain modules; see Figure 2:

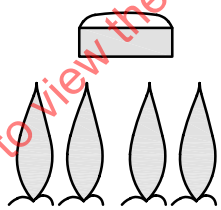

Figure 2 — Bag away from flame

Alternatively if all (micro) gas generator(s)/ignite(s) are already successfully tested according to ISO 14451-4, ISO 14451-5 and ISO 14451-8, these tests should be considered passed for the airbag module as well.

4.7.2 Acceptance criteria

Only foreseeable fragmentation or foreseeable opening of the airbag module shall occur.

4.8 Functioning Test

4.8.1 Requirements

Airbag modules shall be tested as specified in ISO 14451-2:2013, 4.9 with the following positions without any fixation.

When airbag modules with multi-stage gas generators or airbag modules with single- or multi-stage gas generators in addition with any number and combination of igniters, micro gas generators, actuators, gas generators are tested, the delay between ignition of stage 1 and the following stages shall be 5 ms or in accordance with the product specification or requirements given by the manufacturer.

Position for modules except for curtain modules; see Figure 3:

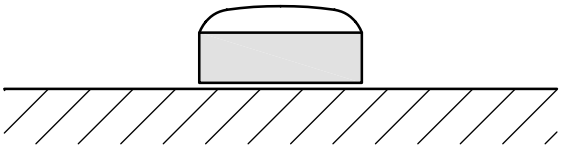

Figure 3 — Horizontal, bag away from ground

Position for curtain modules; see Figure 4:

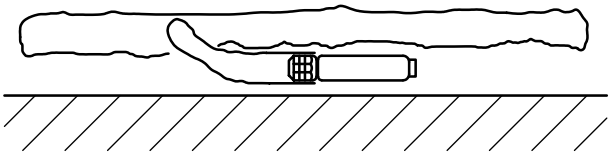

Figure 4 — Horizontal, bag unfolded

4.8.2 Acceptance criteria

Only intended fragmentation or intended opening of the airbag module shall occur.

5 Test matrix for airbag modules

Table 1 shows the test matrix which summarizes all tests in an overview. Test samples have been numbered from 1 to 10 for easier reference. The roman numbers in the Table indicate in which sequence the same sample will undergo different examinations.

Table 1 — Test matrix

	Test methods of ISO 14451-2:2013	Requirements of ISO 14451-6:2013	Unexposed airbag modules			Exposed airbag modules		
Sample number			1	2 to 4	5	6 to 8	9	10
Possibility to reuse the test from sub-level(s) for the assessment of the airbag module. See relevant test requirement.			YES	NO	YES	YES	YES	YES
Verification of design and documentation	4.1	4.2	I	I	I	I	I	I
Drop test	4.2	4.3				II		
Vibration and temperature test	4.3	4.4					II	
Thermal humidity cycling test	4.4	4.5						II
Electrostatic discharge test	4.5	4.6			II			
Fire test	4.6	4.7	II					
Functioning test	4.9	4.8		II			III	III

6 Categorization

6.1 Airbag modules are categorized as follows: