

KES

Air Bag Ignitor

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Remark



1. Purpose

This standard aims at securing proper quality by standardizing specification.

2. Scope of Application

This standard specifies the air bag ignitor for automobiles(hereinafter referred to as the "ignitor")

3. Report of Evaluation Result

The quality evaluation result at each stage from development to mass production shall be submitted to Kia according to the Appendix.

4. Definition of Terminology

(1) Ignitor

A part of the inflator in the air bag constraint system. The ignitor operates the inflator by specified or more electric signal

(2) Inflator

Device which generates gas for inflating the air bag in the air bag constraint system.

(3) Propellant

A part of the ignitor. The propellant changes into gas by applying the specified or more electric signal to the bridge wiring of the ignitor.

(4) Bridge wire

A part of the ignitor. The bridgewire changes electrical energy into neat energy by which the propellant is changed into gas.

5. Specifications Indicated in Drawings

The following items with * mark determined by the manufacturer shall be approved by Kia.

- (1) Inflator operating gas pressure *
- (2) Time to reach peak gas pressure *
- (3) Volume and shape of vessels for ballistic test *
- (4) Evaluation standard of radio frequency impedance *
- (5) Limit value of maximum break load *
- (6) Attenuation tolerance of ferrite insulation by voltage input
- (7) Thermal time constant *
- (8) The evaluation standard of dimensional check *
- (9) The evaluation standard of external quality *
- (10) The evaluation standard of fungus *

6. Evaluation Standard

The evaluation standard of the ignitor shall conform to Table 1.

Remark 1: The way of reading evaluation items and methods in Table 1 shall conform to the following example.

Evaluation Item		Evaluation	
Durability	Vibration resistance	First evaluation	7.5.1 First Evaluation Method
	• Operating force of slider	Second evaluation (Evaluation item tested after evaluating the vibration resistance)	• 7.3.1 Second Evaluation Method
	•• Noise	Third evaluation (Evaluation item tested after evaluating the operating force)	•• 7.3.7 Third Evaluation Method

Remark 2: The quality rank shall be represented by A, AR, B or C.

The definitions shall conform to KMS Q410001(Determination and Procedure of Quality Ranking).

Table 1

Evaluation Item			Evaluation Standard	Quality Rank	Evaluation Method
Per- for- mance	S-1	Dimensional check	Shall be within the standard	B	Gauge
		(1 ·)External quality	indicated in the drawing.	B	(1 ·)Visual
		(2 ·)Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be 1 MΩ or more.	B	(2 ·)MIL-STD-202F Method 302
		(3 ·)Bridge wire resistance	$1.0 \pm 0.1 \Omega$	A	(3 ·)MIL-STD-1512 Method 201, MIL-STD-202F Method 303
		(4 ·)Non-ignition signal	The ignitor shall not ignite when $175 \pm 10 \text{mA}$ of current is applied for 10 seconds or more.	A	(4 ·) -
		(5 ·)DC sensitivity at normal temperature (complete ignition)	(1) Ignition current : 3.5 A or less (2) All ignitors shall be petal open system. (Refer to Fig. 1)	A	(5 ·)7.2.3
		(5 ·)DC sensitivity at normal temperature (Non-ignition)	Non-ignition current: 0.75 A or more		(5 ·)7.2.4
	S-2	Dimensional check	Shall be within the standard	B	Gauge
		(1 ·)External quality	indicated in the drawing.	B	(1 ·)Visual
		(2 ·)Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be 1 MΩ or more.	B	(2 ·)MIL-STD-202F Method 302
		(3 ·)Bridge wire resistance	$1.0 \pm 0.1 \Omega$	A	(3 ·)MIL-STD-1512 Method 201, MIL-STD-202F Method 303

Table 1 (continued)

Evaluation Item		Evaluation Standard	Quality Rank	Evaluation Method
Per- for- mance	S-2	(4.) Non-ignition signal (complete ignition)	A	(4.) -
		(5.) DC sensitivity at a temperature of -30°C (Non-ignition)	A	(5.) 7.2.3
		(5.) DC sensitivity at a temperature of -30°C		(5.) 7.2.4
	S-3	Dimensional check	B	Gauge
		(1.) External quality	B	(1.) Visual
		(2.) Insulation resistance	B	(3.) MIL-STD-202F Method 302
		(3.) Bridge wire resistance	A	(3.) MIL-STD-1512 Method 201, MIL-STD-202F Method 303
		(4.) Non-ignition signal	A	(4.) -
		(5.) DC sensitivity at a temperature of 95°C (complete ignition)	A	(5.) 7.2.3
		(5.) DC sensitivity at a temperature of 95°C (Non-ignition)		(5.) 7.2.4
	S-4	Dimensional check	B	Gauge
		(1.) External quality	B	(1.) Visual

Table 1 (continued)

Evaluation Item		Evaluation Standard	Quality Rank	Evaluation Method
Per- for- mance	S-4	(2.) Insulation resistance	B	(2.) MIL-STD-202F Method 302
		(3.) Bridge wire resistance	A	(3.) MIL-STD-1512 Method 201, MIL-STD-202F Method 303
		(4.) Non-ignition signal	A	(4.) -
		(5.) Ballistic at normal temperature	A	(5.) 7.2.1 (5.) 7.2.2
		(6.) DC resistance after ignition	B	(6.) MIL-STD-202F Method 303
	S-5	Dimensional check	B	Gauge
		(1.) External quality	B	(1.) Visual
		(2.) Insulation resistance	B	(2.) MIL-STD-202F Method 302

Table 1 (continued)

Evaluation Item			Evaluation Standard	Quality Rank	Evaluation Method
Per- for- mance	S-5	(3・)Bridge wire resistance	1.0±0.1Ω	A	(3・)MIL-STD-1512 Method 201, MIL-STD-202F METHOD 303
		(4・)Non-ignition signal	The ignitor shall not ignite when 175±10mA of current is applied for 10 seconds or more.	A	(4・) -
		(5・)Ballistic at a temperature of -30℃	(1) To generate the inflator operating gas pressure indicated in the drawing by ignition of the ignitor in the test vessel. (2) The time required to reach peak gas pressure shall be within the standard value indicated in the drawing. (3) It shall be confirmed according to 7.2.1 that the peak pressure and the time to reach the peak gas pressure are within the limit value indicated in the drawing.	A	(5・)7.2.1 (5・)7.2.2
		(6・)DC resistance after ignition	After ignition, the pin to pin and pin to case resistance shall be 0.9Ω or more.	B	(3・)MIL-STD-202F Method 303
	S-6	Dimensional check	Shall be within the standard indicated in the drawing.	B	Gauge
		(1・)External quality		B	(1・)Visual
		(2・)Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be 1 MΩ or more.	B	(2・)MIL-STD-202F Method 302
		(3・)Bridge wire resistance	1.0±0.1Ω	A	(3・)MIL-STD-1512 Method 201, MIL-STD-202F Method 303

Table 1 (continued)

Evaluation Item			Evaluation Standard	Quality Rank	Evaluation Method
Performance	S-6	(4 ·)DC at normal temperature (Non-ignition)	Non-ignition current: 0.75A or more	A	(4 ·)7.2.4
	S-7	Dimensional check	Shall be within the standard indicated in the drawing.	B	Gauge
		(1 ·)External quality		B	(1 ·)Visual
		(2 ·)Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be $1\text{ M}\Omega$ or more.	B	(2 ·)MIL-STD-202F Method 302
		(3 ·)Bridge wire resistance	$1.0 \pm 0.1\Omega$	A	(3 ·)MIL-STD-1512 Method 201, MIL-STD-202F Method 303
		(4 ·)Non-ignition signal	The ignitor shall not ignite when $175 \pm 10\text{mA}$ of current is applied for 10 seconds or more.	A	(4 ·) -
		(5 ·)Sensitivity of radio frequency	In both modes of pin to pin and pin to case, the ignitor shall not ignite at the output stage of the non-ignition area in Fig. 2.	A	(5 ·)7.2.7
	S-8	Dimensional check	Shall be within the standard indicated in the drawing.	B	Gauge
		(1 ·)External quality		B	(1 ·)Visual
		(2 ·)Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be $1\text{ M}\Omega$ or more.	B	(2 ·)MIL-STD-202F Method 302
		(3 ·)Bridge wire resistance	$1.0 \pm 0.1\Omega$	A	(3 ·)MIL-STD-1512 Method 201, MIL-STD-202F Method 303

Table 1 (continued)

Evaluation Item			Evaluation Standard	Quality Rank	Evaluation Method
Per- for- mance	S-8	(4 ·)Non-ignition signal	The ignitor shall not ignite when $175 \pm 10\text{mA}$ of current is applied for 10 seconds or more.	A	(4 ·)7.2.4
		(5 ·)Change in DC sensitivity	After exposure to EMI and FRI, shall meet the evaluation standard of 7.2.3 and 7.2.4.	B	(5 ·)MIL-STD-1512 Method 208
	S-9	Dimensional check	Shall be within the standard indicated in the drawing.	B	Gauge
		(1 ·)External quality		B	(1 ·)Visual
		(2 ·)Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be $1\text{ M}\Omega$ or more.	B	(2 ·)MIL-STD-202F Method 302
		(3 ·)Bridge wire resistance	$1.0 \pm 0.1\Omega$	A	(3 ·)MIL-STD-1512 Method 201, MIL-STD-202F Method 303
		(4 ·)Non-ignition signal	The ignitor shall not ignite when $175 \pm 10\text{mA}$ of current is applied for 10 seconds or more.	A	(4 ·) -
		(5 ·)Impedance of radio frequency	Shall be within the standard indicated in the drawing.	B	(5 ·)MIL-STD-1512 Method 204
		(6 ·)Static discharge sensitivity	The ignitor shall not ignite.	B	(5 ·)MIL-STD-1512 Method 205
		(7 ·)DC sensitivity at normal temperature (complete ignition)	(1) Ignition current : 3.5 A or less (2) All ignitors shall be petal open system. (Refer to Fig. 1)	A	(7 ·)7.2.3
		(7 ·)DC sensitivity at normal temperature (Non-ignition)	Non-ignition current: 0.75 A or more	A	(7 ·)7.2.4

Table 1 (continued)

Evaluation Item		Evaluation Standard	Quality Rank	Evaluation Method
Per- for- mance	S-10	Dimensional check	B	Gauge
		(1 ·)External quality	B	(1 ·)Visual
		(2 ·)Insulation resistance	B	(2 ·)MIL-STD-202F Method 302
		(3 ·)Bridge wire resistance	A	(3 ·)MIL-STD-1512 Method 201, MIL-STD-202F Method 303
		(4 ·)Non-ignition signal	A	(4 ·) -
		(5 ·)Minimum ignition signal at a temperature of -30°C	A	(5 ·)7.2.6
	S-11	Dimensional check	B	Gauge
		(1 ·)External quality	B	(1 ·)Visual
		(2 ·)Insulation resistance	B	(2 ·)MIL-STD-202F Method 302
		(3 ·)Bridge wire resistance	A	(3 ·)MIL-STD-1512 Method 201, MIL-STD-202F Method 303
		(4 ·)Non-ignition signal	A	(4 ·) -

Table 1 (continued)

Evaluation Item			Evaluation Standard	Quality Rank	Evaluation Method
Per- for- mance	S-11	(5 ·)Ballistic at a temperature of -40℃	(1) To generate the inflator operating gas pressure indicated in the drawing by ignition of the ignitor in the test vessel. (2) The time required to reach peak gas pressure shall be within the standard value indicated in the drawing. (3) It shall be confirmed according to 7.2.1 that the peak pressure and the time to reach the peak gas pressure are within the limit value indicated in the drawing.	A	(5 ·)7.2.1 (5 ·)7.2.2
		(6 ·)DC resistance after ignition	After ignition, the pin to pin and pin to case resistance shall be 0.9Ω or more.	B	(6 ·)MIL-STD-202F Method 303
	S-12	Dimensional check	Shall be within the standard indicated in the drawing.	B	Gauge
		(1 ·)External quality		B	(1 ·)Visual
		(2 ·)Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be 1 MΩ or more.	B	(2 ·)MIL-STD-202F Method 302
		(3 ·)Bridge wire resistance	1.0±0.1Ω	A	(3 ·)MIL-STD-1512 Method 201, MIL-STD-202F Method 303
		(4 ·)Non-ignition signal	The ignitor shall not ignite when 175±10mA of current is applied for 10 seconds or more.	A	(4 ·) -
		(5 ·)Cook-off temperature	The ignitor shall not ignite.	B	(5 ·)7.2.5
	S-13	Dimensional check	Shall be within the standard indicated in the drawing.	B	Gauge
		(1 ·)External quality		B	(1 ·)Visual
		(2 ·)Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be 1 MΩ or more.	B	(3 ·)MIL-STD-202F Method 302

Table 1 (continued)

Evaluation Item			Evaluation Standard	Quality Rank	Evaluation Method
Per- for- mance	S-13	(3 ·)Bridge wire resistance	$1.0 \pm 0.1\Omega$	A	(3 ·)MIL-STD-1512 Method 201, MIL-STD-202F Method 303
		(4 ·)Non-ignition signal	The ignitor shall not ignite when $175 \pm 10\text{mA}$ of current is applied for 10 seconds or more.	A	(4 ·) -
		(5 ·)Minimum ignition signal at normal temperature	(1) All ignitor voltage: 6V (2) All ignitors shall be petal open system. (Refer to Fig. 1)	A	(5 ·)7.2.6
	S-14	Dimensional check	Shall be within the standard	B	Gauge
		(1 ·)External quality	indicated in the drawing.	B	(1 ·)Visual
		(2 ·)Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be $1\text{M}\Omega$ or more.	B	(3 ·)MIL-STD-202F Method 302
		(3 ·)Bridge wire resistance	$1.0 \pm 0.1\Omega$	A	(3 ·)MIL-STD-1512 Method 201, MIL-STD-202F Method 303
		(4 ·)Non-ignition signal	The ignitor shall not ignite when $175 \pm 10\text{mA}$ of current is applied for 10 seconds or more.	A	(4 ·) -
		(5 ·)Terminal strength	It shall be confirmed according to 7.2.1 that every terminal and wire on the ignitor are strong enough to bear the tensile force of 45N.	B	(5 ·)7.2.1 (5 ·)7.2.8
	T-1	Dimensional check	Shall be within the standard	B	Gauge
		(1 ·)External quality	indicated in the drawing.	B	(1 ·)Visual

Table 1 (continued)

Evaluation Item			Evaluation Standard	Quality Rank	Evaluation Method
Dur- abi- lity	T-1	(2 ·)Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be 1 MΩ or more.	B	(2 ·)MIL-STD-202F Method 201,
		(3 ·)Bridge wire resistance	1.0±0.1Ω	A	(3 ·)MIL-STD-202F Method 303, MIL-STD-1512 Method 201
		(4 ·)Non-ignition signal	The ignitor shall not ignite when 175±10mA of current is applied for 10 seconds or more.	A	(4 ·) -
		(5 ·)Acceleration	-	-	(5 ·)7.3.6
		(6 ·)Vibration	-	-	(6 ·)7.3.7
		(7 ·)Impact	-	-	(7 ·)7.3.8
		(8 ·)External quality	Shall be within the standard indicated in the drawing.	B	(8 ·)Visual
		(9 ·)Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be 1 MΩ or more.	B	(9 ·)MIL-STD-202F Method 302
		(10 ·)Bridge wire resistance	1.0±0.1Ω	A	(10 ·)MIL-STD-202F Method 303, MIL-STD-1512 Method 201
		(11 ·)DC sensitivity at normal temperature (complete ignition)	(1) Ignition current : 3.5 A or less (2) All ignitors shall be petal open system. (Refer to Fig. 1)	A	(11 ·)7.2.3
		(11 ·)DC sensitivity at normal temperature (Non-ignition)	Non-ignition current: 0.75 A or more	A	(11 ·)7.2.4

Table 1 (continued)

Evaluation Item			Evaluation Standard	Quality Rank	Evaluation Method
Dur- abi- lity	T-1A	Dimensional check	Shall be within the standard indicated in the drawing.	B	Gauge
		(1 ·) External quality		B	(1 ·) Visual
		(2 ·) Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be 1 MΩ or more.	B	(2 ·) MIL-STD-202F Method 302
		(3 ·) Bridge wire resistance	1.0±0.1Ω	A	(3 ·) MIL-STD-202F Method 303, MIL-STD-1512 Method 201
		(4 ·) Non-ignition signal	The ignitor shall not ignite when 175±10mA of current is applied for 10 seconds or more.	A	(4 ·) -
		(5 ·) Acceleration	-	-	(5 ·) 7.3.6
		(6 ·) Vibration	-	-	(6 ·) 7.3.7
		(7 ·) Impact	-	-	(7 ·) 7.3.8
		(8 ·) External quality	Shall be within the standard indicated in the drawing.	B	(8 ·) Visual
		(9 ·) Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be 1 MΩ or more.	B	(9 ·) MIL-STD-202F Method 302
		(10 ·) Bridge wire resistance	1.0±0.1Ω	A	(10 ·) MIL-STD-202F Method 303, MIL-STD-1512 Method 201

Table 1 (continued)

Evaluation Item			Evaluation Standard	Quality Rank	Evaluation Method
Durability	T-1A	(11 ·)Ballistic at normal temperature	(1) To generate the inflator operating gas pressure indicated in the drawing by ignition of the ignitor in the test vessel. (2) The time required to reach peak gas pressure shall be within the standard value indicated in the drawing. (3) It shall be confirmed according to 7.2.1 that the peak pressure and the time to reach the peak gas pressure are within the limit value indicated in the drawing.	A	(11 ·)7.2.1 (11 ·)7.2.2
		(12 ·)DC resistance after ignition	After ignition, the pin to pin and pin to case resistance shall be 0.9Ω or more.		(12 ·)MIL-STD-202F Method 303
	T-2	Dimensional check	Shall be within the standard indicated in the drawing.	B	Gauge
		(1 ·)External quality		B	(1 ·)Visual
		(2 ·)Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be $1\text{ M}\Omega$ or more.	B	(2 ·)MIL-STD-202F Method 302
		(3 ·)Bridge wire resistance	$1.0 \pm 0.1\Omega$	A	(3 ·)MIL-STD-202F Method 303, MIL-STD-1512 Method 201
		(4 ·)Non-ignition signal	The ignitor shall not ignite when $175 \pm 10\text{mA}$ of current is applied for 10 seconds or more.	A	(4 ·) -
		(5 ·)Thermal shock	-	-	(5 ·)7.3.3
		(6 ·)External quality	Shall be within the standard indicated in the drawing.	B	(6 ·)Visual
		(7 ·)Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be $1\text{ M}\Omega$ or more.	B	(7 ·)MIL-STD-202F Method 302

Table 1 (continued)

Evaluation Item			Evaluation Standard	Quality Rank	Evaluation Method
Durability		(8 ·) Bridge wire resistance	$1.0 \pm 0.1 \Omega$	A	(8 ·) MIL-STD-202F Method 303, MIL-STD-1512 Method 201
		(9 ·) DC sensitivity at normal temperature (complete ignition)	(1) Ignition current : 3.5 A or less (2) All ignitors shall be petal open system. (Refer to Fig. 1)		(5 ·) 7.2.3
		(9 ·) DC sensitivity at normal temperature (Non-ignition)	Non-ignition current: 0.75 A or more		(5 ·) 7.2.4
	T-2A	Dimensional check	Shall be within the standard indicated in the drawing.	B	Gauge
		(1 ·) External quality		B	(1 ·) Visual
		(2 ·) Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be 1 M Ω or more.	B	(2 ·) MIL-STD-202F Method 302
		(3 ·) Bridge wire resistance	$1.0 \pm 0.1 \Omega$	A	(3 ·) MIL-STD-202F Method 303, MIL-STD-1512 Method 201
		(4 ·) Non-ignition signal	The ignitor shall not ignite when $175 \pm 10 \text{mA}$ of current is applied for 10 seconds or more.	A	(4 ·) -
		(5 ·) Thermal shock		-	(5 ·) 7.3.3
		(6 ·) External quality	Shall be within the standard indicated in the drawing.	B	(6 ·) Visual
		(7 ·) Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be 1 M Ω or more.	B	(7 ·) MIL-STD-202F Method 302

Table 1 (continued)

Evaluation Item			Evaluation Standard	Quality Rank	Evaluation Method
Dur- abi- lity	T-2A	(8 ·) Bridge wire resistance	$1.0 \pm 0.1\Omega$	A	(8 ·) MIL-STD-202F Method 303, MIL-STD-1512 Method 201
		(9 ·) Ballistic at normal temperature	(1) To generate the inflator operating gas pressure indicated in the drawing by ignition of the ignitor in the test vessel. (2) The time required to reach peak gas pressure shall be within the standard value indicated in the drawing. (3) It shall be confirmed according to 7.2.1 that the peak pressure and the time to reach the peak gas pressure are within the limit value indicated in the drawing.	A	(9 ·) 7.2.1 (9 ·) 7.2.2
		(10 ·) DC resistance after ignition	After ignition, the pin to pin and pin to case resistance shall be 0.9Ω or more.	B	(10 ·) MIL-STD-202F Method 303
	T-3	Dimensional check	Shall be within the standard indicated in the drawing.	B	Gauge
		(1 ·) External quality		B	(1 ·) Visual
		(2 ·) Insulation resistance	Insulation resistance between external shell and bridge wire on ignitor shall be $1 M\Omega$ or more.	B	(2 ·) MIL-STD-202F Method 302
		(3 ·) Bridge wire resistance	$1.0 \pm 0.1\Omega$	A	(3 ·) MIL-STD-202F Method 303, MIL-STD-1512 Method 201
		(4 ·) Non-ignition signal	The ignitor shall not ignite when $175 \pm 10\text{mA}$ of current is applied for 10 seconds or more.	A	(4 ·) -